REDACTED VERSION

CONFIDENTIAL

PRESCORE FOR THE

WHITEWATER AND HANOVER CREEKS SITE

GRANT COUNTY, NEW MEXICO

Stephen L. Wust
New Mexico Environment Department
June 1993

877472

NPL Characteristics Data Collection Form
Whitewater & Hanover Creeks - 07/23/93

Record Information

1. Site Name: Whitewater & Hanover Creeks
   (as entered in CERCLIS)

2. Site CERCLIS Number: NMD986682763

3. Site Reviewer: Stephen Wust

4. Date: June 1993

5. Site Location: Silver City/Grant County, NM
   (City/County,State)

6. Congressional District: NM-02

7. Site Coordinates: Multiple

   Latitude: 32°46'45. Longitude: 108°06'30.

Site Description

1. Setting: Rural

2. Current Owner: Private - Industrial

3. Current Site Status: Active

4. Years of Operation: Active Site , from and to dates: 1804 to present

5. How Initially Identified: CERCLA Notification

6. Entity Responsible for Waste Generation:

   - Mining
     - Metals

7. Site Activities/Waste Deposition:

   - Waste Piles

Waste Description

8. Wastes Deposited or Detected Onsite:

   - Inorganic Chemicals
   - Metals
   - Mining Waste

Response Actions

9. Response/Removal Actions:

RCRA Information

10. For All Active Facilities, RCRA Site Status:

    - Not Applicable

Demographic Information

11. Workers Present Onsite: Yes

12. Distance to Nearest Non-Worker Individual: Onsite

13. Residential Population Within 1 Mile: 2279.0

14. Residential Population Within 4 Miles: 9157.0

Water Use Information

15. Local Drinking Water Supply Source:

    - Ground Water (within 4 mile distance limit)

16. Total Population Served by Local Drinking Water Supply Source: 6739.0

17. Drinking Water Supply System Type for Local Drinking Water Supply Sources:

- Municipal (Services over 25 People)
- Private

18. Surface Water Adjacent to/Draining Site:

- Stream
- Contaminated Stream

TARGET SHEET

SITE NAME: WHITEWATER AND HANOVER CREEK

CERCLIS I.D.: NMD986682763

TITLE OF DOC.: PRESCORE FOR THE WHITEWATER AND HANOVER CREEKS SITE

DATE OF DOC.: 1-Jun-93

NO. OF PGS. THIS TARGET SHEET REPLACES: 229

SDMS #: 9002809 **KEYWORD:** 96.99

CONFIDENTIAL ?	X	MISSING PAGES ?	
ALTERN. MEDIA ?		CROSS REFERENCE ?	

LAB DOCUMENT ? _____ **LAB NAME:** _____

ASC./BOX #:

CASE #: _____ **SDG #:** _____

COMMENTS : PAGES 5 - 233 OF 2076 PAGES ARE BEING WITHHELD UNDER FOIA EXEMPTION 5

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2) USEPA, March 1993, Superfund Chemical Data Matrix Tables.

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operations: NMED Superfund Section files.

39) Shacklette, H.T. and Boerngen, J.G., 1984, Element concentrations in soils and other surficial materials of the conterminous United States: U.S. Geological Survey Professional Paper 1270.

REFERENCE 1

Hazard Ranking System

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

REFERENCE 2

Superfund Chemical Data Matrix

SUPERFUND CHEMICAL DATA MATRIX

9 March 1993

REFERENCE 3

Hanover Creek Mining District
Site Inspection Follow-up Report

HANOVER CREEK MINING DISTRICT (HCMD)

Introduction

The HCMD was identified by a RCRA 3012 inspection on September 28, 1980. Robert Lowy of the EID submitted to the EPA a Potential Hazardous Waste Site Identification form on the HCMD dated September 28, 1984. A Preliminary Assessment dated January 16, 1985, was also prepared and submitted to EPA by Lowy. A Site Inspection was accomplished by Richard Rawlings and Steve Cary on October 1, 1985. In the SI, evidence was presented which documented 1) the presence of significant quantities above background of lead and copper in tailings from Bull Hill complex at Hanover and the Continental mine complex near Fierro and 2) an air release of heavy metals (particularly lead) from the Bull Hill tailings. Some sampling was also done that indicated a surface water release.

Based on the above information, EPA authorized a Site Investigation Follow-up (SIF) to be undertaken by the EID. The EID proposed a work plan for the SIF to accomplish the following: 1) further characterize the hazardous substances impacting the HCMD, 2) document a ground water release by ground water sampling and analyses, 3) document surface water releases from the small tailings areas 0.7 and 0.8 miles below Fierro Spring and the Blackhawk tailings 4) further characterize impacts from the Blackhawk tailings using photographs, and 5) estimate populations (Targets) of Fierro, Hanover and Vanadium. The results of the SIF are presented below.

Hanover Creek SIF

I. Geologic Setting

The Hanover Creek mining district (HCMD), part of the Central Mining District, is located in Grant County in southwestern New Mexico. The principal towns in the area are Fierro - Hanover, Vanadium and Bayard. The topography of Grant County is diverse, ranging from wide expanses of plains, to rolling or rugged hills and mountains over 10,000 feet in elevation. The HCMD is approximately 5 miles in length, trends from northeast to southwest in the highland area of eastern Grant County, and is situated in a narrow rugged valley with 7500 feet peaks lying directly to the east and west. The surficial rock in the northern half of the district is principally granodiorite porphyry of the Hanover-Fierro pluton and apophyses from the lower Tertiary Age. At the southern end of the site, quartz monzonite, Colorado Sandstone and hornblende quartz diorite, all of which are intersected by intrusive dikes and plugs, are found at the surface of the ground (Santa Rita Quad, 1967). Very little alluvial material exists along the Hanover Creek stream channel in the northern section until just south of Union Hill on down to the area of the intersection of US 90 and State Road 356. The accompanying geologic map (from USGS, 1967) illustrates the diverse geology extant in the HCMD (Figure 1).

II. Hydrogeologic Environment

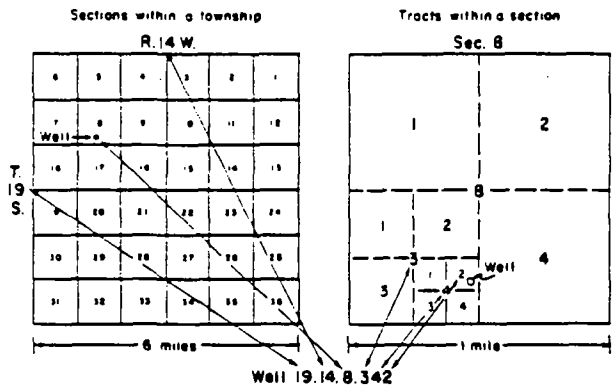
A. Ground Water

Because of the complicated geology of the HCMD, ground water can exist in any or all of 4 major rock categories.

1. Metamorphic and igneous intrusive rocks.
2. Extrusive igneous rocks (flow and pyroclastic deposits).
3. Marine sedimentary rocks.
4. Sedimentary deposits including alluvium.

All the geologic formations present in this area yield water, at least locally, but the yields from most surficial formations and rock units may be small and impermanent.

A review of well records (Table 1) in Trauger's report (1972) in T17S, R12W, lists 22 wells in the HCMD. The EID was able to locate only a few of these wells still in use because the area is now largely served by the Hanover Community Water District of 100 hookups. The wells listed in Table 1 are located according to the following USGS system (see Map 1).



System of numbering wells and springs.

Table 1

Location No.	DTW (ft)	Formation	Use
3,134	7(1954)	Kc	N
3.333	24.6	Tki	Unk.
4.334	6.6 (1954)	Kc	Unk
9.423	6.6 (1955)	Tki	N
15.322	15.(1955	Tki	D.S
15.333	21 (1954)	Tki	D.S
15.333a	18	Tki	D
16.141	35 (1954)	Tki (?)	S
21.241	12 (1954)	Tki	D
21.241a	17	Tki	D
21.241b	20 (1954)	Tki	D
21.331	15 (1954)	Tks	D
21.332	141 (1954)	PM	N
21.342	20 (1954)	Tki	D
21.433	154	Tki	D
21.433a	unk.	Tki	D.PS
22.113	36	Tki	S
27.131	281.	Tki (?)	D
28.114	23 (1954)	Ts	S
28.132	15	Tki (?)	PS
28.214	325 (1954)	Tks	D.S
28.413	625	PM	D

PM Pennsylvanian and Mississippian limestone
Tki Tertiary Intrusive rocks
Tks, Conglomerate, sandstone, fanglomerate and shale
Ts, gravel, sand and tuff
Kc Colorado Formation

Use of Water: N = none, D = domestic, S = stock, PS = public supply

As Table 1 indicates, Trauger identified 15 shallow wells that intercept water from intrusive rocks (TKi) from the Tertiary Age, and 2 wells into the Colorado Sandstone. Deeper wells are drilled into Mississippian, Pennsylvanian Limestones. Those latter rock zones are the more significant yielding aquifers in this area. One well, 28.214, is characterized as being in a conglomerate, possibly the Wimsattville Formation since this well is located at Wimsattville. Finally, one shallow stock well, 28.114 is also undoubtedly in the Wimsattville Formation.

The shallower intrusive aquifers in this area can be unreliable in terms of specific capacity. Water in the granodiorite intrusives result where fractures or joints are open to the surface. Water is recharged at the surface and moves to the base of the unweathered granite. The intrusives are more weathered under the flatter slopes, and more open-jointed and fractured in the vicinity of large faults. Weathering occurs in the cracks and fractures and water is most likely to be found near the bottom of the weathered zone, just above the main body of

unweathered rock. Since Hanover Creek follows lines of faulting and jointing, the shallow wells are traditionally located adjacent to the stream channel where there is a better chance of finding water in joints and fractures than on ridges and inter-stream areas (Trauger, pp. 33 ff).

In the area near the intersection of US 90 and State 356 is found an example of a continental sedimentary deposit, the Wimsattville Conglomerate. This Formation consists of consolidated deposits of boulders cobbles, gravel, sand, silt and clay. Another conglomerate aquifer, the Gila, in the southwestern section of the state is the largest and most important source of ground water in the area but the Wimsattville Conglomerate is a limited and significantly less valuable aquifer than the widespread Gila Conglomerate.

Finally, several marine sedimentary rock formations serve as aquifers in the HCMD. These include the Colorado Formation (CF) and certain Pennsylvanian-Mississippian Limestones such as the Oswaldo Limestone. The CF, a clastic of marine origin, is according to Trauger not a good aquifer in Grant County. This unit does not yield much water although a well drilled 200-300 feet below the water table can be expected to yield a supply of water adequate for domestic and stock use. Basic area-wide igneous dikes cut through the CF and essentially compartmentalize the formation. The low yield and histories of depletion and subsequent well deepening in the CF lend credence to compartmentization by a dike system. Water occurs in the "compartments" formed by cross-cutting and intersection of dikes, and initial yields to wells may be ample. However, these pockets may be depleted rapidly (Trauger, pp. 39 ff).

The carbonate formations are massive to thin bedded generally dense, finely crystalline, commonly sandy and silty. Solution cavities and channels in the limestone are uncommon at most places underground in the HCMD. Limestones encountered in the mines may be brecciated along fault zones and occasionally have cavities enlarged by solution. Wells drilled to enter fault zones below the regional water table have a chance of developing moderately to large water supplies. Recharge is via joints and fractures. Solution channels, where they exist, are sufficiently well developed and interconnected to allow easy movement of water. As above, the best place to find water supplies is at relatively shallow depths in areas underlain by carbonate rocks such as near the channel of Hanover Creek. The low porosity and small amount of water in these rocks deems deeper penetration below the water table. Trauger (pp. 37 ff) reports several wells in production in the limestones in the HCMD.

Figure 2 from Trauger (1972) illustrates that the regional water table in the HCMD (From Fierro down to Vanadium) trends from NE to SW and generally follows the local topography. Local ground water movement may be influenced by large volume wells, and by mine shaft dewatering, and by open pit mining into the water

table such as at Chino's Santa Rita mine. Hydraulic connection between the shallow and deep aquifers is intimated by the fact that active dewatering of the underground mines into the limestones caused depletion of shallow wells, and by associating the locations (in the valley floor) of the deeper wells into the limestone units where the fault zones are aligned along the axis of the valley (see discussion in Section II.A.)

B. Surface Water

Hanover Creek at the present time is an intermittent stream and does not normally flow except during or after precipitation events. In the past, however, dewatering of several of the mines (Empire 7 and 8, Continental, Union Hill Tunnel) in the district occurred and discharge to Hanover Creek resulted in a perennial low volume flow (Graeme, 1988). The EID has sampled this flow in Hanover Creek several times over the years and analyses of these discharges are included in this report in Table 4.

C. Field Sampling Procedures

The field sampling preservation and test procedures followed were in accordance with the New Mexico Superfund, Standard Operating Procedures (SOP) Manual, April, 1988. A copy of this manual has been submitted to EPA. Page 8 of the SOP is a table listing the preservation and handling procedures followed for all water samples taken. Samples taken at variance from the SOP are noted in the field notes included as an appendix to this report.

III. Historical Mining Activities

Although some gold and silver mines were located in the HCMD, the majority of the mineral extraction was for iron and for non-ferrous metals such as lead, zinc and copper. The principal non-ferrous metal mines in the district (from north to south) are: 1) The Continental, Sleeping Beauty, Union Hill copper mine complex at Fierro, 2) The Empire-Bull Hill zinc mines at Hanover, and 3) The Blackhawk - Hobo zinc mines complex between Hanover and Vanadium. Additionally, several mine dumps or tailings are located right in Hanover Creek, approximately 0.7-0.8 miles south (in Section 3) of the border of the Gila National Forest, while an active copper mine dump (Chino West Dumps) is located adjacent to Hanover Creek opposite the Blackhawk tailings (see Figure 1).

Metal Extraction Procedures Utilized in the HCMD

As mined, most ores contain the valuable minerals (the values) disseminated in a matrix of by-product rock, called gangue (pronounced gang). The purpose of ore beneficiation (reducing rock to small particle size) is to assist the yield of a more useful solid called concentrate -- a product now higher in metal content. Crushing and grinding of the ore can get the rock to a size where one portion, after treatment, contains the values and the other much more voluminous portion contains the gangue. The final stage of the operation is to separate the portion containing the values (concentrate) from the portion made up of gangue (now called tailings).

The 2 processes principally utilized at the HCMD to separate the concentrate from the tailings include gravity separation and floatation (or flotation). These 2 processes utilize the properties of specific gravity, or affinity for certain chemicals and tendency to form chemical complexes to effect separations.

Gravity-concentration processes exploit differences in mineral density to separate the values from gangue. Jigging, tabling, spirals and sink-float separation were commonly used to achieve the separation. Selection of a particular gravity based method for a given ore is strongly influenced by the size to which the

ore must be crushed or ground in order to most efficiently separate the values from gangue, as well as by the inherent density differences of the ore. Methods of carrying away the tailings depend on viscosity, and the efficiency of this separation is determined by feed to the process of a specific distribution of particle sizes. Chemicals are not used in the gravity-separation process. The smaller tailings disposal area at Bull Hill adjacent to Hanover Creek appear to have resulted from gravity concentration processes because of the wide distribution of particle sizes and average larger particle size than the tailings located at the main Bull Hill disposal area to the east (which were floatation tailings).

Floatation concentration is the principal method utilized by contemporary non-ferrous mills to yield concentrate and is the preferred procedure for handling hundreds to thousands of tons of low grade ore per day. Floatation is a process whereby particles of one mineral (say, galena or PbS) are made, by addition of chemicals, to preferentially adhere to air bubbles. When air is forced through a slurry of finely ground mixed minerals, the rising bubbles carry with them the particles of the specific mineral(s) to be separated from the rock matrix. A foaming or frothing agent is added to prevent the bubbles from bursting as they reach the surface and the mineral-laden layer of bubbles at the top of the floatation cell is skimmed off to recover the mineral being preferentially isolated. Because floatation is amenable to recovery of values in slimes also, the grind can be finer and recovery efficiency with floatation is much greater than with gravity separation. Additionally, by clever selection of chemicals, different minerals say CuS, PbS, and ZnS, can all be floated from the same ore and in addition, by utilizing several circuits, separated from one another and individually concentrated.

Sulfide minerals are all readily recovered by floatation. Sulfide floatation is carried out at basic pH so that tailings as deposited are also basic. Chemical collectors are most often alkaline xanthates having 2-5 carbons, for example sodium ethyl xanthate (NaS_2COC_2HS). The underflow or waste in the floatation cells is the gangue which is directed to an impoundment area as <u>tailings</u> after being adjusted with water to a slurry suitable for hydraulic transport. The types of chemicals commonly used in copper, lead and zinc concentrating operations are listed in Table 2 below (From EPA, July, 1978. EPA 440/1-78/061-d, Vol. 1). The floated concentrate is dewatered, dried, packaged and directed to a smelter. Concentrate typically contains 15-30% values. The liquid overflow is recycled to the process.

The tailings from the copper/lead/zinc floatation mill contain the gangue from the original ore which, as stated above, has been finely ground. Tailings also contain dissolved metals, salts and excess mine reagents. Figure 3(EPA, 1978) gives the processing operation for a lead/zinc floatation concentrate operation.

IV. Waste Characteristics

As stated above the potential environmental hazards at the HCMD consist of 3 major and several minor sources of hazardous substances residing mainly in abandoned tailings piles or mine dumps (see Table 3, Hanover Creek, sediments). The physical and chemical nature of the tailings themselves and the local geology and hydrology determine the seriousness of the potential problem sources inherent in the tailings and include the following:

1. Chemicals that are added in excess during the the concentrating process. These could include cyanide ion which was used at times in mining operations as a depressant to prevent floatation of unwanted minerals, as well as any of those substances mentioned in Table 2. The collection agents, if in excess, would also go to the tailings disposal area. These include the xanthates. These reduced sulfur compounds, however, while sitting in the atmosphere have a tendency to oxidize to harmless products (elemental sulfur or disulfides). Additionally, because these constituents are surface active, xanthates have a proclivity to adsorb to the surface of particles and have little tendency to migrate through sediments to ground water. Small amounts of pine oil, the common frothing agent utilized in floatation operations, could also be present in tailings.

2. Soluble chemical species released from the rock matrices during any phase of the milling operation, or species found in the makeup water employed in the process may ultimately manifest themselves as soluble salts in the tailings. Typically, tailings are deposited in an impoundment. Salts are concentrated in this pond as process water evaporates. This salt buildup is maximized if the tailings are relatively fine-grained (minimizing seepage through the sands and slimes) and if fluids on the tailings are not re-cycled through the mill. The Blackhawk tailings between Hanover and Vanadium is an extreme example of salts concentrating in the tailings. Along the side of the tailings where vertical erosion cuts are evident, at the contacts between the sands and the slimes, voluminous amounts of yellow green salt crystals are evident (see Photo 1). These soluble salts contain high concentrations of heavy metals including lead and copper. Analyses of samples taken at Blackhawk here are included below (Table 3).

3. The third phenomenon by which tailings are rendered hazardous is by oxidation of pyrite minerals. By this mechanism the tailings become locally acidic and heavy metals are rendered soluble and easily mobililzed.

Pyrite (FeS_2) is found in varying quantities in non-ferrous metal ores. In the presence of oxygen and water, sulfide ion is oxidized to sulfate ion, forming sulfuric acid (H_2SO_4.)

$$2\ FeS_2 + 2\ H_2O + 7O_2 \rightarrow 2\ FeSO_4 + 2H_2SO_4.$$

This is accompanied by a second oxidation reaction, that of ferrous iron, which is mediated by the bacteria, Thiobacillus ferrobacillus and Thiobaccillus sulfoxidans).

$$4FeSO_4 + 2H_2SO_4 + O_2 \rightarrow 2Fe_2\ (SO_4)_3 + 2H_2O$$

Notice that this reaction can take place in the absence of water. The ferric ion (Fe +++) formed above can hydrolyze to form more H_2SO_4.

$$Fe_2\ (SO_4)_3 + 6H_2O \rightarrow 2\ Fe(OH)_3 + 3\ H_2SO_4.$$

More importantly, Fe (III) itself is a powerful oxidizing agent and can also initiate oxidation of pyrite by the following reaction.

$$Fe_2\ (SO_4)_3 + FeS_2 + H_2O \rightarrow 3\ Fe\ SO_4 + 2S.$$

$$2S + 3O_2 + 2H2O \rightarrow 2\ H_2SO_4.$$

The bottom line in the oxidation of pyrite is the generation of acid with the concomitant release of heavy metals should adequate neutralizing materials not be present. Any or all of the above processes can contribute to hazards associated with tailings piles in the HCMD. The principal hazard associated with these tailings piles is potential for release of toxic heavy metals. Lead, cadmium, cobalt, and copper, and aluminum have all been detected in HCMD tailings significantly above background levels. Additionally, if pyrites are found in high percentage in tailings, acid generation can ultimately serve as a secondary source to release heavy metals. Cyanide may also be found in tailings but 2 samples of tailings tested by the EID were negative for cyanide (Table 3). Sulfate ion, because of pyrite oxidation, and introduction into mill circuit in makeup water, is invariably found in tailings but is not considered as a hazardous substance. Infiltration of sulfate ion into ground water and runoff of sulfate ion into Hanover Creek can nevertheless render water unfit for human, agricultural, or industrial use. As stated above, sulfate, however, is not considered a hazardous substance and is not covered by Superfund unless found in the company of a hazardous substance.

Three Principle Tailings Areas

I. Continental-Sleeping Beauty-Union Hill - This is an existing copper mine and mill which has been moth-balled since 1982. It is owned by a Sharon Steel Corp., which is in Chapter 11 bankruptcy. During the time it operated, it had the capacity to process up to 8,000 tons per day (TPD) of ore. Since it operated at this level for at least several years, millions of tons of tailings exist at this site. This mill began operation in 1967 but shut down in 1982. A standby crew is on site and haulage trucks are maintained. The underground pumps continue to operate and the water is utilized on site for drinking water and dust suppression. The excellent price of copper at this time (Summer, 1988) may allow the re-opening of this mill sometime in the near future. A fugitive discharge from the Union Hill mine dumps was sampled by the EID in October, 1987. This discharge flows into Hanover Creek and contains elevated levels of aluminum, copper, cadmium and zinc (see Table 4).

II. The second major mine grouping is the Empire - Bull Hill Mine complex at Hanover. This zinc mill was owned and operated by the Empire Zinc Company, a division of the New Jersey Zinc Company. Mining began in this area in 1902. Tailings from this mill are on both sides of the road which goes north through Hanover and along the north side of Highway 90 just east of the intersection of US 90 and State Road 356 (see photo 2). The tailings have been impacted both by water erosion, by Hanover Creek surface runoff from the tailings themselves, and wind erosion. Wind erosion of tailings and tailings transport by surface water at Bull Hill were documented in the SI. The mechanical integrity of these tailings is not nearly as established as the other tailings in the HCMD and there is physical (photographic) evidence of an air release (see the SI). These tailings are gray in color and are easily eroded by air and water, while most of the other tailings in the HCMD are iron stained and quite well cemented by soluble salts. Chemical data for the Bull Hill tailings were included in the SI. The EID in the SI estimated the area covered by these tailings to be 500 acres.

III. The Blackhawk tailings are located 0.5 miles southwest of Highway 90 on State Road 356 between Hanover and Vanadium. Only remnants of the mill are still located at the site. The mill was a custom operation (processed ores trucked in from other mines), which was operated by Blackhawk Consolidated Mining Company. The Blackhawk mill processed zinc ore and operated until the late 1940s.

Unlike the other tailings the EID investigated in the HCMD, these tailings had a distinctive reduced sulfur odor which was evident as soon as we got out of our vehicle. At the north end of these tailings, hydrated yellow-green salt

crystals had formed at each contact between sands and fines. These tails in general are held together pretty well with salts, which minimizes evident wind erosion but doesn't prevent erosion by surface water. There are photographs and chemical evidence of these tails being washed down during precipitation events into Hanover Creek (Photos 3 and 4). These tailings cover approximately 50 - 100 acres.

IV. Another potential source of hazardous substances discharge into Hanover Creek is also in the area of the Blackhawk tailings, but on the east side of Hanover Creek. This source is the active west mine dumps adjacent to the open pit Santa Rita copper mine (see photo 4). The dumps have been built up to within several hundred feet of the creekbed and at least on one occasion there has been an observed discharge from the dumps into Hanover Creek (which itself was flowing at a low rate at the time). The acidic discharge had left the streambed stained a copper color for hundreds of yards down stream (Photos 4 and 5). Samples were taken of Hanover Creek above the discharge, and of the fluids impounded above the discharge which was the origin of the seep (see Table 4). The West Dumps at Chino occupy approximately 290 acres.

HAZARDOUS SUBSTANCES MIGRATION PATHWAYS

Two goals of the SIF were to document releases to groundwater and surface water. There is now evidence at the HCMD for observed releases to surface water but a release of hazardous substances to ground water was not previously documented. The evidence for these observations are presented below. A release to the air route was documented previously in the SI.

Ground Water Route

Shallow ground water is the norm, as stated above, in the HCMD. This shallow ground water is mainly found in the igneous intrusive rocks but shallow ground water can also be found in the Colorado Sandstone, alluvium and Wimsattville conglomerate. It is believed that there is hydraulic connection between these aquifers along the Hanover Creek valley (see earlier discussion in Section II A). North of the Wimsattville area, however, very little alluvial material exists along the creek bottom. The area surrounding the intersection of US 90 and State Road 356 is low-lying and bowl shaped and is referred to as the Hanover Hole. In this area is found a significant thickness of alluvium, as well as on the western perimeter, quantities of Wimsattvile Conglomerate.

Tables 5 and 6 summarize the wells which the EID has sampled in the HCMD. Table 5 contains historical water quality data collected by the EID for several wells during the years 1969-1980. The CERCLA section sampled 14 ground water sources in the fall of 1987 and this data is included in Table 6. The well locations are on Figure 4. Fierro spring (designated as H-S on the map) represents one background water quality sample. It is located just north of the HCMD (and hence upgradient both from a surface water and regional ground water gradient standpoints). The [redacted] well, drilled into limestone, can be thought of as a second background water quality sample.

None of the heavy metals tested for in Fierro Spring were above detection limits. Several general properties of this ground water quality are evident. 1) pH of ground water is neutral or near neutral. 2) except for the [redacted] well, the TDS content is elevated (1003-3112 mg/l), 3) and Ca and Mg are the dominant cations and HCO_3^- and $SO_4^=$ are the dominant anions. The heavy metal concentrations in wells sampled in 1987 exhibit elevated concentrations of zinc, manganese and iron, none of which is a hazardous substance, (see H6, H8, H7, H5, and H12 on Table 6). The historical ground water quality data (a less reliable data set) (Table 5) indicates elevated concentrations of lead [redacted], [redacted] [redacted] and [redacted] wells). Recall that the principal metals extracted in this area were zinc, lead and iron so it is not surprising to see elevated levels of these metals.

What is unexpected is the relatively low concentrations of these constituents as well as the absence of other heavy metal ions. There are 2 reasons the heavy metal concentrations at ground water sampling points may be relatively low.

1) Both gravity separation (which uses no chemicals) and floatation concentration processes, which takes place under basic conditions, are conducive to minimization of the release of heavy metals in comparison to the release of heavy metals from acidic fluids. Only in the HCMD that abuts the Chino west dumps are higher concentrations of heavy metals expected (the fugitive discharge at this point was pH=3.5). However, it is just in this area of the Chino west dumps that there are no ground water monitoring wells. Any RI/FS that is undertaken should include monitoring wells in the areas adjacent to Chino's dump both into the unconsolidated units and the intrusives.

2) Most of the HCMD wells sampled by the EID were either deep (drilled into limestones) or very shallow hand dug wells. The deeper wells in the limestones may not show heavy metals because of either lack of sufficient percolation to these deeper levels or because the neutralization capability of the limestones has effected precipitation of heavy metals. The shallow hand dug wells would, because of their open nature, contain much higher concentrations of dissolved oxygen than would a cased well penetrating to the same depth. It has been demonstrated that iron and manganese (both metals which are predominant in the HCMD), upon hydrolyzing ($M^+ + H_2O > M(OH) + H^+$) precipitate out as oxides and hydroxides. Freshly precipitated oxides of iron and manganese can co-precipitate most other heavy metals that happen to be present in the same environment. It is possible that in the shallow hand-dug wells, the heavy metals are not manifested in solution because of co-precipitation effects. At this time a release of hazardous substances to the ground water has not been documented.

The majority of the residents in the HCMD from Fierro on south to vanadium are served by the Hanover Community Water System (MDWCA). At this time there are 100 hookups on the system. Using a county figure of 3.8 residents per household, 3800 residents are served by this system. The community well(s) are drilled into limestone units that are hydraulically connected to Hanover Creek. The supply wells are all located less than 1 mile west of Hanover Creek (see Figure 4). The MDWCA provides water for all old residents of the area who in the past were on private systems that went bad because of mining activities or whose wells went dry because of mine dewatering or

pumping for industrial use, and for new residents of the area served. The mining communities of Fierro, Union Hill, Hanover, Wimsattville, Santa Rita, and Vanadium were in the past all served by private wells, or other sources of water provided by the mines. Of course, these communities, except for Hanover, by and large, do not today exist. The EID did an exhaustive search of residents that still had wells that could be sampled. These wells are listed in Table 6. This table includes use, if any, of water. The (b) (6) and (b) (6) still use their shallow wells for drinking water. Thus, at least (3.8 residents per well times two) or 8 residents still use this shallow ground water for drinking water. Additionally, the Hanover MDWCA only services approximately 2 miles up Hanover Canyon above the intersection of Hwy 90 and State 356. There are several more residences along Hanover Creek above the 2 mile point where people either are on private well water or carry water from Fierro spring (HS).

Surface Water Route

The EID has collected water quality data, sediment samples, and photographic evidence to illustrate the existence of a surface water release at the HCMD (see photos 5 -8). Table 4 portrays water quality of discharges into side arroyos that make their way into Hanover Creek (Union Hill discharges 1 and 2), and water quality data from a surface discharge from the Chino Mines west dumps directly into Hanover Creek. The accompanying map (Figure 2) indicates the discharge points. The Union Hill discharges sampled by the EID were basic and heavy metal concentrations were minimized for this reason. However photos 7 and 8 indicate previous acidic discharges with resultant copper color staining of sediments.

The Chino discharge from the West Dumps was on the acidic side (pH=3.5). Table 4 includes samples of Hanover Creek (which flows intermittently) which was sampled the same day the fugitive discharges from Union Hill and Chino were sampled. This Hanover Creek sample would be the background sample. A comparison of Hanover Creek heavy metal concentrations with Union Hill and especially Chino discharges documents a surface water release at the HCMD.

Sediments and salts laden with heavy metals also make their way into Hanover Creek. Sediments samples were taken at the "0.8 mile tailings", which are situated directly in the creekbed, at Bull Hill, and at the BlackHawk tailings (this heavy metal content of the the Blackhawk and 0.8 mile tailings was presented earlier in Table 3). Heavy metal content is especially concentrated in the Bull Hill (see SI report) and Blackhawk tailings and accompanying salts.

Heavy metal (HM) analyses (after a nitric acid leach) were accomplished on these sediment samples. At both the Bull Hill and Blackhawk sites there is clear evidence of the elevation of lead in sediments in the streambed below the tailings piles. There are also elevated levels of zinc and copper in the Hanover Creek stream sediments below the Blackhawk tailings. Finally, there is photographic evidence of impacts from the Blackhawk and Bull Hill tailings on Hanover Creek. Photo 2 shows runoff from Empire Zinc's tailings at Bull Hill into Hanover Creek and Photos 3 and 4 illustrate the runoff from the Blackhawk tailings into Hanover Creek. Finally, Photos 5, 6, 7 and 8 illustrate the impact that Chino west dumps and the Union Hill dumps have had on Hanover Creek as a result of fugitive discharge into the Creek.

Hanover Creek, when it flows, is not used for drinking water. The only use we could find was casual recreational use (e.g. children playing in water). It is possible, also, that there may be some pumping from stream for small garden plots although this was not documented.

Air Route

There is also an air route for dissemination of hazardous substances, especially at the Bull Hill location. This route was documented in the SI. Photos taken by Steve Cary and Richard Rawlings in 1985 point out the effect of wind on the tailings at Bull Hill. These tails appear to have a finer grind than the other tails we looked at in the HCMD and evidently have lower salt content since they are not cemented to the extent that the other tails (such as Blackhawk) are. The formation of dunes below and adjacent to Bull Hill is indicative of the effect of the wind on these tailings (see photos in SI). There are at least 40 residences within 1 mile of the Bull Hill tailings. Four residences, the Manhattan Bar, a Texaco station and the Hanover Community Center all are situated within one quarter mile of the Bull Hill tailings. For the former scenario at 3.8 residents per dwelling, 152 residents are affected by wind borne tailings. For the latter scenario, within one quarter mile of Bull Hill, 15 full-time residents would be affected. Add to this number, any citizens visiting the Manhattan Bar, the Texaco station or the Hanover Community Center.

SIF Report - Hanover Creek

Conclusions

The Hanover Creek Mining District (HCMD) has been environmentally impacted by toxic heavy metals and inorganic salts from moth-balled, inactive and active mining complexes.

The EID has documented releases of heavy metals (lead, zinc, copper) by surface water, and air routes. Releases of these heavy metals from tailings piles and mine dumps will continue unabated until measures are taken to mitigate the presently uncontrolled releases.

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Maps provide by Dennis Engineering of Socorro, NM, depicting the Hanover Municipal Water System, including supply wells, hookups, etc.

Reagent	Purpose
Methyl Isobutyl-carbinol	Frother
Propylene Glycol Methyl Ether	Frother
Long-Chain Aliphatic Alcohols	Frother
Pine Oil	Frother
Potassium Amyl Xanthate	Collector
Sodium Isopropol Xanthate	Collector
Sodium Ethyl Xanthate	Collector
Dixanthogen	Collector
Isopropyl Ethyl Thionocarbonate	Collectors
Sodium Diethyl-dithiophosphate	Collectors
Zinc Sulfate	Zinc Depressant
Sodium Cyanide	Zinc Depressant
Copper Sulfate	Zinc Activant
Sodium Dichromate	Lead Depressant
Sulfur Dioxide	Lead Depressant
Starch	Lead Depressant
Lime	pH Adjustment

Table 2
Chemicals and additives commonly used in zinc and lead concentrating

HANOVER CREEK MINING DISTRICT - SEDIMENT SAMPLES
HNO_3 leach Units ug/g, dry weight basis

Date YY,MM,DD	Lab Name	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Comments
(A1) .8 Mi. BG sample. 100 yds. up H.C. 871006	SLD	10300	<.1	10	110	52500	30	3800	40	470	Background sediment for next 2 samples
(A2) H.C. Tails .8 Mi. Below Fierro Spring 871006	SLD	14000	<.1	9	860	36000	54	160	40	77	Tailings Sample
(A3) .8 Mi. taken 6" down from surface 871006	SLD	12000	<.1	10	910	54300	10	380	10	40	Tailings Sample Negative CN
(B) BG for Blackhawk 871006	SLD	17600	<.1	40	370	51900	230	4700	20	2900	Background sedimen for C1, C2 and C3 below
(C1) Blackhawk @ H.C. below wood culvert 871006	SLD	6600	<.1	10	1100	52400	2800	1100	9	2400	Sediment sample taken where tails wash down into Hanover Creek
(C2) Blackhawk salts from Erosion 871006	SLD	5900	40	10	11000	132000	4800	1500	10	9900	Negative CN Taken from tailings
(C3) Blackhawk from top & front @ N. end 871006	SLD	6700	<.1	20	670	98100	1800	2200	<.1	2200	Tailings sample fro top of pile

(A) These sediment samples locations are found on Figure 4 and identified by designated letters.

Table 3

HANOVER CREEK SURFACE WATER SAMPLES

Sampling Point Date	Lab	F/NF	Ca	Mg	Na	K	HCO_3	Cl	SO_4	TDS	Comments
Hanover Cr. at Manhattan Bar 830117	SLD	F	484.	126.	97.	7.	115.	168.	1807.	2778.	Background for flows in main channel of Hanover Creek
Hanover Creek 1.6 miles below Fierro Spring 871006	SLD	NF	420.	227.	97.	7.	213.	77.	1595.	2732.	Background for flows in main channel of Hanover Creek
Hanover Creek taken just before Chino West Dumps Discharge 871007	SLD	NF	440.	109.	101.	5.	192.	71.	1320.	2300.	Background for Chino West Dump Discharge
Discharge into Hanover Creek from West Dumps. Taken from 2nd berm 871109	SLD	NF	NA	NA	A6.	5.	0	10.	1040.	35,126.	pH = 3.1 conductivity 13,100 umhos at 29.5°C
Union Hill Discharge #1 871100	SLD	NF	500.	317.	99.	7.	219.	09.	2255.	3926.	
Union Hill Discharge #2 871109	SLD	NF	540.	341.	101.	7.	NA	87.	NA	4272.	

Table 4

HANOVER CREEK SURFACE WATER SAMPLES

Sampling Point Date	Lab	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Coments
	GHMCL	.2	.005	.1	.3	.3	.015	.05		.5	
Hanover Creek at Manhattan Bar 830117	SLD	NA	.002	NA	<.05	NA	<.005	NA	<.01	.74	Background for flows in ma NF channel of Hanover Creek
Hanover Creek 1.6 miles below Fierro Spring 871006	SLD	<.1	<.001	<.005	<.1	<.1	<.01	<.05	<.1	.<1	Background for flows in ma NF channel of Hanover Creek
Hanover Creek taken just before Chino West Dump Discharge 871007	SLD	<.1	.004	<.005	<.1	<.1	<.01	.15	<.1	1.00	Background for Chino West Dump Discharge NF
Discharge into Hanover Creek from West Dumps. Taken from 2nd berm 871007	SLD	700.	.94	.07	850.	1040.	.10	1380.	7.1	310.	NF
Union Hill Discharge #1 871109	SLD	.80	.01	.01	1.7	<.1	<.01	2.7	<.1	1.2	NF
Union Hill Discharge #2 871109	SLD	3.1	.018	<.005	4.4	.2	<.01	3.6	<.1	1.9	NF

Table 4(cont.)

HANOVER CREEK MINING DISTRICT
SAMPLES ANALYZED BY NEW MEXICO STATE LAB

Historical Well Data
Table 5
mg/l

Name Location	Date	Depth	Lab	Name	pH[a]	As	Cu	Pb	Zn	Cd	Cr
				MCL	6.5-8.5	0.05	1.0[a]	0.015	5[a]	0.005	0.1
(b) (6) [redacted]	3/20/69	105'		PHL	7.2						
	8/15/72	105'		PHL	7.2	0.004	0.01	0.014	6.18*	0.01*	
	9/21/78	105'		SLS	8			0.005	0.17		
	8/15/72	20'		PHL	7.65	0.004	0.01	0.005	0.058	0.01*	0.01
	8/15/72	40'		PHL	6.8	0.004	0.05	0.007	0.047	0.01*	
	8/15/72	32'		PHL	3.25	0.004	0.01	0.015	0.413	0.01*	
	5/5/70	200'		PHL	8.2		0.02	1.02*			
	8/15/72	32'		PHL	7.45	0.004	0.01	0.009	0.01	0.01*	0.01
	9/11/79	32'		SLD				0.005			
	11/1/79	32'		SLD	7.55						
	3/24/80	32'		SLD	7.36						
	8/8/80	32'		SLD	7.79						
	2/8/79	80'		SLD							
	11/8/82	80'		SLD	5.51						
	8/5/76	NA		SLD	8.25	0.03			2.81	0.01*	0.01
	9/11/75	NA		SLD				0.005			
	11/1/79	NA		SLD	7.2						
	3/24/80	NA		SLD	7.17						
	8/8/80	NA		SLD	7.9						

* ABOVE USEPA MCL

HANOVER CREEK MINING DISTRICT
SAMPLES ANALYZED BY NEW MEXICO STATE LAB

Historical Well Data

Table 5 (cont.)

mg/l

Name Location	Date	Depth	Lab	Name	pH	As	Cu	Pb	Zn	Cd	Cr
(b) (6) [redacted]											
	8/31/72	NA		PHL	7.84	0.004		0.01	0.036	2.45*	
	9/11/79	NA		SLD				0.005			
	8/8/80	NA		SLD	7.75						
	4/19/76	34'		SLD	8.24		0.01	0.02*	0.82		

*** BLANK SPACES INDICATE DATA NOT AVAILABLE**

*Above US EPA MCL

FAC. NAME: HANOVER CREEK, GROUND WATER DATE OF PRINTOUT: 3/29/88 All samples unfiltered

DATE YY,MM,DD	LAB NAME	F/NF	DTW	pH	Ca (mg/l)	Mg (mg/l)	Na (mg/l)	K (mg/l)	HCO3 (mg/l)	Cl (mg/l)	SO4 (mg/l)	NO3-N (mg/l)	CN (mg/l)	TDS (mg/l)	Ca (meq/l)	Mg (meq/l)	Na (meq/l)	K (meq/l)	HCO3 (meq/l)	Cl (meq/l)	SO4 (meq/l)	NO3-N (meq/l)	Perc. Error	Comments	Use of H_2O
BLANK 871006	SLD				6	3	58	1	132	<5	12			160	0.3	0.2	2.5	0.0	2.2	0.0	0.2		12.4		–
GRANT CTY. 871006	SLD			6.9	344	144	156	7	93	92	1230			2198	17.2	11.8	6.8	0.2	1.5	2.6	25.6		9.5		Backup for fire dept.
(b) (6) [redacted] WELL 871006	SLD			7.2	460	159	92	6	207	75	1505			2534	23.0	13.1	4.0	0.2	3.4	2.1	31.3		4.3	Dug well	Irrig.
NW1/4, NW1/4, SEC. 15 871007	SLD		13.	6.5	216	85	46	3	290	24	454			1003	10.8	7.0	2.0	0.1	4.8	0.7	9.5		14.3	Dug well	None
(b) (6) [redacted] 871007	SLD			7.0	224	46	39	0	316	113	185	10		1016	11.2	3.8	1.7	0.0	5.2	3.2	3.9	0.7	12.6		None
(b) (6) [redacted] ELL 871006	SLD		19	6.7	400	122	94	3	251	68	1165			2148	20.0	10.0	4.1	0.1	4.1	1.9	24.3		6.0	Dug well	Irrig.
(b) (6) [redacted] WELL 871006	SLD			6.9	20	7	71	1	18	113	62			290	1.0	0.6	3.1	0.0	0.3	3.2	1.3		-0.9		None
(b) (6) [redacted] ELL 871006	SLD		13	7.0	360	122	90	4	267	39	976			1946	18.0	10.0	3.9	0.1	4.4	1.1	20.3		10.8	Dug well	Irrig.
U.S.P.O. WELL 871006	SLD				480	122	106	6	220	83	1380			2504	24.0	10.0	4.6	0.2	3.6	2.3	28.7		5.5		Domestic except drinking
(b) (6) [redacted] ELL 871109	SLD		10	7.0	180	73	62	6	330	<5	424			1096	9.0	6.0	2.7	0.2	5.4	0.0	8.8		11.2	Dug well	Domestic except drinking
SLEEPING BEAUTY SHAFT 871109	SLD		10		520	219	110	10	200	72	1780			3112	25.9	18.0	4.8	0.3	3.3	2.0	37.1		7.3		None
SILVER DOLLAR WELL 871109	SLD		10	7.0	400	73	74	8	240	54	965			1912	20.0	6.0	3.2	0.2	3.9	1.5	20.1		7.0		None
(b) (6) [redacted] WELL 871110	SLD				360	73	58	4	266	27	795			1628	18.0	6.0	2.5	0.1	4.4	0.8	16.6		10.2	Windmill	Drinking and Irrig.
(b) (6) [redacted] ELL 871109	SLD		30	6.6	376	375	64	6	299	72	1075			2056	18.8	30.8	2.8	0.2	4.9	2.0	22.4		28.4	Dug well	Drinking

*BLANK SPACES INDICATE DATA UNAVAILABLE

Table 6
HCMD Ground Water Sampling Points, EID 1987

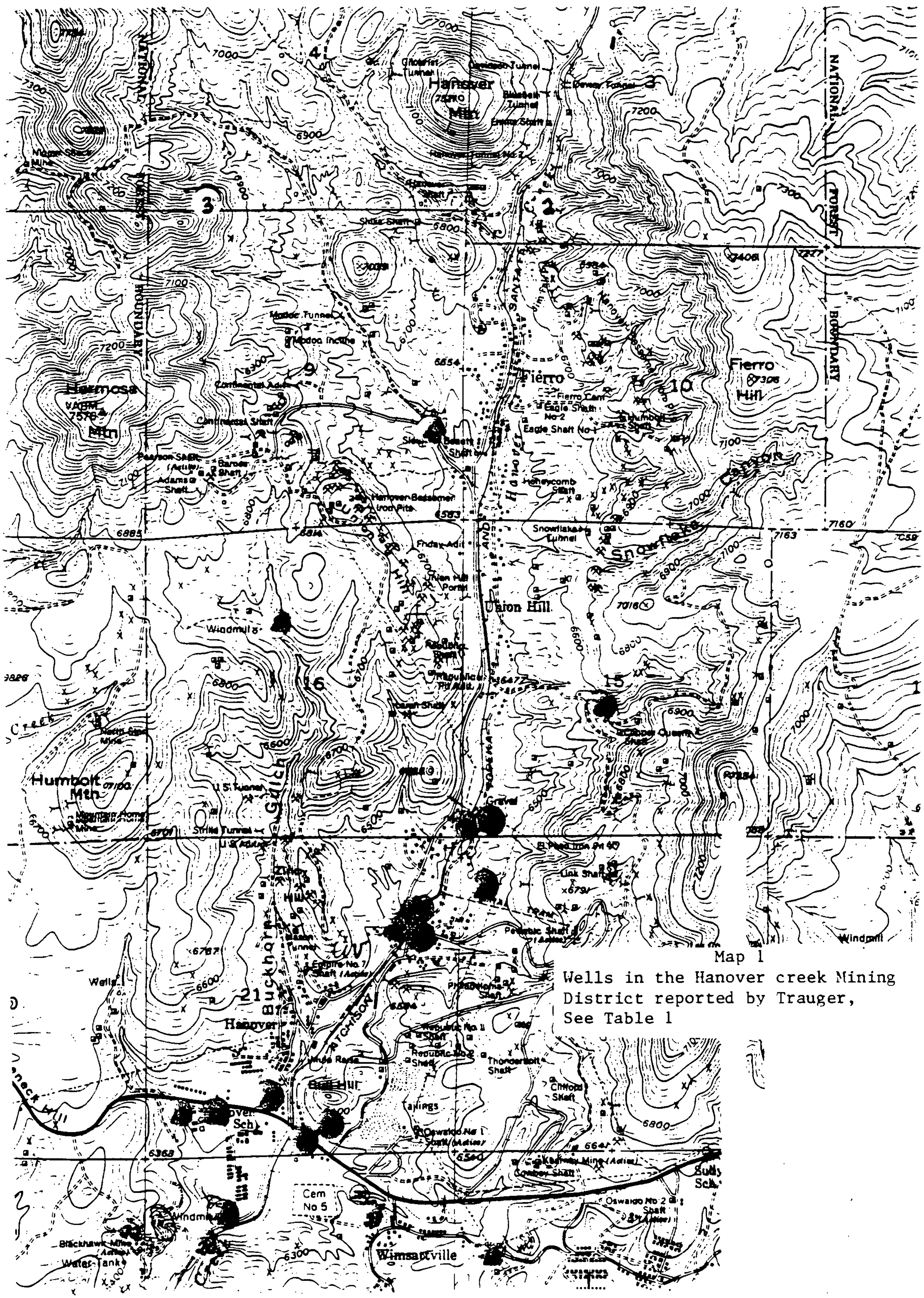
FAC. NAME: HANOVER CREEK, GROUND WATER

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	Se	Hg	Comments
							mg/l Heavy Metals							
BLANK 871006	SLD	<.1	<.001	<.005	<.1	<.1	<.01	<.05	<.1	<.1				NF
GRANT CTY. 871006	SLD	<.1	<.001	<.005	<.1	3.60	<.01	<.05	<.1	0.80				NF
(b) (6) [redacted] WELL 871006	SLD	<.1	<.001	<.005	<.1	0.10	<.01	<.05	<.1	<.1				NF
NW1/4, NW1/4, SEC. 15 871007	SLD	<.1	<.001	<.005	<.1	0.40	<.01	0.31	<.1	<.1				NF
(b) (6) [redacted] WELL [redacted] RD. 871007	SLD	<.1	<.001	<.005	<.1	<.1	<.01	<.05	<.1	0.60				NF
(b) (6) [redacted] WELL 871006	SLD	<.1	<.001	<.005	<.1	0.30	<.01	<.05	<.1	<.1				NF
(b) (6) [redacted] WELL 871006	SLD	<.1	<.001	0.01	<.1	80.00	<.01	0.39	<.1	0.50				NF
(b) (6) [redacted] WELL 871006	SLD	<.1	<.001	0.01	<.1	0.20	<.01	<.05	<.1	<.1				NF
U.S.P.O. WELL 871006	SLD	<.1	<.001	0.01	<.1	24.00	<.01	0.11	<.1	0.50				NF
(b) (6) [redacted] WELL 871109	SLD	<.1	<.001	<.005	<.1	0.40	<.01	0.12	<.1	<.1				NF
SLEEPING BEAUTY SHAFT 871109	SLD	0.70	<.001	0.01	0.80	16.00	0.04	0.37	<.1	0.20				NF
SILVER DOLLAR WELL 871109	SLD	<.1	<.001	<.005	<.1	7.80	<.01	0.10	<.1	0.70				NF
(b) (6) [redacted] WELL 871110	SLD	<.1	<.001	<.005	<.1	0.3	<.01	<.05	<.1	<.1				NF
(b) (6) [redacted] WELL 871109	SLD	<.1	<.001	<.005	<.1	<.1	,.01	<.05	<.1	0.1				NF
(b) (6) [redacted] SPRING 870615	SLD	<.1	<.001	<.005	<.1	<.1	<.01	<.05	<.1	<.1				NF

*BLANK SPACES INDICATE DATA UNAVAILABLE

( ) = Above US EPA MCL

Table 6(cont.)



Map 1
Wells in the Hanover creek Mining District reported by Trauger, See Table 1

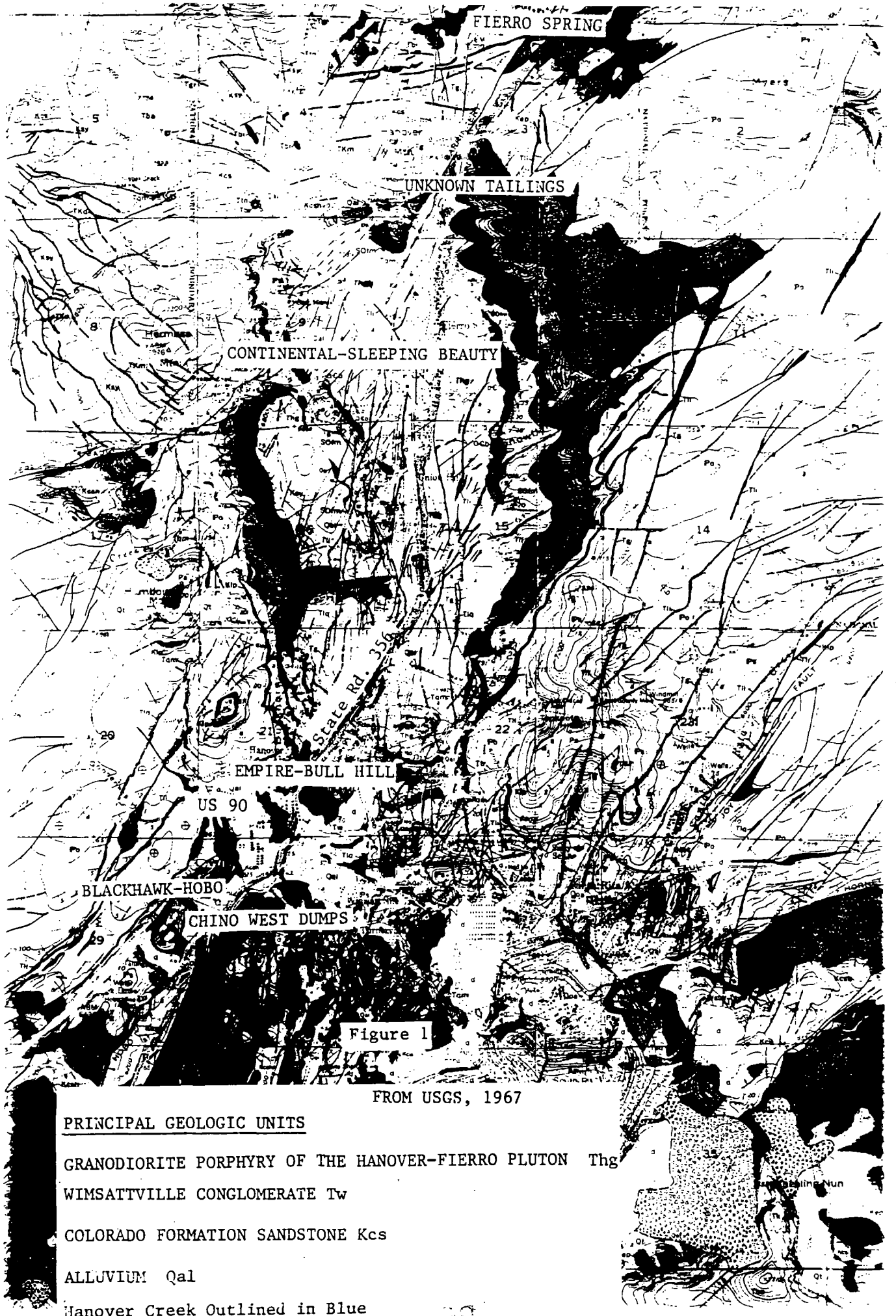


Figure 1

FROM USGS, 1967

PRINCIPAL GEOLOGIC UNITS

GRANODIORITE PORPHYRY OF THE HANOVER-FIERRO PLUTON Thg

WIMSATTVILLE CONGLOMERATE Tw

COLORADO FORMATION SANDSTONE Kcs

ALLUVIUM Qal

Hanover Creek Outlined in Blue

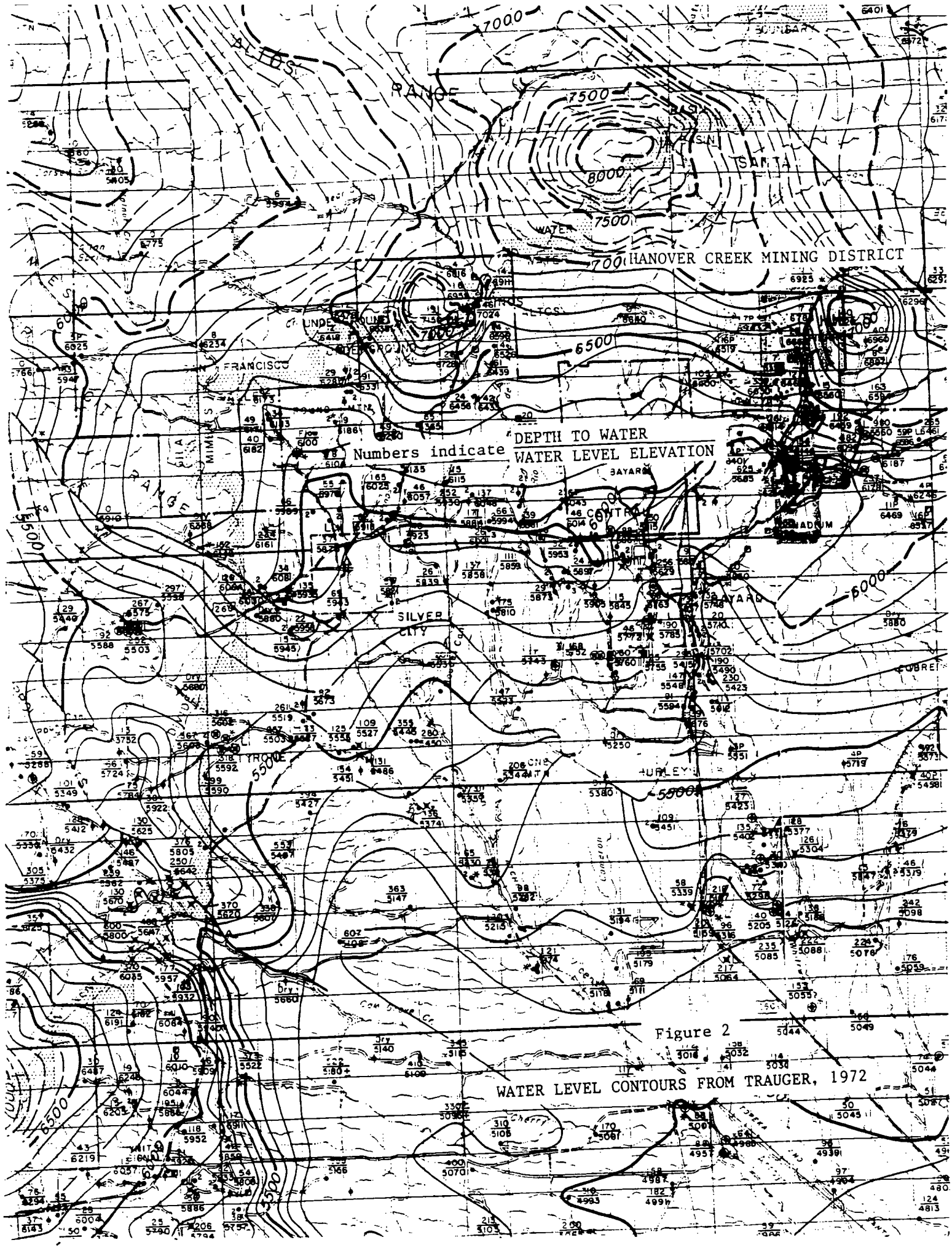
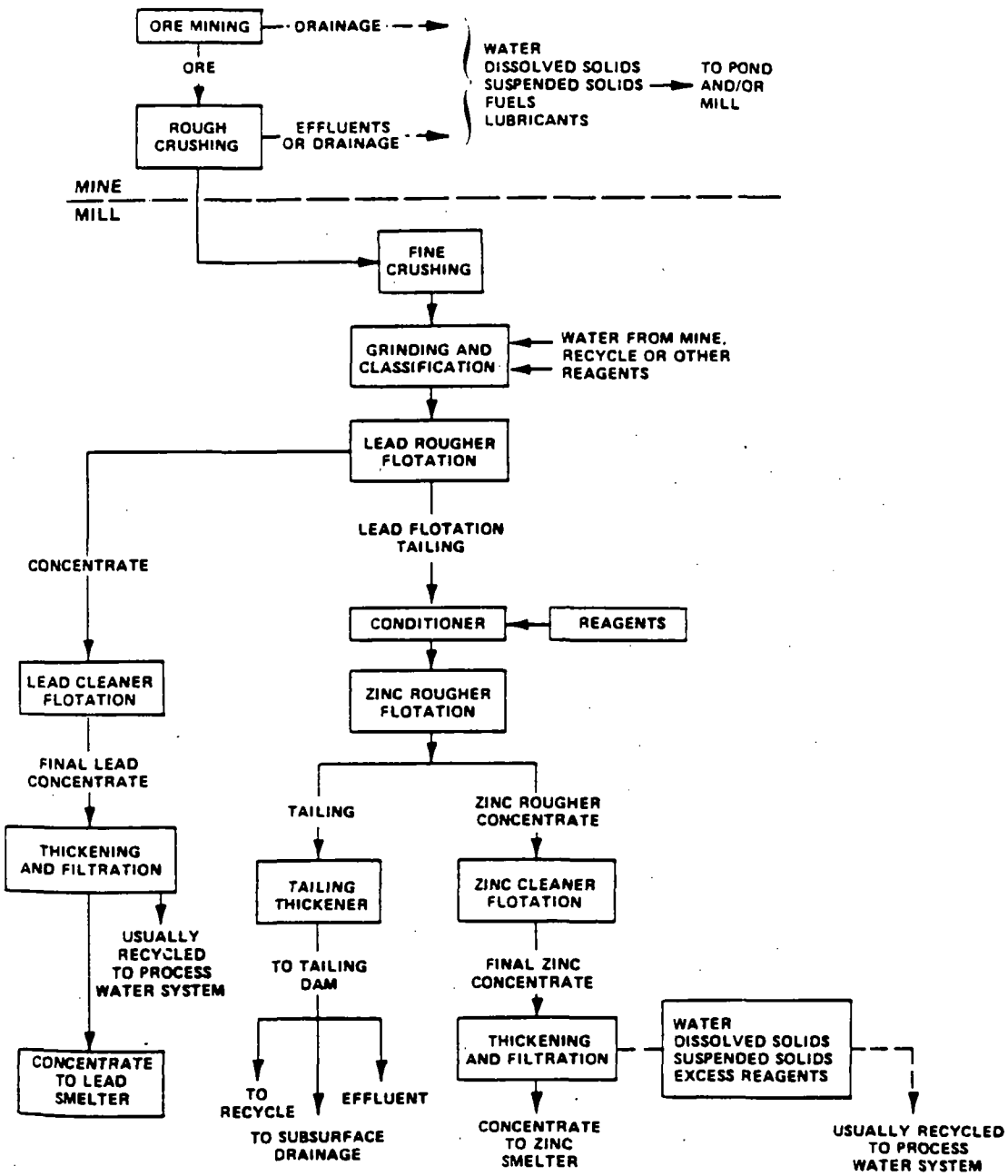


Figure 2

WATER LEVEL CONTOURS FROM TRAUGER, 1972

Figure 3 . LEAD/ZINC-ORE MINING AND PROCESSING OPERATIONS



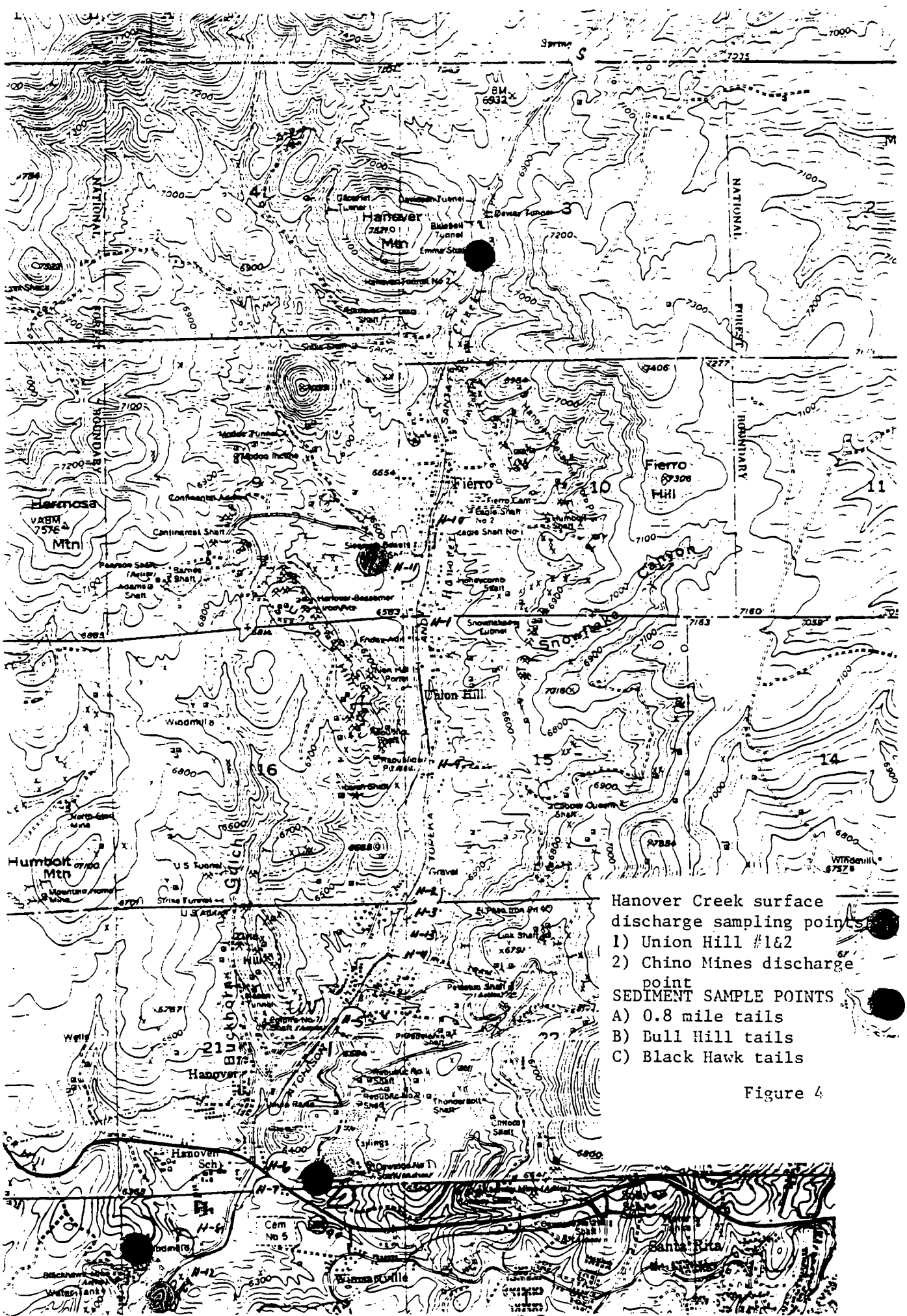

Hanover Creek surface discharge sampling points
1) Union Hill #1&2
2) Chino Mines discharge point
SEDIMENT SAMPLE POINTS
A) 0.8 mile tails
B) Bull Hill tails
C) Black Hawk tails

Figure 4

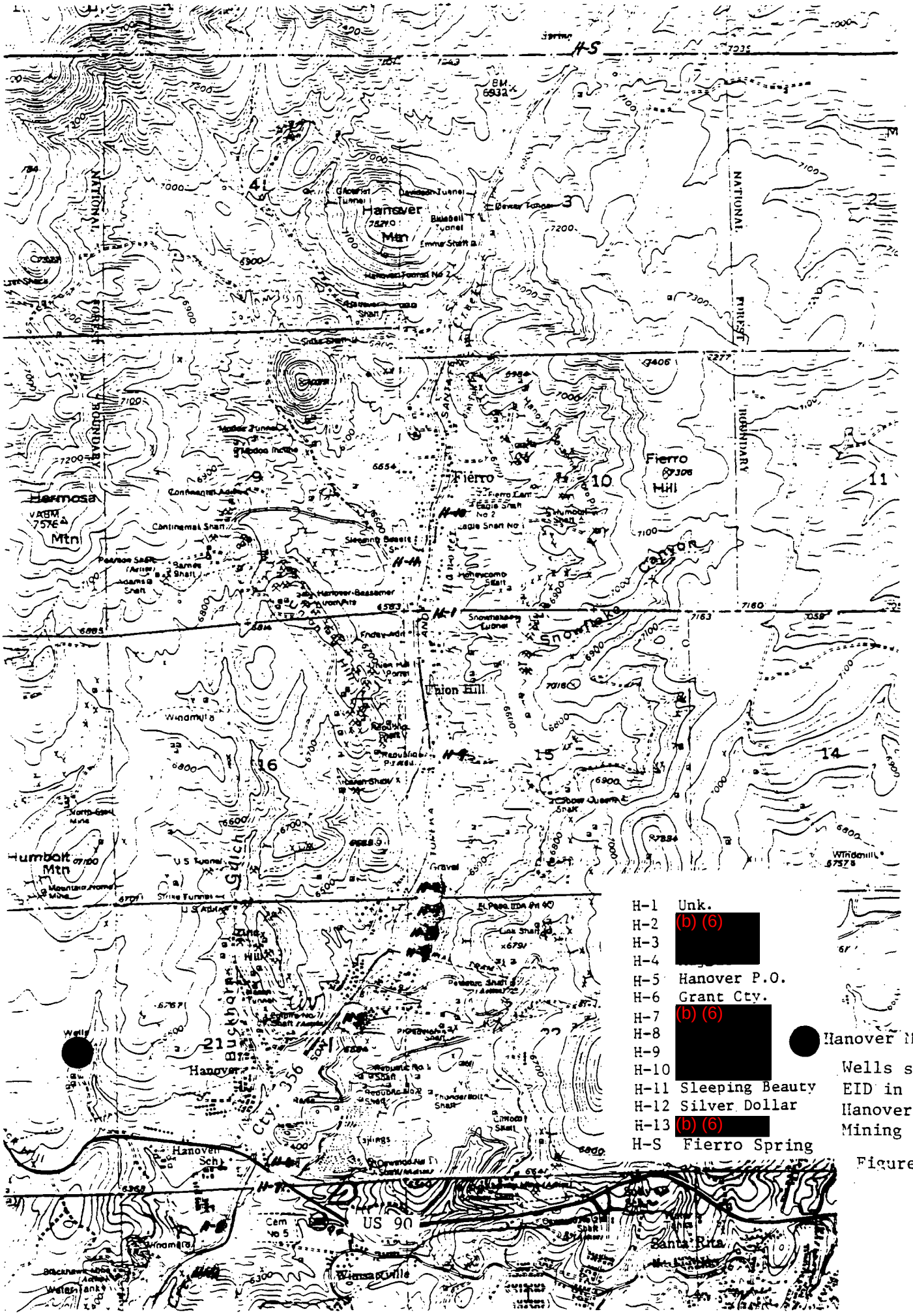

H-S
Hanover Mtn
Fierro
Fierro Hill
Hermosa Mtn
Union Hill
Snowflake Canyon
Humbolt Mtn
Hanover
US 90
Santa Rita
Wimsatville
H-1 Unk.
H-2 (b) (6)
H-3
H-4
H-5 Hanover P.O.
H-6 Grant Cty.
H-7 (b) (6)
H-8
H-9
H-10
H-11 Sleeping Beauty
H-12 Silver Dollar
H-13 (b) (6)
H-S Fierro Spring
Hanover MDWCA Well
Wells sampled by EID in the Hanover Creek Mining District

Figure 4

REFERENCE 4

Chino Mines
Site Inspection Follow-up Report

SIF REPORT

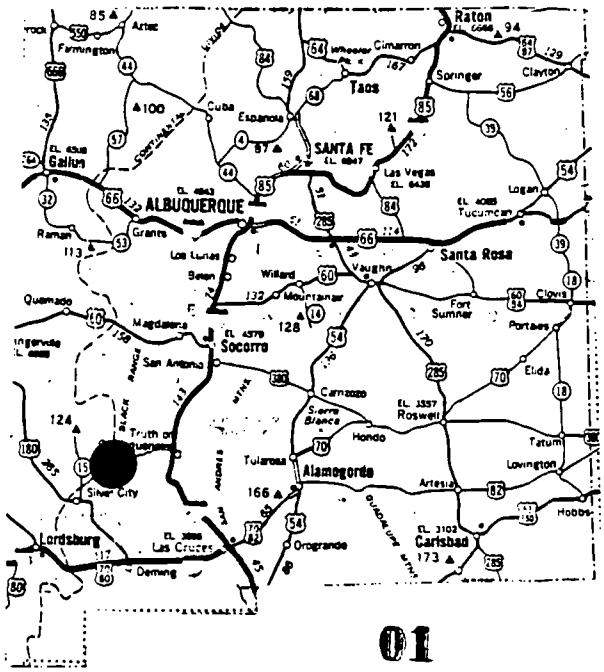
CHINO MINES (AKA KENNECOTT COPPER OR WHITEWATER CREEK)

I. Introduction

The Chino Mines site near Bayard and Hurley, New Mexico was given a Potential Hazardous Waste Site Identification and Preliminary Assessment by Jack Ellvinger of the EID on November 25, 1980, and by Jairo Guevara of the EPA on May 28, 1981. Site Inspection reports (SI) were done by Mr. Guevara of the EPA on June 30, 1981, and July 10, 1981. The SIs estimated the extent of the wastes and characterized hazardous substances in liquids and solids at certain areas of the site. The SI presented preliminary data for releases of hazardous substances to ground water and surface water. The Chino Mines site was treated as two sites in the earlier SIs (Santa Rita Mine and Smelter-Concentrator), but the primary source of the hazardous substances for both areas is the precipitation plant (p-plant) and waste and leach dumps at the mine. The discharge from the p-plant moves along Whitewater Creek down to the other Chino facility (the smelter and tailings area at Hurley). For this reason, "Chino Mines" is treated as one site in this SIF.

The SIF work plan proposed to 1) document releases of hazardous substances (and other constituents) such as sulfate and total dissolved solids (TDS) to ground water in various affected aquifers and to surface water; 2) identify and characterize by sampling and photographs other sources of hazardous substances that affect the Whitewater Creek area; 3) document air releases of hazardous substances from Chino's tailings at Hurley and other tailings in the Whitewater Creek area; and 4) sample any flows into Whitewater Creek.

The results of the SIF are presented below. The location of Chino Mines is depicted on a map of New Mexico below.



II. Background

The Kennecott Copper smelter and concentrator and Santa Rita Mine, hereafter known as Chino Mines, is located near Silver City in Grant County, in the southwestern section of New Mexico (Figures 1 and 2). Grant County is composed of wide expanses of plains, gentle to ruggedly contoured hills, and mountains rising to 10,000 feet in elevation. The first 4 miles of the Chino site and Whitewater Creek, at the northern end where the open pit mine and leaching operations are located, trends northeast to southwest through a rugged valley. The topography abruptly opens up at the town of Bayard. Whitewater Creek, which begins at the precipitation plant (p-plant) at the open pit mine, continues almost due south from Bayard through the company town of Hurley where the Chino Mines smelter and tailings disposal areas are located.

Hurley is situated in a basin which extends southward at least as far as Deming, in what is called either the Hurley Plain or the San Vicente Basin. This basin is important because it contains the principal towns and communities in Grant County and is underlain by an extensive reservoir of ground water which will yield moderate to large amounts of water to wells.

The climate of the Chino site is semi-arid with rainfall in the more mountainous open pit mine area ranging between 16 and 24 inches per year. The basin area around Hurley has annual precipitation near the lower end of this range. The majority of the precipitation occurs during July and August in the form of afternoon showers.

II. Geologic Setting

The Chino site lies within the USGS's Santa Rita quandrangle. It is near the southeastern tip of the Colorado Plateau and on the north rim of the Sonoran geosyncline, where sedimentary rocks are relatively thin (Jones, USGS, pp. 120 FF). In the Santa Rita region, the predominant structures of the southeast-trending belt includes faults of southwest to northeast trend (see Figure 3).

Many types of rocks ranging in age from Precambrian to Recent occur in the Santa Rita area:

1) gneiss of Precambrian age;

2) quartzite, shale, dolomite and limestone of Paleozoic age;

3) andesite breccia of Late Cretaceous, and Early Tertiary age;

4) syenodiorite to granodiorite sills, laccoliths and dikes and granodiorite, quartz monzonite, quartz latite and rhyodacite stocks, dikes and plugs of Early Tertiary age;

5) rhyolite to quartz latite crystal and lithic tuffs, and andesite and basalt flows interbedded with water laid deposits of sand, tuff and conglomerate of Miocene age;

6) valley fill deposits of Miocene to Pleistocene age.

The Santa Rita (Chino) open pit mine itself and its genesis is described in layman's terms below (from Schilling pp. 27-28). Millions of years ago, oceans covered the area. Sedimentary rocks formed on the ocean floor and along the shore lines. Later, internal geologic forces folded and cracked these sedimentary rock units. Approximately 70 million years ago, great masses of igneous rock forced their way up through cracks in the sedimentary rocks (forming dikes), between the different sedimentary layers (forming sills), and massively into the main body of sedimentary rocks (forming stocks). The Santa Rita mine ore body is one of these stocks. As a stock formed, it cracked the surrounding rocks and the top of the stock itself which had cooled enough to be somewhat solid. Hot water, containing dissolved minerals found its way into every crack that had formed and deposited its minerals as pyrite, chalcopyrite (a copper pyrite) and other minerals.

Later, the overlying rocks and the top of the stock were eroded away. Water and oxygen caused the pyrite to oxidize to iron sulfate and sulfuric acid. The acid dissolved the chalcopyrite which trickled further down into cracks until it reached the water table where it reacted with fresh pyrite and deposited chalcocite (mineral made up in part of copper and sulfur), in quantities high enough to eventually be profitably mined. Finally, volcanoes spewed out lava and ash (tuff beds) which covered the mine. Erosion later uncovered the ore deposits again. Figure 4 is a simplified depiction (from Schilling) of the Santa Rita Mine.

III. Hydrologic Setting

1. Surface Water

Whitewater Creek (an intermittent stream) cuts down through hornblende quartz diorite from its outlet below the Chino precipitation plant to the town of Bayard. It then flows over gravels for a short stretch, and alluvial units for 5 miles between Bayard and Hurley. Just north of Hurley, Whitewater Creek encounters the Gila Conglomerate over which it flows until its intersection with San Vicente arroyo (dry) approximately 10 miles south of Hurley. There are no perennial streams in the Santa Rita area although all streams flow at some time during the year. Dewatering activities on Hanover Creek, a tributary of Whitewater Creek, have made that

creek artificially perennial at times. Surficial flows occur after precipitation events or as the result of snowmelt runoff. Whitewater Creek flowed rather frequently as a result of discharges from Chino mining operations and the Groundhog Mine dewatering operation up until 1985 when most low volume flows ceased.

Streams of the Santa Rita area drain almost entirely southward into the Hurley Plain mainly through Whitewater Creek. The main tributaries that join Whitewater Creek are Gold Gulch and Hanover Creek.

2. Ground Water.

The ground water regime at Chino encompasses water found in intrusive stock, limestone, sandstones, volcanic tuff, Gila Conglomerate, and the alluvium. The accompanying figure (Figure 5) from Trauger illustrates the type of aquifers found over the Chino site area. Figure 6, also from Trauger, depicts the regional water table in the area of the Chino site. The stock that is being mined in the Santa Rita open pit copper mine is principally quartz monzonite porphyry and quartz diorite porphyry, penetrated by granodiorite porphyry dikes. These types of rocks weather from the land surface downward, and along the planes of both horizontal and vertical joints.

A well located in a crack or joint is generally emplaced at the bottom of the crack where the water is presumed to be situated on top of the solid, unweathered rock. These rocks are generally more weathered under the flatter slopes than under the steeper slopes, and are more open jointed and fractured in the vicinity of large faults. The upper course of Whitewater Creek follows the Groundhog Fault. Consequently, wells drilled along this channel would offer a better chance of finding water in joints and fractures than would wells drilled on the ridges and interstream areas. Additionally, these intrusives are cut by dikes which would compartmentalize any water that would be found in the faults and joints that do have dense interconnections. One would expect water from these types of wells to be undependable from the standpoints of both yield and longevity and this is verified along Whitewater Creek (Trauger, pp. 33-35).

Highly colored flow rocks of volcanic origin form in part the cliffs and rims overlooking the Santa Rita mine, Whitewater Creek stream bed and the Hurley Plain. These rhyolitic rocks are dense and generally yield little water.

However, rubble zones may occur locally between individual flows and can serve as aquifers. Some sediments found interbedded with the pyroclastic and flow rocks are mixtures of clay, sand, pumice and coarse pyroclastic material and locally may yield a few gallons per minute, or enough for a small domestic well.

Marine sedimentary rocks in the site area include carbonate rocks and clastic rocks. The carbonates are massive to thin bedded, generally dense, finely crystalline, commonly sandy, silty and cherty. Carbonate rocks are more likely to yield water in the site area than are other marine rocks. Yields range from very small to large depending on the structure of the rocks, depth of penetration and topographic position. Just south of the Chino smelter at Hurley, the Apache Tejo well field yields industrial quantities of ground water from the underlying limestones. This well field has yielded hundreds of gallons per minute (gpm) of good quality water for the Chino copper operation for decades (Kennecott Copper Discharge Plan, 1981). Evidently in this area the joints, fractures and solution channels are sufficiently well developed, interconnected and cavitated to allow easy movement of groundwater. Marine clastic rocks in the site area also include the Colorado Formation (CF) Sandstone, interbedded with shale. Trauger (page 39) states that the CF, inherently a poor aquifer, has been made poorer by compartmentalization by igneous dike systems.

The continental sedimentary deposits are the largest and most important sources of ground water in the site area. These include the Gila Conglomerate, which provides most of the water for public and private water supplies and for the huge mining operations in the area. These deposits were all laid down on the land surface by streams, in lakes, or by the wind. The Gila Conglomerate (GC), of the Late Tertiary and Early Quarternary Ages, is the most widespread of the continental deposits in Grant County. The GC consists of poorly sorted sediments that range from unconsolidated to strongly consolidated. Two major divisions of the Gila, an upper and a lower, can be recognized area wide. The lower part of the Gila furnishes very little water to wells; the upper Gila can furnish moderate to very large amounts. Chino Mines operates several large well fields in the Hurley Plain in the upper Gila.

Sand and gravel in the channels and under the flood plains of rivers and creeks are unconsolidated continental deposits commonly referred to as alluvium. Trauger locates significant alluvial deposits between the towns of Bayard and Hurley along Whitewater Creek. Also included in this category is the material immediately underlying the surface of the valley floors (bolsons). The composition of the material ranges from fine to coarse, from clay to boulders.
The alluvium is hydraulically connected to the underlying Gila Conglomerate, bolson deposits, volcanics, and limestone.

Bolson deposits are similar to river channel and flood plain deposits but can attain great thicknesses. Bolsons contain a heterogeneous mixture of rocks from the surrounding uplands. Mostly unconsolidated, some beds may be locally cemented with calcium carbonate, limonite or silica. In intermontane valleys, such as the Hurley Plain, it may be difficult to distinguish bolson deposits from the Gila Conglomerate. Bolson deposits and the upper part of the GC constitute a ground water reservoir of great capacity and excellent quality. It is this aquifer which has been most threatened by wastewater from mining operations at the Chino Mines site. The aquifer are recharged in part by flow through the overlying alluvium.

IV. Mining Operations

Several mining operations occurred along the Whitewater Creek watershed in recent history. (see Map No.1 for location of these operations). These include the Ground Hog zinc mine, owned and operated by ASARCO, which is located in Section 5, Township 18 South, Range 12 West. This mine is just south of the outfall from Chino precipitation plant. This is an underground mine operated into the 1970's. The ore from this mine which was transported to a mill located near Deming, New Mexico. A SI was submitted by the EID for the Groundhog mine on March 7, 1985.

The Bullfrog mine and mill is located about a mile northwest of the Groundhog, adjacent to the town of Vanadium, in parts of Section 31 and 32, Township 17 South, Range 12 West. The Bullfrog mill was owned by U.S Smelting and Refining and Mining Co., and operated until about 1975, and generated a tailings pond which impacts Whitewater Creek as a result of surface runoff (see Table 8). It is not known what the impacts on groundwater are from the Bullfrog operation as there are no monitor wells in the immediate area. The Bullfrog tailings also impact the environment as a result of wind-blown tailings.

The main contributor to environmental degradation at Whitewater Creek is Chino Mines Company. Chino is presently owned by Phelps Dodge Corporation (PD), but up until 1986 was a part of Kennecott Copper Corporation (KCC) of Salt Lake City, Utah. Wastewater from the principal operations at Chino have impacted the environment and they will be discussed here in brief (see photos 1-4).

The Chino open pit copper mine waste dumps and leach dumps are located at Santa Rita. This mine is one of the oldest in the United States and dates back to the 1700s when New Mexico was still a part of Spanish territory. Indeed, a crown grant from the Spanish was utilized to build the town of Santa Rita. Slave labor and local Indians were used for mining at Santa Rita. Mining was primitive. Vertical shafts were sunk, and horizontal adits driven along fractures until native copper was encountered. Everything was done in tiny spaces, often on the miners' hands and knees, utilizing only picks as tools. Although only native copper at first was mined, a crude smelter was later added to treat high grade ores (greater than 10% copper). Early mining was often pre-empted by Apache raids and the future of Santa Rita was in doubt until the 1880s when the Apache Indians were finally subdued. During the American Civil War, the Confederacy occupied the fort (built by the Spanish) at Santa Rita and utilized it as an outpost. By the 1880s, mining had removed all the high grade ore and Santa Rita was another New Mexico ghost town. However, in 1905, John Sully, a young mining engineer collected and assayed 4,300 samples and determined that a tremendous amount of copper ore remained at Santa Rita, but it contained less than 2% copper. Sully suggested that open pit mining techniques could be employed to economically

extract the ore. In 1910, open pit operations were initiated, and have continued to the present day (Schilling, pp. 28 ff). At the Santa Rita mine several types of wastes are created.

WASTE CHARACTERISTICS

1) Overburden or waste rock. This is material that continuously has to be removed to get to the copper values, or is rock from the ore body containing too low copper values for economic recovery. This rock is piled up in big lifts on the edge of the mine. In some places, for example, say directly overlooking Hanover Creek or Whitewater Creek, runoff from these waste piles or seepage through these waste piles containing high sulfates and acidity and heavy metals, makes its way into Hanover Creek or Whitewater Creek. If one assumes that 3 tons of rock are moved for every ton of ore concentrated and the average amount of ore processed through the concentrator each day since 1910 is a conservative 10,000 tons (it is now 50,000 TPD), there are approximately 854 million tons of waste rock in the waste dumps at the mine.

2) Leach dumps - These dumps cover approximately 1300 acres on the Whitewater Creek drainage, and contain rocks in which copper values not economically viable through the concentrating process, or exist in a mineral form not amenable to concentrating, but are economically recovered by leach methods. These dumps are prepared (by leveling and berming) on the surface to accommodate fluids percolating through them either by flood irrigation or by sprinkling. Either sulfuric acid is directly added to the dumps or water percolating through the dumps oxidizes (with the help of bacteria) pyrites which in turn form sulfuric acid. The acid attacks the surfaces of the broken-up ore and dissolves copper and other heavy metals from the surfaces of the rock. The leach dumps are located on natural drainages, so that the fluids which have percolated through the dumps (pregnant solution) follow the natural drainages and are collected in surge ponds and directed to the "precipitation" or "precipitant" plant (p-plant). The p-plant uses iron (in the form of "tin" cans) to remove (by reduction) metallic copper from the pregnant solution. This solution, now called the barren solution, is pumped up to the dumps again to begin the leaching cycle all over. Dump sections are taken in and out of production in order for a particular section or dump to be dried out and re-innoculated with oxygen after surficial salt crust buildup is removed by bulldozers. The leach solution (pregnant or barren) has a pH of about 2, total dissolved solids of approximately 50,000 mg/l and contains high concentrations of heavy metals such as copper, cadmium, iron, zinc, lead, nickel, cobalt, and other transition metals (see Tables 1 and 11 which depicts discharges of barren solution from the p-plant). Runoff from these leach dumps at the p-plant has occurred routinely down Whitewater Creek since the mid 1930s. Consequently, the adjoining aquifers (alluvial, igneous and conglomerate) along Whitewater Creek have been significantly degraded beginning at a pointjust below the precipitation plant to at least the point where Whitewater Creek crosses U.S. 180, 10 miles below Hurley.

3) Mine Water - This is, according to Chino Mines, approximately one billion gallons of acidic, heavy-metal-laden, high TDS water that has accumulated in low spots (from runoff or seeps) in the mine or is pumped up to excess mine water reservoirs from the upper Whitewater reservoir at the p-plant during periods of precipitation or technical problems at the p-plant (see Table 2). The impact on the environment of this excess mine water as it sits in the pit or excess-water reservoirs is not known since it has yet to be investigated to any great extent. For the last 2 years Chino has been neutralizing this water (up to 200 million gallons) before adding it to tailings (which are at pH = 9). The tailings are deposited at the disposal area near Hurley.

B. Concentrator Wastes - Until 1983, concentrating of copper at Chino Mines was done at Hurley adjacent to the smelter. However, all concentrating is now done at a new concentrator (the Ivanhoe) located adjacent to the mine site. Tailings liquor and solids tailings are the final waste-products resulting from the concentrating process. The concentrator utilizes froth floatation (or flotation) to extract copper values in the form of "concentrate" (33% Cu, 33% sulfur, 33% iron and silica) from an average of 50,000 tons of ore per day. The "concentrate" provides the feed for the smelter. The mined ore is finely ground and milled before froth floatation occurs. Since the copper content is less than 1% of the ore, and since lime is added in the concentrating process, approximately 50,000 T/D of tailings report as a 50% solids slurry (by 7 miles of a triple pipeline) to the disposal area(s) south of Hurley. The tailings have a pH of approximately 8-9 (which minimizes heavy metals in a mobile form in the tailings liquor), TDS of 2500 mg/l and sulfate of approximately 1500 mg/l (see Table 3 for heavy metal analyses of Chino's tailings). Approximately 2200 acres of the Hurley Plain is covered with Chino's tailings. Assuming an average of 10,000 TPD ore throughput at Chino since 1910, approximately 285 million tons of tailings are found at the disposal site.

C. Smelter Wastes

There are several operations at the smelter at Hurley which create waste fluids. Sulfuric acid plants are an integral part of the air emission control strategy at Hurley. An acid plant at the smelter converts sulfur dioxide (from the smelting and converting process) to sulfuric acid. The sulfuric acid plant has several by-product streams (acid plant blowdown) which are directed to an area just east of the smelter. The acidic blowdown fluid is neutralized with lime before disposal and directed to the western sector of Lake One. It is not routinely discharged down Whitewater Creek although a recent precipitation event caused flooding which resulted in a discharge of neutralized acid plant blowdown to enter Whitewater Creek. Acidic sludges from the INCO furnace at the smelter are also treated with lime and disposed in the same area adjacent to Pond 1. A sample analyses from the acid plant blowdown that has been neutralized is depicted in Table 4.

D. Other Hazardous Substances Sources

Minor sources of hazardous substances besides those mentioned above also occur along the Whitewater Creek streambed. There were approximately 7 private but illegal copper recovery operations that existed between the p-plant and the Bayard sewage treatment plant. These private recovery operations utilized the same technology as the p-plant but on a on miniature scale. Evidently, Whitewater Creek flow from Chino's p-plant was constant enough to be diverted by private individuals through crude structures which contained iron cans. The copper in solution in the Whitewater Creek flow plated out as metallic copper on the cans and was recovered in this way. Unfortunately, much more available iron (and perhaps other heavy metals) were introduced into Whitewater Creek by these private operations in this oxidation-reduction recovery process. Photos 5 and 6 illustrate the remnants of several of these recovery operations. Table 5 contains analyses of sediments collected at various points along Whitewater Creek including a set from private recovery operations (see "private recovery operation" and F. Torres one and two).

Another source of hazardous substances is the tailings pile (called the Bullfrog) at Vanadium, formerly operated by United States Smelting and Mining and Refining Co., and presently owned by Sharon Steel. Photos number 7, 8, and 9 illustrate how sediments and salts from this tailings pile have been washing down into Whitewater Creek. Table 6 includes sample data from the Bullfrog tailings which documents how the Bullfrog discharges make their way into Whitewater Creek. The Bullfrog tailings and runoff sediment samples are high in Cu, Fe, Al, Pb, Mn, Ni, Co. and Zn. Compare these values to the background stream sediment samples taken in Hanover Creek above the confluence with Whitewater Creek, in Lampright Draw and 150 yards off Pipeline Road (sampling points located on Map 1). These sediment background samples are taken from tributaries of Whitewater Creek which have been unaffected by flows down Whitewater Creek but which should reflect streambed background sediment heavy metal concentrations.

Ground Water Route

At least three aquifers are documented below to have been contaminated by mining operations at the Chino site. The two aquifers most affected are the alluvium and the Gila Conglomerate.

The alluvium along Whitewater Creek has been impacted by discharges of acidic leach water from the precipitation plant (p-plant) which is used in conjunction with the leach dumps at the Santa Rita mine. These acidic leach waters are characterized by high TDS, sulfate

and heavy metals, (see Table 1 for heavy metal concentrations of fluids discharged from the p-plant). Alluvial aquifers exist from just south of Bayard to just north of the Chino smelter at Hurley (Trauger Geologic Map of Grant County, Figure 1). At least 9 "small capacity" wells were identified by Trauger in the alluvium in this area. Three alluvial wells near North Hurley have been sampled in the past by the EID and Chino. These are the (b) (6), (b) (6) and (b) wells, all hand dug wells. Historical data (pre-CERCLA) provided by Chino Mines for these three wells are included in Table 7. A recent EID-CERCLA sampling (1987) of the (b) (6) well is depicted in Table 8. It is documented that in the (b) (6) well there are elevated levels of Al (140 mg/l), Cd (0.035 mg/l), Co (0.88 mg/l), Cu (14.mg/l), Fe (120 mg/l), Pb (0.59 mg/l), Mn (23 mg/l), Ni (0.3 mg/l), and Zn (13.0 mg/l). Several other shallow wells were sampled around Hurley and this data is included also in Table 8. The locations of the wells sampled are on Figure 9.

Since the alluvium directly overlies the Gila Conglomerate (GC) in the Hurley Plain where the (b) (6) well is located, and because the alluvium is hydraulically connected to and recharges the GC, (in fact, has contaminated the GC) the GC can be used as background water quality for the alluvium in the Hurley Plain. The background water quality of the GC in the Hurley Plain is excellent and remarkably constant. Table 9 includes a summary of water quality data for Gila Conglomerate wells located at the Chino site. There are no detectable concentrations of any of the heavy metals which are found in the (b) (6) well evident in any of the background Hurley Plain wells. These background GC wells are located some distance away from the Whitewater Creek stream channel (that carried acidic p-plant fugitive flows), and are distant enough from the tailings that no impact from the tailings is manifested. The location of the sampled wells are indicated on Map 1.

The second aquifer impacted is the Gila Conglomerate (GC). As stated above in an earlier section, the GC (and associated bolson deposits) is the principal water supply for the Silver City area. The EID has collected an abundance of ground water data in the GC aquifer in the vicinity of the tailings disposal area near Hurley. Some 60 monitoring wells are routinely sampled by Chino and EID for general chemistry and heavy metal analyses. Although this voluminous amount of data will not be submitted in this SIF report, data will be presented from one of the most contaminated GC wells at Hurley. This well is 16S and its location is not far from the Whitewater Creek streambed or Lake One. (see Map 1 for location).

Heavy metal data for GC wells are listed in Table 9 for 2 sampling periods. The 10/21/86 sample was taken by Chino, split with the EID and the analyses accomplished by the New Mexico state lab (SLD) and Chino. The April, 1988 sample was taken by Chino and analyzed by the CEP Laboratory in Santa Fe. This data indicates ground water from 16S contaminated with copper, cadmium, cobalt, iron, manganese, nickel and zinc. The pH of the water from 16S in both instances was approximately 3.9.

This acidic ground water must have resulted from discharges of acidic fluids orginating from the p-plant located at the Santa Rita mine. These acidic discharges (discussed above) have periodically occurred since the late 1930s. These acidic discharges have impacted the area adjacent to and south of the tailings via recharge from Whitewater Creek, as well as all along Whitewater Creek up to the p-plant. Although there is certainly seepage also from the tailings, the tailings are basic (the concentrating process involves addition of lime and froth floatation occurs at pH=9-10). TDS and sulfate concentration in the tailings liquor are much less than TDS and sulfate concentrations existing in 16S. This indicates that the source of the more severe ground water contamination at Hurley, at least in those areas adjacent to Whitewater Creek, is the p-plant overflow to Whitewater Creek.

As stated above, the tailings also undoubtedly seep. Chino states that the tailings seep at the rate of 1850 gpm (Kennecott Copper Discharge plan, 1981). However, all the tailings monitor well water quality data (away from Whitewater Creek stream channel and thus unaffected by acidic p-plant discharges) that have been impacted by tailings reveal elevated levels of sulfate and TDS but no elevated levels of heavy metals, including copper. Evidently the combination of basic tailings and alkaline content of sediments in the GC preclude mobilization of heavy metals. New Mexico Ground Water Standards for TDS and sulfate in this groundwater, however, have been exceeded due to tailings disposal. Table 9 includes data from S8 and 9S which have been impacted solely by the tailings.

The background water quality data for the GC is also found in Table 9. The background water quality is excellent. It is apparent that the GC aquifer is contaminated with heavy metals, TDS and sulfate.

In the immediate area of Bayard many residents had relatively shallow wells sunk into intrusive rocks such as hornblende quartz diorite. These wells did not yield large quantities of water and at times were undependable water sources. The locations of the Bayard wells were adjacent to Whitewater Creek where one would expect to find the greatest and most trustworthy sources of ground water. Many of these wells went bad as a result of discharges down Whitewater Creek from Chino's p-plant. The EID did an exhaustive search for residents who still had wells that could be sampled, and present the results of this sampling in Table 8. Many of these wells are contaminated with TDS and sulfate. Trauger also reports 28 wells in the area from Bayard to Hurley, all located in close proximity to Whitewater Creek. Table 10 (from Trauger) includes information on these wells. Several of the Trauger wells are still in existence and were sampled by the EID. These include the [redacted] (b) (6) well (1), the [redacted] (b) (6) well (8) which is now dry, the [redacted] (b) (6) well (3), also known as the [redacted] (b) (6) well and the Kennecott Rifle Range well (7). References are made in Trauger's report (pages 149 and 150 included) to mine waste waters ruining wells, (at 18.12.6.314 the [redacted] (b) (6) Well, 18.12.18.133 - [redacted] (b) (6) well and 18.12.18.133a). All 3 of these wells are adjacent to Whitewater Creek. The wells identified in Traugers report are located on Figure 8.

Surface Water Route

There are admitted and documented releases of deleterious fluids by Chino into Whitewater Creek. The most recent incidents occurred during the period between July 8 and July 20, 1988 (see Appendix A), and indefinitely beginning September 1, 1988. Currently, discharges periodically occur as a result of either a large precipitation event, unforeseen equipment breakdown, leach dump landslide, or desire to waste excess mine water. However, prior to 1984, discharges were routine at the Chino p-plant. These discharges (as stated above) are characterized by low pH, high TDS and sulfate and elevated heavy metal concentrations. Chino has sampled these discharges over the years and Table 11 is a submittal they made to the EID which summarizes the chemical characteristics of p-plant discharges (Kennecott Copper, Discharge Plan Application, 1981).

Additionally, the EID and Chino have sampled these discharges many times over the last five years. Examples of analytical sampling results are compiled in Table 1. The samples from Hanover Creek (a tributary of Whitewater Creek), although impacted to a certain extent by zinc mining, can be considered background for Whitewater Creek. Analyses of this water is included in Table 1. Heavy metals concentrations of Whitewater Creek fluids above background include aluminum, cadmium, copper, iron manganese, zinc, arsenic, lead, selenium, nickel, and vanadium. An observed surface water discharge was also photographed from the air by EPA's Las Vegas Environmental Monitoring Laboratory on September 12, 1976. These photos are in EPA files in Dallas and Las Vegas. An observed surface water release has been documented. The discharges from the Bullfrog tailings to surface water have been discussed above in Section D.

Air Route

Evidence for air releases have been collected at the Chino site in the area directly east of the tailings. Aerial photographs taken by the EPA Las Vegas Laboratory on September 12, 1976 illustrate how the tailings have blown over the terrain in the area just to the east of the tailings. The EID has in its possession copies of these photos but are not submitting them as part of this report. The EID is attempting to get another copy of these photos from EPA Las Vegas. These photographs should also be in the files of the NPDES section in Dallas. A photograph (photo 10) taken by the EID on site on October 5, 1987, illustrate that dunes have formed east of Chino's tailings. This proves that the Chino tailings are being carried by wind away from the main tailings disposal site.

The EID also did an air transect in the direction of the prevailing winds and sampled soils 270, 552, 834, and 1116 feet downwind of the tailings, as well as the wind-blown tailings themselves. Samples were taken with a trowel from the surface of the ground. The

analytical data from the state laboratory (Table 12) indicates that the air transect sediment samples have elevated levels of copper over the background sediment samples taken at areas away from the tailings.

Finally, there is also documentation for an air release from the Bullfrog tailings located just west of the Santa Rita pit. These air releases are significant because several private dwellings and the Vanadium Post Office are located within a quarter mile of the tailings in the prevailing wind direction. Photographs 11 and 12 illustrate how the tailings have been eroded by wind over the years. In photograph 12 one can observe wind-carved erosional features in the background. It is obvious from this photo that significant quantities from the top of these tailings have blown off-site. Table 6 includes heavy metal data of tailings samples taken from several locations. It is obvious that these tailings samples are elevated in copper, iron, lead, manganese and zinc over background sediment samples. These photos and data from Table 6 document an air release at the Chino or Whitewater Creek site.

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	Se	Hg	Comments
NM				.05			.015							
MCL		.05, .2	.005	.1	1.3	.3	mg/l	.05	10	5	.05	.05	.002	
							Heavy Metals							
DISCHARGE FROM P-PLANT AT (CHINO) P-PLANT 861006		510.00	0.17	-	166.00	9430.00	-	352.00	-	74.00	-	-	-	Sampled and analyzed by Chino TDS = 20,300; pH = 2.9
W.W. CREEK AT HANOVER BRIDGE 860117 SLD		-	0.37	-	89.00	-	0.06	376.00	7.90	114.00	0.09	0.08		Sampled by EID TDS = 24809, Filtered
W.W. CREEK 100 YDS. BELOW SPILLWAY 841214 SLD		2600.00	-	-	360.00	2400.00	<	780.00	8.00	200.00	-	-	-	Sampled by EID, filtered Co = 24 mg/l
W.W. CREEK AT OLD BAYARD SEWAGE TREATMENT PLANT 841213 SLD		-	0.29	-	-	-	0.39	-	-	118.00	0.21	0.05		
BACKGROUND SAMPLES														
H.C. 1.6 MI. BELOW FIERRO SPR. 871006	SLD	<.1	<.001	<.005	<.1	<.1	<.01	<.05	<.1	<.1				NF
H.C. BEFORE CHINO DIS. AT W.D. 871007	SLD	<.1	<.004	<.005	<.005	<.1	<.01	0.15	<.1	1.00				NF

TABLE 1

Discharges into Whitewater Creek from Chino Mines P-plant

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	Se	Hg	Comments
							mg/l Heavy Metals							
EXCESS MINE H20 FROM RESERVOIR 5	SLD	2040.00	0.31	0.20	110.00	2480.00	0.01	650.00	7.30	170.00	0.40	-	-	Sampled by EID, pH = 2.9 Filtered, Co = 28 mg/l
871020														TDS=40,868 mg/l

TABLE 2

Typical sample of Chino Mines "Excess Mine Water"

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Comments
						ug/g dried sample					
BG 150 YDS. OFF PIPELINE RD.				BACKGROUND SAMPLE							
871005	SLD	8300	<	5	83	8800	<5	610	9	40	
NE CORNER OF TAILS ADJ. TO LAKE ONE											
871005	SLD	8200	<	20	620	50000	24	370	5	40	

TABLE 3
Analyses of a sample of Chino Mines Tailings

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb
		mg/l Heavy Metals					
LAKE ONE @ SE CORNER @ OUTFALL 871005	SLD	0.90	0.01	0.01	4.30	2.80	0.03

TABLE 4

Heavy Metal Analyses of acid plant blowdown that has been neutralized by lime

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Comments
		ug/g dried sample									
BACKGROUND SEDIMENT SAMPLES											
UPSTREAM OF HANOVER BRIDGE BEFORE CONFL. 871005	SLD	3800	<	<5	380	21000	70	1100	<	1300	Sediments from Hanover Creek before it merges with Whitewater Creek
BG HWY. 180 @ LAMP BRIGHT DRAW 871006	SLD	6500	<	9	40	8300	5	320	9	30	Sediments taken from Lampbright Draw just before it goes under Hwy 180.
BG 150 YDS. OFF PIPELINE RD. 871005	SLD	8300	<	5	83	8800	<5	610	9	40	See Map 1 for location. "Background sediment sample"
W.W. CK. BELOW LAST CHANCE DAM 871005	SLD	6100	<	10	680	40100	72	600	8	180	Sediment sample taken from Whitewater Creek within 50 yds of discharge point from p-plant
W.W. CK. @ PRIVATE RECOVERY OPER. [redacted]	SLD	22000	<	30	15000	79500	75	900	30	390	Taken from WW Cr. several hundred yards up from confluenc with Hanover Creek
(b) (6) [redacted]	ALL										
AT 2.5 FEET 871110	SLD	7900	<	10	2000	27000	150	220	9	240	Sediments from WW Cr. at private recovery operation adjacent to Bayard
(b) (6) [redacted] #1 SUMP AT 3 FEET 871110	SLD	6800	<	10	600	41000	340	240	<	430	Ditto
NEAR INLET TO LAKE ONE 871005	SLD	5800	<	20	90200	72800	580	1900	54	800	Taken from WW Cr. at "delta" where WW Cr. enters Lake One
W.W. CK. SURF. SALTS ADJ. TO GROUNDHOG MINE 871005	SLD	19000	20	9	12000	13000	120	13000	140	3300	Taken from WW Cr. adj. to Groundhog head frame located north of WW Creek
SED. STREAM SAMP. JUST UPSTREAM OF W.W. CK. CROSSING HWY. 180 871007	SLD	3200	<	5	250	18000	9	130	<	30	WW Cr. sediments miles below Hurley where WW Cr. goes under Hwy 180. Still noticeable impacts from Chino discharges
N. BANK UPSTREAM OF HANOVER CULVERT 871005	SLD	4300	<	30	430	69000	52	230	<5	110	Sediment sample from WW Cr. just before confluence with Hanover Creek

TABLE 5

Analyses of Sediments collected from Whitewater Creek stream bed at various locations

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Comments
		ug/g dried sample									
BACKGROUND SEDIMENT SAMPLES											
UPSTREAM OF HANOVER BRIDGE BEFORE CONFL. 871005	SLD	3800	<	<5	380	21000	70	1100	<	1300	
BG HWY. 180 @ LAMP BRIGHT DRAW 871006	SLD	6500	<	9	40	8300	5	320	9	30	
BG 150 YDS. OFF PIPELINE RD. 871005	SLD	8300	<	5	83	8800	<5	610	9	40	
VANAD. TAILS TOP OF DAM FRONT EDGE @ E. SLOPE 871007	SLD	1700	<	5	650	101000	20	2600	10	2600	Bullfrog tailings
VANAD. TAILS DISC. @ CHAIN LINK FENCE 871007	SLD	4200	5	<5	3900	81200	780	1600	<5	6400	Bullfrog tailings
DISC. PT. FROM VANAD. TAILS INTO W.W. CK. 871007	SLD	8000	<	<	570	47200	1200	3600	<5	3700	Bullfrog Tailings

TABLE 6

Heavy metal analyses of sediments collected at the Bullfrog (Vanadium) Tailings Disposal Area

TABLE 7

Heavy Metal Analyses of shallow alluvial wells below Chino Mines discharge from P-Plant
See (b) (6) [redacted] and (b) (6) [redacted] wells in particular

	As	Cd	Cu	Fe	Ni	Pb	Zn	SO_4	pH
(b) (6) [redacted]									
Plant (b) (6) [redacted]									
Water Level 25 ft--EID									
Sample 9/72	-	0.10	0.44	164.00	2.44	0.30	41.75	2,550	3.0
3/76	0.48	0.05	2.14	203.00	1.76	0.17	28.70	5,951	3.0
11/76	0.30	0.17	6.20	-	-	-	-	2,348	4.7
10/80	0.35	0.04	0.26	246.00	1.89	0.29	24.50	4,242	3.4
2/81	0.53	0.05	1.15	174.00	1.71	0.38	29.30	6,602	3.0
Rifle Range Windmill									
400 ft East of Creek-									
Water Level 20 ft									
3/76	-	-	-	-	-	-	-	-	-
11/76	-	-	-	-	-	-	-	-	-
10/80	0.004	0.01	0.02	34.8	0.01	0.13	13.50	72	8.5
2/81	0.004	0.01	0.02	4.4	0.04	0.03	2.00	68	8.4
(Across from Ward Well)									
(b) (6) [redacted]									
Water Level 20 ft									
3/76	-	-	-	-	-	-	-	-	-
11/76	-	-	-	-	-	-	-	-	-
10/80	0.39	0.14	14.50	10.20	2.00	0.25	47.30	4,120	3.3
[redacted]	0.43	0.10	4.40	71.20	2.10	0.23	38.80	4,737	3.1
(b) (6) [redacted]									
Water Level 110 ft									
EID Sample									
8/72	0.004	0.01	0.01	0.78	0.10	0.005	0.22	29	8.5
3/76	0.004	0.07	0.13	4.40	0.02	0.12	3.70	20	8.0
11/76	-	-	-	-	-	-	-	-	-
10/80	0.004	0.01	0.27	6.20	0.01	0.23	6.60	19	7.5
2/81	0.004	0.01	0.01	0.14	0.01	0.01	0.24	19	8.7
	(0.004)	(0.05)	(0.14)	(7.90)	(0.01)	(0.20)	(6.80)	(29)	(8.8)

Continued

TABLE 7 (CONTINUED)

MCL	.05 As	.005 Cd	1.3 Cu	.3 Fe	10 Ni	.015 Pb	5 Zn	250 SO_4	6.5-8.5 pH
(b) (6) [redacted]									
Water Level 20 ft									
3/76	0.60	0.15	18.00	15.60	2.40	0.24	50.20	6,528	3.2
11/76	0.83	0.20	28.00	-	-	-	-	7,275	3.4
10/80	0.70	0.18	22.00	38.60	2.50	0.28	50.00	4,490	3.1
2/81	0.47	0.14	17.50	18.80	2.40	0.21	44.40	4.946	3.1
Creek in Front of (b) (6) [redacted]									
4.5 Miles Downstream									
3/76	0.48	0.06	7.10	19.90	0.87	0.13	19.20	2,962	4.0
11/76	-	-	-	-	-	-	-	-	-
10/80	0.25	0.09	9.60	31.80	1.10	0.13	23.20	2,880	4.1
2/81	0.42	0.06	7.80	16.40	1.00	0.11	20.80	3,126	3.9
Lake One Inlet									
5.5 Miles Downstream									
3/76	0.46	0.12	13.90	16.40	1.80	0.24	35.90	5,083	3.7
11/76	0.73	0.14	16.60	-	-	-	-	4,327	3.8
10/80	0.40	0.12	13.80	29.90	1.59	0.17	33.10	3,470	4.0
2/81	0.70	0.11	12.70	14.70	1.70	0.20	32.80	5,639	3.8
Lake One Monitor Well									
10/80	0.004	0.03	0.14	14.70	0.26	0.16	0.96	2,880	6.6
2/81	0.04	0.01	0.40	5.70	0.24	0.19	1.09	2,814	7.2

TABLE 8

FAC. NAME: WHITEWATER CREEK, GROUND WATER DATE OF PRINTOUT: 3/29/88

DATE YY,MM,DD	LAB NAME	DTW	pH	Ca	Mg	Na	K	HCO3	Cl	SO4	NO3-N	TDS	METH. OF SAMP.	Comments
						mg/l								
MIMSVILLE 871110	SLD	–	7.8	56	22	53	2	-	15	46		546	Pump	Volc.
(b) (6) [redacted] 871007	SLD	20	7.3	244	54	64	3	287	182	343		1218	Tap	Qal
PD WELL NEXT TO (b) (6) [redacted] 871005	SLD	11.4	7.4	332	49	478	6	503	264	1125		2598	Bail	Qal
(b) (6) [redacted] 871006	SLD	8.9	5.8	600	334	147	7	98	208	2585		4232	Bail	–
RIFLE RANGE 871006	SLD	14.7	6.4	6	2	87	1	113	<5	64		236	Bail	Volc
(b) (6) [redacted] 871109	SLD	–	6.2	240	61	55	6	177	197	370		1418	Bail	Windmill
(b) (6) [redacted]	SLD	–	6.9	496	75	55	7	217	348	752		2474	Tap	80 ft deep
BAYARD CANYON SPRING 871110	SLD	–	–	26	6	23	3	138	<5	<5		192	Dip	Volc
(b) (6) [redacted] WELL 871109	SLD	–	–	224	46	85	4	323	31	576		1252	Tap	65 feet deep
(b) (6) [redacted] 871109	SLD	5.67	7.3	700	134	156	6	286	424	1355		3882	Bail	50 ft deep
(b) (6) [redacted] WELL 871109	SLD	24.2	5.1	468	81	53	5	266	315	625		2270	Bail	–
(b) (6) [redacted] 871109	SLD	–	7.2	320	61	64	6	170	225	500		1690	Tap	80 ft deep
(b) [redacted] WELL 871109	SLD	–	–	540	85	83	6	367	182	1245		2578	Tap	–
B-20 981110	SLD	47.2	6.6	252	17	39	6	160	<5	566		1016	Bail	–
B-39 871110	SLD	59.3	7.6	27	2	101	1	297	9	17		354	Pump	Volc
B-40 871110	SLD	10.7	7.8	340	78	94	4	333	<5	925		1780	Bail	Gila Con.
B-43 871110	SLD	–	7.0	660	97	138	4	101	<5	1945		3210	Pump	Volc

GROUND WATER SAMPLING POINTS NEAR BAYARD AND HURLEY. STRATIGRAPHIC UNIT OF WELL DEPTH LISTED UNDER "COMMENTS"

TABLE 8 (cont'd.)

FAC. NAME: WHITEWATER CREEK, GROUND WATER

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	Se	Hg	Comments
							mg/l Heavy Metals							
MIMSVILLE 871110	SLD	0.40	-	-	-	10.00	0.03	0.44	-	2.30	-	-	-	
(b) (6) [redacted] 871007	SLD	-	-	-	-	-	-	-	-	-	-	-	-	
PD WELL NEXT TO (b) (6) [redacted] 871005	SLD	-	-	0.01	0.10	0.30	-	2.90	-	-	-	-	-	
(b) (6) [redacted] 871006	SLD	0.60	0.01	0.01	0.10	1.80	-	8.90	-	0.40	-	-	-	
RIFLE RANGE 871006	SLD	-	-	-	-	5.30	0.02	0.07	-	1.00	-	-	-	
(b) (6) [redacted] 871109	SLD	-	-	0.01	-	0.20	-	-	-	-	-	-	-	
(b) (6) [redacted] 871109	SLD	-	-	-	-	0.70	-	-	-	1.00	-	-	-	
BAYARD CANYON SPRING 871110	SLD	-	0.00	-	-	0.40	-	0.06	-	-	-	-	-	
(b) (6) [redacted] WELL 871109	SLD	-	-	0.01	-	2.60	-	-	-	-	-	-	-	
(b) (6) [redacted] 871109	SLD	-	-	0.01	-	0.50	-	-	-	-	-	-	-	
(b) (6) [redacted] WELL 871109	SLD	-	-	-	-	0.70	-	0.10	-	-	-	-	-	
(b) (6) [redacted] 871109	SLD	-	-	-	-	-	-	-	-	-	-	-	-	
(b) [redacted] WELL 871109	SLD	-	-	-	-	4.5	-	0.37	-	-	-	-	-	
B-20 981110	SLD	3.2	-	0.008	0.2	4.4	0.12	0.92	-	0.2	-	-	-	
B-39 871110	SLD	-	-	-	-	0.4	-	0.17	-	-	-	-	-	
B-40 871110	SLD	-	-	-	-	0.3	-	-	-	-	-	-	-	
B-43 871110	SLD	-	-	-	-	1.4	-	6.3	-	0.3	-	-	-	

TABLE 8 (co. ..)

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	Se
		mg/l Heavy Metals										
B-44 871110	SLD	-	-	-	-	1.5	-	0.14	-	-	-	-
B-46 871110	SLD	-	-	-	-	3.2	0.02	0.13	-	-	-	-
(b) (6) [redacted] LL 871005	SLD	140	0.035	0.1	14	120	0.59	23	0.3	13	-	-

FAC. NAME: WHITEWATER CREEK, GROUND WATER

DATE OF PRINTOUT: 8/16/88

Gila Conglomerate

DATE YY,MM,DD	LAB NAME	F/NF	DTW	WLE	pH	Ca	Mg	Na	K	HCO3	Cl	SO4	NO3-N	TDS	COMMENTS
						mg/l									
Pond 7-A															
861022	SLD	F	134.11		6.8	100	5	<10	<1	105	64	42		316	Background
Pond 7-BS															
861022	SLD	F	130.9		6.7	50	22	51	1	188	61	66		404	Background
Pond 7-N															
861022	SLD	F	56.17		6.9	40	12	<10	<1	165	11	50		284	Background
8-S															
861020	SLD	F	107.88		6.6	400	83	37	7	49	105	1302		2396	
9-S															
861020	SLD	F	117.38		6.9	342	11	38	3	84	120	643		1312	
16-S															
880420	CHINO	F			3.95	476	195	79	16	0	31	3050		4850	
16-S															
861021	SLD	F			3.9	620	878	69	18	0	45	3838		5630	
16-S															
861021	CHINO	F			3.9	463	161	62	18	0	40	3310		6470	

TABLE 9

Heavy metal analyses of Gila Conglomerate wells. Compare 16S data to background (7A, 7-BS, and 7-N) wells.

FAC. NAME: WHITEWATER CREEK, GROUND WATER

DATE OF PRINTOUT: 8/16/88

Gila Conglomerate

mg/l

Heavy Metals

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	As	COMMENTS
	MCL	.2	.005	.05	1.3	.3	.05	.05	.2	5	.05	
Pond 7-A 861022	SLD	<.1	<.001	<.1	<.1	<.1	<.01	<05	<.1	<.1	<.005	Background
Pond 7-BS 861022	SLD	<.1	<.001	<.1	<.1	<.1	<.01	<.05	<.1	<.1	<.005	Background
Pond 7-N 861022	SLD	<.1	<.001	<.1	<.1	<.1	<.01	<.05	<.1	<.1	<.005	Background
8-S 861020	SLD	-	-	-	-	-	-	-	-	-	-	
9-S 861020	SLD	-	-	-	-	-	-	-	-	-	-	
16-S 880420	CHINO	-	-	<.01	141	98.7	<.01	41.9	0.8	6.5	<.01	
16-S 861021	SLD	150.00	0.18	<.1	270	110	<.01	50	1	18	0.037	
16-S 861021	CHINO	-	-	-	255	188	<.01	209	-	-	-	

Table 9(cont.)

TABLE 10

Records of wells in Grant County—Continued

Location number	Owner or tenant	Year completed	Depth of well (feet)	Diameter of well (inches)	Altitude above mean sea level (feet)	Water level: Depth below land surface (feet)	Water level: Date	Stratigraphic unit	Method of lift and power source	Use of water	Remarks
18.10.22.111	(b) (6) [redacted]	-	27	48	5,495	p 23.5	1-14-57	Qtg	P,e,w	D,S	Dug, concrete cribbing to 30 ft.
22.122	do.	-	12	60	5,480	Dry	1-15-57	(Qal)	N	-	Dug in alluvium for irrigation but was inadequate, later went dry.
22.124	do.	-	13	30	5,495	12.2	do.	Qal	N	(D)	Dug, stone cribbing.
22.222	(b) (6) [redacted]	-	-	-	5,520	-	do.	QTg	J,e	D,S	Rept good.
* 23.111	do.	-	21	60	5,505	17.7	6- 5-52	Qal	P,w	D	Dug, concrete cribbing; T 12°C.
						17.6	1-15-57				
26.142	(b) (6) [redacted]	-	344	16	5,446	40.3	do.	Qtg/QTg	N	-	(b) (6) [redacted] cased 30 ft; drilled to 400 ft for irrigation but never tested.
26.144	do.	1952	400 R	16	5,445	39.2	do.	Qtg/QTg	T,e	Irr	(b) (6) [redacted] cased 30 ft; yield 350 gpm; main water struck at 380 ft.
* 29.233	(b) (6) [redacted]	(1930)	75	8	5,780	p 53.1	3-16-57	Trp	P,w	S	Strong; T 22°C.
33.433	State of New Mexico (Leedro Eby)	(1880)	18	48	5,760	11.3	do.	Trp	P,w	S	Dug, rock cribbing; site of old spring; weak but never dry.
* 34.131	(b) (6) [redacted]	1935	73	10	5,520	28.0	3-20-57	Tr	P,w	S	(b) (6) [redacted] cased 10 ft; drilled to 125 ft; never has pumped out.
34.424	[redacted]	Old	33	60	5,460	32.7	do.	Qal	P,w	S	Dug, concrete and rock cribbing.
† 34.424a	do.	1957	100 R	6	5,460	16.3	6-21-57	Tba	P,w	S	(b) (6) [redacted] cased 100 ft; bailing 30 gpm did not lower wl appreciably.
35.324	(b) (6) [redacted]	(1936)	99	6	5,400	30.7	1-16-57	QTg	P,w	D,S	(b) (6) [redacted]; good.
35.344	do.	-	20	60	5,390	16.6	do.	Qal	P,w	D,S	Dug, concrete cribbing; weak.
35.344a	do.	1952	47 R	8	5,410	24.9	do.	Qal	P,w	D,S	(b) (6) [redacted] good.
35.432	(b) (6) [redacted]	1957	39	16	5,370	8.3	6-21-57	Qal	N	(Irr)	(b) (6) [redacted] cased 50 ft; perforated 30 to 50 ft; bedrock found at 50 ft.
18.11. 3.134	[redacted]	1954	220 R	8	6,165	199.0	4-23-57	(IPM)	P,w	S	(b) (6) [redacted] cased 10 ft; water found at 206 ft rose to 190 ft; bailed 6 gpm.
5.414	State of New Mexico (Forest Delk)	1936	57	6	5,920	24.1	do.	Qal	P,w	S	(b) (6) [redacted] strong.
18.244	do.	-	80	-	5,865	25	do.	Tr	P,w	S	Not visited.
20.213	(b) (6) [redacted]	1953	50 R	16	5,740	15	12-1954	Qal	N	(Irr)	(b) (6) [redacted] slight yield from gravel overlying volcanic rock at 50 ft.
30.114	Kennecott Copper Corp.	-	78	12-6	5,614	15.7	1-12-55	Tr	P,w	S	(b) [redacted] well; 6-in casing inside 12-in.
18.12. 5.142	American Smelting & Refining Co.	1932	510 R	-	6,120	300	1932	TKl	T,e	Ind	Groundhog No 1 mine shaft; steady yield of 5 gpm kept mine dry when bottom workings were at 310 ft below surface-10 gpm from the 410 ft level, and 20 gpm from the 510 ft level;this shaft now connected with the Star shaft (17.12.32.444) from which 500 gpm is pumped steadily.
6.314	(b) (6) [redacted]	Old	13	36	5,824	8.7	9-15-54	Qal	N	(D)	Dug, wooden cribbing; mine waste in adjacent creek ruined well.
✓ 7.133	[redacted]	(1935)	51	8	5,780	28.1	9-14-54	Ts	P,e	D,S	(b) (6) [redacted] l fluctuates--was 17 ft in spring of 1954.
✓ 7.133a	do.	-	98	6	5,780	p 32.1	do.	Ts	P,w	Irr	[redacted] sed to irrigation large garden and yard.
13.321	Kennecott Copper Corp.	1956	345 R	8	6,225	Dry	1- 4-56	Tr	N	(S)	(b) (6) [redacted] drilled in volcanic tuff, no water found.
✓ 18.131	do.	-	26	72	5,730	19.7	9-14-54	Qal	C,g	S	Dug, wood cribbing; south well of two.

Well record data from Trauger. These well locations are denoted on Figure 8. Note entries 5 and 6 where wells went bad.

Table 12–*Records of wells in Grant County*–Continued

Location number	Owner or tenant	Year completed	Depth of well (feet)	Diameter of well (inches)	Altitude above mean sea level (feet)	Water level: Depth below land surface (feet)	Water level: Date	Stratigraphic unit	Method of lift and power source	Use of water	Remarks
18.12-18.131a	Kennecott Copper Corp.	-	24	8	5,730	16.8	9-14-54	Qal	N	N	Test hole, north well of two.
18.133	do.	Old	22	12	5,715	17.6	do.	Qal	P,w	(D,S)	Spiral riveted casing; pump out of order; water contaminated about 1947 by mine waste flowing in nearby creek; south well of two.
18.133a	do.	-	8	48	5,707	9.6	do.	Qal	N	(S)	Dug, concrete cribbing; water unusable because of minerals from mine wastes.
18.341	do.	-	247	6	5,715	13.4	do.	Ts	P,w	S	
19.111	(b) (6)	1944	210 R	6	5,680	190	6-1954	Ts	P,e	D	(b) (6) ased 40 ft; drilled originally to 156 ft, deepened to 210 ft ill pump out in 20 minutes with small capacity pump.
19.112	(b) (6)	1953	205 R	8	5,678	-	-	Ts	P,e	D	(b) (6) ound first water at 70 ft, never has pumped out.
19.112a	do.	-	26	60	5,678	8.0	6-15-54	Qal	P,w C,e	Irr	(b) (6) dug, concrete cribbing; adequate for large garden and yard.
19.113	(b) (6)	1948	10	48	5,680	8.1	do.	Qal	C,e	Irr	(b) (6) dug, culvert cribbing; will pump out at 3 gpm; water marks indicate wl was 5.9 ft before current drought.
19.311		-	225	8-6	5,675	197.6	do.	Ts	P,w	(D,S)	Eight-in casing to 15 ft; depth of 6-in casing unknown, but probably below shallower water-bearing strata; pump out of order.
19.311a	do.	-	-	-	5,770	-	do.	-	P,e	D	Sealed.
19.321	(b) (6)	-	13	18	5,651	10.1	12-15-54	Qal	N	(S)	Dug, backfilled around steel casing.
19.323		(1935)	285	6	5,653	230+	do.	Trp	P,e	D,S	Weak; can pump only 5 min a day; water entering at about 225 ft.
19.324		-	125 R	6	5,665	-	do.	Trp	P,e	D,S	Weak; can pump for about 30 min each day.
30.124	Kennecott Copper Corp.	-	74	10	5,623	10.6	do.	Ts	P,w	D,S	Good.
31.241	do.	-	4	60	5,555	2.9	9-26-54	Qal	N	(D)	Dug, and infiltration gallery about 700 ft N.E. extends under creek bed and to 40 HP turbine pump--water used in Hurley Mill.
34.432	do.	-	13	48	5,723	3.6	12- 2-54	Tr	N	(D)	Dug, concrete cribbing; may be a developed spring.
36.144	do.	1951	296 R	6	5,565	192.4	1-12-55	Tr	P,w	S	(b) (6) strong; wl 193 ft at time of drilling; Zinc ore at 206 ft.
18.13. 1.133	State of New Mexico	Old	119	96	5,960	100.9	9-15-54	TKi	N	-	Mine shaft, wood timbered; found covered by new hiway in 1962.
1.133a	(b) (6)	-	220	6	5,965	81.0	8- 8-62	TKi	P,e,w	D	Had only a few feet of water several years ago.
1.313	State of New Mexico	1957	500	6	5,925	-	do.	TKi	N	N	Found destroyed in 1962; did not make enough water to justify installing pump.
2.114	(b) (6)	-	102	6	5,945	88.1	5-10-54	Kc	P,w	S	Pumping less than ½ gpm and drawing air.
2.143	do.	-	23 R	-	5,917	22	4-26-54	Qal	P,e	D,S	Dug; weak, will pump out; plenty of water when rainfall is normal.
2.143a	do.	-	110 R	-	5,915	21	do.	TKi	N	D,S	Will be equipped with pump soon; weak.
* 2.321	(b) (6)	1870	26 R	40	5,910	24.3	do.	Qal	P,e,w	D,S	(b) (6) dug, rock cribbing; pumps out in 10 min at 25 gpm.
2.323	do.	1948	110	17	5,909	25.3	do.	Ts	N	(PS)	Drilled 232 ft as supply well for town of Central; yield 2 gpm.
2.434	(b) (6)	(1915)	83	6	5,890	33.8	4-23-54	Ts	P,w	D,S	Adequate; pumping level 64 ft.

Table 12–*Records of wells in Grant County*–Continued

Location number	Owner or tenant	Year completed	Depth of well (feet)	Diameter of well (inches)	Altitude above mean sea level (feet)	Water level: Depth below land surface (feet)	Water level: Date	Stratigraphic unit	Method of lift and power source	Use of water	Remarks
18.13. 3.112	(b) (6) [redacted]	(1953)	55	10	5,995	31.4	6-11-54	Kc	N	(D)	(b) (6) [redacted] will be equipped with pump soon.
3.114	[redacted]	1948	60 R	6	5,985	32	do.	Kc	P,w	D	(b) (6) [redacted] pumping level 52 ft.
3.114a	[redacted]	-	58	6	5,986	32.1	do.	Kc	N	(D,S)	-
3.132	[redacted]	-	75	6	5,980	-	do.	Kc	P,w	D,S	(b) (6) [redacted] adequate.
3.412	[redacted]	-	200	8	6,026	24.3	9- 8-54	Trp	N	-	Drilled 500 ft as test hole but produced very little water; no casing.
4.322	[redacted]	(1951)	67	12	5,975	21.2	5- 7-54	Kc	P,w J,e	D,S	Enough water to maintain lawn and shrubs.
4.433	[redacted]	-	-	6	5,910	-	do.	Kc	J,e	D,S	Inadequate during drought; one of two wells at house.
4.433a	do.	-	45	72	5,910	44.0	do.	Kc	P,w	S	Dug, backfilled around 12-in pipe in lower part of well; has not pumped out.
4.441	(b) (6) [redacted]	-	55	6	5,921	23.9	5-10-54	Qal	P,w	S	Unused for many years.
5.241	[redacted]	1954	300 R	6	6,010	110.6	10-13-54	Kc	P,g	D	(b) (6) [redacted] cased 11 ft; yield less than 1 gpm; first water found at 143 ft; rose to 110 ft by next day; southwest well of two.
5.241a	do.	1955	99	8	6,025	38.7	4-12-55	QTg	N	(D,S)	(b) (6) [redacted] sand and gravel at bottom; bailed 50 gpm; to be equipped soon.
5.242	(b) (6) [redacted]	1954	280 R	10	6,060	92.4	do.	QTg	J,e	D	Cased 6 ft; has plenty of water for domestic use.
8.111	[redacted]	1949	172	6	5,995	137.4	5-19-54	Kc	P,e	D	(b) (6) [redacted] first water found at 180 ft rose to about 135 ft.
* 8.133	[redacted]	1950	270 R	6	5,965	145.5	5-18-54	QTg(?)	P,g	D,S	(b) (6) [redacted] cased 40 ft; hard rock found at 257 ft; drilled 3 ft then bit dropped 10 ft, and water rose to 140 ft.
* 8.313	[redacted]	-	207	12	5,985	p175.4	do.	QTg	P,w	S	Adequate; water slightly murky; T 20°C.
9.211	[redacted]	-	34	72	5,916	26.5	5-10-54	Kc	P,w	(S)	Unused for many years.
9.224	[redacted]	1935	20	7	5,908	17.9	5- 7-54	Qal	N	(D)	Bored; middle well of three.
9.224a	do.	-	18	60	5,909	15.8	do.	Qal	P,w	S	Dug, concrete cribbing to 15 ft; strong; south well of three.
9.224b	do.	-	50	7	5,917	22.3	do.	Kc	P,w	D,S	Drilled adjacent to old unused dug well; north well of three.
9.231	(b) (6) [redacted]	1953	116	6	5,902	28.7	5-10-54	Kc	P,w	S	(b) (6) [redacted]
10.213	[redacted]	-	56	6	5,924	19.1	do.	Trp	N	(S)	-
10.444	do.	-	61	48	5,860	15.2	7-29-54	Trp	N	(S)	Dug, wood cribbing.
11.212	(b) (6) [redacted]	-	30	8	5,880	30.0	4-23-54	Trp	P,w	(S)	Water supply declined; not used for past twelve years.
11.441	[redacted]	-	55	36	5,837	Dry	5-26-54	(QTg)	N	-	Dug, backfilled around steel drums.
11.444	do.	1947	-	6	5,831	68.2	5-24-54	QTg	P,w	S	Cased 6 ft; dependable.
✓ 12.111	do.	1953	308+	6	5,885	255.7	2-13-54	QTg	P,w	D,S	(b) (6) [redacted] drilled alongside old shallow dug well that went dry.
✓ 12.113	do.	1944	129	6	5,855	Dry	-	(QTg)	N	(PS)	Formerly Bayard well No. 1; drilled 500 ft; penetrated fault and water drained away; plugged back to 125 ft; north well of four.

Table 12–*Records of wells in Grant County*–Continued

Location number	Owner or tenant	Year completed	Depth of well (feet)	Diameter of well (inches)	Altitude above mean sea level (feet)	Water level: Depth below land surface (feet)	Water level: Date	Strata: Geographic unit	Method of lift and power source	Use of water	Remarks
18.13N12.113a	(b) (6) [redacted]	1944	345 R	6	5,855	69.0	3-21-49	QTg	P,w	S	Formerly Bayard well No. 3; yield 40 gpm but would pump out if No. 5 well pumping; dd 88 ft at yield of 25 gpm in 1954 when used by Central.
						87.6	3-23-54				
12.113b	do.	1944	224 R	8	5,855	69.2	3-21-49	QTg	T,e	Irr	Formerly Bayard well No. 5; yield 40 gpm; now used for small orchard.
						88.0	3-23-54				
12.113c	do.	1944	343 R	8	5,855	69.5	3-21-49	QTg	N	(PS)	Formerly Bayard well No. 2; used by Central in 1954, west well of four.
						88.1	3-23-54				
13.222	Kennecott Copper Corp.	-	14	8	5,840	3.1	6-18-57	Qal	N	-	South hole of 3 drilled 20 ft apart, all about 13 to 14 ft deep.
13.323	do.	1953	645 R	20-8	5,975	190.5	4-15-54	QTg	N	-	Golf Course well No. 5; cased 338 ft; yield 24 gpm, dd 425 ft; water found at 360, 395, 413, and 580 ft; bottom of hole shot with dynamite.
14.221	Town of Bayard	1950	-	8	5,830	61.3	3-23-54	QTg	T,e	PS	Bayard well No. 10; nearby wells pumping when wl measured.
* 14.221a	do.	1950	100 R	9	5,830	p 78.1	2-13-54	QTg	T,e	PS	Bayard well No. 9.
14.222	do.	1948	102 R	12	5,830	65.2	3-23-54	QTg	T,e	PS	Bayard well No. 6; nearby wells pumping when wl measured.
14.222a	do.	1948	124 R	12	5,830	64.8	do.	QTg	T,e	PS	Bayard well No. 7; reptd yield 75 gpm with about 25 ft; nearby wells pumping; Hyd.
14.222b	do.	1950	-	8	5,830	-	-	QTg	T,e	PS	Bayard well No. 8.
14.222c	do.	1956	250	12	5,830	65	1956	QTg	T,e	PS	Bayard well No. 11; cased 250 ft, perforated 65-250 ft; yield 100 gpm.
14.244	Kennecott Copper Corp.	1953	274	10	5,818	46.4	2-13-54	QTg	N	Ind	Golf Course No. 6; cased 263 ft; drilled to 310 ft; casing perforated 139-161, 182-203, 243-263; yield 145 gpm with 8 ft dd.
14.431	do.	1953	270 R	14-10	5,795	30.9	5-26-54	QTg	N	-	Golf Course No. 1; cased to 116 ft; yield 28 gpm; fissured rock between 220 and 225 ft; water found at 42 ft; about 100 ft NW of No. 2 well.
14.431a	do.	1953	300 R	14-10	5,795	30.8	do.	QTg	N	-	Golf Course No. 2; cased 183 ft; yield 31 gpm; water found at 42 ft.
14.432	do.	1953	175 R	14	5,785	28	1953	QTg	N	-	Golf Course No. 3; cased 135 ft; bailed 30 gpm; casing perforated 28-134 ft; water found at 37 ft; T 16°C.
14.434	do.	1953	141 R	18	5,780	25.0	3-26-54	QTg	N	-	Golf Course No. 4; cased 37 ft; water found at 25 ft; T 18°C.
15.222	State of New Mexico	-	92	5	5,862	p 9.4	do.	frp	P,w	S	(b) (6) [redacted]
15.433	State of New Mexico (Town of Central)	1961	555 R	10	5,830	75.7	4-11-62	QTg	T,e	PS	[redacted] Central Well No. 3; cased 401.5 ft, perforated 80 ft to 397 ft; yield about 375 gpm.
† * 15.434	do.	1954	472	12	5,920	167.6	10-13-54	QTg	T,e	PS	McBee Drilling Co.; Central Well No. 1; yield 108 gpm, dd 46 ft, 9-29-56; T 21°C.
* 15.444	do.	1954	387 R	18-10-6	5,815	44.8	10-22-54	QTg	P,e	PS	McBee Drilling Co.; Central Well No. 2; yield 24 gpm; T 20°C.
21.143	Kennecott Copper Corp.	-	7	24	5,725	Dry	5-10-54	(Qal)	N	(DS)	Dug, rock cribbing; caved; water rising in ajacent creek channel flows for several hundred yards.
21.213	do.	-	148	12	5,760	16.9	10- 6-54	Qal/QTg	N	(Ind)	Weak; south well of two that supplied the Hurley smelter about 1910 to 1934; depression around casing indicates well may have caved.

Table 12–*Records of wells in Grant County*–Continued

Location number	Owner or tenant	Year completed	Depth of well (feet)	Diameter of well (inches)	Altitude above mean sea level (feet)	Water level: Depth below land surface (feet)	Water level: Date	Strata graphic unit	Method of lift and power source	Use of water	Remarks
†*18.13.22.222	(b) (6) [redacted]	1952	744 R	10-8	5,790	30.4	5-26-54	Qal/QTg	T,e	Irr	(b) (6) [redacted] d 105 ft after pumping 175 gpm for 2½ hrs, T 19°C.
22.224	do.	-	26	-	5,790	Dry	do.	(Qal)	N	(D,S)	Dug, went dry in early 1954.
22.242	do.	-	130 R	6	5,775	-	do.	Qal/QTg	T,e	D,S	Yield 70 gpm with 5 HP motor on pump.
24.244	(b) (6) [redacted]	1949	500 R	6	5,710	295±	6-15-54	Trp	P,e	D,PS	(b) (6) [redacted] ater entering about static level; wl about 200 ft in 1949.
24.444	[redacted]	-	225 R	6	5,695	147.0	do.	TKt	P,w	D,PS	Cased 6 ft; originally 125 ft deep, deepened about 1952.
25.222	[redacted]	1952	158 R	8	5,685	90.7	do.	TKt	P,w	D	(b) (6) [redacted] as weakened in past two years--will now break suction.
25.242	[redacted]	-	74	7	5,715	39.4	do.	Qal(?)	P,w	D	Not pumped for past year; inadequate for domestic supply.
29.213	[redacted]	1950	161	6	5,670	147.3	6-10-54	pC	P,w	S	Will pump out; wl measured 1 hr after pumping halted.
32.333	[redacted]	-	300 R	6	5,550	205.7	do.	QTg	P,w	S	Not pumped recently - mill out of order.
34.212	[redacted]	1949	300 R	-	5,550±	Dry	1949	-	N	(S)	Rept dry when drilled but may have had some water; not visited.
34.434	do.	Old	157	7	5,537	Dry	6-14-54	QTg/SOC	N	(D,S)	Adjacent to ruins of old house.
18.14.1.111	(b) (6) [redacted]	-	300 R	8	5,981	-	-	Kc	P,w	D	(b) (6) [redacted] eak but will not pump out.
1.111a	do.	-	68	-	5,980	-	-	Kc	T,e	Irr	[redacted] ill pump out in one hour; waters yard and garden.
1.412	(b) (6) [redacted]	-	260 R	6	5,935	-	5-18-54	Kc	P,w	D,S	Weak; will break suction.
1.444	[redacted]	-	29	6	5,865	p 25.9	5-17-54	Kc	P,w	D,S	Dug, backfilled around casing; wl pumped down to cylinder.
2.222	Rosedale Dairy	1944	290 R	8	5,971	27.8	6-25-57	Kc	T,e	D,S	(b) (6) [redacted] ater at 80 ft and 235 ft; supplied former dairy.
2.222a	do.	Old	38	60	5,970	26.9	do.	Kc	N	(Ind)	Dug, concrete curbing; original well for former dairy.
3.211	State of New Mexico	-	148	6	5,910	37.4	8-11-54	Kc	P,w	(D)	No longer used.
4.333	State of New Mexico (James Turner)	1948	74	6	6,115	34.3	7-14-54	Dp(?)	P,w	S	(b) (6) [redacted] cased 74 ft; yield 8 gpm when drilled, now yields 1/3 gpm
5.343	do.	(1935)	216	6	6,190	126.3	7-15-54	QTg	P,w	D,S	(b) (6) [redacted] drilled 350 ft; cased 240 ft; water found only at 110 ft.
5.343a	do.	1912	184	6	6,172	87.0	12-23-49	QTg	P,w	D,S	(b) (6) [redacted] ased 175 ft; yield 3/4 gpm; water found at 90 ft; west well of two.
						p108.0	7-15-54				
5.344	do.	1922	225	8	6,190	85.3	do.	QTg	P,w	D,S	(b) (6) [redacted] ield about ½ gpm steady.
* 6.111	do.	1954	287	6	6,300	p151.9	do.	pCg	P,w	S	[redacted] cased 290 ft; seeps at 110 and 200 ft; main water from 265 to 270 ft; yield has declined from 4½ to 1 gpm; T 18°C.
8.224	(b) (6) [redacted]	-	-	6	6,085	-	7-14-54	SOC	P,e	D	-
8.224a	do.	-	69	48	6,085	55.4	do.	QTg	J,e	D,S	Dug, water may be perched.
8.234	(b) (6) [redacted]	-	50	48	6,075	44.9	do.	QTg	P,w	D,S	Dug, wooden cribbing to 10 ft; water may be perched.
8.242	[redacted]	1952	164 R	5	6,070	135	do.	QTg	P,w	D,S	(b) (6) [redacted] drilled and cased 200 ft; perforated and gravel-packed.
8.312	[redacted]	-	190+	10	6,075	200	do.	QTg	P,w	D,S	-

TABLE 11

Precipitation Plant Discharges

1973-1977 Data Base in mg/l

Element	Minimum Value	Maximum Value	Average Value	Data Pieces	Sampling Interval
As	0.092	2.70	1.18	20	73-77
Ba	0.080	0.30	0.185	17	75-77
Cd	0.050	0.59	0.483	16	75-77
Cr	0.26	0.62	0.423	17	75-77
Cu	21.4	142.0	71.3	25	73-77
Fe	1880	5800	2762	24	73-77
Pb	0.35	0.98	0.668	26	73-77
Hg	0.0001	0.0008	0.0003	26	73-77
Mo	0.01	0.98	0.269	18	75-77
Ni	6.9	14.6	10.95	18	75-77
Se	0.01	0.36	0.137	26	73-77
Ag	0.03	0.06	0.05	18	75-77
Zn	102	192	142	20	73-77
SO_4	17210	48950	33340	27	73-77
TDS	20100	57400	43300	17	75-77
pH	2.80	3.83	3.12	23	73-77

1978-1980 Data Base in mg/l

Element	Minimum Value	Maximum Value	Average Value	Data Pieces	Sampling Interval
As	0.41	2.20	0.96	8	78-80
Ba	0.20	0.30	0.29	8	78-80
Cd	0.38	0.54	0.46	8	78-80
Cr	0.18	0.96	0.42	8	78-80
Cu	51.4	156.0	82.3	7	78-80
Fe	1970	2830	2510	7	78-80
Pb	0.62	1.04	0.74	8	78-80
Hg	0.0001	0.0004	0.0002	7	78-80
Mo	0.10	0.40	0.14	7	78-80
Ni	4.90	10.5	8.77	8	78-80
Se	0.011	0.22	0.09	8	78-80
Ag	0.010	0.13	0.07	8	78-80
Zn	76.0	170.0	135.6	8	78-80
SO_4	15750	31700	25300	7	78-80
TDS	19260	82000	42040	6	78-80
pH	3.00	3.5	3.16	7	78-80

Data submitted by Chino Mines (Kennecott Copper) in discharge plan application, depicting character of P-plant discharges

DATE YY,MM,DD	LAB NAME	Al	Cd	Cr	Cu	Fe	Pb	Mn	Ni	Zn	Co
		ug/g dried sample									
BACKGROUND SEDIMENT SAMPLE											
BG HWY. 180 @ LAMP BRIGHT DRAW											
871006	SLD	6500	<	9	40	8300	5	320	9	30	
BG 150 YDS. OFF PIPELINE RD.											
871005	SLD	8300	<	5	83	8800	<5	610	9	40	
AIR TRANSECT POINT CLOSEST TO TAILS											
871005	SLD	510	<	<	120	6100	<	5.1	<	<	-
TRANSECT #1 270' E. OF SOURCE											
871005	SLD	1400	<	<	300	16000	<	39	<	9	-
TRANSECT #2 552' E. OF SOURCE											
871005	SLD	1000	<	<	240	11000	<	30	<	5	-
TRANSECT #3 834' E. OF SOURCE											
871005	SLD	950	<	<	160	14000	5	20	<	5	-
TRANSECT #4 1116' E. OF SOURCE											
871005	SLD	2400	<	<	850	20000	<	90	<	10	-

TABLE 12

Analyses of sediments collected by EID during air transect Downwind from Chino Mines Tailings

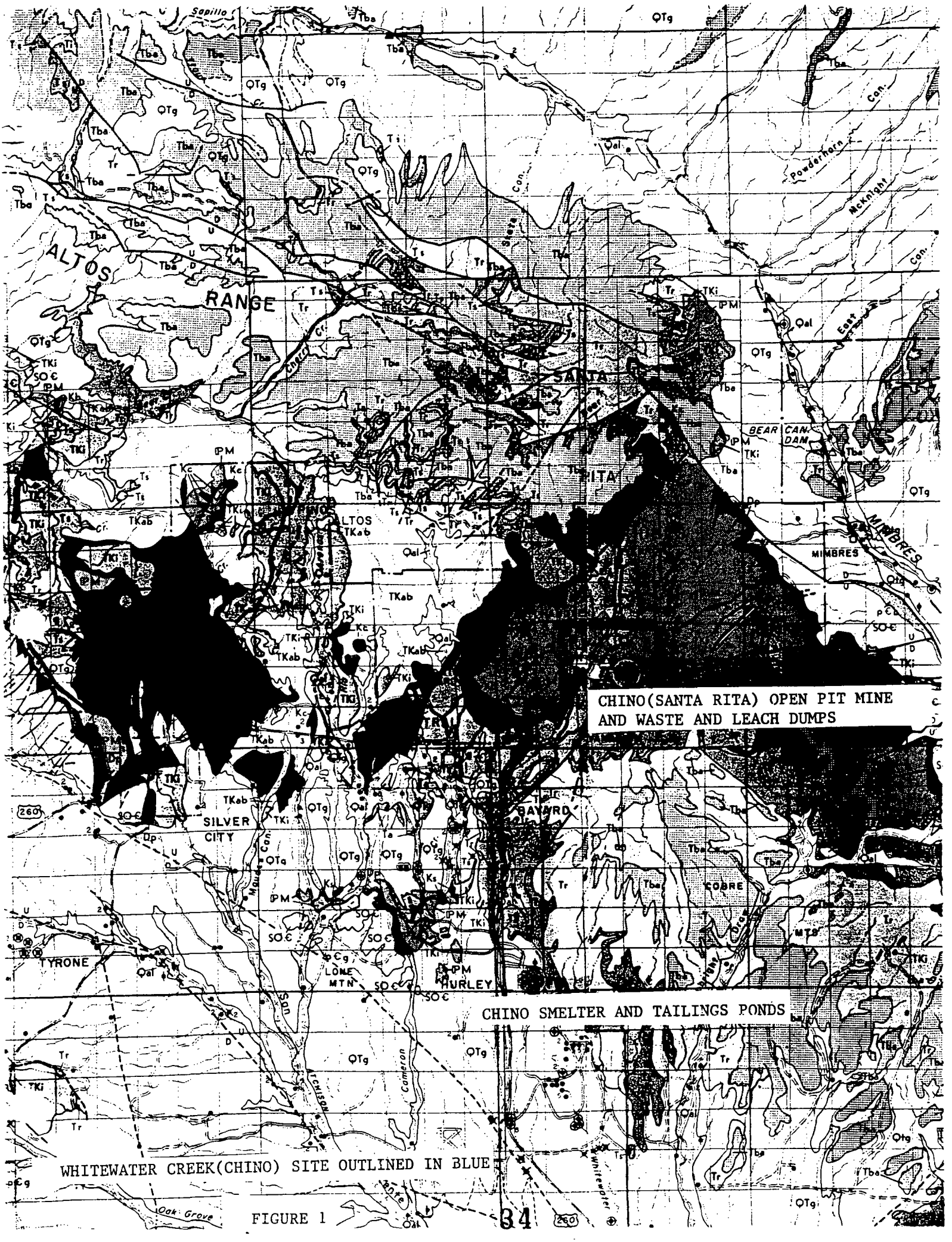

CHINO(SANTA RITA) OPEN PIT MINE
AND WASTE AND LEACH DUMPS
CHINO SMELTER AND TAILINGS PONDS
WHITEWATER CREEK(CHINO) SITE OUTLINED IN BLUE
ALTOS
RANGE
SANTA
RITA
BEAR CAN-DAM
MIMBRES
SILVER
CITY
BAYARD
COBRE
TYRONE
HURLEY
LONE
MTN
Sapillo
Powderhorn
McKnight
East
Cherry
Mauldin
San
Cameron
Whitewater
Oak Grove
Oak
260

FIGURE 1

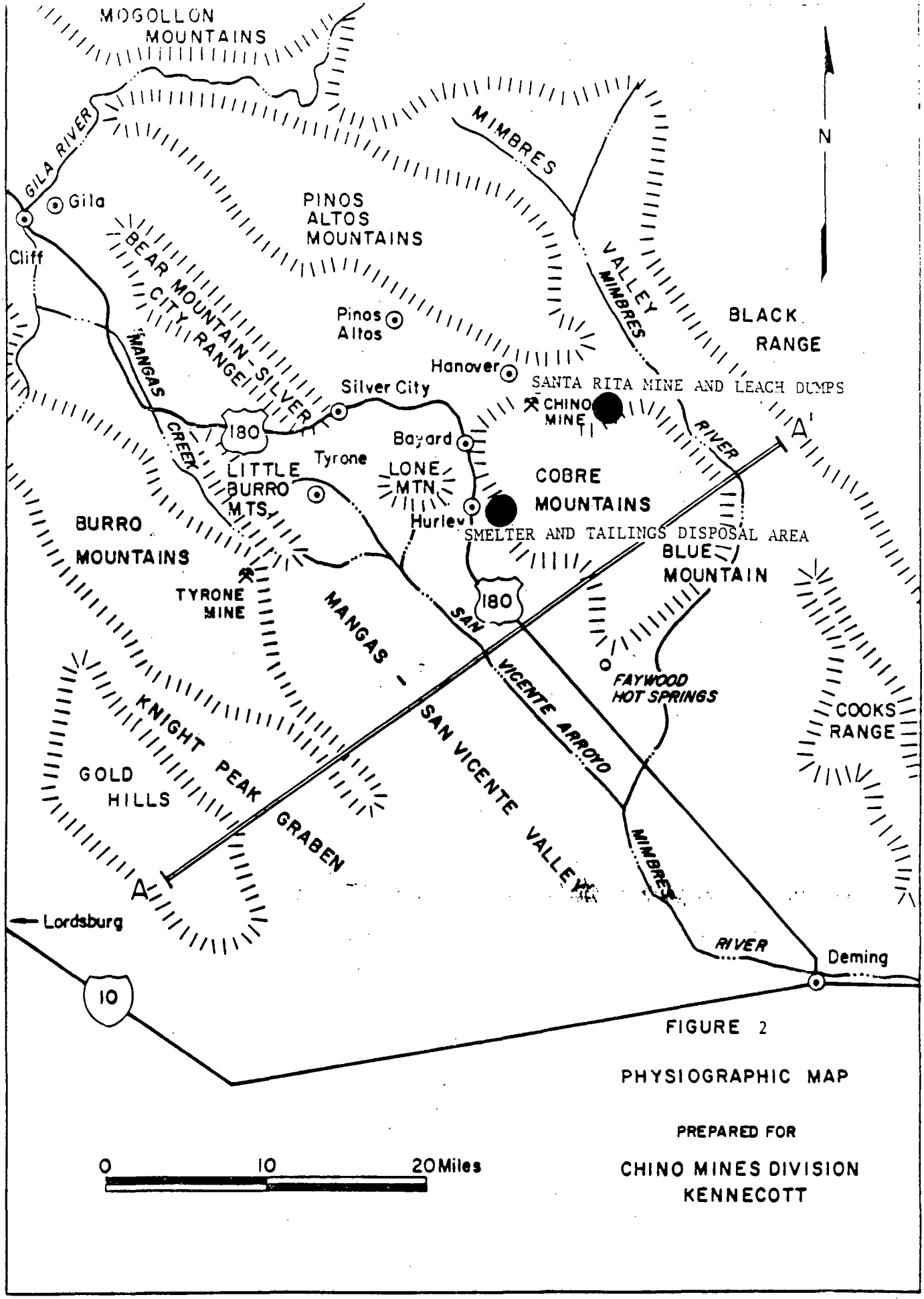
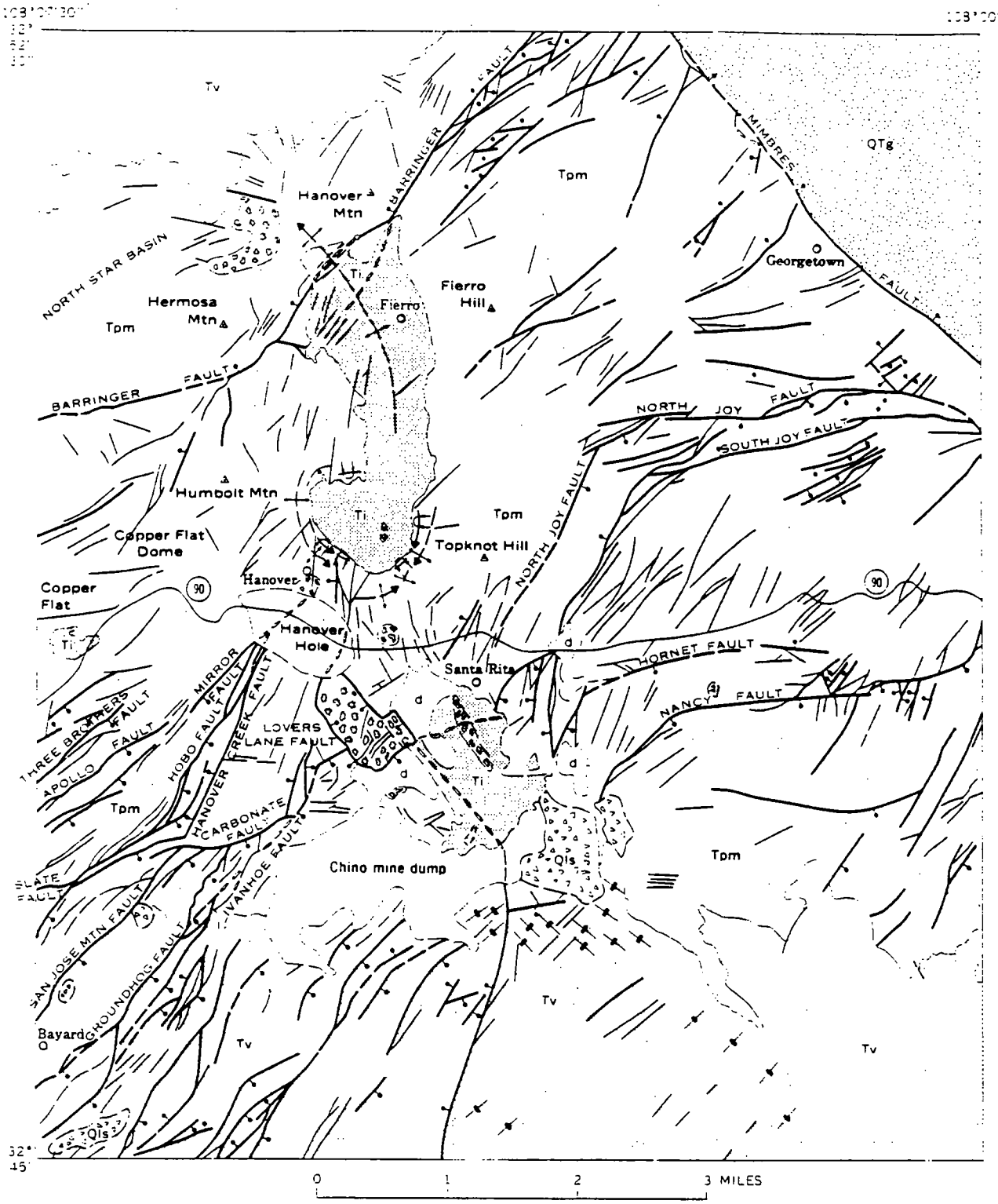


FIGURE 2

PHYSIOGRAPHIC MAP

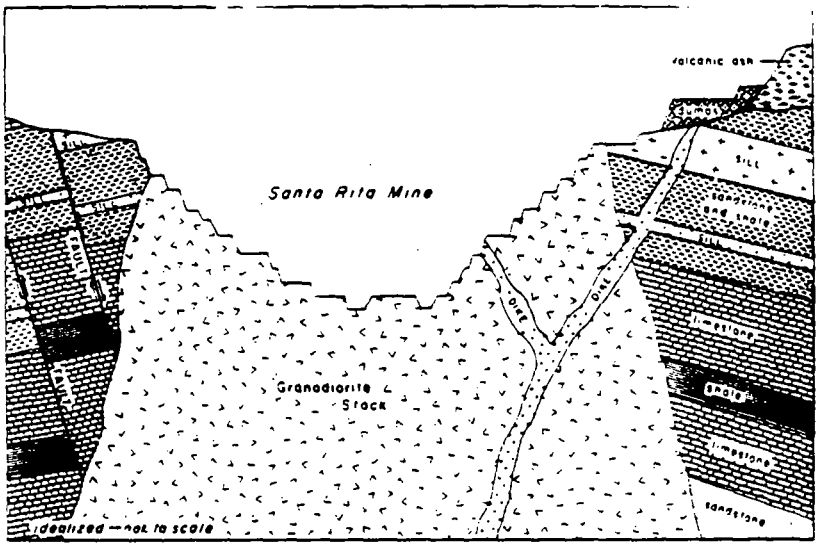
PREPARED FOR

CHINO MINES DIVISION
KENNECOTT



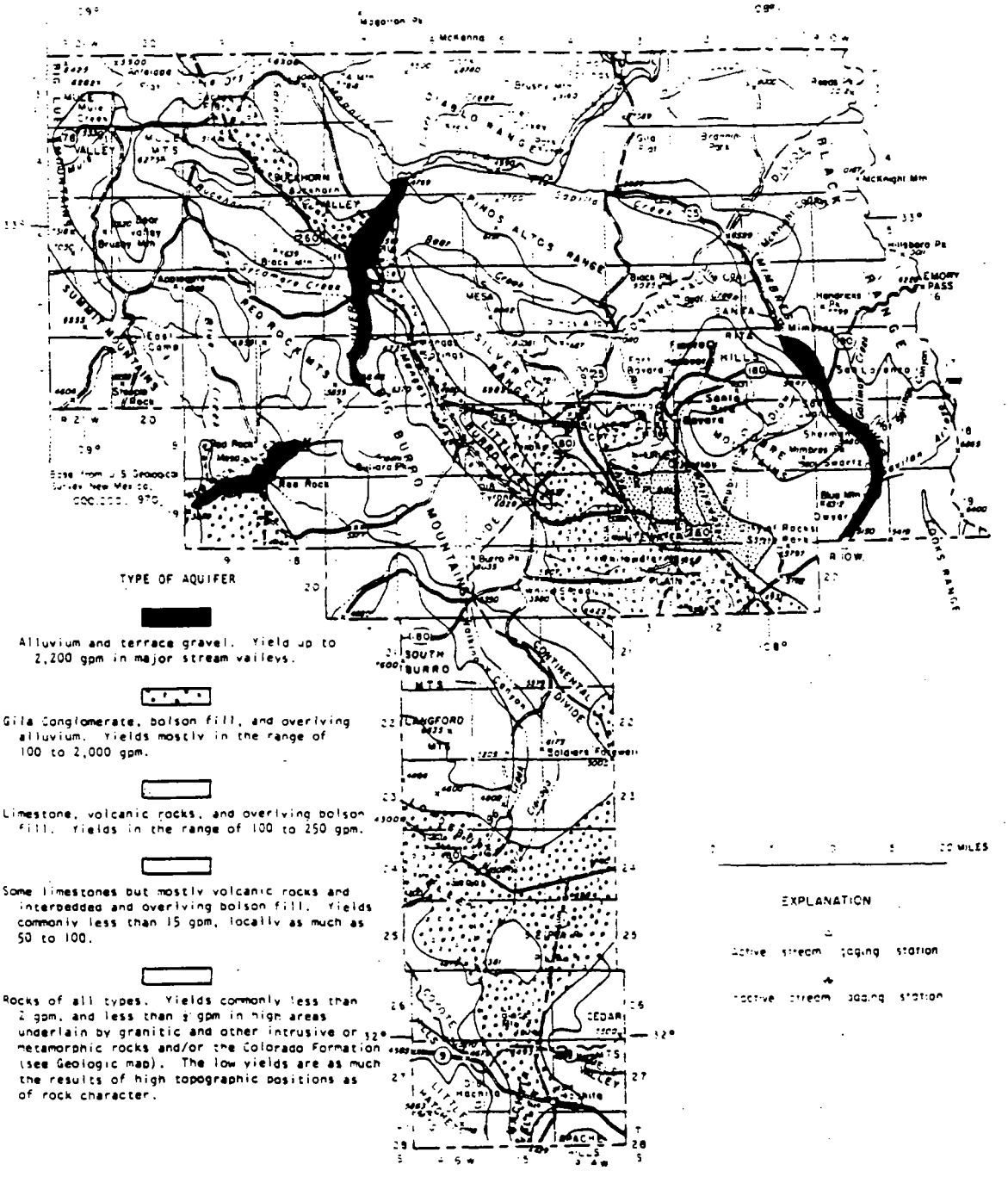
—Major structural features in Santa Rita quadrangle.

Figure 3



Cross-section through the Santa Rita mine.

Figure 4



– *Map showing the availability of ground water in Grant County.*

Figure 5

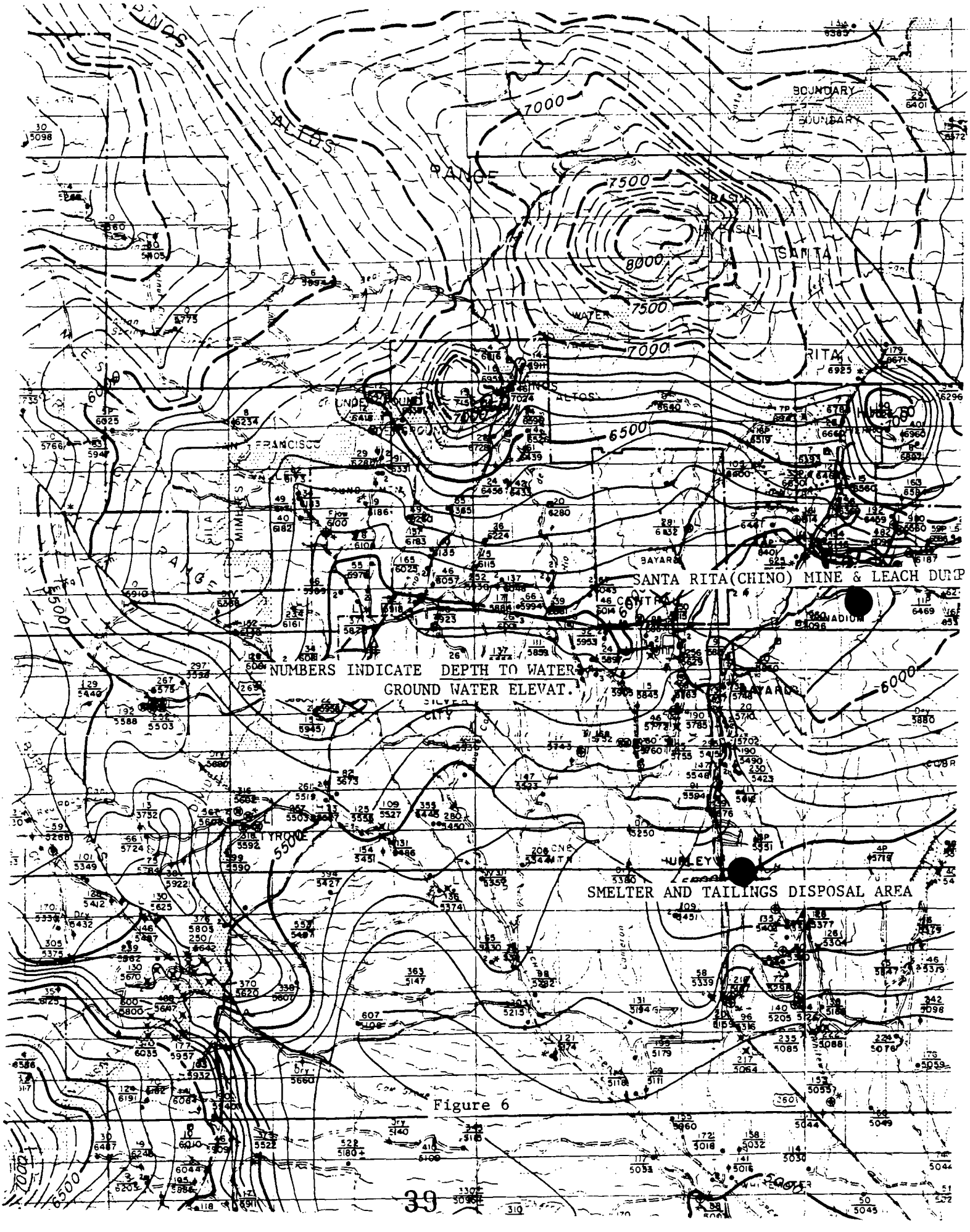
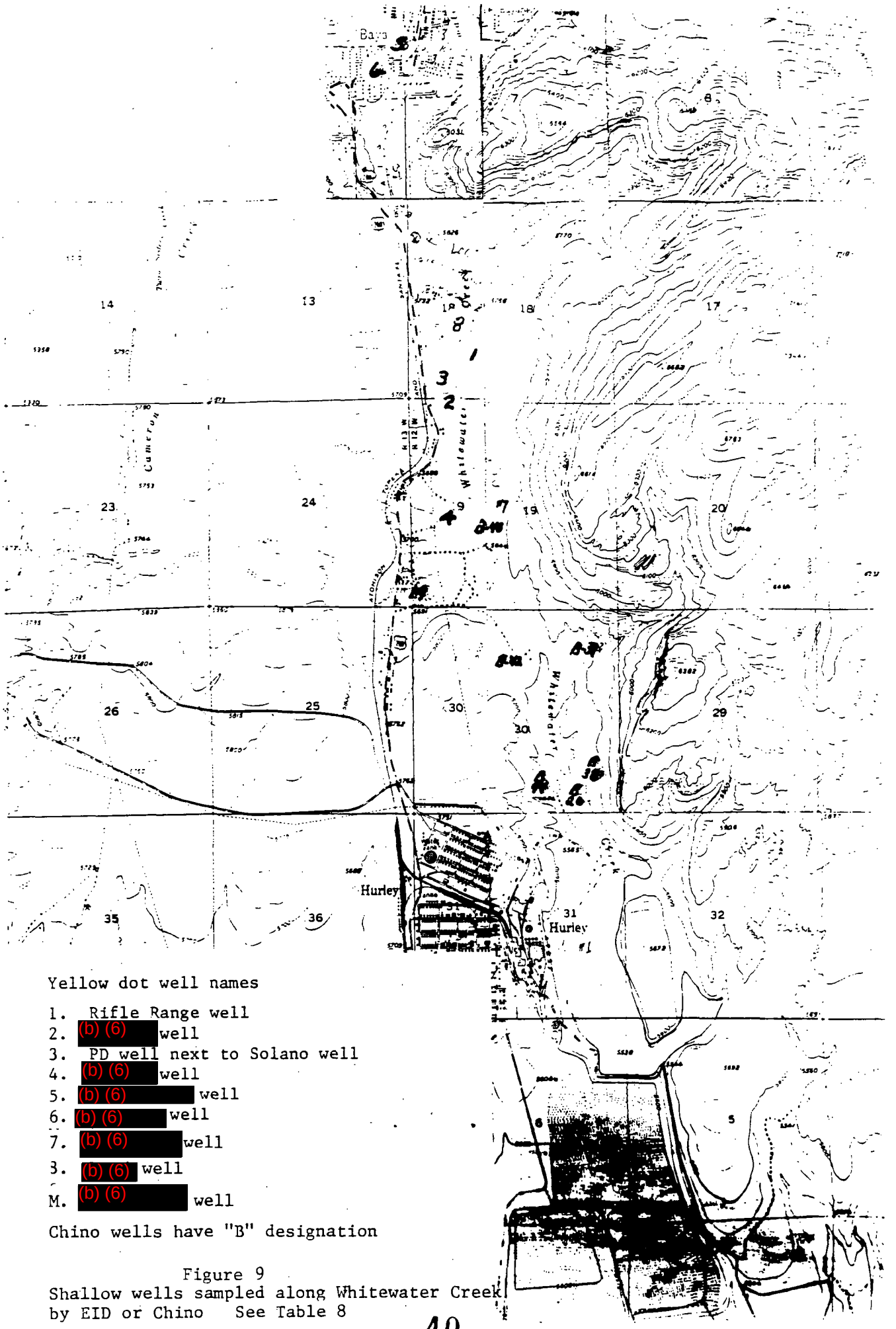

SANTA RITA(CHINO) MINE & LEACH DUMP
NUMBERS INDICATE DEPTH TO WATER
GROUND WATER ELEVAT.
SMELTER AND TAILINGS DISPOSAL AREA
BOUNDARY
7000
7500
8000
6500
6000
5500

Figure 6



Yellow dot well names

1. Rifle Range well
2. [redacted] well
3. PD well next to Solano well
4. [redacted] well
5. [redacted] well
6. [redacted] well
7. [redacted] well
8. [redacted] well
M. [redacted] well

Chino wells have "B" designation

Figure 9
Shallow wells sampled along Whitewater Creek by EID or Chino See Table 8

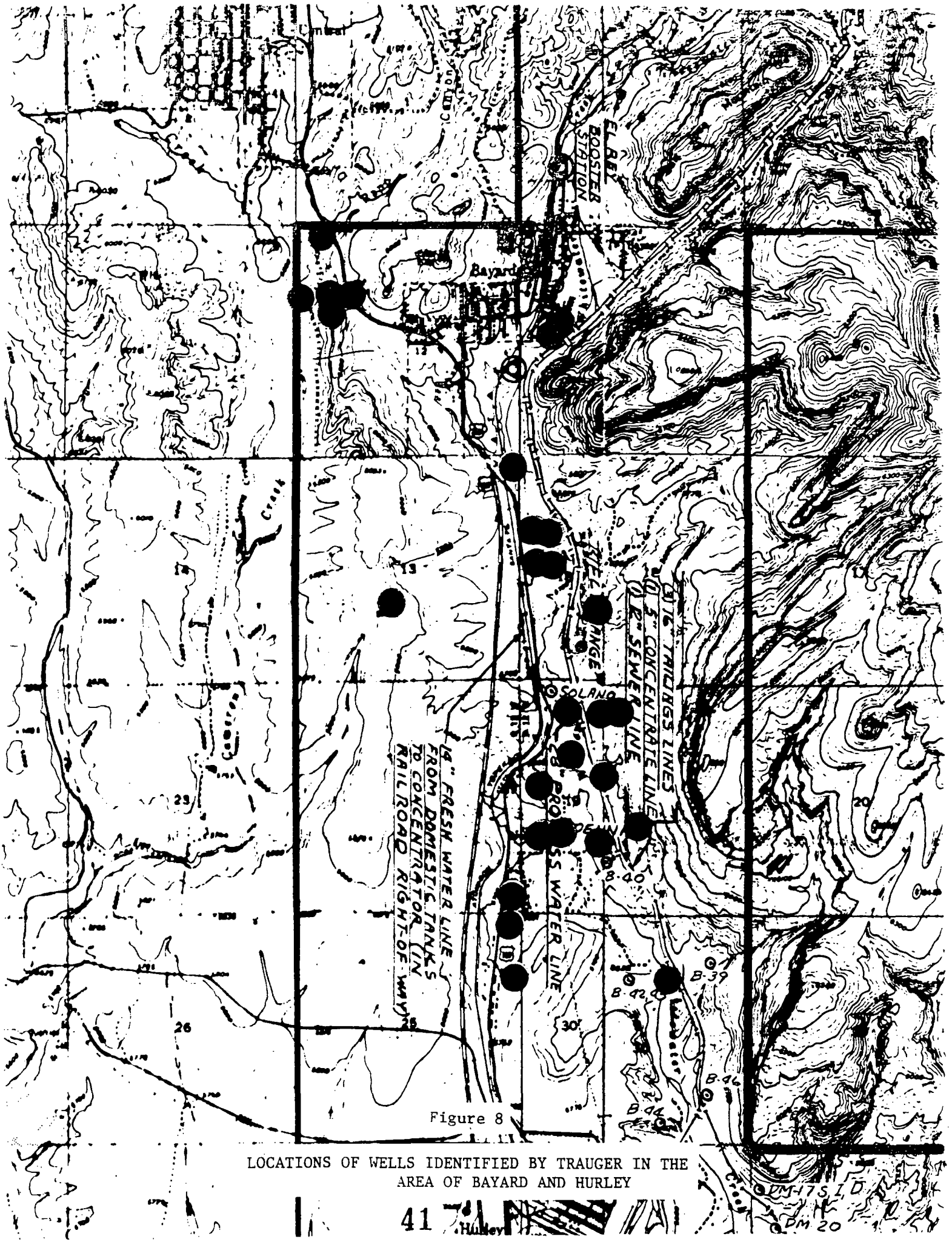


Figure 8

LOCATIONS OF WELLS IDENTIFIED BY TRAUGER IN THE AREA OF BAYARD AND HURLEY

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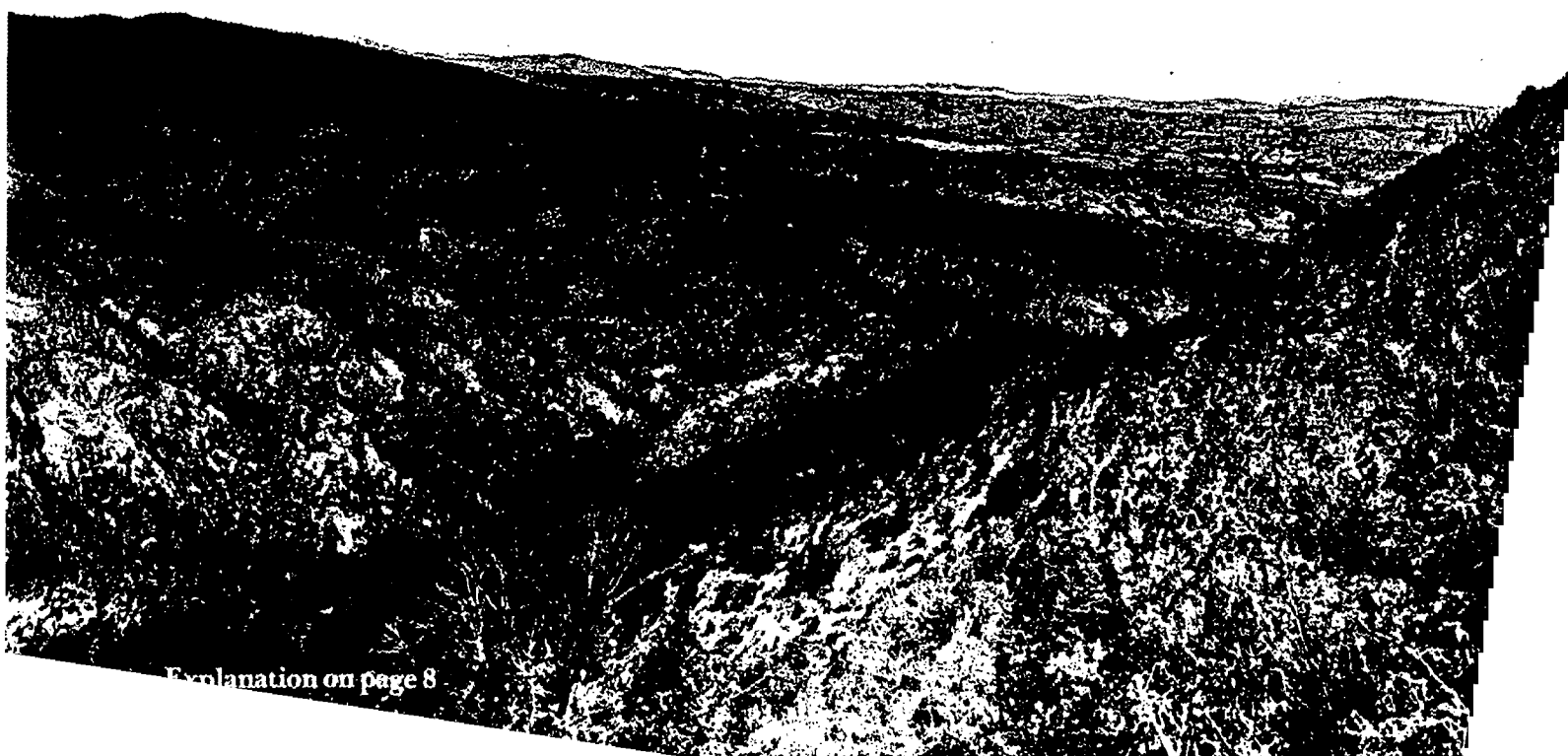
REFERENCE 5

Trauger, 1972

Water Resources and General Geology of Grant County, New Mexico

by F. D. Trauger
U.S. Geological Survey



HYDROLOGIC REPORT 2 1972

New Mexico State Bureau of Mines and Mineral Resources

Prepared in cooperation with:
The United States Geological Survey
The New Mexico State Engineer Office
The Grant County Commission

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The Gila flows mostly in deep canyons in the headwater areas and is perennial to a point about 4 miles northeast of Cliff (T. 15 S., R. 17 W.) where large diversions for irrigation sometimes result in the channel downstream being dry during the growing season. The stream is perennial through the Middle Gila Box—from about sec. 16, T. 17 S., R. 17 W. to sec. 23, T. 18 S., R. 18 W.—but the channel below the Box occasionally is dry in Red Rock Valley downstream from points where diversions are made.

The principal tributaries of the Gila River in Grant County are, in downstream order, Black Canyon, Sapillo, Turkey, Mogollon, Duck, Bear, Sycamore, Mangas, and Blue Creeks. Each of these tributaries is perennial in portions of its course and may be presumed to contribute underground flow to the Gila.

The Mimbres River drains approximately 460 square miles of the west slope of the Black Range and the eastern slopes of the Pinos Altos and Cobre Mountains in Grant County. The San Vicente Arroyo-Whitewater Creek drainage system, tributary to the Mimbres River south of the county line, drains the large lowland area (San Vicente basin) and adjacent slopes that lie between the Big Burro and Cobre Mountains—an area of about 390 square miles in Grant County.

The Mimbres River generally is perennial from just below the confluence with McKnight Canyon to San Lorenzo. Diversions for irrigation start near Mimbres, and the channel below San Lorenzo is dry much of the time.

Many of the larger tributaries of the Mimbres River, as of the Gila, have perennial flow in parts of their courses, and generally in the upper part rather than the lower. The lower parts of the tributary canyons are mostly broad and filled with alluvium into which the flow from the headwaters quickly disappears. The principal tributaries to the main stem of the Mimbres River in Grant County are McKnight Canyon, Allie Canyon, Bear Creek, Gallinas Creek, and Gavilan Creek. Of these, only Gallinas Creek has no perennial flow.

Legend says that a perennial creek once flowed approximately where San Vicente Arroyo now slashes through Silver City, and that Rio de Arenas, Cameron Creek, and Whitewater Creek, between Silver City and Santa Rita, were perennial in that area. These are now intermittent streams and if they were ever perennial it must have been prior to about 1885.

The San Francisco River does not flow through Grant County but drains the northwest corner through two tributaries, Mule Creek and Little Dry Creek. Little Dry Creek has no perennial flow, but Mule Creek is perennial through much of its course from a point about 3 miles north of the Mule Creek Post Office to its junction with the San Francisco River.

The southern part of Grant County is drained by a nonintegrated system of washes and arroyos that descend from the various isolated hills and mountain ranges. Drainage that is tributary to Lordsburg Valley collects in an ill-defined axial channel known as Lordsburg Draw. The infrequent runoff flows northwest, swings around the north side of the town of Lordsburg in Hidalgo County, then flows southwest to South Alkali Lake in the Lower Animas Valley, which is a closed basin.

Walking X Canyon, which originates on the east side of the pass between the Big Burro and South Burro Mountains, is the only drainage of consequence that is tributary to Lordsburg Valley. There is a legend of perennial flow in the channel in T. 21 S., R. 15 W.; vestiges of orchards and old irrigation ditches at places along the banks tend to support the story.

Runoff tributary to Hachita Valley in Grant County is lost on the valley floor. Sharply definable, continuous channels are not well developed down the axis of the valley. However, runoff occurs generally once or twice a year during the summer rainy season. The road west from Hachita is not passable across the axis of the valley at these times until the generally short-lived flow subsides.

Flash-floods are common throughout the county during the summer rainy season and may be expected to occur at any place (fig. 12). The heaviest rainfall generally is over the higher ground, but the runoff may reach to the basin floors where no precipitation has fallen. The loss annually of a vehicle or two, and sometimes even a life, results when people prematurely attempt to drive across discharging arroyos. Vehicles become stalled and then may be swept down-channel if the flood rises still higher.

Figure 12—Floodflow in a normally dry wash crossing a road in Mangas Valley. The precipitation fell mainly on the Little Burro Mountains—the area depicted received only a brief shower. The water is about 3 feet deep below the base of the standing waves and the current could easily sweep a large vehicle from the road.

CLIMATE

Climate is a major element of the hydrology and ecology of any large area. Climate directly affects

Table 1--Monthly and annual mean of maximum and minimum air temperature, in degrees Fahrenheit, and the average monthly and annual precipitation, in inches, at selected stations in Grant County

Station and period of record 1/	Altitude (feet)	Temp. and Precip.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Bear Creek Rch. 1940-59	5,300	Max.													
		Min.													
		Precip.	1.11	1.11	1.18	0.62	0.22	0.59	2.29	3.29	1.31	1.14	0.56	0.90	14.32
Buckhorn 1940-60	4,900	Max.													
		Min.													
		Precip.	1.15	.83	.81	.59	.30	.57	2.38	2.71	1.52	1.05	.42	.82	13.15
Cliff, 10 mi.SE 1940-60	4,800	Max.	55.6	59.8	64.9	74.8	83.1	92.9	93.6	90.9	88.5	77.4	65.0	57.0	75.3
		Min.	21.4	23.0	28.1	35.3	41.6	52.2	59.8	58.2	49.5	39.4	25.6	21.3	38.0
		Precip.	.93	.70	.86	.33	.16	.50	2.51	2.84	1.04	1.24	.41	.64	12.16
Cureton Rch. 1940-60	5,200	Max.													
		Min.													
		Precip.	1.08	.83	.78	.31	20	.60	2.16	2.58	1.25	1.00	.53	.80	12.12
Ft. Bayard 1867-1960	6,152	Max.	51.9	55.3	60.1	68.4	76.6	86.5	86.4	84.4	80.4	71.1	60.3	52.5	69.5
		Min.	25.2	27.5	31.3	37.3	44.4	53.7	58.2	57.2	51.6	41.7	31.1	25.8	40.4
		Precip.	.85	.97	.75	.41	.40	.72	3.12	3.35	2.02	1.15	.71	.91	15.36
Gila, 6 mi. NE 1954-59	4,600	Max.	56.9	60.1	66.6	74.6	83.8	95.4	94.7	90.9	89.9	77.4	64.6	60.1	76.3
		Min.	24.7	25.8	29.8	36.5	40.2	52.1	59.4	57.9	47.3	40.3	24.7	22.9	38.5
		Precip.	.83	.94	.92	.50	.34	.32	3.04	2.94	1.22	1.63	.20	.50	13.38
Hachita 1934-60	4,504	Max.	55.8	61.6	68.0	76.9	85.0	94.4	94.2	91.5	87.8	77.5	65.8	58.4	76.4
		Min.	26.5	28.5	33.1	40.1	47.9	58.0	63.1	62.1	55.7	44.4	31.4	26.8	43.1
		Precip.	.47	.60	.53	.21	.17	.40	2.14	2.38	1.12	.88	.49	.71	10.10
Mimbres Ranger Station 1905-60	6,250	Max.	49.3	54.8	59.9	69.5	76.9	88.4	87.4	83.1	80.2	68.7	58.6	53.3	69.2
		Min.	19.3	23.7	25.4	30.8	36.9	49.3	54.1	53.8	45.4	36.9	24.3	21.0	35.0
		Precip.	1.15	1.05	.86	.52	.42	.97	3.45	3.29	1.98	1.20	.79	1.10	16.78
Pinos Altos 1911-60	7,000	Max.													
		Min.													
		Precip.	1.32	1.60	1.36	.73	.56	1.12	4.28	4.28	2.23	1.57	.80	1.47	21.32
Redrock 1905-64	4,150	Max.	57.1	62.8	68.1	79.0	87.7	96.3	96.1	91.8	88.1	79.5	67.1	59.1	77.7
		Min.	21.7	25.1	29.0	36.1	42.1	52.1	61.9	61.4	54.2	41.1	29.6	24.2	39.9
		Precip.	.61	.84	.70	.45	.25	.44	2.43	2.22	1.40	.91	.64	.93	11.82
Santa Rita 2/ 1911-52	6,312	Mean Month Temp.	37.7	39.0	44.0	53.7	62.7	71.3	74.1	71.2	65.2	58.1	46.8	40.6	55.4
		Precip.	.85	1.06	.84	.52	.52	.99	3.65	3.65	2.33	1.26	.80	1.11	17.58
Silver City 1879-1960	5,937	Max.	48.9	53.0	58.1	66.8	75.9	86.3	86.7	84.7	80.4	69.8	58.3	50.5	68.3
		Min.	25.0	26.0	30.4	36.8	44.1	54.6	59.3	57.8	51.8	41.2	29.5	24.6	40.1
		Precip.	1.03	1.20	1.03	.57	.39	.72	3.09	3.30	1.84	1.32	.78	1.13	16.40
White Signal 1942-60	6,070	Max.													
		Min.													
		Precip.	1.49	1.07	.97	.40	.32	.86	2.47	2.21	1.32	.93	.35	.92	13.31
White Water 1945-60	5,150	Max.													
		Min.													
		Precip.	.64	.41	.61	.22	.21	.22	2.32	1.79	1.18	.84	.06	.28	8.78
Gila Hot Springs 1957-64	5,600	Max.	51.9	57.9	61.9	72.2	81.3	89.4	89.5	86.7	82.6	74.3	62.9	56.9	72.3
		Min.	15.6	19.5	22.9	29.7	35.0	43.7	53.6	53.3	45.6	34.5	24.4	18.7	33.0
		Precip.	.74	.57	.70	.62	.14	.56	2.64	2.72	2.03	1.44	.74	1.34	14.24

1/ Records are not necessarily continuous for the period indicated but are considered to be of sufficient duration to give a representative mean; temperature records at most stations are for appreciably shorter period than those for precipitation.

2/ Records kept by Kennecott Copper Corp.

Geologic Setting

The types of rocks in an area, their distribution, thickness, and general structure control the occurrence of water; these geologic factors must be known before the water resources can be appraised. Knowledge of the age of the rocks makes possible general predictions of their stratigraphic relations—vertical position with respect to each other—and so makes possible also prediction of their distribution beneath the surface. The younger rocks lie on top of the older rocks except where faulting and folding may have disturbed the normal sequence, and where younger igneous rocks intrude into older rocks.

AGE AND DISTRIBUTION OF ROCKS

The rocks that crop out in Grant County range in age from Precambrian to Holocene, and include intrusive and volcanic igneous rocks, marine sediments, and continental deposits. The oldest rocks are schist, gneiss, greenstone, and granite of Precambrian age more than 570 million years old. The largest areas of exposure of these rocks are in the Big Burro, South Burro, and Little Burro Mountains, and in the Silver City Range (fig. 2). They are exposed also at the north end of the Cooks Range (T. 19 S., R. 9 W.), at several places near the central crest of the Black Range, and along the west side of the Mimbres Valley, west of San Lorenzo.

Marine sediments of Paleozoic age, 225-570 million years (m.y.) old, include shale, sandstone, limestone, and dolomite. Every period of the Paleozoic is represented in the geologic column. The deposits consist mostly of limestone and dolomite which crop out mainly in the central part of the county, from the Silver City Range east to the Mimbres Valley, and along the crest of the Black Range in the vicinity of Emory Pass. Minor but significant exposures occur also in the southern part of the county and in the Cooks Range.

The Mesozoic Era is represented only by rocks of Late Cretaceous age, 60-90 m.y. Sandstone, shale, and volcanic and intrusive rocks crop out in the same general areas as do the rocks of Paleozoic age. They are found also in the Little Burro Mountains, at the north end of the Big Burro Mountains, and in the Little Hatchet Mountains in the southwest corner of the county.

Volcanic rocks of Tertiary and Cretaceous age underlie a large area in the Summit Mountains northwest of Red Rock and a relatively small area in the Little Hatchet Mountains west of Hachita. Intrusive rocks of Cretaceous and Tertiary and Cretaceous age crop out in the central and southern parts of the county where they commonly are associated with mineral deposits.

Rocks of Tertiary and Quaternary and Tertiary age, 65 m.y. ago to the present, underlie nearly all of the northeastern and northwestern highlands and much of the central and southern parts of the county. These rocks are mostly of two types, volcanic and sedimentary.

The rocks exposed in the highlands are mostly of volcanic origin. They consist of flows of rhyolite, dacite, basalt, and associated pyroclastic rocks; some of the pyroclastic material was deposited in lakes to form well bedded tuffs. Most of the tuffs and volcanic agglomerates are massive and dense. The whole sequence may be more than 10,000 feet thick.

The sedimentary rocks of Quaternary and Tertiary age are mostly conglomerates and sandstones. Some fine-grained sediments, probably deposited in lakes, and some basalt flows are interbedded locally with the conglomerates and sandstones. These rocks generally occupy a position intermediate between the highlands and the valleys. They crop out around the margins and on the flanks of the mountain ranges, and they lie at varying depths beneath the surface of the lowland plains.

Rocks of Quaternary age, from about 2 to 3 m.y. ago to the present, are found mostly as gravel and sand in the stream valleys, as terrace deposits along the streams, and as alluvial fill in the bolsons. A Quaternary age has been assigned (Ballmann, 1960) to some rhyolitic volcanic rocks southeast of the South Burro Mountains, but Elston (1968, p. 239) has stated they are of Tertiary age. Basalt flows that overlie the bolson fill are conspicuous features about 7 miles north of Hachita, at the southern end of the county; basalt, underlain by conglomerate of possible early Quaternary or late Tertiary age, caps a long ridge immediately east of Hachita.

STRUCTURAL PATTERN OF GRANT COUNTY

The structural pattern of Grant County is complex, involving the transition from the Colorado Plateau structures of the northern part to the Basin and Range structures of the southern part (fig. 15). The transition zone, not sharply defined, is characterized by widespread, intensive, recurrent, normal faulting and by local, gentle folding. Both the faulting and the folding commonly were accompanied by local intrusions of igneous rock, and by widespread extrusion of volcanic rocks. The faulting resulted in extensive fracturing of all rocks involved, and the folding and intrusions opened joints in otherwise dense rocks.

The transition zone between Colorado Plateau and Basin and Range structures is a northwest-trending structural belt, some 50 to 75 miles wide, that includes most of the county. The zone is an element of the Deming axis (Turner, 1962, p. 60) or, as it

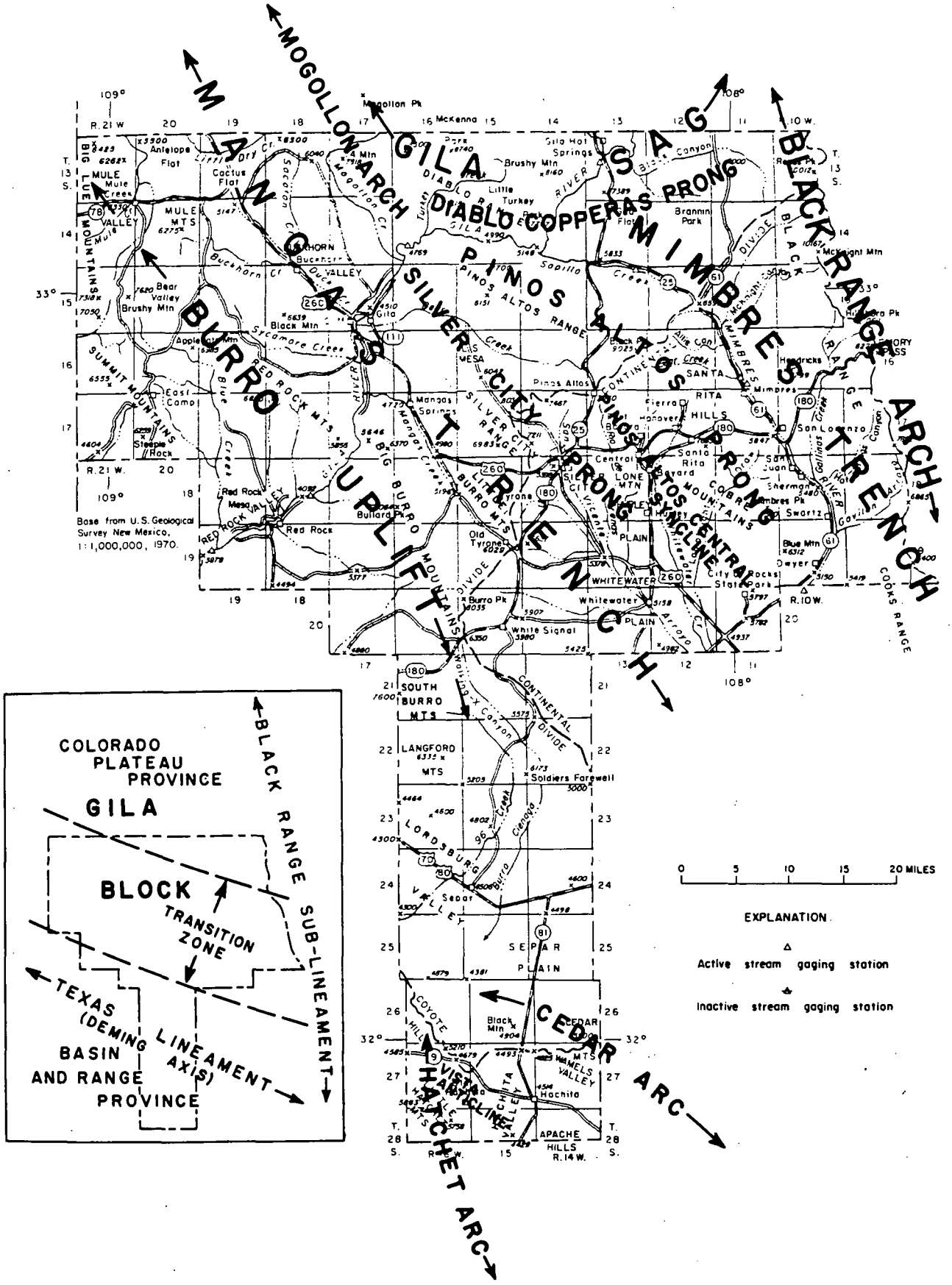


Figure 15—Geologic structural elements.

is better known, the Texas lineament, described by Kelley (1955, p. 61) as "—marking roughly the southern boundary of the plateau along the Mogollon Rim—one of the largest, longest and most prominent of the transverse lineaments on the North American continent."

Divergent from the Texas lineament, and itself constituting a major structural feature in New Mexico, is a fault system that extends from the vicinity of Deming northward to the plains of San Augustin (off map), a distance of about 110 miles. Involved in this system of faulting and uplift is the Black Range, and the less extensive Cooks, Cuchillo, and Luera Ranges (off map).

The large, elevated, wedge-shaped area lying between the Texas lineament and the Black Range sub-lineament forms the major structural unit of Grant County and has been named the Gila block (Trauger, 1965, p. 184); it forms the south end of what Kelley has called the Mogollon Segment of the Colorado Plateau (Kelley, 1955, p. 58). However, the Gila block in some respects seems more closely related to Basin and Range structures than to the Colorado Plateau, although it is not a definite part of either structural province.

The Gila block has been deformed by many lesser structures, most of which are faults associated with the larger uplift structures that define the block, but some of which are associated with, and result from, regional warping and intrusions of igneous rocks (Paige, 1916, p. 10). The relation of the intrusions and warping to the faulting is not everywhere clear. Some major structures, such as that which forms the Mogollon Mountains, disintegrate into several smaller elements, change character, and continue in their new form for long distances.

The Mogollon Mountains, the highest in southwestern New Mexico, lie mostly in Catron County but extend southeast into Grant County. The mountains are developed from a domed and faulted structure termed the Mogollon arch (Trauger, 1965, p. 186). Ferguson's (1927, pl. 2) sections show the west-dipping limb of the arch in the vicinity of Mogollon, but the east limb has not been mapped to date. The Mogollon arch at about the Catron-Grant County line branches to form three distinct faulted structures that extend far into Grant County.

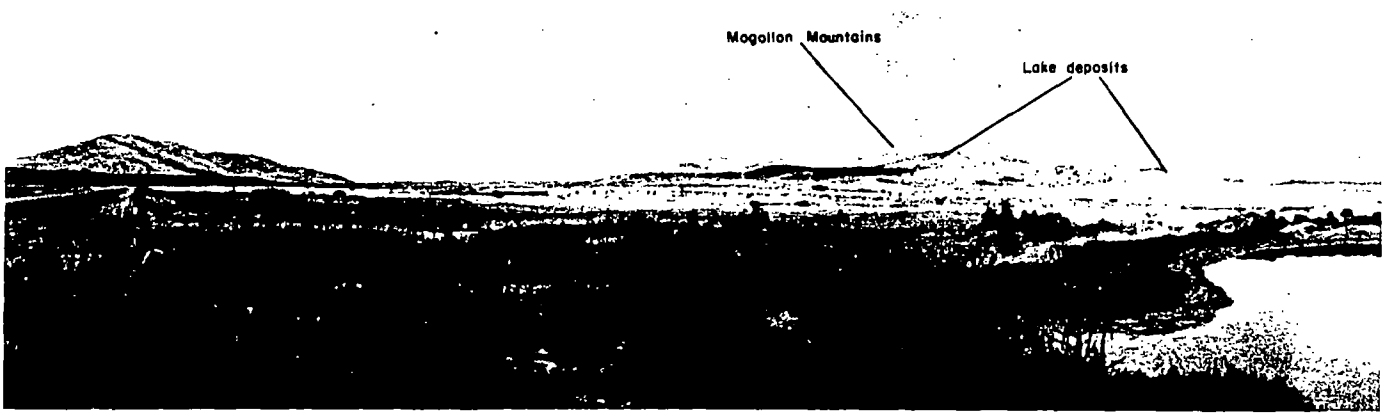


Figure 16—View of Duck Creek Valley; a part of the Mangas trench. Lake deposits in the upper part of the Gila Conglomerate are exposed in the low hills in the right middle ground (NW¼ sec. 29, T. 14 S., R. 18 W.); the western front of the northeastern highland (Mogollon Mountains) is on the right horizon. View covers 120°, west northwest to northeast, from well 14.18.30.444. Large yields are obtained from wells tapping the alluvium and upper part of Gila Conglomerate in this general area; some occurrences of artesian water are reported. The artesian aquifer is believed to be gravel and sand overlain by fine-grained lake deposits.

The valleys containing Duck Creek (fig. 16), Mangas Creek (fig. 17), and San Vicente Arroyo form a major linear topographic feature of Grant County that is structurally controlled; this structure was named the Mangas trench by Trauger (1965, p. 186). The eastern side of the trench is well marked by normal faults trending along the west side of the Mogollon arch and the Silver City Range. The west side of the trench is well defined topographically by the Big Burro Mountains, but evidence of fault control is lacking except locally. Conglomerate has been faulted down against granite on the east side of the Big Burro Mountains near the Tyrone open-pit mine. Hewitt (1959) and Elston (1960) have mapped normal faults, downthrown to the east, that parallel the Mangas trench along the northeast side of the Burro uplift. Possibly other faults are concealed beneath the valley fill along the west side of the trench.

The valley system containing Sapillo Creek and the Mimbres River also is a linear feature that is structurally controlled. The west side of the Mimbres Valley is marked by the prominent system of normal faults that form the steep east-facing front of the Pinos Altos Range. The east side of the valley is well defined topographically but, like the west side of the Mangas trench, there is little evidence of fault control except locally. Kuellmer (1954, pl. 1) mapped normal faults, downthrown to the west, par-

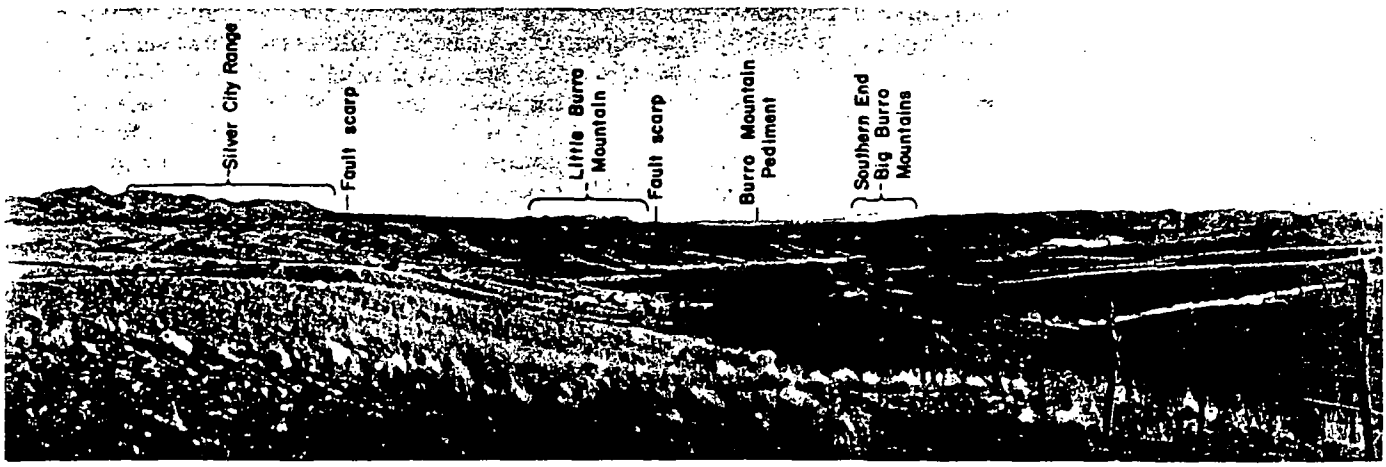


Figure 17—View of southern part of the Mangas trench: view covers 120°, looking south from a point (17.16.5.233) on State Highway 180. A master fault system bounds the east side of the trench, extending along the base of the Silver City Range; a related fault, possibly a branch from the master, extends along the west front of the Little Burro Mountains. Yields to wells tapping the Gila Conglomerate along the east side of the trench are mostly small; some large-yield wells have been developed in Mangas Valley and tap the alluvium and the upper part of the Gila Conglomerate. Yields from rocks of the uplands generally are very small to small.

alleling the valley, but nearer to the crest of the Black Range than to the valley.

A broad, synclinal structure, first described by Paige (1916, p. 10) and named the Pinos Altos-Central syncline by Lasky (1936, p. 49), lies between the east side of the Silver City Range and the west side of the Pinos Altos-Cobre Mountains. The syncline, some 16 miles wide and 1,500 feet deep (Ordonez, Baltosser, and Martin, 1955, p. 12), trends northwest, and the northern end terminates in the vicinity of Pinos Altos. The plunge is gently southeastward and the structure, being older than the bolson fill, disappears under the gravel. The floor of the syncline has been domed locally by intrusive rocks and broken by faulting.

The structure of the Gila block in the northern part of the county is characterized by centripetally dipping beds of sedimentary and volcanic rocks that form a large basin some 65 to 75 miles across. Only the southern rim of this basin lies in Grant County. Dips are gentle toward the center of the basin, generally not more than 10°, and commonly less than 5°.

The Lordsburg Valley, a broad, elongated northwest-trending structure, lies on the trace of the Texas Lineament and separates the transitional structures of the Gila block from the purely Basin and Range structures to the south. The structure of the bedrock under the valley fill is not known, but an irregular and probably highly faulted structure can be inferred from the occurrences of isolated exposures of rocks of Paleozoic age east and southeast of Separ, and from the fact that wells near these exposures have been drilled to depths of hundreds of feet without reaching bedrock. Records of oil well tests drilled in Hidalgo and Luna Counties show that the bolson fill may be at least 1,800 feet deep near Lordsburg, and 2,800 feet deep near Deming (Dixon, Baltz, Stipp, and Bieberman, 1954, p. 30).

The mountain ranges and valleys south of Lordsburg Valley are block-faulted structures, only the northern ends of which extend into Grant County. The Coyote Hills and Little Hatchet Mountains in Grant County, and the Big Hatchet and Alamo Hueco Mountains south of the Grant County line are part of a large, arcing system of closely related fault structures; the Cedar Mountains and the Carrizalillo Hills (off map) form another arcing fault-block system. The pattern of exposures and the attitude of beds in the two systems and in the intervening hills indicate a complex structural interrelation, the details of which are yet to be determined.

Rock strata in the Coyote Hills and at the north end of the Little Hatchet Mountains dip northeast at angles ranging up to 70°. The strata may flatten under the alluvial fill. Inasmuch as the strata in the Cedar Mountains also dip to the northeast, major fault structures are inferred to be buried beneath the valley fill. Basalt flows of probable Holocene age overlying bolson fill north of Hachita may mark the general location of at least one such structure.

A concealed fault, buried beneath the valley fill, and extending along the west side of Hachita Valley, south of Old Hachita, was inferred by Trauger and Herrick (1962, p. 7) from the structure of the Little Hatchet Mountains as mapped by Lasky (1947, pl. 1) and by the shape of the water-level surface under the valley floor.

Rock Structures and Ground Water

The regional and local structure of rocks is a geologic factor that has a pronounced effect on the occurrence of ground water. Water may be under artesian conditions where it occurs in rocks that are overlain by less permeable rocks. Flowing wells have been developed in beds of limestone and shale

in the central part of the county, in volcanic rocks in the Mimbres Valley and Silver City Range, and in the valley fill near Cliff and Buckhorn.

The internal structure of volcanic rocks locally may be conducive to the storage of water. Highly porous rubble zones commonly form at the base and top of a lava flow as it advances. Gases escaping from the molton rock in the final stages of cooling may produce bubbles and cavities having sufficient interconnection to permit free movement of water. Contraction joints commonly form as a flow cools and these joints can store and transmit appreciable amounts of water.

The internal structure of sedimentary rocks also influences the occurrence and storage of water. Bedding planes of both marine and continental deposits may inhibit or promote storage, movement, and recovery of water depending upon how the rock material varies in character along the bedding planes. Coarse, granular material in sheet-like structure between beds of fine, dense material may provide storage and facilitate lateral movement of water. On the other hand, laminae of fine clay in and between beds of coarse material may inhibit movement of water and adversely affect recovery of water even though storage has not been greatly impaired. Both types of structure are common in beds of the Gila Conglomerate, the principal aquifer in much of Grant County.

Solution channels in normally dense carbonate rocks such as limestone and dolomite are internal structures that greatly increase storage and enhance recovery of ground water. They are not common in the carbonate rocks but do occur locally.

Joints and fractures in rocks can serve as conduits for water and as natural reservoirs where such joints and fractures are well-developed over an appreciable area. Much of the relatively small amount of water recovered from the granitic rocks of the Burro Mountain area is found in joints and fractures.

Joints are cracks, or partings, in rock masses that occur later as a result of stresses present when the rock was formed. In general, joints in rocks become tighter with increasing depth, and at some point they become only incipient—there is no actual opening in the rock, but one will develop as overlying rock is removed either by erosion or excavation. Fractures are also partings and cracks but they more commonly result from stresses applied after the rock has formed.

Faults are large-scale fractures in the earth's surface along which there has been displacement of the two sides relative to one another. The displacement may be of less than an inch or many miles, but more commonly amounts to a few tens to hundreds of feet. Movement along a fault plane may be recurrent, in small increments that result eventually in large net displacements. Rarely do individual increments amount to more than a few feet.

Fault planes may act as barriers to the movement of ground water if clay, or fault gouge, has been formed along the plane by the grinding movement between the fault blocks. Faults also can interrupt the continuity of permeable beds by displacing them to a position against a relatively impermeable rock, or by raising them to a level above the regional water table. More commonly, however, faults and fault zones disrupt and fracture rock formations in such a way that the storage capacity and water-yielding characteristics are improved. For this reason, it generally is worthwhile to prospect for ground water in the vicinity of known faults. Thus it becomes important to recognize the principal structures, especially faults, in any region where ground water is scarce.

HOW TO USE THE GEOLOGIC MAP

The types of rocks present in Grant County, the areas in which they crop out, and their general water-bearing properties are shown in fig. 2; their stratigraphic relations, average thickness, and lithologic characteristics are shown in fig. 18. Diagrammatic cross sections showing subsurface relations are shown in fig. 19. These figures, when properly understood and used with the water-level contour map (fig. 3), can assist in determining the availability of ground water at most places and appraising the dependability of the supply.

To determine types of rock at a proposed well site, first find the general location of the map using the townships, range, and section description if necessary. Next, note the color pattern at this point, then refer to the map explanation on which is described briefly the type of exposed rock represented by that color pattern.

The range in thickness and the water-bearing characteristics of the various types of rock formations that might underly an area are given in fig. 18. The figure thus can be used to determine the type of rock that may occur beneath those found at the surface, and the approximate depth to an underlying aquifer. The rock units are arranged in the column with the oldest rocks at the bottom, the youngest rocks at the top.

Suppose that you wish to know what rock formation in an area is yielding water to wells. You learn from data for nearby wells (fig. 3) that the depth to water in the area of a proposed well is about 400 feet, and the rock exposed at the surface (fig. 2) is shown to be the Percha Shale (Dp)—then it could be presumed that the water found at 400 feet is in the underlying beds of the Fusselman or Montoya Dolomite (SO€) because the Percha Shale is no more than about 315 feet thick at most (fig. 18). However, both the Percha Shale and Fusselman Dolomite together could be as little as 330 feet thick, thus the aquifer might be the Montoya Dolomite. A careful examination of the sequence of rock cuttings removed from the well would enable one to determine which formation was yielding the water. This sort of problem points up the importance of keeping a good record of the types of rocks penetrated during drilling.

Or suppose you wish to determine what formation would be most likely to yield water in an area where there are no nearby wells. Determine from fig. 2 what formation is at the surface at the site. Find that formation in the columnar section (fig. 18) and note what rock units below it are most likely to yield the quantity of water you need, then add up the combined thickness of the overlying beds to determine the approximate depth to which a well would need to be drilled.

Some of the older rocks may not be found beneath the younger rocks—they may not have been deposited at that point, or they may have been stripped away by erosion before the younger rocks were deposited. The geologic cross sections (fig. 19) show the rocks that occur beneath the surface along the lines of the sections. It will be noted on the geologic map that in certain areas, as in the northern part of the county, the rocks of Paleozoic age are not known to occur at the surface. If they are present beneath the surface, they are buried beneath great thickness of volcanic rocks.

Granitic and metamorphic rocks of Precambrian age are widely exposed in the Burro Mountain area and are indicated by the purplish color on the geologic map (fig. 2). These are the oldest rocks in the region, and no younger sedimentary rocks would be found if drilling were started in these older rocks. Another example: a deep hole drilled at a point 2 to 3 miles north of Silver City would start in rocks of the Colorado Formation (darker green on the geologic map) and would penetrate possibly as much as 1,000 feet of sedimentary and igneous rocks of Cretaceous age before entering the rocks of Paleozoic age (blue tints on the geologic map).

The type of older rock that might be expected to occur under a younger rock in any given area can be determined by studying the geologic map (fig. 2) and the stratigraphic chart (fig. 18). As a general rule, when dealing with sedimentary or volcanic rocks, note on the map the other types of rocks in the vicinity. If older rocks are observed to crop out all around an area of younger rocks, or to lie at the center of an area of younger rock, the older rocks likely will be found beneath the younger rock. This rule does not hold for circumstances where a massive intrusion of igneous rock (as indicated by the "TKi" symbol on the geologic map) has pushed up, or into, older rocks, as in the Pinos Altos-Bayard-Santa Rita area and elsewhere. Such intrusions commonly lift, push aside, or drastically alter the intruded, or "host" rock, so that the host rock cannot be found by drilling through the intrusion.

The areas underlain by younger intrusive rocks can be determined on the geologic map by the characteristic bright red color. These rocks commonly produce little water and generally it is not practicable to attempt to drill through them to reach underlying water-bearing rocks.

The younger intrusive rocks also may form relatively thin sheet-like bodies that cut upward through overlying beds, or spread out between beds. Those that cut upward across beds are referred to as "dikes" and those that intrude between beds are called "sills." Sometimes water-bearing sedimentary rocks may be found beneath sills. The sills commonly have no surface expression and their presence can be determined only by drilling or inferred at some placed by careful study of surrounding outcrops. Sills and dikes of quartz diorite have intruded the Colorado Formation in many places in the central part of the county. Thin but extensive quartz-diorite and albite-quartz porphyry sills are found in the shales and carbonate formations of the mining district of Fierro, Hanover, and Santa Rita.

Dikes commonly have prominent surface expression because they are resistant to erosion and they form distinct narrow "ribs" of rock that extend for appreciable distance across the land surface. They are especially prominent in the area between Silver City and Central, and are well exposed in the roadcuts along the highway between the two towns.

The kind of older rock that underlies the more central parts of the bolsons generally cannot be determined from surface exposures. These areas commonly are many miles from outcrops of older rocks; thus little or no data are available that allow reliable prediction. The bolson fill generally is of such great thickness in these areas as to make the question of the character of the basement rock unimportant insofar as the availability of ground water is concerned.

Hydrogeology

Hydrogeology is the science that considers water and its relation to the rocks with which it is associated. It includes consideration of all aspects of water in relation to the rocks—its introduction into the rocks, its movement through and over the rocks, its discharge from the rocks, and any alteration of its character as a result of its association with the various rocks with which it comes in contact.

The discussions that follow are intended to increase the understanding of the relation of water to the geologic environment and to help in the development and conservation of all the available water resources of Grant County.

Virtually all continental water, both surface water and ground water, can be assumed to come from atmospheric precipitation. The first step in what commonly is called "the hydrologic cycle" (fig. 20) is the precipitation of moisture in the form of rain or snow on the land surface. The rain that falls in light showers of short duration is mostly evaporated or, in small part, consumed by vegetation. However, some of the precipitation that falls during a period of heavy or prolonged rain or snowfall may move downward and through the soil zone, or through the streambeds, and be stored in the underlying rocks. This stored water is the source of all but a very small percentage of the water that issues from some springs or is pumped from a few wells.

Whether flowing off on the surface or soaking into the ground, precipitation enters a hydrologic system. A hydrologic system is any relatively large area in which the hydrologic characteristics are closely related and which can be isolated, or nearly so, from other areas for consideration of causes and effects pertaining to water. What occurs within one large hydrologic system may have little or no effect on the hydrology of adjacent systems except at outflow points.

A large hydrologic system such as the Gila River has distinct hydrologic divisions or subsystems. These units generally constitute tributary drainage basins such as Bear Creek and Duck Creek in which ground water behaves more or less uniformly and independently of adjacent units. Ground-water and surface-water units in a hydrologic system are closely related but the boundaries of these units do

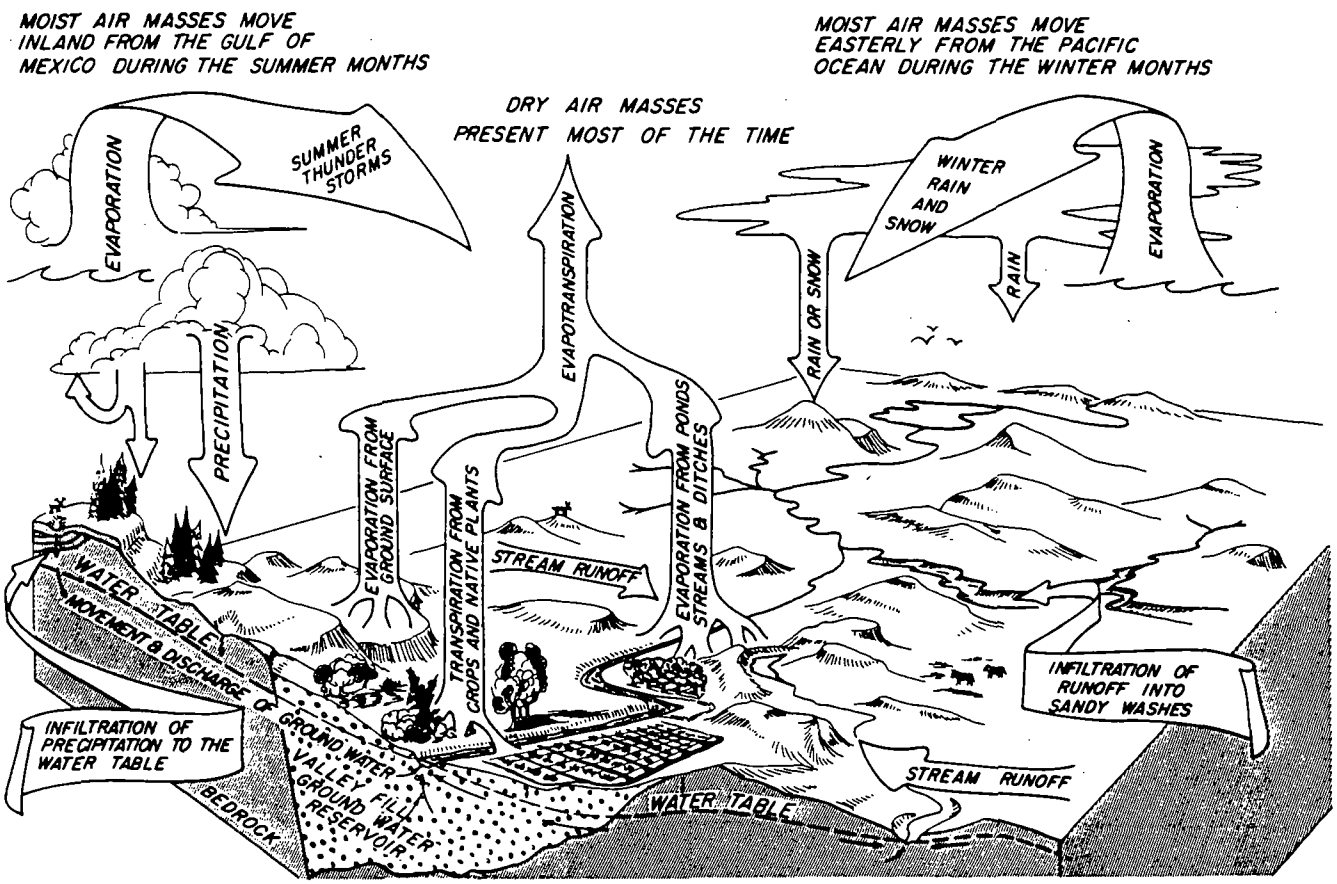


Figure 20—Hydrologic cycle in southwestern New Mexico.

not necessarily coincide.

Hydrologic units, like systems, can be separated from other units for study, development, and management. However, what occurs in one hydrologic unit of a system may noticeably affect other units of the system and consequently may affect the system as a whole.

Water in a hydrologic system or unit occurs mainly as surface water in streams, or as ground water. Water occurs also in systems as soil moisture and in other less obvious ways, none of which are significant in the problems treated in this report.

Many special terms are used to describe the occurrence of water in rocks. The terms used in this report, as well as some geologic terms, are defined in the Glossary of Hydrologic Terms at the rear of this report. Some basic hydrologic principles also are included in the glossary. Fig. 21 diagrams some of the conditions under which ground water occurs. For a more complete discussion of definitions and the principles of hydrology, see Meinzer (1923, a and b) and Tolman (1937).

HOW TO USE THE WATER-LEVEL CONTOUR MAP

The water-level contour map (fig. 3) may be used to determine the approximate depth at which water will stand below the land surface. The depth is determined by subtracting the altitude of the water-level surface at a particular place from the altitude of the land surface at that place. The difference is the depth at which the water will stand, in the absence of artesian conditions. If the location in question is near a well, the depth at that well may be used as an approximation, allowing for small differences in surface elevations.

The approximate altitude of the water level can be estimated for any point in the county by using the water-level contour map and interpolating altitudes between contours. The altitude of the land surface is shown by contours on topographic maps available locally for all of Grant County (fig. 4).

The water-level contour map has been drawn using water levels measured in wells for control points. Where wells are close together the map may be considered accurate enough to permit estimates to within 10 to 25 feet. However, control points are widely scattered in some large areas. In those areas the contours are located only approximately; thus estimates of the depth to water can be only approximate. The depth to water may lower appreciably in areas of large withdrawals of water due to pumping. In those areas the depths to water indicated on the map may no longer be useful for estimating the depth to water.

The water-level contour map may be used also to determine the direction of movement of ground water, and thus the areas of recharge and discharge. The direction of movement generally is downgradient and at right angles to the contours.

The spacing of the water-level contours can be an indication of the general availability of water in an area. Closely spaced contours commonly mean that the permeability of the rocks is low and that water moves slowly through the aquifer; as a consequence, the rocks do not yield much water to wells. On the other hand, wide spacing of contours commonly means the aquifer has greater permeability and will yield water readily. However, the close spacing of contours does not necessarily rule out the development of high-yield wells. For example, the overall permeability of the Gila Conglomerate is relatively low in many places and so the water-level contours are closely spaced. But within the total saturated thickness of the aquifer in these places there may be individual beds that have a high permeability. A well tapping one or more of these beds could develop a high yield.

ROCK TYPES AND WATER-BEARING CHARACTERISTICS

About fifty distinct rock units in Grant County have been named by various geologists over the years; an equal, or perhaps even greater number of rock units are unnamed. The rock units, named and unnamed, are grouped into four categories: 1) Metamorphic and intrusive igneous rocks; 2) extrusive igneous rocks—flows and pyroclastic deposits; 3) marine sedimentary rocks, and 4) continental sedimentary deposits. The rock units within each category have similar characteristics and the units, therefore, behave in similar manner as aquifers or as confining beds. The physical characteristics and water-bearing properties of the individual rock units are shown on figs. 2 and 18. The figures can be used as a guide to identify the rock units found in drilling, and as an aid in evaluating the prospects for obtaining water.

The important factors determining or controlling the occurrence of ground water are the physical properties of the rocks. For this reason the discussions of the various rock types found in Grant County are directed toward describing the physical characteristics that affect their water-bearing capabilities.

All the geologic formations present in Grant County yield water, at least locally, but the yields from most formations and rock units are small. Some yields are highly uncertain as to permanency. The largest quantities of water are produced from the alluvium and bolson fill; therefore, these deposits can be considered the principal aquifers.

Intrusive and Metamorphic Rocks

Intrusive rocks as granite, diorite, and the porphyries are formed by solidification of molten rock beneath the surface of the earth. Metamorphic rocks

All inter-connected open spaces in rock formations are saturated below the water table (potentiometric surface), but the rocks will not yield much water to wells if the spaces--joints, fractures, and openings between particles--are few, very small, and widely spaced. Water can move downward easily and quickly through large cracks, fractures, and highly porous rock. As a result the water table may lie far below the surfa of upland areas that are underlain by rocks that are permeable. Intrusive and metamorphic rocks generally are not permeable; volcanic and sedimentary rocks generally are permeable enough to allow infiltration and relatively rapid downward percolation of water.

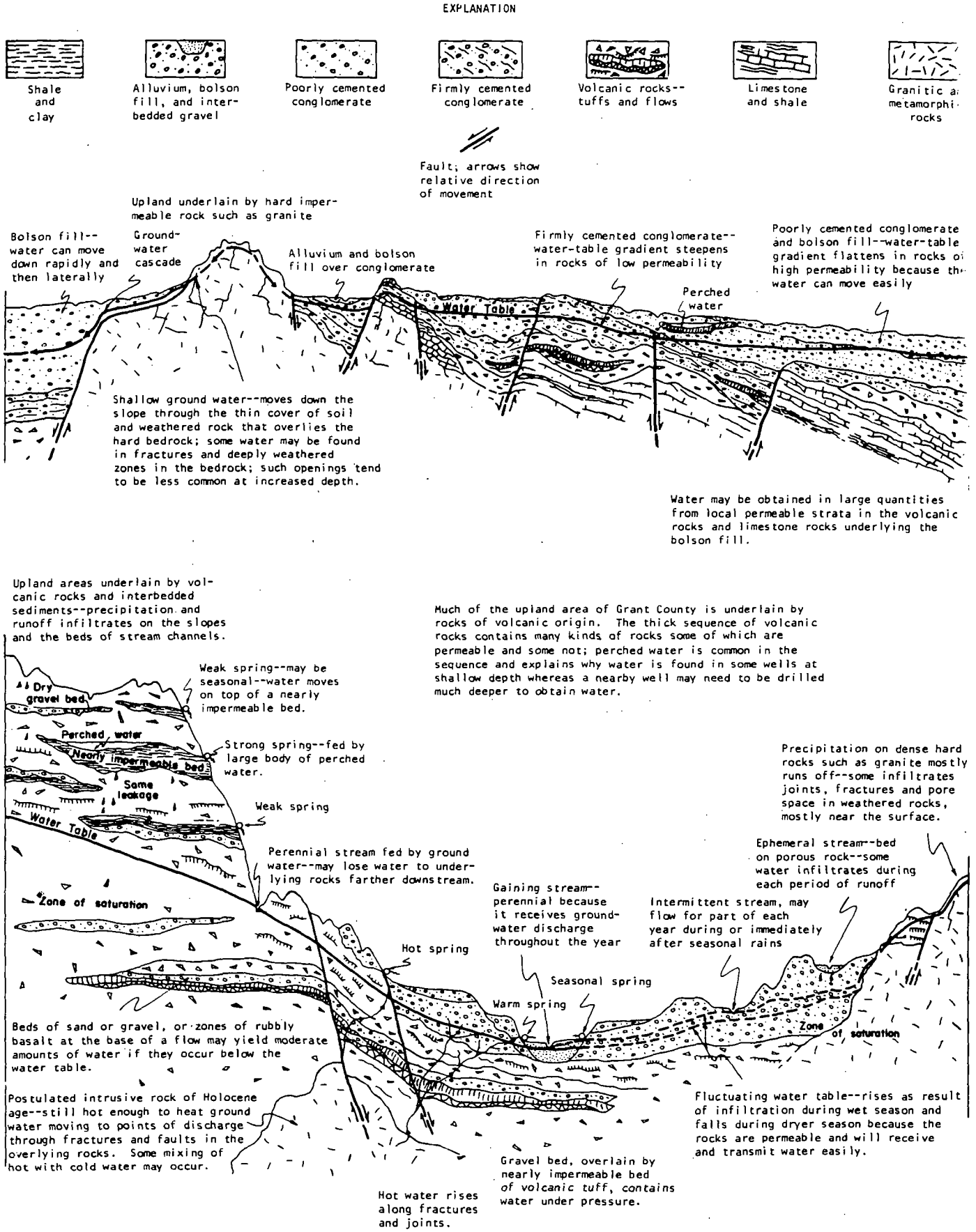


Figure 21—Schematic diagram showing occurrence of water under conditions commonly found in Grant County.

as schist, gneiss, and greenstone are formed from other rocks through processes of heat, pressure, and chemical change.

Granitic rocks (granite and similar rocks—p€g and TKi, fig. 2) are found mostly in the Big Burro and South Burro Mountains, exposed over broad areas and extending to undetermined depths. The granitic rocks range in color from light gray and pinkish gray to orange red. The community of Redrock takes its name from the exposures of the orange-red granite in the vicinity. The color is due to the abundance of orange-red feldspar crystals, a large part of the rock.

Less extensive outcrops of granitic rocks are exposed along the west front of the Little Burro Mountains and Silver City Range, in the Pinos Altos area, in Lone Mountain, the Black Range, and at the north end of the Cooks Range.

Gneiss and schist (p€m) are found mostly in the Big Burro Mountains area; greenstone (p€m) is found exposed along the foot of the mountains just west of San Lorenzo.

The granitic rocks in Grant County generally are coarse to medium grained, dense, relatively impermeable, and nonwater bearing except where deeply weathered and (or) intensely jointed (fig. 22a).

Figure 22a—Jointed and deeply weathered granitic rock (TKi) exposed in roadcut on the Silver City-Pinos Altos road. Water is found locally in very small to small quantities in such weathered granitic rocks.

These rocks commonly weather to loose aggregates of granular material and the weathering may penetrate to a depth of many tens of feet. The schist, phyllite, and greenstone are exposed only in small areas and are not known to yield water. They are, like the granitic rocks, mostly dense and impermeable, but do not weather as readily to loose aggregate (fig. 22b).

Yields to wells finished in the metamorphic and intrusive rocks range from less than one gpm to as much as 15 gpm. Reports of "dry holes" are common. Almost all the higher yields come from wells in granite where the rock is both deeply weathered and intensely jointed.

Davis and Turk (1964, p. 11) studied data for some 2,575 water wells drilled in granitic and metamorphic rocks in the eastern part of the United States, and in the Sierra Nevada of California. They determined that from 5 to 15 percent of wells drilled in unweathered rock were failures, 75 to 85 percent developed yields of less than 8 gpm, and 10 percent had yields of 50 gpm or more. They determined also that water production per foot of well decreases rapidly with increase in well depth, and the decrease is roughly tenfold between depths of 100 and 1,000 feet. Their analysis indicated that the depth of an economically feasible domestic well should be less than 150 to 250 feet in unweathered granitic rocks. Data available for Grant County indicate these conclusions also to be generally valid for areas underlain by granitic and metamorphic rocks.

Figure 22b—Greenstone of Precambrian age (p€m) underlying the Bliss Formation (SO€) in roadcut on State Highway 90, about 1.5 miles west of junction with State Highway 61. The greenstone is weathered to a depth of about 1 foot below the contact, and below the weathered zone is dense and relatively impermeable. The Bliss Sandstone wherever found is mostly glauconitic, dense, well cemented, and relatively impermeable. No wells in Grant County are known to obtain water from either the Bliss or the greenstone.

Granite weathers from the land surface downward, and along the planes of both horizontal and vertical joints and fractures. Generally granitic rock is more solid with depth, and the joints and fractures become tighter; consequently, the rock is likely to contain smaller quantities of water at increasing depth. Davis and Turk (1964, p. 6) found that unweathered and unfractured granitic and metamorphic rocks generally will have less than one percent porosity, and will have permeabilities so small as to be almost negligible, but that porosity resulting from weathering commonly ranged from 30 to 50 percent.

The depth to which granite will weather is affected by the depth to which fractures and joints are open, past geologic and hydrologic conditions, topography, and the rock composition. The log of well 22.15.-17.411 shows decomposed granite to a depth of 365 feet; the log of well 22.15.14.412 shows the granite decomposed to a depth of 260 feet. The main water supply in each well occurs at the bottom-hole depths, where the water is presumed to be on top of solid (unweathered) granite. The depth of weathered granite at these wells is believed to be exceptional. Generally granitic rocks in the region are weathered to no more than a few tens of feet.

Differences in mineral composition can result in zonal weathering in which the granite remains solid in places while decomposition proceeds around a solid core, or spheroid. These spheroids of solid granite, which may be mistaken for "boulders," commonly have sharp contacts and generally are no more than a few feet thick. Examples can be seen in roadcuts where the highway to Lordsburg crosses the Big Burro Mountains.

The transition at depth from intensely weathered to solid granite generally is moderately abrupt, through a vertical distance of only 10 to 20 feet (Davis and Turk, 1964, p. 7); thus, a spheroidal zone may be suspected if solid rock is found "suddenly" while drilling. Weathered rock may be reentered after drilling a few feet through the spheroid of solid rock. Water is most likely to be found near the bottom of the weathered zone, just above the main body of unweathered rock.

Granite generally is more deeply weathered under the flatter slopes than under the steeper slopes, and more open-jointed and fractured in the vicinity of large faults. The courses of many creek channels follow lines of faulting and jointing in the granite. Consequently, wells drilled along the major creek channels would seem to offer a better chance of finding water in joints and fractures than would wells drilled on the ridges and interstream areas. However, where deeply weathered granite underlies interstream areas, as south of the Burro Mountains, successful wells generally can be developed; yields commonly are small to very small.

Younger intrusive rocks—the dikes and sills of mostly Tertiary age—generally are also dense and do not contain water in quantities sufficient to supply wells. The dikes commonly act as dams to block the movement of ground water through otherwise permeable beds, and the sills may serve as the "floor" under bodies of perched water.

Volcanic Rocks

Broad areas of Grant County are underlain by lava flows and pyroclastic (fragmental) material blown from volcanoes. Volcanic flow rocks, associated pyroclastic rocks, and some interbedded sediments have accumulated to great thicknesses in many parts of the county. Elston (1958, p. 58) has estimated the maximum thickness of volcanic rocks in the Mogollon Mountain region to be about 8,000 to 10,000 feet. The lava flows at some places, as near Cliff and Hachita, however, are no more than a few tens or hundreds of feet thick and few pyroclastic rocks are present.

About 5,000 feet of interbedded flows, pyroclastic rocks, and minor thicknesses of sediments are exposed in the canyon walls of Mogollon Creek from the summit of Mogollon Peak (altitude 10,778 feet) in Catron County down to the mouth of the canyon in sec. 13, T. 13 S., R. 18 W., in Grant County. Ferguson (1927, p. 5-6) describes similar rocks in a sequence about 7,200 feet thick in the vicinity of Mogollon in Catron County just north of the Grant County line. Comparable thicknesses are believed to underlie most of the northern highland areas of Grant County. About 2,500 to 3,000 feet of volcanic rocks are exposed in Dark Thunder Canyon from the summit of Tillie Hall Peak (altitude 7,318 feet) down to Smith Ranch (sec. 5, T. 16 S., R. 21 W.) on the west side of the Summit Mountains; the base of this volcanic sequence is not exposed. Kuellmer (1954, pl. 1) shows a total thickness of about 3,200 feet for the volcanic rocks of Tertiary age on the west side of the Black Range. About 7,700 feet of volcanic rocks of Cretaceous and Tertiary age were measured by Lasky (1947, p. 13) in the Little Hatchet Mountains.

The volcanic flow rocks may be grouped into two main categories distinguished by color and flow characteristics—dark-colored rocks that spread out in thin sheets over broad areas and lighter colored rocks that tend to accumulate as thick piles, not normally extending great distances from the point of eruption.

The pyroclastic rocks are associated mainly with the lighter colored flow rocks, and generally are also of light hue. However, unlike most of their associated flows, many of the pyroclastic rocks extend to great distances. The Kneeling Nun Tuff is an example of a broadly distributed and distinctive rock unit of pyroclastic origin.

Correlation of the thick sequence of volcanic rocks beneath most of the highland areas of the north part of Grant County has been a problem for years. Some of the distinctive lithologic units and sequences have been considered part of the Datil Formation. The Datil Formation was named by Winchester (1920, p. 4) for rocks exposed in the Datil Mountains north of Datil, and in the Bear Mountains north of Magdalena where he described a type section. Other equally distinct rock units of similar character and origin in Grant County were not included in the Datil Formation, because they did not seem to fit properly into Winchester's type section.

Elston (1968) has shown that the great bulk of the volcanic material in the region has resulted from cyclic eruptions of an andesite-rhyolite-basalt sequence repeated at least three times. Elston has shown also that the type Datil Formation at the type locality described by Winchester corresponds only to the first cycle of eruptions. Significantly the eruptions came from various centers; and no single

cycle of rocks completely covered the area. Also significant is that rocks erupted from a center during a particular phase of one cycle are found to overlap rocks of a different phase being erupted from another center in an adjacent area. The intertonguing of different rock types from different centers has resulted in the extremely complex relationships found in the region.

Elston's (1970) compilations of potassium-argon dates (ages of rock units based on decomposition of radioactive material in the rocks) have shown that various rock units assigned to Winchester's type Datil are from about 29 to 38 million years (m. y.) old (Oligocene age). Many of the volcanic rocks in northern Grant County, similar in appearance and assigned to the Datil by Dane and Bachman (1965) or earlier workers, are within the same age range as recognized Datil rocks. However, other rock units that have been referred to the Datil are less than 21 m. y. The great bulk of the volcanic rocks in northern Grant County must, therefore, be of Oligocene and Miocene (middle Tertiary) age.

Some volcanic rocks of similar appearance and character in the Coyote Hills and Cedar Mountains of southern Grant County probably will be found to fall within the same age ranges as the type Datil rocks when potassium-argon dates are made; other rocks probably will be found to be somewhat younger, just as in the northern part of the county.

Partly to avoid perpetuating errors of correlation, and partly for purposes of simplifying the geologic map, rocks previously designated as Datil on earlier maps have not been shown separately on the geologic map (fig. 2). Instead, volcanic rocks of similar types (Tertiary to Quaternary and Tertiary) are shown in the same color. Whether or not given units should be assigned to the Datil Formation (or whether the Datil might better be assigned group status) is undetermined.

Dark-colored Flow Rocks

The dark flow rocks, mostly basalt or andesite, commonly are called "malpais." The color ranges from medium gray to black, but purplish-gray and reddish-brown tones are common color variations. Balsatic flows generally are associated with less violent volcanic activity and occur as relatively quiet emissions from fissures. Successive flows at many places accumulated to form sequences several hundreds of feet thick. Elsewhere, single flows a few tens of feet thick lie between beds of sand, gravel, or conglomerate (fig. 23). Andesite and basaltic flows may issue repeatedly from a central point and may in time build up a large mountain from which the flows spread in all directions. Black Mountain in Catron County, about 12 miles north of Gila Hot Springs, is a comparatively young volcano (Elston, 1965b, p. 172) from which lava spread far to the south into Grant County. The two Brushy Mountains, T. 14 S., R. 13 W. (fig. 8), and T. 15 S., R. 20 W.,

Figure 23—A thin basalt flow (Tba) interbedded with the lower part of the Gila Conglomerate (QTg). NW¼NE¼SE¼ sec. 8, T. 16 S., R. 17 W., southwest of Cliff. Wells finished in these types of rocks generally yield only small amounts of water. So-called "sheet water" sometimes is found at the rubbly base of a basalt flow where it may be perched on the dense upper surface of an underlying flow, on the clayey surface of a soil zone between flows, or on another nearly impermeable rock such as the lower part of the Gila Conglomerate.

are believed also to be basaltic volcanic cones of late Tertiary age.

The andesitic and basaltic rocks range from dense to extremely vesicular, from fine grained to porphyritic, and from massive to well jointed. Vesicular structure is conspicuous locally and the vesicles may be filled or partly filled with whitish minerals, commonly calcite or one of the zeolitic silica minerals.

The base of a thin lava flow commonly is a zone of scoria and rubble formed as the flow advanced and rolled over the crusted and broken surface that forms at the front of the flow. Thick flows generally retain sufficient heat to re-melt solidified blocks over which the flow advances.

Vertical and horizontal joints generally form in lava flows as the molten rock cools. Joints may be few and far apart, or numerous and closely spaced; and they may result in the formation of distinct massive columns or platy sheets that weather to a fragmental rubble.

Light-colored Flow Rocks

The light-colored flow rocks are mostly rhyolite or latite. The color ranges from nearly white to medium gray; varying shades of pink and orange red are common color variations, particularly on weathered surfaces.

Rhyolite and latite flows are less fluid than basalts and tend to build up locally thin accumulation of rock rather than to spread out as thin sheets. The major vent areas also may build large mountains or volcanoes and these generally have steeper slopes

than do the basalt cones. The rhyolitic rocks generally are dense, and jointing is apt to be complex; flow banding in intricate pattern is common. Rubbly zones may occur locally within flows and between individual flows.

Rhyolite and latite flows commonly are associated with explosive volcanic activity accompanied by ejection of large amounts of pyroclastic material with which the flows are interbedded (fig. 24a).

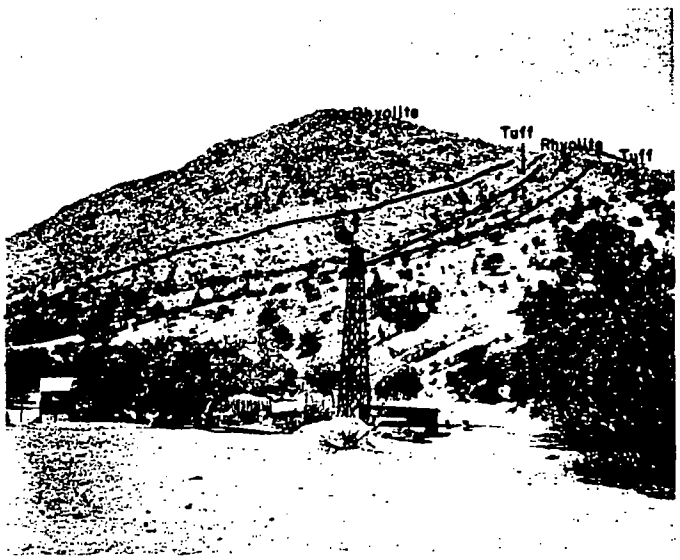


Figure 24a—Rhyolitic volcanic rocks of Tertiary age (Tr) in Carrizo Canyon, southwest flank of the Black Range; in the background is a faulted section of flow-banded stony rhyolite overlying bedded pumiceous rhyolite tuff; both are units of the Mimbres Peak Formation of Elston (1957, p. 27) which he later referred to as the Mimbres Peak Rhyolite (1965b, p. 174). The bedded tuffs at creek level dip southwest at about 30°. Well 18.9.16.442, in the foreground, obtains water from the volcanic rocks. It is about 375 feet deep and the static water level is about 280 feet below land surface; yield is reported small but reliable.

Pyroclastic Rocks

The pyroclastic rocks consist of material which was ejected aerially as fragmental material in the course of volcanic eruption. The fragments are similar in composition to flow rock if flows occur, but the color may be much different. They may range in size from minute particles to huge blocks. The smallest particles commonly are called "ash"; pumice is a light-colored glassy froth that will float and which generally breaks rapidly to tiny fragments; cinders and scoria generally are glassy to finely crystalline, light-gray to black fragments that are less than an inch in diameter.

Tuff is formed by consolidation of pyroclastic fragments; and when the larger fragments comprise up to 75 percent, the rock is called a tuff breccia. All these pyroclastic rocks are widely distributed in Grant County.

Pyroclastic rocks, such as the Kneeling Nun Tuff that forms the prominent rimrock above and southward from the Santa Rita Pit, were ejected at high temperatures that caused the fragments to partly or completely fuse after deposition (fig. 24b). Some of

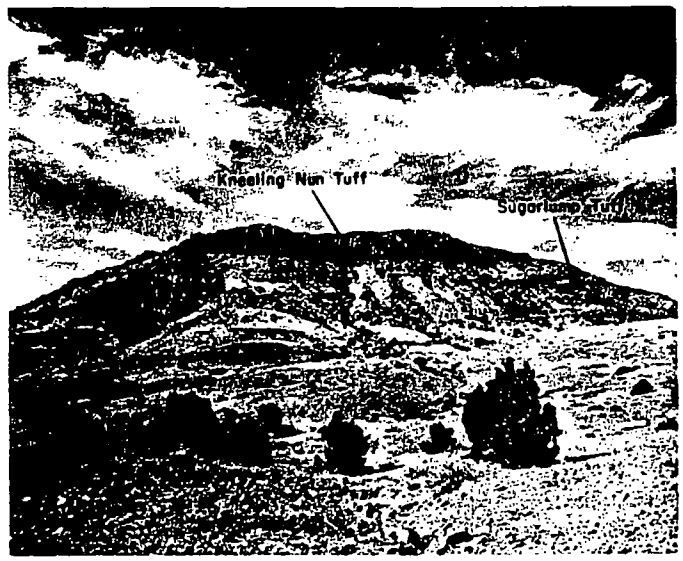


Figure 24b—Rhyolitic pyroclastic rocks of Tertiary age (Tr) comprise most of the deposits exposed in Blue Mountain in sec. 19, T. 19 S., R. 10 W. The Kneeling Nun Tuff caps the interbedded ashflows and water-deposited tuffs of Elston's Sugarlump Tuff.

the best exposures of pyroclastic rocks can be seen along state road 61 from San Lorenzo to Faywood Hot Spring in the Mimbres Valley (Elston and Netelbeck, 1965).

Dust-size particles of volcanic ash may be windborne to great distances and deposited as thin beds; ash deposits have been found interbedded with other rocks hundreds of miles from the nearest eruptive center. The coarser and heavier fragmental material falls close to the point of eruption where its accumulation helps to build up the volcanic cone. These accumulations of coarse fragments generally are highly permeable and allow rapid infiltration of precipitation. They are excellent aquifers where they lie below the water table.

Almost every thick sequence of pyroclastic rocks contains discontinuous interbeds of clay, silt, sand, and gravel. They form because the streams continue to erode and deposit sediments even as the volcanic rocks are being erupted. Lava flows may dam the rivers and create temporary lakes into which volcanic ash settles and coarser material is carried by the rivers. To determine locally if a rock is purely of volcanic origin, or is a mixture of pyroclastic and sedimentary material can be difficult.

Some of the sediments, especially the coarser materials, may serve as aquifers and yield small to large amounts of water. The rock unit designated by the symbol "Ts" on the geologic map contains water-bearing beds. However, some sediments found interbedded with the pyroclastic and flow rocks

are mixtures of clay and sand, ash, pumice, and coarse pyroclastic material. They generally are poor aquifers, but locally may yield a few gallons per minute (gpm); commonly they are confining beds because of their poor sorting.

Most of the pyroclastic rocks are dense, massive, and relatively impermeable; therefore, poor aquifers. A formation as the Kneeling Nun Tuff is more likely to be a confining bed rather than an aquifer. Effective porosity in the massive pyroclastic rocks, as in the flows, is limited largely to joints and fractures which tend to be closed at depth. Deposits of coarse, unconsolidated volcanic fragments make good aquifers if they occur below the water table, but such occurrences are uncommon and unpredictable. They are most apt to be found as relatively thin layers interbedded with flow rocks.

Well-sorted water-deposited beds of mostly pyroclastic material are found locally interbedded with flows and tuffs in the Little Burro Mountains, Pinos Altos Mountains, Santa Rita Hills, and Cobre Mountains. These beds are known to yield water to stock wells (19. 10. 7. 232, 19. 10. 29. 211, and others) in the vicinity of Dwyer, and are believed to be the source of artesian water in well 19. 10. 33. 221.

Marine Sedimentary Rocks

The marine sediments consist of two types, carbonate rocks and clastic rocks. The carbonate rocks are limestone and dolomite composed of carbonates of calcium and magnesium. The clastic rocks are shale, siltstone, and conglomerate derived from the weathering and disintegration of other rocks. Thick sections of both types crop out in the central and southern parts of Grant County.

The marine sediments in the central part are not as thick as those in the southern part. The aggregate thickness in the Silver City-Santa Rita area ranges from about 3,200 feet to 4,400 feet. The carbonate rocks range from about 1,800 to 2,300 feet and the clastics from about 1,400 to 2,100 feet. In the Little Hatchet Mountain area, Lasky (1947, p. 12) measured continuous exposures ranging from 17,000 to 21,000 feet thick and reported a possible aggregate thickness of about 26,500 feet. Carbonate rocks make up about 6,000 feet and clastics 12,000 feet in measured sections having a total thickness of about 18,000 feet.

The greatest thickness of marine sediments penetrated by wells in the Silver City-Santa Rita area is the 2,275 feet drilled in well 19. 12. 19. 132d at Apache Tejo (log, table 15). About 1,900 feet were penetrated in well 17. 12. 23. 413a (see log) near Santa Rita. The Beartooth Quartzite and the Colorado Formation of Cretaceous age, which average about 1,100 feet thick in this area, are missing in these two wells; the sediments penetrated are mostly carbonate rocks of Paleozoic age.

Marine carbonate and clastic rocks generally are intimately associated. Thin beds of one type are commonly interlayered in thick sequences of the other type. Units such as the Howells Ridge and Syrena Formations may contain both types in thick beds of nearly equal proportions.

Marine sedimentary rocks are exposed or lie at shallow depth in about 150 square miles, or about 4 percent of the county. However, about 75 percent of the population of the county lives in this area. The distribution of the marine rocks and the occurrence of water in these rocks, therefore, is significant.

The pattern of surface exposures and the logs of wells 19. 10. 27. 234 and 19. 12. 19. 132a (table 15) indicate that marine sediments underlie all the volcanic rocks between the Mimbres Valley and a line along the west side of the Silver City Range and San Vicente Arroyo at least to the county line. Exposures of lower Paleozoic rocks in the Lordsburg Valley and the thick marine sediments in the Little and Big Hatchet Mountains indicate that similar deposits also underlie the bolson fill of southern Grant County. These rocks could be reached by deep wells.

The depth to the marine deposits in the bolsons is conjectural. The bolson fill is several thousands of feet thick locally; as much as 7,000 feet of volcanic rocks could lie between the base of the bolson fill and the top of the marine sediments.

Carbonate Rocks

The carbonate rocks are massive to thin bedded, generally dense, finely crystalline, commonly sandy, silty, and cherty (fig. 25a). The colors range from nearly white through all shades of gray to black; some weather to shades of tan and brown. Fossils are common in all but a few of the limestone beds but are rare in the dolomite and marble.

Figure 25a—The Oswaldo Formation (ℙM), composed mostly of limestone, is exposed in the roadcut in Gooseneck Hill west of Hanover. Limestone beds in the Oswaldo generally are dense, and some beds contain abundant chert. Joints and bedding planes generally are open near the land surface and closed at depth. Yields to wells are very small to small.

Figure 25b—Fractured and brecciated zone in the Oswaldo Formation (PM) resulting from a minor fault having only a few feet of displacement. Such brecciated zones where penetrated below the water table can yield moderate to large quantities of water to wells.

Joints and fractures are well developed only in the vicinity of faults, folds, and large intrusive bodies (fig. 25b). Solution cavities and channels are not conspicuous in any outcrops and are uncommon at most places underground in the Santa Rita-Bayard mining district (oral commun., Don Miller and Keith Lobiano, U.S. Geological Survey, 1954, and R. M. Hernon, U.S. Geological Survey, 1965). Miller and Lobiano also reported that limestones in the mines commonly are brecciated along fault zones and have cavities enlarged by solution. However, they are dense and relatively nonporous away from the faults and brecciated zones.

Lasky's (1947) descriptions of carbonate rocks in the Little Hatchet Mountains and the appearance of the rocks underground indicate that in that area also they are mostly dense, finely crystalline and not apt to be good aquifers. However, Lasky also noted the development of solution channels in zones of faulting and brecciation.

The knowledge that solution channels are likely to occur in zones of faulting can be utilized to advantage in searching for ground water in the carbonate rocks. Wells drilled to enter fault zones below the regional water table have a better chance of developing moderate to large supplies of water than do wells drilled in the carbonate rocks where there are no faults.

Carbonate rocks are more likely to yield water in Grant County than other marine rocks. Yields range from very small to large depending on the structure of the rock, the depth of penetration, and the topographic position. Wells drilled deeply into these rocks are likely to find more joints and fractures and develop moderate to large supplies of water. Shallow wells that penetrate a relatively few feet below the water table seldom yield more than a few gallons per minute. Well 17.14.32.233 near Silver City penetrated only 76 feet below the water table in the carbonate rocks; the yield was initially 1-1/2 gpm and that reportedly declined to less than 1 gpm within a year.

Most domestic and stock wells that penetrate less than 100 feet below the water table in the carbonate rocks produce less than 5 gpm; the results of deeper penetration are revealed by records of other wells. Well 17.12.20.244a, near Hanover, penetrated 139 feet below the water table and yielded about 9 gpm. Well 17.12.23.413, 998 feet deep (log, table 15), bottomed in the Percha Shale after penetrating all the upper Paleozoic rocks; it reached 516 feet below the water table; the yield is about 185 gpm. Well 17.12.23.413a, 2,115 feet deep (log, table 15) reached 1,135 feet below the water table and penetrated the Precambrian bedrock. The yield, believed to be all from lower Paleozoic rocks, was about 235 gpm.

The American mine in the Little Hatchet Mountains is in carbonate rocks of Early Cretaceous age that were intruded by monzonite. Lasky (1947, p. 85-87) shows some 1,600 feet of tunnels below a water level of about 50 feet and cites reports that 125 to 150 gpm were pumped to keep the mine dewatered to the 250-foot level. The dewatering extended over a wide area and drained nearby mines as well. Lasky interpreted these reports to indicate that ground water was moving "through a system of fairly open channelways." The channelways are primarily joints and fractures in the carbonate rocks. The reports, considered reliable, suggest that the occurrence of water in the carbonate rocks is about the same in both the central and southern parts of the county.

Joints, fractures, and solution channels in the carbonate rocks may not be numerous but they are sufficiently well developed and interconnected to allow easy movement of water. As a consequence, water that infiltrates these rocks on the hill slopes can move quickly down to the water table which, as Lasky (1936, p. 10) noted in the Bayard area, lies at about the same altitude as the streambeds.

It may be inferred that the best place to find the water table at a shallow depth in areas underlain by the carbonate rocks is near the channel of a major stream. However, because of the generally low porosity and small amount of water in these rocks, it may be necessary to drill at least 100 feet below the water table to obtain a supply of water adequate for domestic or stock use.

Perched water is common in both the carbonate and clastic rocks, and any water found appreciably above the level of nearby streambeds or the water surface as shown in fig. 3 is likely to be perched. The supporting bed in the carbonate rocks generally is a layer of siliceous limestone or fine-grained clastic rock as shale or siltstone.

Clastic Rocks

The marine clastic rocks consist of shale, shaly sandstone, and lesser amounts of siltstone and con-

Figure 26a—Hard, well-cemented sandstone bed in the Colorado Formation (Kc) exposed in roadcut on State Highway 180 west of Central. Blasting has opened joints and fractures that normally would be closed. Most sandstone beds in the Colorado Formation are dense and yield only very small amounts of water.

glomerate. The shales range from light tan, red, and yellow through dark green, and brown to black. The sandstone is mostly light colored, tan to light gray or white, and well cemented (fig. 26a). Lasky (1947, p. 24) mentions the occurrence of black sands in the Corbett Sandstone in the Little Hatchet Mountains.

Clean, well-sorted beds of sandstone are uncommon; most contain appreciable amounts of shale and silt. On the other hand, thick beds of shale containing little or no sand are found in all areas underlain by the marine clastic rocks.

Clastic rocks of marine origin are not good aquifers in Grant County. None of the clastic units are known to yield more than small amounts of water. Reports indicate that dry holes have been drilled to depths as great as 300 feet in the Colorado Formation in the area between Silver City and Bayard. However, as a general rule, a well drilled 200 to 300 feet below the water table in the marine clastics can be expected to yield a supply of water adequate for domestic and stock use.

Artesian water has been found in both the carbonate and clastic rocks in the central part of the county. Wells 17. 14. 21. 323 and 17. 14. 22. 331 developed small flows from depths of 690 and 145 feet, respectively. These two wells were drilled in the Colorado Formation; the water is presumed to be in beds of sandstone and to be confined by shale.

The occurrences of artesian water in the Colorado Formation appear encouraging. However, they are exceptions rather than the rule, and they serve to point up a situation where artesian flow, dry holes, low yields, and uncertain supplies are found in the same general area and in the same rock formation.

A lack of pattern in the occurrence of water has been noted in all areas underlain by the Colorado Formation, but the situation becomes chaotic in the area between Silver City and Central owing to the intrusion of a complex system of dikes (fig. 26b).

Figure 26b—Beds of the Colorado Formation (Kc) cut by basic igneous dikes (TKi) of Tertiary age—roadcut on State Highway 180 just east of Silver City. The Colorado Formation yields very small to small amounts of water and the widespread occurrence of dikes makes finding water uncertain.

Water-table contours (fig. 3) based on moderately scattered wells, indicate a rather uniform southerly slope to the water table in conformance with the general slope of the land surface. Reports of well owners indicate, however, the lack of uniformity of occurrence of water. One well may penetrate several hundreds of feet and be relatively dry, then pass through a dike and find water that will rise in the well. Another nearby well may encounter water at much shallower depths, or not at all, even though drilled deeper than the neighboring well.

The dike system trends roughly north-south to N. 30° E., more or less parallel to the general slope of the land surface. Consequently, the influence of the dikes on the elevation and general slope of the water table is minimized, but may have a profound influence on individual wells.

No well in the general area between Silver City and Central is known to produce more than a few gpm. Many of the wells have histories of depletion and subsequent deepening until more water was found. The data suggest that the Colorado Formation, inherently a poor aquifer, has been made poorer as a result of compartmentalization by the dike system.

Water occurs in the compartment-like bodies or pockets formed by the crosscutting and intersection of dikes, and initial yields to wells may be ample. However, these pockets may be depleted rapidly and a well that first had an adequate yield may be dry within a few months.

Continental Sedimentary Deposits

The continental sedimentary deposits are the largest and most important sources of ground water. These deposits comprise several named geologic formations and many unnamed sedimentary units of sequences, all laid down on the land surface by streams, in lakes, or by the wind; similar deposits are currently accumulating at many places. They consist of unconsolidated deposits of boulders and gravel, sand, silt, and clay, and their consolidated equivalents—conglomerate, sandstone, siltstone, and mudstone.

Continental deposits that have been given formational names are the Gila Conglomerate (Gilbert, 1875, p. 540), the Wimsatville Formation of Hernon, Jones, and Moore (1953, p. 120), Virden Formation of Elston (1960), and Ringbone Shale (Lasky, 1947, p. 18-19). Formations as the Datil, Rubio Peak, and Hidalgo Volcanics, consisting mainly of volcanic rocks, contain interbeds of sand and gravel that locally may yield water.

Poor sorting and a large content of fine-grained, tuffaceous material is characteristic of almost all the named formations except the upper part of the Gila Conglomerate. Consequently, most are poor aquifers.

Continental sedimentary deposits are locally interbedded with volcanic rocks of Cretaceous and Tertiary age (fig. 23), but they are most common as the thick deposits of Quaternary age that fill the valleys and underlie the slopes up to the higher mountains. These continental sedimentary deposits are also found locally capping mesas in the upland areas.

Gila Conglomerate

The Gila Conglomerate (late Tertiary and early Quaternary) is the best known and most widespread of the continental deposits in Grant County. The Gila consists of poorly sorted sediments that range from unconsolidated to strongly consolidated. The sediments are nonbedded to well bedded and locally are monolithic. Two major divisions of the Gila, an upper and a lower, can be recognized throughout. Lake deposits interbedded with some sand and gravel underlie a broad area in the northwest part and constitute a locally important subdivision of the upper part of the Gila. Other subdivisions of the Gila have been recognized locally but are not important to this study.

The mode of origin of most of Gila, with the exception of the lake deposits, is analogous to the present formation of overlapping alluvial fans along the fronts of block-fault mountain ranges.

The upper and lower parts of the Gila are difficult to differentiate in many places because they are gradational and their lithology is similar. Where they are unconformable the contacts generally are concealed by mantles of weathered rock; the weathered products of similar conglomerates and related deposits are not easily distinguished. For this reason, the units were not mapped on a countywide basis. The principal differences are degree of consolidation and lithologic character of included constituent rocks.

The lower part of the Gila generally is strongly indurated, and locally deformed and intruded by younger volcanic rocks (figs. 27a, b). Older basalt flows can be found locally interbedded with the clastic rocks, particularly in the lower part of the Gila (fig. 23). One of two andesitic basalt flows in the basal part of the Gila Conglomerate exposed at the spillway at Roberts Lake has been dated by potassium-argon methods and assigned a middle Miocene age of 20.6±0.5 million years (Elston and Damon, 1970, p. AVI-6). The upper part of the Gila also has some interbedded basalt flows, but they are not as prevalent as in the lower part. A flow in the upper-

Figure 27a— Basaltic dike (Tba) intruding lower part of Gila Conglomerate (QTg); on Cottonwood Creek, west side of the Silver City Range, adjacent to well 17.15.7.313. The dike is a feeder to a basalt flow higher in the section.

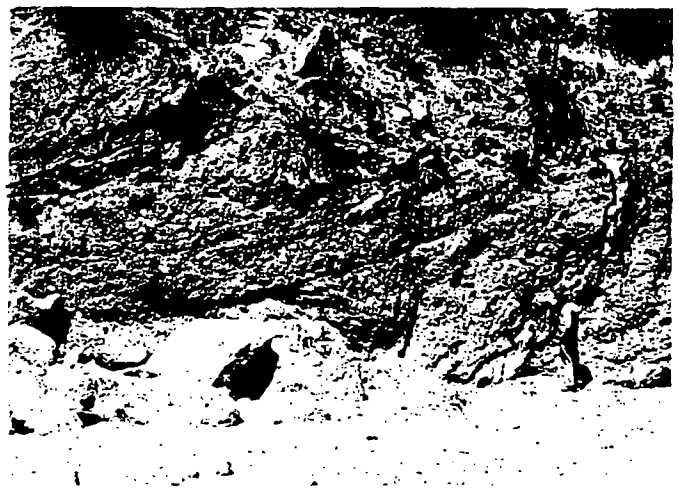


Figure 27b—Lower part of Gila Conglomerate (QTg), dipping southwest, on the north side of the dike shown in "a." The man is standing beside a projection of basalt (Tba) from the main body of the feeder dike.

most part of the Gila, visible as a rimrock east of the community of Mimbres, has been dated at 6.3± 0.4 million years (Elston, 1968, p. 239), thus of late Pliocene age.

The clastic materials of the lower part of the Gila consist mostly of fragments of light-colored volcanic rocks derived by weathering from the thick and widespread volcanic deposits of Oligocene to middle Miocene age. The conglomerates are coarse; the larger rock fragments are characteristically subrounded to angular, and the matrix binding them contains a high percentage of fine sand, silt, and tuffaceous materials (figs. 28a, b). Good exposures of the lower part of the Gila can be seen in a creek-

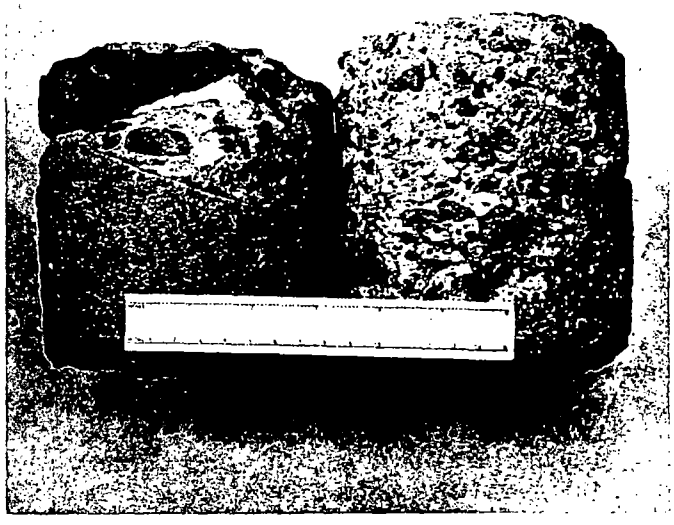


Figure 28a—Cores of the lower part of Gila Conglomerate (QTg) taken from test well 19.14.1.143a in Pipe Line Draw. The well reportedly was drilled to a depth of 1,003 feet, the static water level was about 134 feet below land surface, and the well could be bailed dry.

Figure 28b—Lower part of Gila Conglomerate (QTg) exposed in bank of draw in the NW¼ sec. 16, T. 18 S., R. 14 W., about 1 mile southwest of Silver City. Most of the large angular blocks of rock, some as much as a foot across, are composed of rhyolite or andesite. The beds dip easterly at about 3 to 4°.

Figure 29a—Lower part of Gila Conglomerate (QTg), dipping about 25° west, exposed in Pipe Line Draw, just north of Tyrone. Pipe Line Draw is believed to have developed along the trace of a major fault zone. The lower part of the Gila is widely exposed east of the draw where the upper part is absent generally and wells produce only small amounts of water. However, from 700 to 900 feet of the upper part has been penetrated in wells west of the draw, and some of the wells have large yields.

Figure 29b—Lower part of Gila Conglomerate (QTg), dipping about 44° southwest, exposed in Carrizo Creek on the west side of the Black Range. Terrace gravel (Qtg) of Quaternary age overlies the Gila. The terrace gravels generally are thin and above the water table: they rarely yield water except where perched water or sheet water may be found locally in small quantities.

Figure 30—Nearly flat beds of Gila Conglomerate (QTg) exposed east of State Highway 61, 1.4 miles north of the Mimbres Ranger Station. Differential weathering of alternately well cemented and moderately cemented beds is responsible for the etched relief of the outcrop. Yields to wells tapping the lower part of the Gila in this area generally are small; most wells obtain water at shallow depth in the alluvium overlying the Gila.

bank in the NW1/4 sec. 16, T. 18 S., R. 14 W., (fig. 28b); in Pipe Line Draw, SE1/4 sec. 29, T. 18 S., R. 14 W., (fig. 29a); in the banks of Carrizo Creek (Black Range) in the SE1/4 sec. 21, T. 18 S., R. 9 W., (fig. 29b), and along the highway in the upper Mimbres Valley, north of Mimbres Ranger Station, in sec. 36, T. 15 S., R. 11 W., (fig. 30).

The base of the lower part of the Gila is well exposed at stream-bed level in Wind Canyon, in the SW1/4 sec. 9, T. 18 S., R. 15 W. Large angular blocks of volcanic rock in a matrix of tuffaceous sand and related volcanic debris lie unconformably on older volcanic flow rocks. Bedding cannot be discerned in this lowermost part of the Gila Conglomerate. The size and extreme angularity of the larger rock masses, some of them several feet in diameter, indicate rapid accumulation and proximity to source.

The upper part of the Gila Conglomerate generally is no more than slightly consolidated. It may be somewhat deformed locally but much of the apparent dip results from deposition on slopes that fanned out from the base of the uplands from which the deposits came.

Thick sections of the upper part of the Gila are exposed west of Pipe Line Draw in roadcuts on State Highway 90 between Silver City and Lordsburg, in the cliffs that border the Gila River near Redrock, in the gravelly slopes that border the Mimbres and Mangas Valleys (figs. 31a, b), and along State Highway 180 where the road descends into the Valley of Little Dry Creek just south of the Grant-Catron county line.

Figure 31a—Upper part of Gila Conglomerate (QTg), cut by small fault, exposed in roadcut on State Highway 90, 0.75 mile southwest of Tyrone. These beds, which contain much weathered granitic material generally are poorly consolidated. They yield moderate to large amounts of water where found below the regional water table.

Figure 31b—Uppermost part of the Gila Conglomerate (QTg) exposed in roadcut on State Highway 90, east of San Lorenzo. Note alternation of coarse and finer bedded deposits, none of which are more than poorly consolidated. The upper part of the Gila near San Lorenzo yields large amounts of water locally.

The composition of the upper part of the Gila varies more from place to place than does the lower part even though the two parts were formed in the same manner. The variation resulted because a greater variety of rocks were exposed to erosion when the upper part of the Gila was deposited. The lower part was derived mainly by erosion of the volcanic rocks of Tertiary age which covered nearly all older rocks. The upper part of the Gila was deposited after an interval of time in which many of the rocks of the region, including the lower part of the Gila, were faulted and deformed. The deformation and faulting raised some of the older nonvolcanic rocks and made them also subject to erosion. All of the older rocks thus have contributed material to the upper part of the Gila; therefore, its component sediments have a variety not found in the lower part.

The ability to distinguish between the upper and lower parts of the Gila, in drill holes, is important in the search for ground water. The lower part of the Gila furnishes very little water to wells; the upper part can furnish moderate to large amounts.

Because erosion of the lower part of the Gila also contributed sediment to the upper part, distinguishing between the two on the basis of rock types is difficult. They are best distinguished at the surface by percentage of volcanic rocks, degree of consolidation, attitude, and stratigraphic and topographic position. The hardness, or degree of consolidation, and the percentage of volcanic rocks locally, help differentiate the two parts in drill holes.

Well 18.14.30.324 in Silver City's Woodward Ranch well field penetrated about 890 feet of unconsolidated to poorly consolidated deposits considered to be the upper part of the Gila. The deposits consist largely of feldspar and quartz fragments derived from the granitic rocks in the Big Burro Mountains. At about 890 feet the drill entered very hard conglomerate, composed mostly of volcanic rock, considered to be the lower part of the Gila. The well had a drawdown of about 110 feet after pumping 400 gpm continuously for 2 weeks. All of the water came from the upper part of the Gila.

A test well (19.14.1.143a) in Pipe Line Draw, about 5 miles east-southeast of the Woodward well, penetrated 1,003 feet (log, table 15) of the firmly cemented lower part of the Gila (fig. 26a). This well, drilled in 1944 for Silver City, reportedly would yield no more than 40 gpm when tested. The yields of these two wells show the characteristic difference in hydrology between the upper and lower parts; and why recognizing them in drill holes is important.

Lake Deposits and their Origin

One consequence of the last period of general and rather severe faulting and deformation in this region was the disruption of major lines of drainage and the subsequent formation of some large but temporary lakes. Finely bedded clay, silt, volcanic ash, and diatomite (siliceous material derived from microscopic plantlife called diatoms) was deposited in the quiet waters of the lakes. Coarse-grained deposits were laid down generally on the margins and where streams entered the lakes. The most extensive deposits are in the Duck Creek Valley where they are exposed in the banks of Duck Creek (fig. 32) in low hills (erosional remnants) that rise from the valley floor (fig. 16), and in the lower slopes along the western margin of the valley north of Buckhorn. The lake deposits in Duck Creek Valley may be as much as 1,000 feet thick.

Figure 32—Lake deposits exposed in banks of Duck Creek, near Buckhorn (SW¼ sec. 11, T. 15 S., R. 18 W). The deposits are in the uppermost part of the Gila Conglomerate (QTg). They were laid down in a lake that occupied the valley for a brief time following the last major uplift of the Mogollon-Silver City-Little Burro Mountain Ranges. The beds of clay and silt confine water locally in deposits of sand and gravel.

Other probable lake deposits in the upper part of the Gila crop out in the low hills south of the community of Gila, and in Mangas Valley. These deposits are at least several hundreds of feet thick.

The beds of gravel and sand in the lake deposits locally yield large quantities of water. Some water is found confined under beds of clay. Wells 15.17.-29.442 and 15.18.4.241 flow but the hydrostatic heads are low and yields are small.

The origin of the lakes is conjectural; but terace, mesa, and divide altitudes, the character of the deposits at various places, and the structural pattern of the area lead to the following hypothesis: the Gila and San Francisco Rivers were parts of a single large drainage system before the Mogollon Mountains, Silver City Range, and Little Burro Mountains were uplifted. The ancestral Gila River (before the uplift) flowed southeast down a broad valley, the ancestral "Mangas Trench," in which it had deposited the alluvial debris that now constitutes the lower part of the Gila Conglomerate.

The uplift of the Little Burro Mountains was rapid enough to block the ancestral Gila River and create

a lake that reached from the south end of the Little Burros northward to about 20 miles north of the Grant-Catron county line.

The concurrent uplift of the Mogollon Mountains and Silver City Range greatly rejuvenated the streams that drained the region. Coarse alluvial fill in the old channels was carried into the newly formed lake. The early deposits constitute most of what is considered to be the upper part of the Gila. Much of it was derived from the lower part of the Gila Conglomerate that had been elevated and deformed during the uplift.

The quantity of gravel and associated sediments dumped into the lake by Mogollon, Dry (in Catron County), and Little Dry Creeks was particularly great, and was concentrated in a relatively small area. The deposits accumulated rapidly and a barrier was built across the lake, dividing it and thus creating two separate lakes. The northern lake, fed by what is now the upper San Francisco drainage, found an outlet to the west across a relatively low area, the southern part of which is now known as Antelope Flats in Catron County. The southern lake, fed by the headwaters of the present Gila River, developed an outlet to the west across low ground at the northern end of the Big Burro Mountains.

The faulting that formed these lakes probably was contemporary with similar faulting in the Mimbres-Sapillo Valleys (the Mimbres trench), which parallels the Mangas Valley trench. Elston and Damon (1970, p. AVI-7) concluded on the basis of K-Ar age dates, that block faulting in the Mimbres-Sapillo Valley had virtually ceased about 6 m. y. The lakes probably were short lived and ceased to exist long before the advent of Pleistocene (ice age) time as a result of both filling with sediments and lowering of their outlets by downcutting.

Downcutting would have been rapid at the outlets of the lakes because gradients were steep and the rock relatively nonresistant. The rivers quickly cut deep narrow gorges, the spectacular canyons that still are accessible only by horseback or foot travel.

The lakes dwindled as the outlets cut down to the level of the lake beds; erosion of the lake deposits began on the margins of the lake even as sediments continued to be deposited in the remaining waters. The lakes did not endure at any one level long enough for waves to cut extensive benches or build gravel terraces that would survive erosion during the wet pluvial cycles of Pleistocene time. The low gravel hills bordering the west side of the Little Burro Mountains (fig. 10) may be one of the few remnants of such gravel terraces in Mangas Valley.

Terrace Gravel

Deposits of gravel cap low ridges and overlie older rocks throughout the foothill areas. These terrace gravels are only slightly older than the alluvium filling the valleys; and were laid down over generally flat surfaces prior to the uplifts and rejuvenation of streams that occurred in late Pleistocene and Holocene time. Erosion that followed deposition of the terrace gravels has left some discontinuous gravel and sand deposits above the present level of streams (fig. 33). These terrace gravels

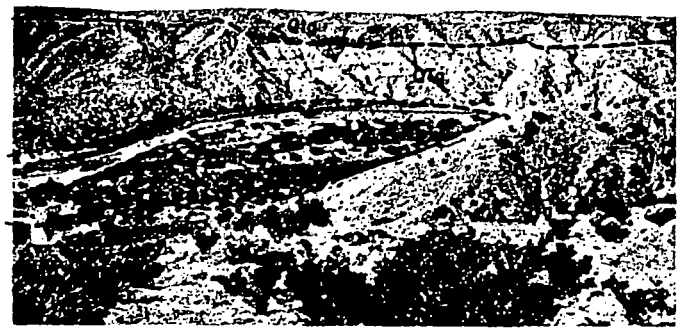


Figure 33—Terrace gravel of Quaternary age (Qtg—probably Pleistocene) unconformably overlying the upper part of Gila Conglomerate (QTg) along Blue Creek, near center of sec. 17, T. 18 S., R. 19 W. The terrace gravels are above the water table which in this area is over 100 feet below the normally dry channel of Blue Creek. The channel is filled with alluvium (Qal) to depths generally of not more than 20 feet.

generally are thin and drained of water because of their high position above the stream channels. Small amounts of water are found in the gravel where extensive deposits overlie relatively impermeable rocks.

Alluvium

The sand and gravel in the channels and under the flood plains of the rivers and creeks are unconsolidated continental deposits of Holocene age commonly referred to as alluvium (fig. 18); also included in this category is the material immediately underlying the surface of the valley floors (bolsons) in the vicinity of Whitewater, Faywood, Separ, and Hachita. The composition and texture of the alluvium and bolson deposits is varied because the streams that deposit them flow across rocks of many types and pick up material of all kinds. The texture ranges from fine to coarse—from clay to beds of boulders. The bolson deposits are similar in physical character to river channel and floodplain deposits but the channel and floodplain deposits generally are thin whereas bolson deposits attain great thickness.

Core drilling for damsites on the floodplain of the Gila River show the valley fill to be as much as 101 feet thick locally (NW1/4, sec. 19, T. 19 S., R. 10 W.) near Redrock (U. S. Bureau of Reclamation, 1930, p. 228). However, in general it is less than that; logs of wells suggest it averages about 40 feet in the broader parts of the river valley.

The alluvium under the floodplain of the Mimbres Valley at the McSherry Range (sec. 27, T. 19 S., R. 10 W.) near Dwyer is about 25 feet thick. However, the log of irrigation well 17.11.13.343 on the Horace Bounds ranch in the Mimbres Valley near San Lorenzo, shows the alluvium there to be at least 55 feet thick.

The alluvium in the channels of major tributaries to the Gila and Mimbres generally is not more than 5 to 20 feet thick although locally may be appreciably more. Most of the tributaries are actively downcutting. Alluvium that accumulates during periods of low flow is moved downstream during periods of flood flow; thick deposits do not generally have an opportunity to form.

Alluvium of Holocene age filled many shallow upland valleys during an earlier cycle of deposition that began about 1300 A. D. (Leopold and Snyder, 1951). The alluvium in most of the larger valleys contained ground water tapped by shallow dug wells during the settlement of the region in the period 1865-85. A regional cycle of erosion that began in the period 1875-95 (Hastings and Turner, 1966, p. 45), has caused extensive gullying and cutting of arroyos. Perhaps the best examples are in Mangas Valley, Buckhorn Valley, and along San Vicente Arroyo (fig. 34) where underlying bedrock now is exposed at places in the stream channel, and arroyo banks are 20 to 30 feet high.

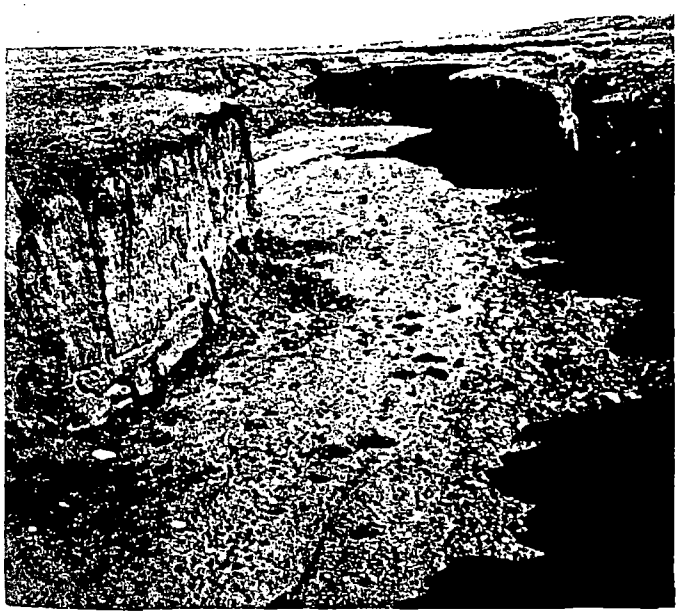


Figure 34—Alluvium (Qal) of Holocene age exposed in banks of San Vicente Arroyo; view looking downstream from the bridge 6 miles northwest of Whitewater. The arroyo, cut since about 1890, has acted as a drain to lower water levels that once were within 5 to 10 feet of the surface along much of the valley. The arroyo at this point is about 30 feet deep; note man at base of bank.

The gullying had the same effect as would the construction of drains—the shallow ground-water levels in the alluviated valleys lowered to the extent that the wells tapping the shallow water bodies went dry and, locally, large trees died (fig. 32).

The cause of the regionwide gullying has been argued for many years and commonly has been attributed to overgrazing. However, Leopold (1951, p. 356) and Hastings and Turner (1966, p. 284-289) present strong arguments that show climatic changes are chiefly responsible, and that grazing has been only a contributing factor.

Probably no large amounts of water were ever stored in the alluviated valleys. The water supply furnished by the early-day wells probably was no more dependable than that of many of the present-day shallow wells tapping water in the alluvium of the upland valleys. The water levels in these wells fluctuate with the seasons now, and they probably fluctuated in the past also.

The shallow alluvial wells of most of the upland valleys yield only small amounts of water. Wells tapping the alluvial aquifer under the floodplain of the Gila River in the vicinity of Redrock yield as much as 2,250 gpm (19. 19. 1. 142). Yields are as high as 2,000 gpm and average 850 gpm on the floodplain of the Gila near Cliff and Gila. Yields near Buckhorn on Duck Creek are as high as 1,100 gpm and average about 500 gpm. Two wells on Mangas Creek near Mangas Springs yield 1,100 and 1,400 gpm, respectively; but these wells might be getting some water from the upper part of the Gila Conglomerate.

The alluvium in the valley of the Mimbres River southward from about San Lorenzo can yield large amounts of water. However, the yields are generally smaller than from wells along the Gila because the alluvial fill is generally thinner. Wells tapping the alluvium near San Lorenzo have yields of about 300 gpm. Well 17. 11. 24. 214 yields about 800 gpm but much of the water from this well is believed to come from the upper part of the Gila Conglomerate.

The coarse alluvium in the uppermost reaches of the channels of major tributaries to the Gila and Mimbres Rivers, and in the larger water courses that drain to the Lordsburg-Deming valley, also generally contains appreciable amounts of water. However, the alluvial aquifers generally will not sustain large yields because the fill is thin and the valleys narrow. Locally, wells may sustain large yields of water seasonally but not annually.

The water table in the tributary channels commonly is near the land surface, but sometimes is far below the surface. Where the water table is deep, perched water may be found in the gravelly fill.

Bolson Deposits

Bolson deposits is a term applied to alluvial sediments that fill broad intermontane areas as the

Lordsburg and Hachita Valleys; and the extension of the Mimbres Valley into the Faywood - Whitewater area of the San Vicente basin. The oldest parts of the fill probably are equivalent to the lower part of the Gila Conglomerate. They were deposited when the last major phase of block faluting began about 20 million years ago (Elston and Damon, 1970, p. AVI-7). Bolson fill at intermediate depths probably is equivalent in age to the upper part of the Gila. The upper part of the bolson fill contains material eroded from the Gila Conglomerate and older rocks during Quaternary time; particularly during the Pleistocene.

The bolson deposits are a heterogeneous mixture of rock from the surrounding uplands. Mostly unconsolidated, some beds may be locally cemented with calcium carbonate, limonite (iron oxide), or silica to varying degrees. Most of these cemented beds, regardless of the depth at which they are now found, were cemented when they were within a few feet of the land surface, and when that surface remained stable for an appreciable time. These hardpan (limonite - cemented) and caliche (carbonate-cemented) layers may be a few inches or many feet thick, and are sometimes mistaken for bedrock when found during drilling. Samples of deep bolson fill from oil well tests are available for examination at the New Mexico State Bureau of Mines and Mineral Resources (Bieberman, Crespin, 1955).

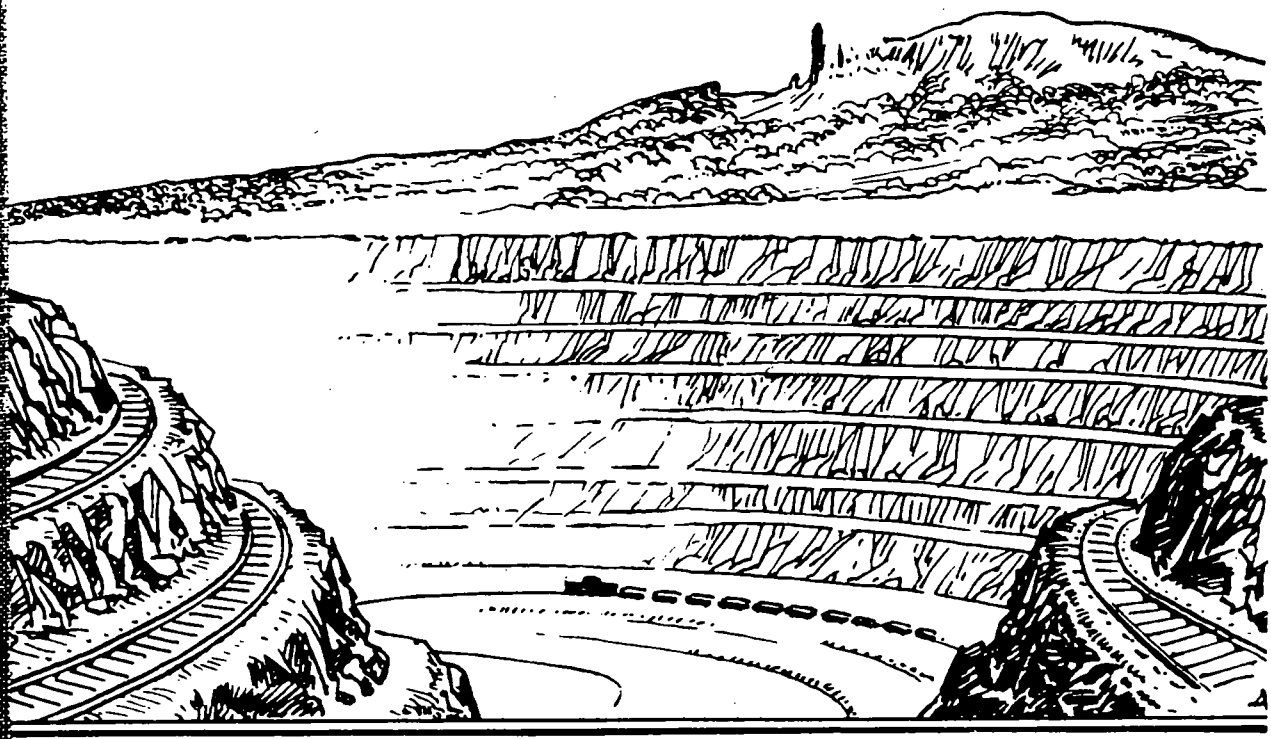
The bolson deposits range in thickness from a few feet where they lap onto the bedrock along the foothills to several thousand feet in the central parts of the valleys. Oil well test 20. 11. 31. 113, 2-1/2 miles southwest of Faywood, bottomed in bolson fill at a depth of 1, 607 feet. Another well test, in Luna County about 9 miles southeast of Faywood, was drilled in bolson fill to a depth of 6, 171 feet; an oil well test near Hachita was drilled to a depth of 1,070 feet in bolson fill (Dixon and others, 1954, p. 30-31). These and other tests in southwestern New Mexico show that the bolson deposits are of great thickness in most of the large valleys; the full thickness is not known. These deposits along with alluvium and the upper part of the Gila Conglomerate constitute a ground-water reservoir of great capacity.

The bolson deposits in general are not as well sorted as the deposits under the floodplains, thus yields to wells are somewhat smaller than those from the stream alluvium. Irrigation and industrial wells tapping bolson fill near Faywood and Whitewater yield from about 100 to 1, 500 gpm, and average about 600 gpm. Some of the higher yields may come from volcanic rocks associated with the bolson fill. Well 24. 15. 33. 232, drilled adjacent to U. S. Highway 70-80 (Interstate 10) near Separ to supply road construction water, has a yield of about 400 gpm. Well 24. 16. 31. 122, drilled for irrigation in the Lordsburg Valley just inside Grant County, reportedly produces 1, 200 gpm.

REFERENCE 6

Schilling, 1959

SCENIC TRIPS to the GEOLOGIC PAST



SILVER CITY
SANTA RITA
HURLEY

NEW MEXICO

Scenic Trips to the Geologic Past

No. 5

SILVER CITY - SANTA RITA - HURLEY, NEW MEXICO

by

JOHN H. SCHILLING[+]

1959
STATE BUREAU OF MINES AND MINERAL RESOURCES
a division of
NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY
Socorro - New Mexico

early 1890's, when the falling price of silver forced the mines -- the Naiad Queen, Commercial, and MacGregor -- to shut down. Almost overnight Georgetown became a ghost town. Over $3,500,000 worth of silver was produced.

New Mexico Magazine

Georgetown during its boom.

	83.0	Stop sign; turn right onto Highway 180.
.7		
	83.7	Again, on left, Oswaldo No. 2 shaft.
3		
	84.0	Turn left onto blacktop road just past gas station. Follow the signs and arrows to Visitors Lookout.
1.1		
	85.1	STOP D. VISITORS LOOKOUT -- SANTA RITA MINE. Park your car and walk to the white lookout platform.

* * * * * * *

We are standing at the edge of one of the largest mines in the world, the Santa Rita open-pit copper mine. At first glance, it looks as if the mine were shut down even when operating full blast. But after looking for a while you will see all sorts of activity -- electric shovels filling railroad cars and trucks, trains coming and going, drills cutting holes, and here and there men working.

Santa Rita is not only one of the biggest but also one of the oldest copper mines in the United States. But, first, before relating Santa Rita's colorful history, let me describe what we can see from here. (Mining progresses so fast that by the time you visit Santa Rita, the description may be inaccurate. But figures, even though outdated, will help give you an idea of its huge size.)

It is difficult to realize the tremendous size of the pit and the mining equipment. From the point where we are standing, the pit is slightly over a mile across, and the bottom is 700 feet below us. The pit is 980 feet deep from its highest to lowest point (in 1959). Each BENCH ("step") is 50 feet high.

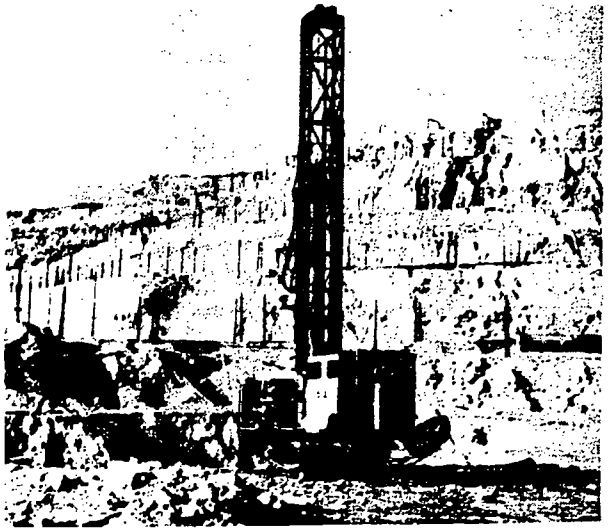
THE MINE'S JOB IS TO GET THE ORE OUT OF THE GROUND. The mining methods used at Santa Rita are different from those used in the other mining districts you have just visited. Here, MASS MINING (both the ore and waste are dug out of the ground and carried away) is used; in contrast, the other mines do SELECTIVE MINING (the ore bodies or veins are removed, but the barren rock is left in place). Santa Rita also is an OPEN PIT; most of the other mines are UNDERGROUND mines. Mass, open-pit mining with big, modern machines is, in a way, much cheaper than selective, underground mining with small machines and more hand labor. Although the initial investment is great, more tons of ore can be mined for the same cost, offsetting the lower value of each ton of the lower grade ore. This does not automatically mean higher profits per ton of ore, but it has a much more important result -- more ore can be mined. Waste has literally been changed into ore; jobs and copper have been "created."

Operating normally on a 7-day-week, around-the-clock schedule, 67,500 tons of rock are mined every day. Only 22,500 tons of this is ore which is sent to the mill; 45,000 tons of rock is hauled to the "waste" dumps. (As you will see later, copper is removed even from this "waste.") The ore averages less than 1 percent copper. On the average, only 15 pounds of copper are recovered per ton (2,000 pounds) of ore!

Before any mining is done, a series of holes are drilled. From the rock "cuttings" removed from the drill holes, the grade, size, and shape of the ore body can be determined. This information is used to plan future mining for years ahead.

The benches ("steps") provide flat places on which the drills, shovels, trains, and trucks can operate.

The first step in mining is to drill 12-inch holes 60 feet deep into the 50-foot benches. Electric-powered ROTARY DRILLS (the tall towerlike affairs seen here and there in the pit) do this work. The actual drilling is done by a bit on the end of a long rod. The rod and bit rotate, and push and cut their way down through the

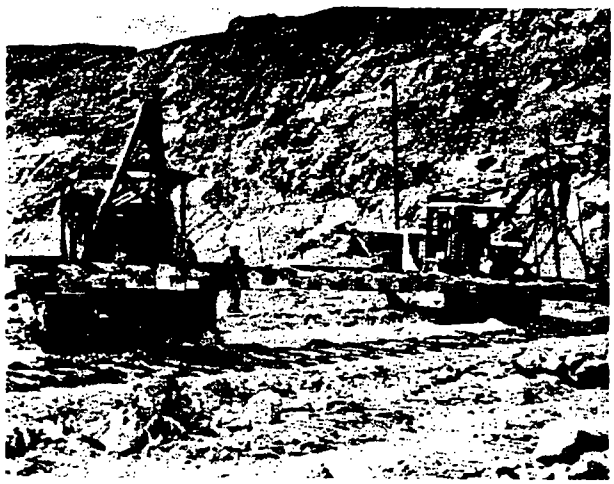


A rotary drill, Santa Rita mine.

Kennecott Copper Corporation

solid rock, much like a power drill. High-pressure air is forced down the center of the rod and blows the "cuttings" out of the hole, at the same time cooling the bit. One of these drills can "make" 200 to 400 feet of hole in an 8-hour shift. The rock is so hard that the drill bits wear out after 3 or 4 days.

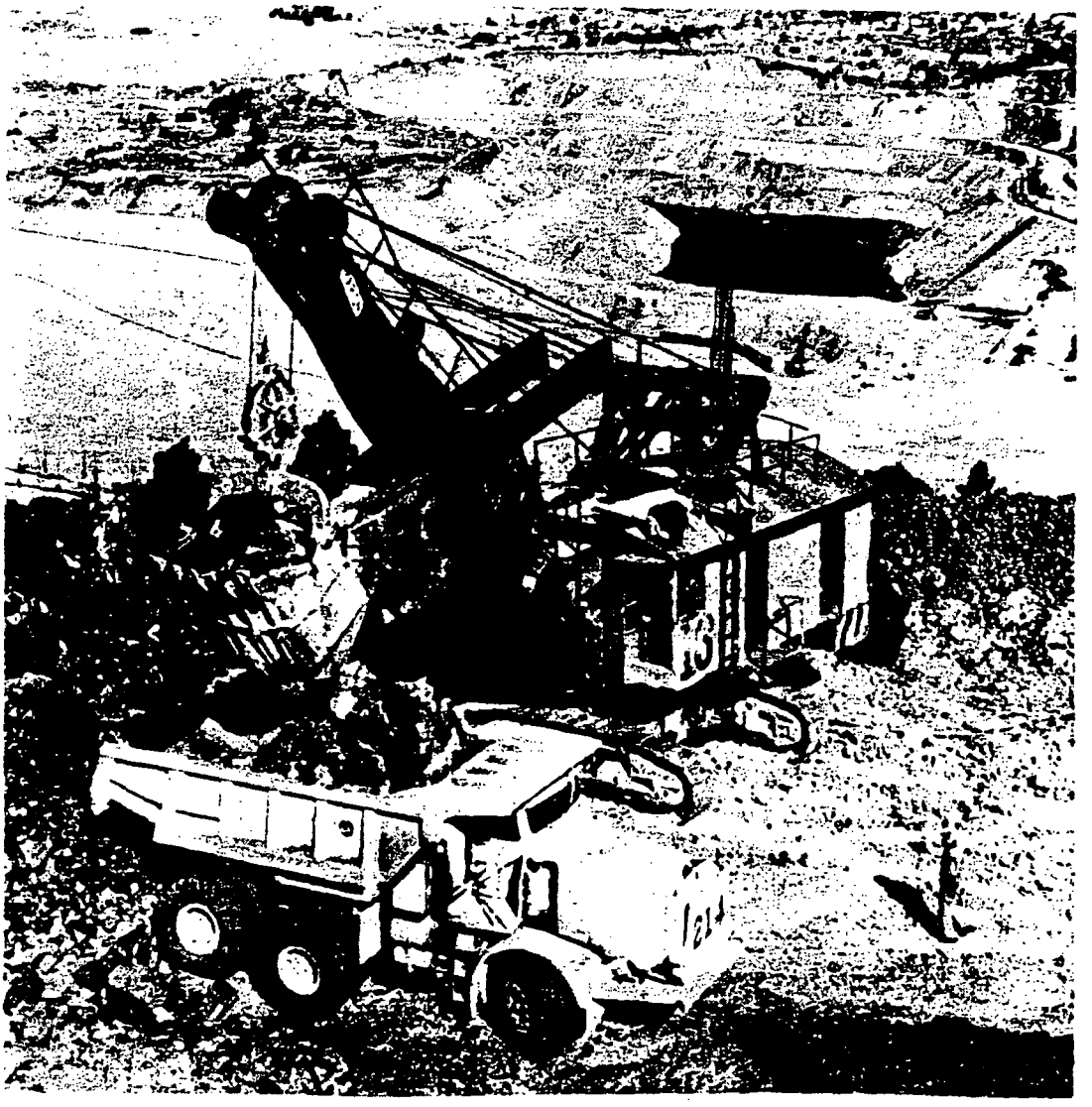
Detonating fuse, with an electric blasting cap on the end, is used to connect the holes to be blasted. Powder (ammonium nitrate; also used as fertilizer) is poured into the holes (on the average 650 pounds per hole, the amount depending on the type of rock and how badly it is cracked). Then the holes are filled with STEMMING (in this case, screened dirt or cuttings from the hole) in order that the main force of the explosion may be directed sideways into the rock rather than be dissipated by blowing upward through the drillhole.



Bulldozers moving track, Santa Rita mine.

Kennecott Copper Corporation

Blasting is done at all times of the day. Before each blast, a warning signal is sounded (10 short toots followed by another signal indicating the location of the blast within the pit). Boom,



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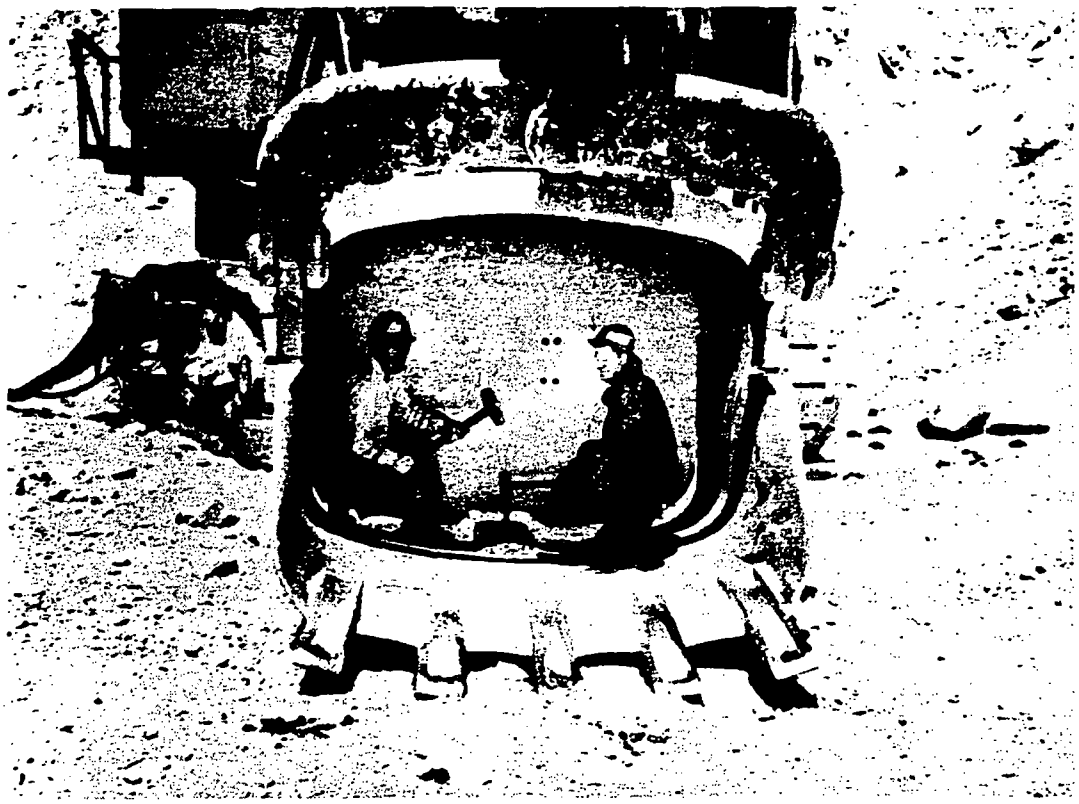
Shovel loading truck, Santa Rita.

the blast goes off! Puffs of dust shoot from the holes, the rock rises slightly and settles back in a heap. It is not very spectacular. As many as 60 holes are shot at a time, using up to 50,000 pounds of powder and breaking as much as 250,000 tons of rock.

The broken rock is scooped up by giant, self-propelled, electric SHOVELS and loaded into either waste or ore cars depending on how much copper is in the rock. There are 10 of these big

fellows scattered on the benches. All but one can scoop up 5 or 6 cubic yards (10-13 tons) at a time and load up to 4,500 tons per 8-hour shift; one supergiant can handle 8 yards (17 tons). When



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Workers in shovel bucket.

the pit was first started, smoke-belching 3½-yard (7-ton) steam shovels mounted on rails were used.

Eighteen electric LOCOMOTIVES, each weighing 85 or 125 tons, haul 7- to 10-car trains of ORE CARS (solid bottoms with high sides, holding 80-90 tons) or WASTE CARS (side-dump with low sides, holding 60-80 tons) out of the pit, zigzagging back and forth, with the locomotive first pushing, then pulling. The waste cars go to the dumps (to the extreme right of the Lookout); the ore cars go to the gathering yard and are made up into longer trains of 50 cars for the haul to the mill. Steam locomotives were used prior to the introduction of the more efficient electric equipment.

Train movements are directed by radio phone from a control tower. Lights on a control board show the location of each train. Most of the main switches are controlled electrically from the tower.

Kennecott Copper Corporation

Shovel No. 1 below old Spanish shaft in 1915.

Over 40 miles of track circles the pit. Because it must be moved frequently, the track has been assembled in prefabricated sections, much like track for toy trains. Working in pairs, bulldozers with special booms move the sections of track to the new location, where they are rebolted together.

TRUCKS are used to haul the rock from the hard-to-reach spots where the trains can't go. The "small" trucks carry 25 tons; the "big" trucks haul 40 tons. Yellow "school" buses convey the men to and from work.

A new system, SKIP HOISTING, is planned to simplify the long haul out of the pit. Cables will pull loaded "cars" straight up the side of the pit on steeply inclined tracks. (Possibly this system will be in operation -- to the right of the Lookout -- by the time of your visit.)

Water is both a problem and a resource. To prevent the pit from becoming a lake, water is collected in a pond at the bottom of the bigger South Pit, then pumped up to a storage pond in the North Pit (to the left). This water, which contains dissolved copper, is used in leaching operations (more about this later). Santa Rita Creek ran across what is now the middle of the pit. To prevent a cloudburst from suddenly filling the pit bottom, a concrete-lined

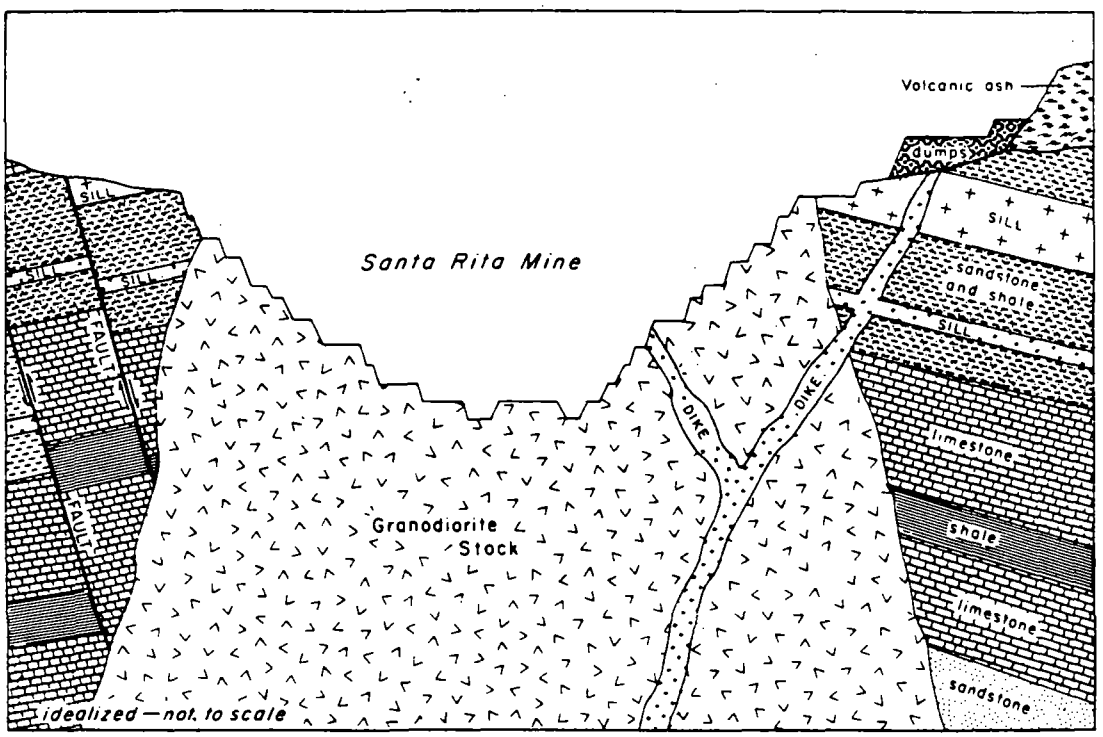
flume (passing directly below the Lookout) was built to divert any such flash flood around the pit edge.

* * * * * * *

The geology at the Santa Rita mine is rather complicated. The rocks have been broken and moved around into a jumbled-up mess, and are so badly altered that it is difficult to tell what they once looked like. But by careful study, the geologist, using clues like a detective, can piece together the story of how the copper got where it is, even though much of the evidence has been destroyed. So much of the evidence has been destroyed that some details of the geologic history are not known with any certainty. Many geologists will not agree with all the details as they are described below.

Millions of years ago, oceans covered this area. SEDIMENTARY rocks (limestones, shales, and sandstones) formed on the ocean floor and along the shore, and slowly piled up into a thick layer. Later, forces within the earth folded and cracked these rocks.

Some 70 million years ago, great masses of hot, pasty IGNEOUS rock (rock formed by the cooling and hardening of molten "rock") began to force their way upward from deep within the earth,



Cross-section through the Santa Rita mine.

forming DIKES (sheets of once-molten rock which filled cracks cutting other rocks), SILLS (sheets of once-molten rock between layers of sedimentary rock), and STOCKS (dome-shaped masses of once-molten rock cutting other rocks).

The Santa Rita open pit is in one of these STOCKS. As the hot, pasty rock forced its way upward, it cracked the surrounding rocks and the top of the stock, which had already cooled enough to be somewhat solid. Hot water, containing dissolved minerals, was driven off as the rock cooled. The water found its way into every tiny crack in the badly cracked rocks and deposited the dissolved minerals as pyrite (combination of iron and sulfur), chalcopyrite (combination of iron, copper, and sulfur), and other minerals. But less than 2 pounds of copper was deposited in each ton of rock, too little to be mined profitably.

Later, the overlying rocks and the top of the stock were eroded away. Rainwater and air trickled down along the many cracks, causing the pyrite to decompose and form sulfuric acid and iron sulfate. The acid, in turn, dissolved the copper-bearing chalcopyrite. The copper-carrying water continued to move downward along the cracks till the water table was reached; here the copper reacted with the pyrite and deposited CHALCOCITE (a soft, black mineral made up of copper and sulfur).

The zone from which the pyrite and copper have been removed is called the LEACHED ZONE (the areas stained reddish-brown on the upper pit walls). The zone in which the chalcocite was deposited is called the ENRICHED ZONE (the green-stained areas on the lower pit walls); here the rock has been "enriched" till, in many places, it contains over 12 pounds of copper in each ton, enough to be mined profitably. The copper-bearing chalcocite is DISSEMINATED (scattered) through the rock as tiny specks and films along cracks. A very small amount of MOLYBDENITE (a greasy, black mineral composed of molybdenum and sulfur) also is disseminated through the rock.

Finally, volcanoes spewed out LAVAS (once-molten rock which flowed out over the land surface) and ash (which formed TUFF beds; the cliffs behind the pit are this type of rock), burying the copper deposit. Luckily, erosion later uncovered the deposit. Probably there are other similar deposits hidden by the blanket of volcanic rocks, a real challenge for the geologist.

* * * * * * *

Santa Rita has a fascinating history as one of the oldest mines in the United States. Long before the coming of the white man, the Indians were using native copper. Copper bells and other ornaments and implements have been found in many ruins of the

Southwest. The Indians probably "mined" native copper from the abundant outcroppings at Santa Rita.

In return for a favor, an Indian told Lt. Col. Jose Manuel Carrasco, the Spanish commandant in charge of military posts in an area to the south, about the copper deposits and showed him a copper sample. He visited the deposit, liked what he saw, quit his job, and set out to make his fortune.

Around 1800, Carrasco began mining the native copper, but like many another mine owner, he did not have enough money to exploit his mine. In 1804, he sold his interest in Santa Rita to Don Francisco Manuel Elguea, a rich Chihuahua banker, who began major mining operations. Elguea obtained a crown grant, the Santa Rita del Cobre (Spanish: Saint Rita of the Copper) grant,

Kennecott Copper Corporation

Adobe tower of old Spanish fort-prison (at left) and early shovel.

from the Spanish Government and built the town of Santa Rita. He also built a combination fort-prison, a triangular structure with thick, round adobe towers guarding each corner, joined by strong adobe walls, to keep out the raiding Apaches and confine the Indian slave labor and convicts borrowed from the Spanish Government in Mexico to work the mine.

Mining methods were primitive. Vertical shafts were sunk, and from them horizontal passageways were driven along fractures until a rich pond of native copper was encountered. The miners working on their hands and knees in the tiny pitch-dark holes, picked the rocks to pieces and put them into rawhide bags. Then,

carrying the bags on their backs, they climbed out of the shafts on nearly vertical "chicken ladders" (poles in which notches had been cut for foot holds; the miners hung on by hugging the pole). On the surface, the ore was carefully sorted to remove any barren rock.

It was not the easiest or safest work in the world. Cave-ins were frequent, and many miners lost their lives. Legend has it that 50 miners were killed by one cave-in. Rawhide bags, chicken ladders, skeletons of miners killed by cave-ins, and other relics of these times have since been uncovered by open-pit mining.

At first, only native copper, needing no smelting, was mined. Later, rough smelting works were built, and the copper was extracted in a crude way from the other copper minerals.

The copper was shipped to Chihuahua and Mexico City by mule trains with military escorts, each mule carrying 300 pounds. In 1807, Zebulon Pike, the American explorer, stated that the mine produced 20,000 muleloads of copper a year. The entire production was used by the Royal Spanish Mint to make copper coins.

As if the hard and dangerous working conditions were not enough, the Apaches were a constant menace for many years, and the mines were closed down as often as they were worked. It took determined men to get any mining done.

After Elguea's death in 1809, the mine was worked until 1822 under various leases negotiated by his widow. After 1822, there were frequent changes in ownership and numerous lessees.

Sylvester Pattie was the first American to operate the mine. In 1812, he and a party of trappers (16 men, all that were left of a party of 116 after numerous attacks by the Apaches) were stranded at Santa Rita when the Indians ran off their horses and stole their furs and supplies. Seeing a chance to recoup his losses, Pattie arranged a lease for 5 years at $1,000 per year. He managed to keep the Indians in check and was doing well until, in 1827, he sent a clerk to Santa Fe with $30,000 in gold to buy supplies. So large a sum was too big a temptation for the clerk; Pattie never saw the money or the clerk again. He was ruined and had to give up the mine. A year later he died in a California prison while being held as a spy.

Robert McKnight was another of the bold, determined men who tried to operate the mine. In 1812, he was one of a group who

loaded a caravan with trade goods and headed for Santa Fe, only to be arrested there as a spy and imprisoned in Durango, Mexico, for 9 long years. While in jail, he heard of the fabulous Santa Rita copper mine and, when finally released, headed there and took a lease. But the Apaches caused so much trouble that he was forced to abandon the mine. For a short time, Kit Carson worked for McKnight as a teamster.

In 1837, before McKnight arrived on the scene, a group of trappers had invited the Apaches to a party near Santa Rita. Suddenly, a hidden cannon, with one blast, killed most of the Indians. The chief of the Mimbres Apaches was killed. His successor, Mangas Coloradas (Bloody Sleeves), lived to make the white man rue the day of the massacre.

During the Civil War, the Confederate Army occupied Santa Rita and used the old adobe fort as an outpost.

In 1873, Martin B. Hayes appeared on the scene. He is remembered chiefly as the man who cleared the title to the mine. Elguea's heirs still owned the property, and Hayes had to track down and settle with each and every one of them, scattered all over Mexico and Spain. Taking no chances, he further strengthened his title by laying out 45 mining claims!

After a series of leases, options, sales, and mergers, the property is now the open-pit mine of the Chino Mines Division, Kennecott Copper Corp., which also operates a mill and smelter at Hurley.

After the Apaches were finally subdued in the 1880's, a completely new problem had to be faced. Eighty years of underground mining had removed most of the high-grade ore (ore with more than 10 percent copper), and the lower grade material couldn't be mined profitably. Santa Rita was about played out and, unless something changed, soon would become just another ghost town.

In 1905, John M. Sully, a young mining engineer fresh out of MIT, was given the task of determining Santa Rita's future possibilities. After collecting and assaying over 4,300 samples, he found that there was a tremendous amount of copper ore left, but that it contained less than 2 percent copper. Impressed by the huge size of the ore reserves, he suggested in his report that steam shovels should be used to open-pit everything, both veins and low-grade deposits -- the lower mining cost would offset the lower value per ton. Sully's boss rejected the idea but allowed Sully to find other backers. In 1910, open-pit operations were started. Waste had been turned into ore.

The NORTH PIT (to the left of the Lookout) was the first area to be open-pitted. The old underground workings were in this same area. Until a few years ago, part of the town of Santa Rita, as

Kennecott Copper Corporation

Santa Rita in 1915 -- as it would have looked from the Visitors Lookout. Buildings at left are in area of what is now the "island"; much of the remaining area is now in the pit.

well as the company offices and shops, were located on the "island" in the center of the pits. Everything has now been removed to get at the ore below.

* * * * * * *

0.8		Let's continue on our drive. TURN AROUND and follow the road on which we came.
	85.9	After climbing up steep hill to stop sign, turn left on blacktop road.
0.4		
	86.3	Ahead, the huge waste dumps of the open pit.
.5		
	86.8	To the left, shops of the Santa Rita mine.
.4		
	87.2	Road junction; continue straight ahead.
.5		
	87.7	On left, next to road; old Ivanhoe shaft and headframe.
.2		
	87.9	STOP E. Pull off on left side of blacktop at entrance to Ground Hog mine. CAUTION -- BLIND CURVE AHEAD.

Below is the Star shaft of the Ground Hog mine (American

Star shaft of the Ground Hog mine and (at left) the Kennecott leaching plant.

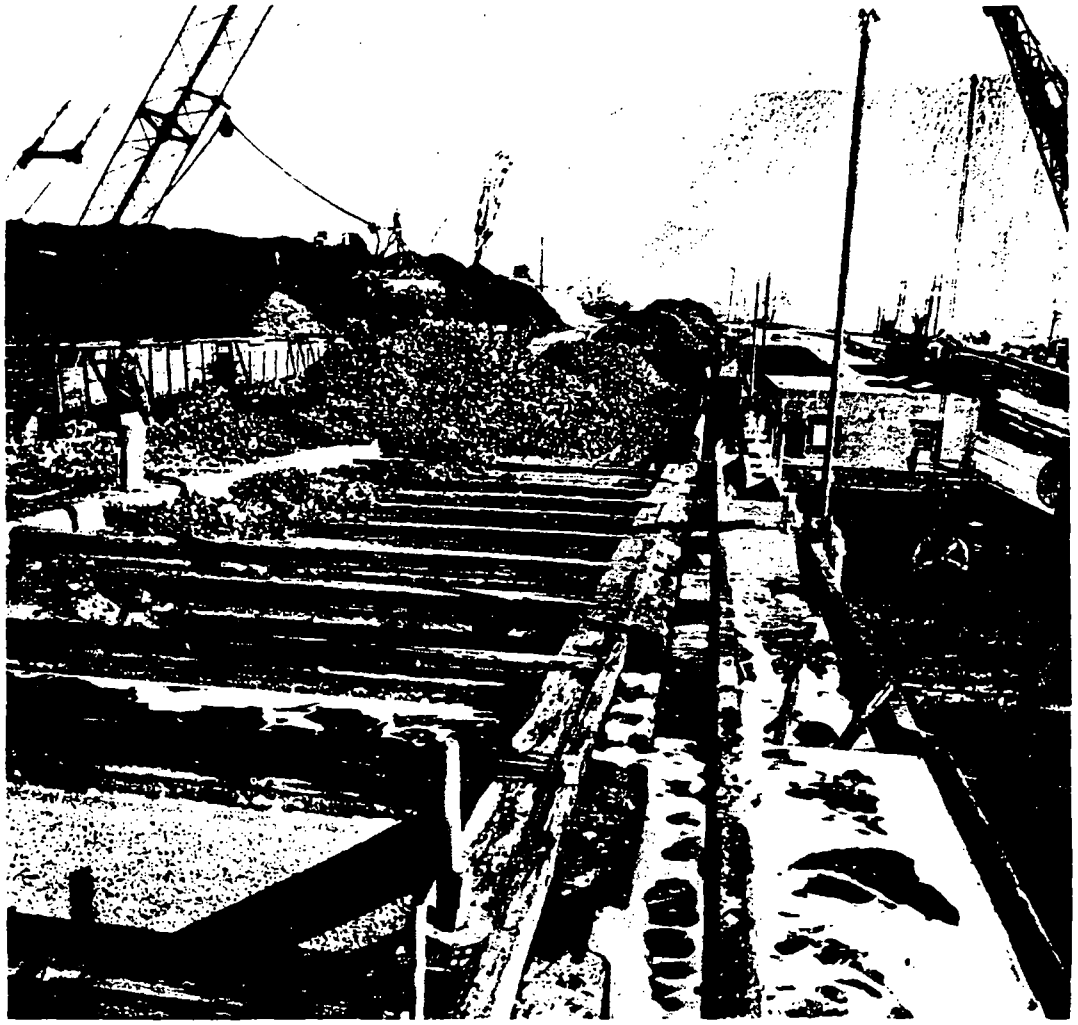
Smelting & Refining Co. lead-zinc mine). To the left of the shaft is the Kennecott leaching plant.

* * * * * * *

Even the small amount of copper in the waste dumps is being recovered by the LEACHING PLANT. Water containing acid is pumped into ponds on the dumps, trickles down through the loose rock, dissolving the copper minerals, and then seeps out at the bottom of the dump. The water, now bright green with dissolved copper, is collected and run through vats filled with "tin" cans. The copper water reacts with the iron cans and deposits powdery bits of copper metal on the cans. As more and more copper metal forms, the cans are completely eaten away, and more cans must be added (piles of cans can be seen). The water, now clear, colorless, and copper-free, is pumped back up onto the dumps (notice the pumphouse and pipes going up the hill) and recirculated. The red copper precipitate is shipped to the Hurley smelter. About one-fourth of the total copper produced from the Santa Rita mine comes from the "waste" dumps.

* * * * * * *

There are many zinc and lead mines in the area to the northwest and west of Santa Rita. The ore occurs both in VEINS (sheets of minerals along cracks) and ORE BODIES (masses of ore). Galena (silvery cubes; combination of lead and sulfur) and sphalerite (shiny-black; combination of zinc and sulfur) are the minerals



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The leaching plant vats being filled with cans by a magnet-equipped crane. "Clam shell" at right is loading the copper precipitate into railroad cars. Santa Rita's waste dumps loom up in the background.

mined. Some mines have only zinc, others have lead and zinc mixed together.

The mining methods used in these underground mines vary greatly. Holes are drilled in the ore body or vein with jackhammerlike drills powered by compressed air. Dynamite is placed in the holes and the ore blasted down. Often the rock is solid enough so that no timber is needed in the STOPES ("rooms" from which the ore is mined). If there is danger of caving, wooden timbers are used to hold up the BACK ("ceiling").

As ore is blasted out of the "ceiling" of the stope, waste rock is placed on the floor to make a "platform" on which the miners can

stand while drilling, the stope moving slowly upward as mining continues. This method is called OVERHAND (upward) CUT-AND-FILL mining. Where no timbers are needed, the ore commonly is blasted from the stope floor, making a higher and higher "room." This method is called UNDERHAND (downward) OPEN mining. Many other methods are also used.

The broken ore is loaded into cars on narrow-gage track and hauled out through DRIFTS (horizontal "tunnels" following or paralleling the ore) and CROSSCUTS (horizontal "tunnels" that do not follow or parallel the ore), then hoisted up SHAFTS (vertical or inclined "tunnels" extending to the surface) in SKIPS ("buckets"), and dumped into an ore bin before being taken to the mill.

* * * * * * *

0.7 Turn back onto highway and continue ahead.

88.6 Cross bridge over Hanover Wash. To left is another shaft of the Ground Hog mine.

0.2

88.8 Ahead, headframe and surface plant of the Bullfrog mine (U. S. Smelting Refining & Mining Co. lead-zinc mine).

0.2

89.0 Crossing Fierro branch of the Atchison, Topeka & Santa Fe Railway. We have been following Santa Rita Creek and the Santa Rita branch of the Santa Fe Railway.

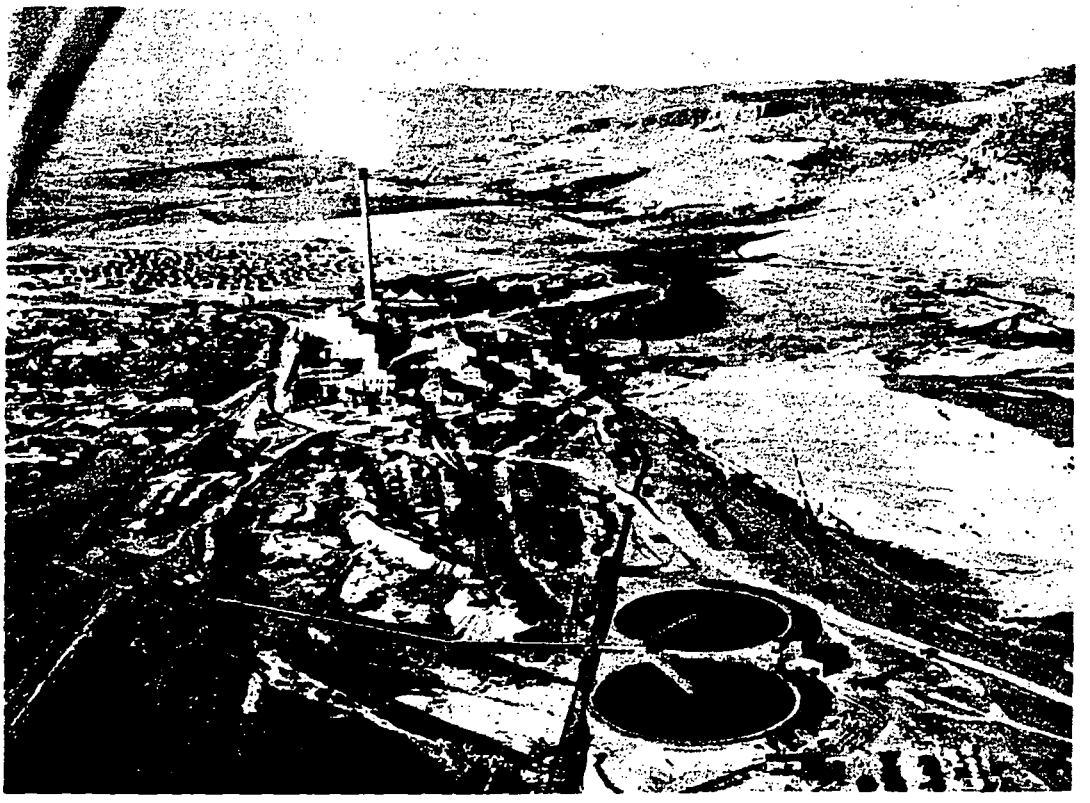
1.8

The Santa Fe Railway is the connecting link between the Santa Rita mine and the Hurley mill. The ore cars

Santa Fe ore train on way to Hurley.

Kennecott Copper Corporation

(owned by Santa Fe) are made up into 50-car trains at



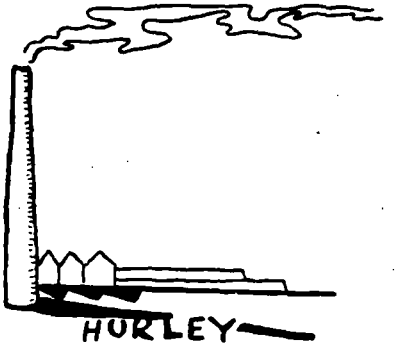
Kennecott Copper Corporation

Hurley -- town, mill, and smelter.

the mine and then hauled over the 10 miles of track to Hurley -- 7 or 8 trains every 24 hours.

Diesels pull the trains once handled by steam engines. Although this is one of the busiest stretches of the Santa Fe Railway system, there are no passenger trains. Its main traffic is the copper ore, but it also hauls equipment and supplies and transports the refined copper to Kennecott's customers.

The Santa Fe is a vital part of New Mexico's mining industry, the hauler of "pay dirt," supplies, and metal.



90.8		Bayard.
	.6	
91.4		Turn left onto blacktop road marked to U. S. Highway 260 and Deming.
	0.2	
91.6		Stop sign; continue straight ahead on U. S. 260.
	.7	

REFERENCE 7

Hilliard, 1993

MINERAL POLICY CENTER

MINING ACCOUNTABILITY PROJECT

This Report Card is part of the Center's Mining Accountability Project, funded by a generous grant from The Educational Foundation of America. Information presented herein is derived from state and Federal environmental records, corporate sources, published materials, and correspondence and telephone interviews. Mineral Policy Center has made every reasonable effort to verify the accuracy of the information presented herein, and a draft version has been submitted to the company for review. However, any reader finding inaccuracies in the report is urged to contact Mineral Policy Center immediately at (202)737-1872. Copyright Mineral Policy Center 1993. Edition: 12 February 1993.

MINING REPORT CARD

FOR

PHELPS DODGE CORPORATION

by

Thomas J. Hilliard

GRADES FOR: PHELPS DODGE CORPORATION	
Management Practices	**C-**
Community Relations	**D**
Compliance	**C-**
Reclamation	**D-**

Phelps Dodge Corporation is America's oldest, largest and most profitable copper mining company. Based in Phoenix, Arizona, this company operates mines in Arizona, New Mexico, Mexico, Chile and South Africa. The Mining Report Card evaluates the extent to which the Phelps Dodge Corporation has conducted its corporate activities in an environmentally and socially sound fashion.

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SECTION 1:
PHELPS DODGE CORPORATION

I. OVERVIEW

One winter day in 1880, a man walked into the New York City office of Phelps, Dodge & Company, and asked to speak to William Dodge, the senior partner. A respectable mercantile firm founded in 1834, Phelps, Dodge & Co. had carved out a comfortable niche for itself as a manufacturer of tinplate and copper wire, and as an investor in railroad and lumbering operations.

The visitor that day did not desire to buy tinplate or copper wire. William Church had just arrived from eastern Arizona, where he claimed to have found and begun developing an immense deposit of copper ore near the New Mexico border. Church had dubbed the deposit "Morenci" after a wealthy mining district in Michigan, but had gone broke developing it and wanted the company to invest $50,000 for a new smelter. Dodge was not in the habit of handing over large sums of money to strangers; he dispatched a consultant instead to study Morenci's profitability. The consultant sent back a good recommendation, and the company invested. While visiting Arizona, the consultant scouted out another deposit near the Mexican border, later named Bisbee, and persuaded the company to invest in a mine there as well. Morenci and Bisbee became two of the richest copper mines the world has ever seen. The staid mercantile firm of Phelps, Dodge & Company became one of the world's most gigantic mining companies.[1]

Today, Phelps Dodge Corporation (PD) is the world's second largest copper mining company, after Codelco (owned by the Chilean government). According to Fortune's Fortune 500 list, PD's sales qualify it as the 180th largest company in the U.S. Phelps Dodge has also grown to become the very model of a vertically integrated company. A chain of smelters, refineries, copper rod and wire producers and the like preserves company ownership from extraction all the way to end use.

An advertising slogan declares that the company is "more than just copper," which, if anything, is overly modest. Besides Phelps Dodge's globe-spanning mining operations, the company owns subsidiaries producing truck wheels and rims, magnet wire, electrical wire and cable (in no less than 15 countries) carbon blacks and synthetic iron oxide. PD is the largest or second-largest American producer of virtually all these products.

Phelps Dodge has survived and prospered over the past century, when many of its contemporaries have fallen by the wayside. The company's successful history stems in large part from certain character traits that seem to persist from

generation to generation. Conservative investment practices and an aversion to debt financing ensured that PD would weather the Great Depression with large cash reserves. A sharp eye for new technologies helped the company get in on the ground floor with processes like flash furnace smelting and solvent extraction/ electrowinning. PD's history nurtured a reputation for ruthlessness. In 1917, hired gunmen at the Copper Queen mine (AZ) loaded hundreds of pro-union employees and townspeople into freight cars, hauled them into eastern New Mexico, and stranded them there without food or water.[2] Since World War II, Phelps Dodge has also gained visibility for taking a leading role against labor organization in the copper industry.

Despite PD's longevity, prospects looked bleak in the early Eighties. The price of copper had dived to record lows, and several straight years of losses led to rumors of impending bankruptcy. The company fought back by initiating three dramatic cost-cutting measures: first, the company broke the unions that represented its Arizona mines and smelters; second, the company invested in non-mining enterprises to make itself less dependent on copper prices; third, the company invested millions in a recently-perfected process for purifying copper called solvent extraction/electrowinning (SX/EW).[3] SX/EW cut production costs by more than half, and enabled the company to close three costly and inefficient smelters. By the end of the Eighties, PD had crawled out of its slump and begun turning profits again. Business magazines hailed Phelps Dodge's newfound profitability as one of the decade's most remarkable turnaround stories.

In 1991, Phelps Dodge mines produced 621,800 tons of copper. The company posted sales of $2.46 billion and profits of $273 million. The company employed 13,000 people, primarily in Arizona and New Mexico.[4]

II. ENVIRONMENTAL RECORD

In the last two decades, awareness of the impact of toxic wastes on human health and on the natural ecosystem has grown enormously. Along with such an awareness has come a rising expectation of corporate sensitivity to the environment. As one of America's oldest and most reputable mining companies, Phelps Dodge might be expected to have an advantage in keeping up with rising environmental standards. Instead, the company's century-old legacy seems to have had the opposite effect, making it unwilling to accept or deal with change. Other companies have responded quickly and farsightedly to the public's concerns; but PD has for the most part lagged behind.

discriminatory treatment against its members.[26] The union won a discrimination suit before the National Labor Relations Board, which ordered the company to make retroactive payments, with interest, to union employees excluded from the bonus program.[27] The company has appealed that decision to a Circuit Court of Appeals.

In January 1992, the company shut down the Tyrone mine, and has since made an effort to relocate its workers to other PD operations. Some union employees have accused the company of discriminating against them in the relocation process.

IV. FINANCIAL BACKGROUND

In 1991, the Phelps Dodge Corporation produced 35 percent of all U.S. copper, and 6 percent of the world's copper. Phelps Dodge is the world's second largest copper producer after Codelco, the nationalized copper company of Chile. No other American producer comes close to PD's prominence: PD's $2.46 billion in 1991 sales put it $800 million ahead of the next-biggest copper company, Cyprus Minerals.[28] According to *Fortune*'s annual "Fortune 500" listing, the company ranked 180th in sales among all American companies in 1991.

The real Phelps Dodge story is not in the sales column, however, but in profits. PD may rank 7th among U.S. metals producers in sales, but its profits -- $273 million in 1991 alone -- put PD in first place.[29] With a return on shareholder equity six times higher than the industry average, PD's profitability ranks in the top 10 percent of all American companies.[30] According to *Forbes Magazine*, an investor who decided in December 1987 to purchase stock in PD would have seen that stock climb 85 percent by November 1992; and this figure does not include special cash dividends to shareholders.

Phelps Dodge's Decline and Comeback

The company's high 1991 profit margin testifies to an amazing turnaround from a decade ago. In the early eighties, Phelps Dodge was foundering, suffering quarter after quarter of heavy losses. At one point, the company was losing $5 million per week.[31] Outside parties generally agreed that this aging giant was teetering on the edge of insolvency, but explanations ranged widely.

Industry-wide factors were Phelps Dodge's main problem: the recessionary economy had cooled demand for copper, while supply had increased. Phelps Dodge had invested almost entirely in copper, and so could not tide itself over with profits from other subsidiaries. In addition, Phelps Dodge was the only large U.S. copper producer that had succeeded in warding off buyout attempts from oil companies during the OPEC-rich seventies. Ironically, the company's hard-won independence deprived it of investment capital from some more profitable parent.

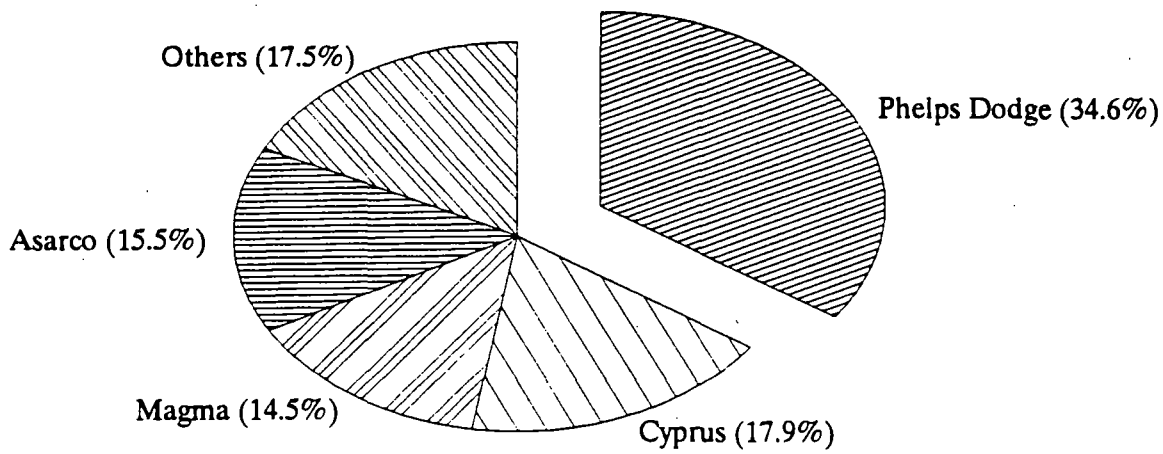
By 1987, PD's star had begun to rise again, and today the company is more profitable than ever. The price of copper played a key role in the company's comeback, of course. In 1982, that price had sunk to 60 cents/lb., the lowest price since the Depression era.[32] Copper prices rose to more than a dollar/lb. in the late 1980's, and have remained high and stable thus far into the 1990's. The copper industry overall is fairly prosperous at the moment. Still, other big copper companies did not make it through the early eighties crunch: e.g., Anaconda and Kennecott. That Phelps Dodge did owes much to the company's massive restructuring and cost-cutting campaign, guided by what former CEO Leonard Judd has called a "blitzkrieg mentality."[33]

1) Solvent-extraction/Electrowinning (SX/EW)

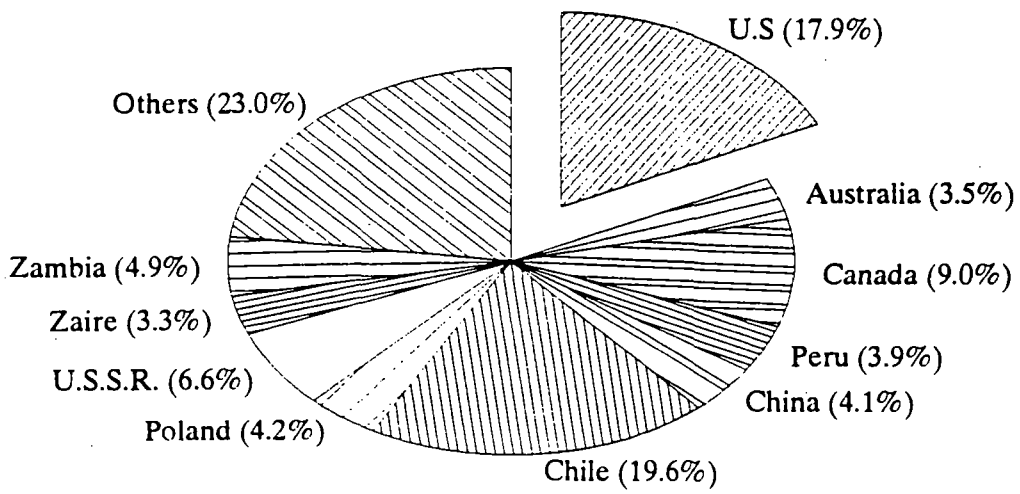
The company took a massive gamble by investing millions of dollars in a recently-perfected refining process called solvent-extraction/ electrowinning (SX/EW). SX/EW is a substitute for smelting in which a sulfuric acid solution percolates through an ore heap, producing a copper-rich liquid that is then passed through solvent-extraction and electrowinning stages to produce nearly pure copper. A report by the U.S. Office of Technology Assessment (OTA) notes that SX/EW "can be built quickly, is flexible in its applications, and can be run practically at any scale; it has low operating costs... and it requires minimal supervision compared to conventional copper production."[34] This innovative process cut the cost of producing a pound of copper from approximately 80 cents to under 40 cents. Besides its intrinsic cost-cutting virtues, SX/EW also helped resolve expensive conflicts with federal and state regulatory agencies over SO_2 emissions from the company's Douglas and Morenci smelters. Today, the company produces almost half its copper using SX/EW. This is all the more remarkable in that only 15 percent of the world's copper ore bodies are believed amenable to the SX/EW process.

FIGURE 1

U.S. COPPER PRODUCTION, 1991
(in metric tons)



WORLD COPPER PRODUCTION, 1991
(in metric tons)



period from which the metal output is derived. **Permitted Acreage** notes the total overall area which regulatory agencies have approved for use in the operation. **Reclamation Bond** states the amount of the bond deposited with a state government for use if the company fails to fully reclaim the mine site.

A. CHINO (New Mexico)

Summary

The Chino mine is a copper mining operation located in southwestern New Mexico. Recurring spills and leaks have dogged Chino from its initial purchase in 1986 up to the present day. Among the most notable violations: 1) an intentional month-long discharge of polluted wastewater from August to September 1988;[66] and 2) operation of an SX/EW facility without a permit from August 1988 to December 1989.[67] The past six years have seen over a dozen more accidental wastewater discharges from one source or another at Chino. The U.S. Environmental Protection Agency is currently considering the Chino mining complex for placement on the National Priorities List of its Superfund program.

History

FACTS ON: CHINO	
Location	New Mexico
Opening Date	1910
PD Purchase Date	1986
Major Shareholder - Mitsubishi	33%
Output (tons): 1991 - copper	157,400
Tons Mined: 1991	103.2 million
Reclamation Bond	None

The Chino copper mine is located at Santa Rita, in southwestern New Mexico, approximately 10 miles east of Tyrone.

Copper has been extracted from the Chino area since at least the 18th century. The first miners were Spanish settlers, who used slave labor and local Indians to build the town of Santa Rita and sink mining shafts. Open-pit operations began in 1910. The Kennecott Corporation purchased Chino in 1933, and built the Hurley smelter -- still used by PD -- in 1939. In 1980, Mitsubishi, a Japanese industrial conglomerate, bought a one-third share in the mine, and in 1986, Phelps Dodge purchased the other two-thirds. The company officially took over operation of the Chino mine and smelter in January 1987.

In August 1988, the company inaugurated a state-of-the-art solvent-extraction/electrowinning (SX/EW) system. The SX/EW system sharply reduces production costs, largely by eliminating the need for smelting and refining. In 1991, Chino produced 35% of its copper (55,200 tons) by means of SX/EW.

A round of labor disputes broke out in 1990, when contracts expired for many Chino employees. Under federal law, members of a union local can vote to "decertify" their local and give up union representation. Company management actively campaigned for decertification elections at several of Chino's union locals. In April, members of the Plumbers and Pipefitters union held an election and voted to decertify their local. The national union filed an appeal with the National Labor Relations Board (NLRB), asserting that Phelps Dodge had used unscrupulous tactics to win the election. The NLRB mandated a new election, which reversed the results of the previous election. Eventually, the company signed new four-year contracts with its unionized employees.

Environmental Background

The Chino mine consists of an open pit, concentrator, smelter and fire refinery. The smelter servicing the Chino mine is discussed under "Active Smelters." Open-pit mining first began in 1910, long before environmental assessments became common. The long history of neglect has left a legacy of serious contamination at Chino. While many of Chino's problems predate Phelps Dodge's 1986 purchase, the company has amassed one of the most controversial environmental records of any mine in New Mexico. Major conflicts have arisen several times between mine management and state and federal regulators.

Compliance

Recurring spills, leaks and other accidents have beset Chino from its initial purchase up to the present day. Even those incidents which did not result in enforcement action raise serious concerns.

- **23 January 1987**: 150,000 gallons of tailings decant water.[68]
- **31 January 1987**: Seepages through waste dumps at Santa Rita mine.[69]
- **2 February 1987**: 50,000 gallons of tailings decant water.[70]

- **9 August 1987**: Chino discharged 127,000 gallons of storm and process water into Whitewater Creek. In January 1988, the state Environmental Improvement Division (EID), seeking to avoid a legal challenge, fined the company a minimal $2000. The company did agree to pay stiff penalties for any future discharges.[71]

- **10-11 July 1988**: Approximately 2 million gallons of wastewater spilled from the leaching dump at Chino's precipitation plant into Whitewater Creek.[72] According to the company, the discharge was unavoidable, resulting from unexpectedly heavy rains.

- **12 July 1988**: 800,000 gallons of process water spilled from a holding pond into Whitewater Creek.[73] The company's discharge permit requires process water to be kept safely non-acidic, at a pH level of 9 or above. Acidic process water is in itself unhealthy, and can also dissolve toxic heavy metals such as copper and cadmium. The company afterwards admitted that the pH had fallen to a level of 7.4, which would still be relatively safe. Yet a water quality test taken three days after the spill reached a different conclusion. An inspector for the New Mexico Environmental Improvement Division (EID) found water remaining in the holding pond to be acidic, at a pH level of 5.3. The NMEID memo concludes: "I believe it is probable the fluids in Lake One at the time of the July 12, 1988 spill were not neutralized (i.e., at or above 7 pH) as Chino has reported."[74]

- **18 July 1988**: 200,000 gallons of wastewater spilled from leaching dump.[75]

- **August 1988:** Company began operation of solvent-extraction/ electrowinning facility (SX/EW) without a discharge permit. Chino's new SX/EW facility began operation in July 1988, but failed to obtain permit until December 1989. In August 1991, the company settled a lawsuit brought by the New Mexico Environment Department (previously designated the Environmental Improvement Division) by paying a $500,000 civil penalty.[76] See "SX/EW Permitting Dispute" section below for more information.

- **18 August 1988**: Company discharged 1.7 million gallons of wastewater into a watershed known as Lampbright Draw, and failed to notify NMEID within the required 15 days.[77]

- **20 August 1988-22 September 1988**: The company intentionally dumped more than 180 million gallons of contaminated wastewater into Whitewater Creek.[78] The dump prompted three suits, all of which were eventually settled out of court: a suit by the U.S. Environmental Protection Agency was settled for a $55,000 fine; a second suit by the New Mexico Environmental Improvement Division was settled for $300,000 in charitable payments; and a third suit by a local citizens' organization, New Mexico Citizens for Clean Air and Water, was settled for a $225,000 payment. See "August-September 1988 Discharge" section below for more information.

- **17 November 1988**: Company spilled tailings into Whitewater Creek, and failed to notify NMEID within the required 15 days.[79]

- **February-March 1989**: Sometime in early February, an underground pipe carrying concentrated sulfuric acid to a holding pond failed, spilling up to 13,000 gallons into the soil. In addition, the spill caused the synthetic liner in the pond to "float" away from the pond bottom. To avoid a serious rupture, plant officials were forced to order the liner punctured. The company finished repairs to the pond and pipeline on 14 March, but failed to inform state officials of that a discharge had occurred. On 17 August 1989, an NMEID inspector was told of the discharge; a week later, the company submitted a written notice.[80]

- **2 May 1989**: 80,000 gallons of tailings decant return water spilled from a pipe into Whitewater Creek. According to a court brief filed by the state NMEID, "Phelps Dodge did not contain and remove or mitigate the damage caused by the discharge, as required by WQCC Reg. 1-203.A.5, and did not submit a corrective action report to NMEID" by the required deadline.[81]

- **18 May 1989**: A pipeline broke, spilling 10,000 gallons of water containing high quantities of lead, cadmium and chromium into Whitewater Creek.[82]

- **29 March 1990**: 270,000 gallons of "sulfuric acid waste" spilled into Hanover Creek, according to an NMEID regulator.[83]

- **17 May 1991**: Phelps Dodge began construction of major revisions to its concentrator plant. The company did not, however, obtain approval from NMEID first. The agency requires such notification to prevent investment in a project that may not meet environmental standards and therefore might

have to be seriously reconstructed or even abandoned. Phelps Dodge paid a $20,500 fine for the infraction.[84]

- **7-13 May 1992**: A small tear in an SX/EW pond liner resulted in the estimated leakage of 1,110 gallons of concentrated sulfuric acid solution.[85]

- **4 August 1992**: A pipeline leaked, spilling 120,000 gallons of tailings material into a basin next to the road.[86]

August-September 1988 Discharge

Of the numerous discharges from Chino Mines, none stirred more controversy than a month-long dump of process water in the fall of 1988. There was no question of accident raised. On 20 August 1988, the company began pouring highly toxic and acidic process water into Whitewater Creek, a nearby dry creekbed. When the discharge ended, 35 days later, an estimated 185 million gallons of polluted water had cascaded down Whitewater Creek and past populated areas downstream. The Whitewater dump ignited one of the fieriest controversies over environmental practices and regulations in New Mexico's recent history.

The company claimed that heavy rains had filled its reservoirs, making an intentional discharge the only alternative to potential catastrophe. Critics, however, contended that the company had long recognized the inadequacy of its water storage system, failed to take action, and needlessly endangered the general public. The Whitewater discharge led to three separate lawsuits: one by the U.S. Environmental Protection Agency, a second by the New Mexico Environmental Improvement Division (NMEID), and a third by a local citizens' group called Citizens for Clean Air and Water (CCAW). Phelps Dodge eventually settled all three cases out of court, paying EPA a fine and making non-fine payments to NMEID and CCAW.

Court documents filed during the CCAW case tell a remarkable story. Phelps Dodge officials realized from 1986 onwards that they had inherited a mining operation with inadequate water storage capacity, and which had inflicted numerous spills and accidents on Kennecott. Company managers appointed a committee to examine the water storage issue, and in March 1987 it delivered an internal report. The committee concluded that "the threat of a discharge . . . to Whitewater Creek is the most immediate environmental problem in the mine/leach dump area."[87]

In September 1987, Chino's manager outlined for NMEID the preventive measures he had initiated or planned to initiate:[88]

- divert fresh water away from mine: initiated fall 1987.
- increase water storage capacity: constructed reservoir 3A in fall 1987. raised capacity from 300 million gallons to 1.2 billion gallons.
- evaporate excess water: installed sprinkler and fogger systems, which evaporate excess water by spraying it into the air, in early 1987.
- treat excess water: system installed by August 1987 for detoxifying excess water by treating with lime, although lime treatment seems to have been practiced as early as November 1986. By June 1988, 186 million gallons of excess water had been treated.

The company's contention that it took prompt action to control water storage clashes with the testimony of regulatory officials and other involved parties. While conscious of the water storage crisis, regulatory agencies did not possess statutory authority to require mitigative measures. Several different staff members for NMEID testified in trial depositions that they had advised the company that its measures for reducing excess water buildup were sharply inadequate. According to regulator Ron Conrad, his agency recommended that the company: 1) invest more seriously in sprayers and fogger systems; 2) install additional pumps to more quickly drain the reservoir in the event of rains; 3) invest more seriously in chemical treatment systems; and 4) undertake systems for recycling excess water in the production system.[89]

Another NMEID specialist, Cynthia Ardito, declared: "There are treatment and disposal options which are available which would have enabled them to reduce their need to store water. We brought that issue up time and time again, and it was as if we were never heard."[90] Regulators also accused the company of drastically underestimating the amount of water drainage into the reservoir.[91]

Heavy rains came in the summer of 1988. The rains swelled the reservoir system, leading mine manager D.P. Milovich to contact the U.S. Environmental Protection Agency (EPA) on 16 August.[92] The Chino mine holds a National Pollution Discharge Elimination System, or NPDES, permit, which determines the manner in which a company can discharge contaminated water to rivers or streams. In general, Chino's permit bars any water discharge. However, Milovich stated the company's intention to discharge wastewater from Whitewater Reservoir, and noted an exemption in the company's NPDES permit if the discharge is "unavoid-

able to prevent loss of life, personal injury, or severe property damage." Milovich predicted: "If rains continue . . . excess runoff will begin to overflow into areas that are being actively mined inside the mine pit itself. . . . The expected revenue loss, if this event occurs, is at a minimum 8 million [dollars], and with continued rains, could exceed 20 million dollars before taxes."

On 18 August, a company official notified NMEID regulators of its intention. According to Albert Dye, a NMEID regulator, the company was informed that such a discharge would be illegal.[93] On 20 August, the company turned on pumps in storage reservoirs around the Chino mine pit. The mine water discharges flowed directly into Whitewater Creek. According to an EPA report, the water contained high concentrations of toxic metals such as copper, nickel and zinc. The water was also as corrosive as vinegar, testing at a pH level of 3.2.[94]

Whitewater Creek is dry for much of the year. When rainy season comes, water in the creek flows past two populated communities, Bayard and Hurley. A photograph printed in a local newspaper during the discharge shows two children playing adjacent to the creek.[95]

On 29 August, the Deputy Director of the New Mexico Environmental Improvement Division (NMEID), Richard Mitzelfelt, ordered the company to stop dumping wastewater into Whitewater Creek: "CMC [Chino Mines Company] must immediately cease this discharge until CMC . . . obtains approval for the discharge."[96] In early September, several state legislators wrote back to Mitzelfelt to protest his letter as "inappropriately and unreasonably harsh and intimidating." Local reporters subsequently alleged that the wording in each letter closely matched a form letter distributed by Phelps Dodge representatives.[97]

The company ceased discharging water into Whitewater Creek on 22 September 1988. As of that date, the company had dumped an estimated 185 million gallons of wastewater. NMEID officials began negotiations with the company over potential penalties. In July 1989, Phelps Dodge and NMEID arrived at a settlement in July 1989 that, according to critics both inside and outside the agency, offered the company an extremely favorable arrangement. Phelps Dodge had agreed earlier in the year that, in the event of an unpermitted spill, it would pay the state $1000/day for each 100,000 gallons of wastewater spilled. This formula would have yielded an approximately $1.8 million penalty against Phelps Dodge. Instead, NMEID settled for $300,000 in contributions to a state emergency fund and various New Mexico universities for environmental studies.[98] The agreement was approved and finalized in September 1990.

The U.S. Environmental Protection Agency (EPA) filed a complaint against the company on 3 November 1989. The complaint asked for a $125,000 fine, charging that the 185 million-gallon discharge violated the "notice" requirements of the company's NPDES permit, and alleging six other NPDES violations as well. In January 1990, EPA settled the complaint for a $55,000 fine.

The most widely-publicized lawsuit came from a local environmental organization called New Mexico Citizens for Clean Air and Water (CCAW). CCAW and its attorney, Grove Burnett, took advantage of a clause in the Clean Water Act that allows citizens to enforce its provisions by filing a civil suit, if they can establish that state and federal regulatory agencies have failed to take action. In February 1989, CCAW filed suit against Phelps Dodge for the August-September discharge. The company eventually settled the case by agreeing to contribute $225,000 to the Sierra Club Foundation.

Since the August-September 1988 dump, the company has systematically overhauled its water storage system.[99] Other small leaks and spills took place in 1989 and 1990, but have tapered off since that time.

SX/EW Permitting Dispute

In July 1988, shortly prior to startup of a new solvent-extraction/ electro-winning facility at Chino, a state NMEID official warned the company that "any discharges from this facility prior to approval of a discharge plan . . . will subject Chino Mines Company to potential penalties under the New Mexico Water Quality Act."[100] However, the same letter granted the company a 120-day grace period to obtain its permit.

The company responded by claiming that no discharge permit would be necessary, because the company did not intend to discharge. Furthermore, spills and leaks would be prevented by a relatively impermeable pond liner built to keep acidified process water out of the soil.[101] Despite its legal position, the company agreed to apply for a discharge permit. The negotiations took longer than expected, however: Discharge Permit 591 was not granted until December 1989, 1 1/2 years after start-up of the SX/EW facility.

The company's position that no leak could occur at the lined SX/EW pond was considered dubious by NMEID even at the outset, running contrary to long-held experience that leakage could occur at <u>any</u> lined impoundment.[102] NMEID's position was validated in February 1989, when a spill took place in an SX/EW pond used for holding sulfuric acid solution after the copper has been stripped

away. On 16 January 1990, NMEID and its parent agency filed suit in a district court, asking for civil penalties. In August 1991, PD settled the case out of court by paying a $500,000 penalty.[103]

A more general question revolves around potential Superfund designation. For more than a decade, the U.S. Environmental Protection Agency (EPA) has been studying the Chino mine area, particularly Whitewater Creek and Hanover Creek, for possible inclusion in the Superfund program's National Priorities List (NPL).[104] If Chino were to make the NPL, it would become the largest Superfund NPL site in the state of New Mexico.[105] Kennecott caused considerable contamination prior to selling Phelps Dodge the Chino property, but financial liability transferred to PD along with the mine's profits. Not surprisingly, Phelps Dodge strongly opposes Superfund status for Chino. As an alternative, the company has floated proposals to study voluntary remediation action. This pre-emption strategy has proven successful at Douglas (AZ) and New Cornelia (AZ), but may be too late to yield results at Chino. EPA will probably decide sometime in early 1993 whether to recommend Chino for the National Priorities List.

Chino has several tailings piles which may prove especially difficult to return to a natural state after the mine shuts down. However, Chino has no reclamation plan filed with state, federal or county regulatory agencies. For many years, the state of New Mexico imposed no reclamation requirements. The state Environment Department (renamed in July 1991 from Environment Improvement Division) has recently begun enforcing a regulation that requires a groundwater protection plan during the permit approval process. There are significant exception to the regulation; also, the state has no written standards for the groundwater plans and, according to one regulator, intends to negotiate on a case-by-case basis.[106] The company is currently preparing a closure plan for facilities that discharge wastewater into the Lampbright Draw, a local drainage area. In addition, the company says that it has begun "tailing capping to achieve environmental closure and reclamation," which presumably applies to tailings heaps already inactive.[107]

B. MORENCI (Arizona)

Summary

Morenci, located in eastern Arizona, is America's highest-producing copper mine. In 1984, a flood washed through a creek-bed where the company had deposited a large pile of waste rock. The floodwater emerged on the other side highly acidic and bright green from copper deposits, and flowed on to pollute the

According to a January 1987 newspaper report, a NMEID staffer calculated that 21 percent of the smelter's sulfur emissions may have escaped during the first half of 1986, twice the allowed threshold; also, "hourly SO_2 averages may have been as much as five times those levels."[139] Officials at NMED and EPA, when contacted, all confirmed that emission problems from 1987 have been brought under control. The EPA regulator who inspected the plant in 1987 says, "I went back last year, and there was vast improvement."[140]

According to the New Mexico Environment Department (NMED), Hidalgo is currently in compliance with air and water emission laws. No reclamation plan is on file for the Hidalgo smelter.

Hurley, New Mexico

The Hurley smelter, located near the Chino mine in southwestern New Mexico, was built in 1939 as a reverberatory furnace. The Kennecott Corporation, responding to Clean Air Act pressures, finally modernized Hurley in 1984 by converting it into a Canadian "Inco" furnace. Phelps Dodge purchased Hurley in 1986 as part of the Chino acquisition process.

A sulfur dioxide release at Hurley smelter took place on the morning of 27 June 1987. According to the El Paso Times, at approximately 4:30 A.M a foreman ordered the release of excess concentrations of sulfur dioxide gas from a pipe into the atmosphere. Sulfur dioxide is a heavy, toxic gas potentially fatal in high concentrations, especially to asthmatics. Consequently, plant policy required the smelter to shut down if sulfur dioxide levels crossed a threshold of three hundred parts per million (ppm). After the 4:30 AM accident, sulfur dioxide levels in and around the plant climbed to six thousand ppm. A smelter employee and a nearby resident claimed to have had difficulties breathing after the release.[141]

In a 4 May 1990 letter, a NMEID field inspector criticized the company for inadequately treating waste water from the Chino Smelter. Required to stay above pH 9, levels actually dipped to 7.6. If the water had continued to slide below a pH of 7, it would have begun to dissolve toxic heavy metals. A 4 May 1990 NMEID letter informed Chino management that the smelter was in violation of its permit, and the company presumably took steps to rectify the violation.[142]

According to the New Mexico Environment Department (NMED), Hurley is currently in compliance with air and water emission laws. No reclamation plan is on file for the Hurley smelter.

REFERENCE 8

Chino Mines Company
Promotional Pamphlet for SX/EW

CHINO MINES COMPANY

A PARTNERSHIP

phelps dodge Corporation

Mitsubishi Corporation

P.O. Box 7
Hurley, New Mexico 88043
(505) 537-3381

CHINO MINES COMPANY

SOLVENT EXTRACTION ELECTROWINNING PLANT

HISTORY OF THE CHINO MINES

The Chino area has been an important copper producer ever since the days of the Mimbres Apaches, who used copper for the metal-tipped arrows that were known as their "calling cards."

In the early 1800s, a Spanish soldier befriended an Indian and learned of the Santa Rita del Cobre mine. Jose Manuel Carrasco began operating what is now the second oldest copper mine in the United States.

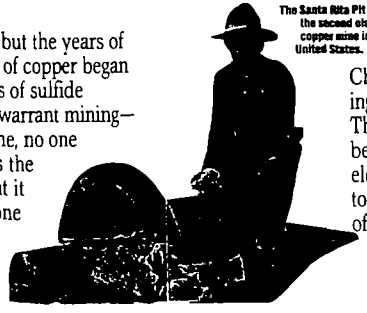
The mine operated under Spanish possession until the late 1830s, when the Apaches took to the warpath and Santa Rita became a ghost town. But when Cochise signed a peace treaty in 1872, the mine was re-opened and continued production until the turn of the century.

Now the Indians were gone, but the years of mining had taken a toll. Rich veins of copper began to play out, and the massive bodies of sulfide rock contained too little copper to warrant mining—or so everyone thought. At that time, no one knew that this low-grade rock was the real treasure of Santa Rita, and that it would become the foundation of one of New Mexico's greatest industries.

As technology improved and the low-grade rock became profitable for mining, the Chino Copper Company was formed. In 1910, the first steam shovel bit into the Santa Rita hillside and started one of the West's major open-pit mines.

The Santa Rita Pit is the second oldest copper mine in the United States.

Over the years a mill, smelter and concentrator were added. In 1980, when Mitsubishi acquired a one-third ownership from Kennecott Copper Corporation, the Chino Mines Company was formed. In 1986, Phelps Dodge acquired the two-thirds portion of Chino and became the operating partner on January 1, 1987. That same year, construction began on a solvent extraction-electrowinning plant designed to produce 87 million pounds of copper annually.



THE SX-EW PROCESS

The solvent extraction-electrowinning plant at Chino uses a relatively simple process to produce virtually pure copper. While high-grade ore requires the conventional processes of milling, smelting and refining, low-grade ore can be treated by the four-step SX-EW process to produce copper at a much lower cost.

The Chino SX-EW facility produces 87 million pounds of cathode copper per year.

LEACHING

The first step, leaching, starts with sprinkling slightly acidic water on a "leach dump" where the low-grade ore has been placed. The water percolates down through the rock, dissolving copper minerals as it goes. The copper-laden water, now called "pregnant leach solution," exits from the bottom of the dump and flows to a collection pond, from which it is pumped to the solvent extraction plant.

Copper-bearing rock is sprinkled with slightly acidic water to dissolve the copper minerals.

EXTRACTION

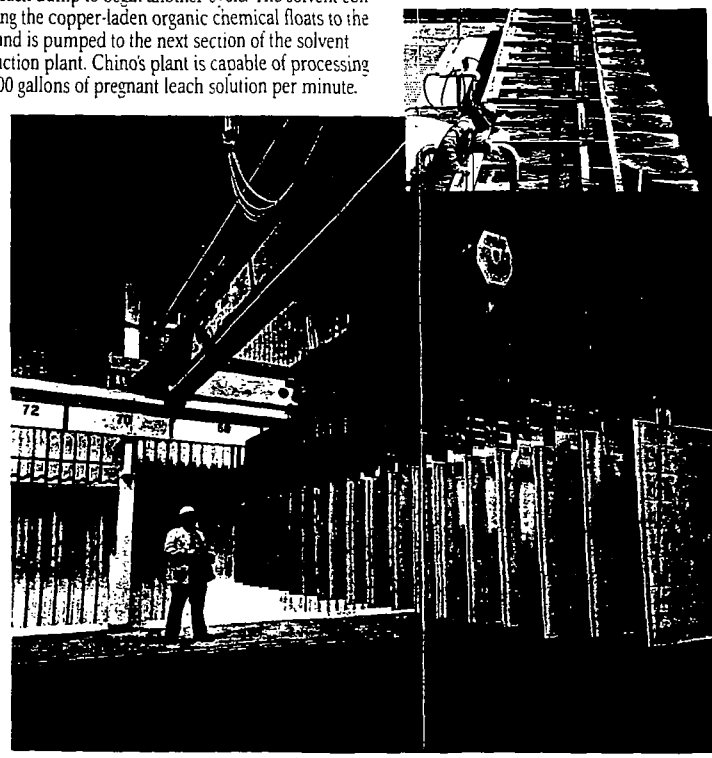
In the second step, extraction, the pregnant leach solution is mixed vigorously with an equal volume of kerosene-based solvent that contains an organic chemical specifically designed to extract copper. The solutions are mixed for about two minutes, then allowed to settle and separate.

The leach solution, which has given up its copper to the organic chemical, is pumped back to the top of the leach dump to begin another cycle. The solvent containing the copper-laden organic chemical floats to the top and is pumped to the next section of the solvent extraction plant. Chino's plant is capable of processing 12,000 gallons of pregnant leach solution per minute.

STRIPPING

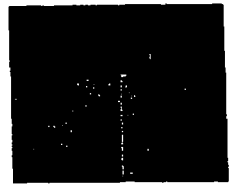
In the third step, stripping, the copper-laden organic chemical called "loaded organic" is mixed with a copper-bearing sulfuric acid solution called "electrolyte," and allowed to settle. The solvent that has been stripped of its copper, which is now called "barren organic," floats to the top and is sent back to the extraction step to pick up another load of copper. The rich electrolyte containing the copper settles to the bottom and is pumped to the electrowinning tankhouse.

Copper-enriched electrolyte contains about 400 pounds of copper in every 1000 gallons of solution.



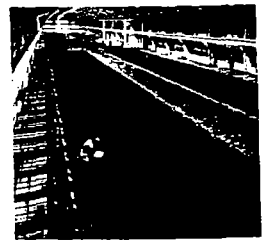
Copper is electroplated from the electrolyte solution onto thin, pure copper starter sheets.

The 200-pound cathodes harvested in the electrowinning tankhouse are 99.99% pure copper.



The Kneeling Nun, a famous rock formation near Chino, was named by Spanish explorers who used the distinctive silhouette as a landmark.

ELECTROWINNING



In the final step, electrowinning, the rich electrolyte is pumped through a series of tanks or cells. Hanging in the tanks are insoluble lead plates which act as the anode poles of an electrical circuit. These lead plates alternate with thin "starter sheets" of pure copper, which act as the cathode poles of the electrical circuit. A direct current is passed through the electrolyte and reduces some of the copper ions to copper metal, which accumulates on the starter sheet.

After ten days the starter sheet has grown from its original weight of about 17 pounds to a cathode of virtually pure copper weighing about 200 pounds. These cathodes are harvested and are ready for further processing into salable copper products. The electrolyte that has passed through the tankhouse is returned to the stripping step to have its copper content upgraded once again.

PROTECTING THE ENVIRONMENT

In each step of the solvent extraction-electrowinning process, no liquids are discharged. Instead, the leach solutions continually circulate between the leach dumps and the extraction section; the organic circulates between the extraction and stripping sections; and the electrolyte circulates between the stripping section and the tankhouse. This ensures an environmentally clean operation.

Chino's SX-EW plant will produce over 87 million pounds per year of pure, low-cost electrowon copper...enough to make 13 billion pure copper pennies annually.

REFERENCE 9

Communication--letter
G.L. Barker to J.R. Ward

[redacted] Andy / Alan

BAYARD MINING CORPORATION

555 N. Woodlawn P.O. Box 20020 Wichita, KS 67208-1020 Telephone (316) 682-6796 FAX (316) 682-6211

NEW MEXICO ENVIRONMENT DEPARTMENT
DEC 29 PM 12: 41
OFFICE OF THE SECRETARY

December 15, 1992

VIA HAND DELIVERY

Mr. Jeffrey R. Ward
President, Cobre Mining Company
303 Fierro Road PO Box 424
Hanover, New Mexico 88041
505-537-3391

Re: Transfer of Discharge Plan 181

Dear Mr. Ward:

Section 3-111 of the New Mexico Water Quality Control Commission Regulations, states that:

> "Prior to any transfer of ownership... of a facility with an approved discharge plan, the transferor shall notify the transferee in writing of the existence of the discharge plan, and shall deliver or send by certified mail to the director a copy of such written notification, together with a certification or other proof that such notification has in fact been received by the transferee."

This letter is for the purpose of providing to Cobre Mining Co. formal notification of Discharge Plan No. 181, as required by Section 3-111 of the Water Quality Control Commission Regulations.

Sincerely,

BAYARD MINING CORP.

By Gary L. Barker
Gary L. Barker
President

cc: New Mexico Environment Department
Attn: Judith Espinoza, Secretary

REFERENCE 10

NMED, Superfund Section
Site Discoveries, Preliminary Assessments and Inspections
for
Hanover Creek Mining District and Chino Mines sites

EID 031

EPA

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION: VI

SITE NUMBER (to be assigned by HQ): NM00779

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II (*Preliminary Assessment*). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: Kennecott Copper-Chino MineDiv. Smelter

B. STREET (*or other identifier*): Hurley

C. CITY: Hurley

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. OWNER/OPERATOR (*if known*)

1. NAME: R. R. Leveille

2. TELEPHONE NUMBER: 505-537-3381

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE ☒ 6. UNKNOWN

I. SITE DESCRIPTION

Copper Smelter with tailings pond - eleven of them

J. HOW IDENTIFIED (*i.e., citizen's complaints, OSHA citations, etc.*): State

K. DATE IDENTIFIED (*mo., day, & yr.*): 8-23-79

L. PRINCIPAL STATE CONTACT

1. NAME: Jack Ellvinger

2. TELEPHONE NUMBER: 505-827-5271 Ext. 275

II. PRELIMINARY ASSESSMENT (*complete this section last*)

A. APPARENT SERIOUSNESS OF PROBLEM

☒ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION

☐ 1. NO ACTION NEEDED (*no hazard*)

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 4. SITE INSPECTION NEEDED (*low priority*)

C. PREPARER INFORMATION

1. NAME: Jack Ellvinger

2. TELEPHONE NUMBER: (505)827-5271 Ext. 275

3. DATE (*mo., day, & yr.*): 5-19-80

III. SITE INFORMATION

A. SITE STATUS

☒ 1. ACTIVE (*Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.*)

☐ 2. INACTIVE (*Those sites which no longer receive wastes.*)

☐ 3. OTHER (*specify*): (*Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.*)

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES (*specify generator's four-digit SIC Code*): 3331

C. AREA OF SITE (*in acres*): 2,240.00

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE (*deg.—min.—sec.*): 32 40 36

2. LONGITUDE (*deg.—min.—sec.*): 108 06 43

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES (*specify*): Smelter office - complete town outside of facility gates.

Continued From Front

IV. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

The ground water in the area is presently contaminated. The site is located in a ground water recharge area and the effluent is discharged into surface water.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

[ ] 1. UNKNOWN [X] 2. LIQUID [ ] 3. SOLID [X] 4. SLUDGE [ ] 5. GAS

B. WASTE CHARACTERISTICS

[ ] 1. UNKNOWN [ ] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE
[X] 6. TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

[ ] 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Unknown

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT Unknown	AMOUNT	AMOUNT	AMOUNT Unknown	AMOUNT Unknown	AMOUNT
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUTICAL
X (2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTO SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	X (3) CAUSTICS	X (3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			X (10) METALS		
			(11) OTHER (specify):		

Continue On Page

Continued From Page 2

V. WASTE RELATED INFORMATION (Cont'd)

3. LIST SUBSTANCES OF GREATEST CONCERN which MAY BE ON THE SITE (pls. in descending order of hazard).

Precipitating plant effluent at the Santa Rita pit heap-leach operation flows down Whitwater Creek to the Hurley Smelter - Three shallow domestic wells have been contaminated by mine wastes.

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	X			
3. NON-WORKER INJURY/EXPOSURE	X			
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY		X	As early as 1947 one case was cocumented	
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	X			
8. CONTAMINATION OF SURFACE WATER	X			
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL	X			
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUIDS	X			
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

[X] 1. NPDES PERMIT term [ ] 2. SPCC PLAN [ ] 3. STATE PERMIT (specify):

[ ] 4. AIR PERMITS [ ] 5. LOCAL PERMIT [ ] 6. RCRA TRANSPORTER

[ ] 7. RCRA STORER [ ] 8. RCRA TREATER [ ] 9. RCRA DISPOSER

[ ] 10. OTHER (specify):

B. IN COMPLIANCE?

[ ] 1. YES [ ] 2. NO [ ] 3. UNKNOWN

4. WITH RESPECT TO (list regulation name & number): Groundwater - state regulations

VIII. PAST REGULATORY ACTIONS

[ ] A. NONE [ ] B. YES (summarize below)

Unknown

IX. INSPECTION ACTIVITY (past or on-going)

[ ] A. NONE Unk. [ ] B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

X. REMEDIAL ACTIVITY (past or on-going)

[ ] A. NONE Unk. [ ] B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment (Section II) information on the first page of this form.

8107-16

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION	SITE NUMBER (to be assigned by Hq)
6	NM00779

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

additional Info

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT COPPER-CHINO MINE Division - Smelter Plant

B. STREET *(or other identifier)*: Elgea St. - 1 Mile East of Hwy. 180

C. CITY: Hurley

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. OWNER/OPERATOR *(if known)*
1. NAME: David Kinneyburg - Plant Manager; Maurice Madden - Environmental Control Director
2. TELEPHONE NUMBER: (505)537-3381

H. TYPE OF OWNERSHIP
☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION
See Attachment A

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*
New Mexico, Environmental Improvement Division

K. DATE IDENTIFIED *(mo., day, & yr.)*: 7/10/78

L. PRINCIPAL STATE CONTACT
1. NAME: Jack Ellvinger
2. TELEPHONE NUMBER: (505)827-5271 ext. 275

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM
☐ 1. HIGH ☐ 2. MEDIUM ☒ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION
☐ 1. NO ACTION NEEDED *(no hazard)*
☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:
☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:
☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION
1. NAME: Jairo Guevara
2. TELEPHONE NUMBER: (214)742-4521
3. DATE *(mo., day, & yr.)*: 5/28/81

III. SITE INFORMATION

A. SITE STATUS
☒ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*
☐ 2. INACTIVE *(Those sites which no longer receive wastes.)*
☐ 3. OTHER *(specify)*: *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?
☐ 1. NO ☒ 2. YES *(specify generator's four-digit SIC Code)*: 3331

C. AREA OF SITE *(in acres)*: 2,240

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES
1. LATITUDE *(deg.—min.—sec.)*: 32°40'36"N
2. LONGITUDE *(deg.—min.—sec.)*: 108°06'43"W

E. ARE THERE BUILDINGS ON THE SITE?
☐ 1. NO ☒ 2. YES *(specify)*: Office, production and equipment buildings

REVIEWED BY (GAEGH) DATE

Continued From Front

IV. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP	X	2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND	X	4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

This facility currently refines copper. It recovered molybdenum in the past. The facility also produces sulphuric acid which is used to precipitate residual copper deposited at the mine dumps.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

[ ] 1. UNKNOWN [X] 2. LIQUID [X] 3. SOLID [X] 4. SLUDGE [ ] 5. GAS

B. WASTE CHARACTERISTICS

[ ] 1. UNKNOWN [X] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE
[X] 6. TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

[ ] 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: None	AMOUNT: None	AMOUNT: None	AMOUNT: Unknown	AMOUNT: Unknown	AMOUNT: None
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
'X' (1) PAINT, PIGMENTS	'X' (1) OILY WASTES	'X' (1) HALOGENATED SOLVENTS	'X' X (1) ACIDS	'X' X (1) FLYASH	'X' (1) LABORATORY PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	X (3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	X (5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	X (6) OTHER (specify): Spent vanadium pentoxide catalyst	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			X (10) METALS		
			(11) OTHER (specify)		

06

 Continue On Page 3

Continued From Page 2

V. WASTE RELATED INFORMATION *(continued)*

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE *(place in descending order of hazard)*.

As, Pb, Cd, Ni, Se, Cu, SO_4

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

During dry weather, the White Water Creek downstream (south) from lake one is dry. The Mimbres River where White Water Creek discharges is also dry.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD *(mark 'X')*	C. ALLEGED INCIDENT *(mark 'X')*	D. DATE OF INCIDENT *(mo., day, yr.)*	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH				
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY		X		As early as 1947, one case of contamination was documented. No contamination was found during inspection.
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER		X	10/80 and 2/81	Samples taken by Kennecott at lake one inlet and at (see attachment A)
8. CONTAMINATION OF SURFACE WATER	X			Heavy metals contamination occurs with heavy rain (see attachment A)
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL	X			Soil on White Water Creek downstream of plant which normally is dry has some metals contamination.
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS	X			Overflow of lake one into White Water Creek is (see attachment A)
17. SEWER, STORM DRAIN PROBLEMS	X			Lake one overflows into White Water Creek (see attachment A)
18. EROSION PROBLEMS		X	5/28/81	Some erosion on the tailing ponds walls was noted but the problem is minor.
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER *(specify)*:				

Continued From Front

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

NM020435

- [X] 1. NPDES PERMIT
- [ ] 2. SPCC PLAN
- [ ] 3. STATE PERMIT *(specify)*:
- [ ] 4. AIR PERMITS
- [ ] 5. LOCAL PERMIT
- [ ] 6. RCRA TRANSPORTER
- [X] 7. RCRA STORER
- [X] 8. RCRA TREATER
- [ ] 9. RCRA DISPOSER

NMD007396930

- [ ] 10. OTHER *(specify)*:

B. IN COMPLIANCE?

- [ ] 1. YES
- [ ] 2. NO
- [X] 3. UNKNOWN
- 4. WITH RESPECT TO *(list regulation name & number)*:

VIII. PAST REGULATORY ACTIONS

- [X] A. NONE
- [ ] B. YES *(summarize below)*

IX. INSPECTION ACTIVITY *(past or on-going)*

- [X] A. NONE
- [ ] B. YES *(complete items 1,2,3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION

X. REMEDIAL ACTIVITY *(past or on-going)*

- [X] A. NONE
- [ ] B. YES *(complete items 1, 2, 3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-2

Corresponding number on form	Additional Remark and/or Explanation
I.i.	The site is a copper smelter plant. The copper ores are brought by railroad from the Santa Rita Mine (7 miles n.e.). The site has four waste water lakes and huge tailing ponds. There are 16 water wells on the site which supply drinking water to the Kennecott smelter plant and to the City of Hurley.
VI.7.	lake one monitoring well show heavy metals contamination.
VI.8.	or when equipment malfunctions.
VI.16.	caused by equipment malfunctions.
VI.17.	when heavy rains occur.

8194-5

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by Hq)
6	NM00779

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (*Section II*). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Tack Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT COPPER-CHINO MINE Division-Smelter Plant

B. STREET (or other identifier): Elgea St. - 1 Mile East of Hwy. 180

C. CITY: Hurley

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. SITE OPERATOR INFORMATION

1. NAME: David Kinneyburg - Plant Manager; Maurice Madden - Environmental Control Director

2. TELEPHONE NUMBER: (505)537-3381

3. STREET: Elgea

4. CITY: Hurley

5. STATE: NM

6. ZIP CODE: 88043

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: Same

2. TELEPHONE NUMBER:

3. CITY:

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION: See Attachment A

J. TYPE OF OWNERSHIP: [ ] 1. FEDERAL [ ] 2. STATE [ ] 3. COUNTY [ ] 4. MUNICIPAL [X] 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):

B. APPARENT SERIOUSNESS OF PROBLEM: [ ] 1. HIGH [ ] 2. MEDIUM [X] 3. LOW [ ] 4. NONE

C. PREPARER INFORMATION

1. NAME: Jairo Guevara

2. TELEPHONE NUMBER: (214)742-4521

3. DATE (mo., day, & yr.): 6/30/81

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: Jairo Guevara

2. TITLE: FIT-Chemical Engineer

3. ORGANIZATION: Ecology & Environment, Inc., 1509 Main St., Dallas, TX 75201

4. TELEPHONE NO. (area code & no.): (214)742-4521

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Larry Landry	Ecology & Environment, Inc.	(214)742-4521

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Maurice Madden	Environmental Control Director (505)537-3381	Elgea St. Hurley, NM 88043
Bill Hooks	Environmental Control Engineer (505)537-3381	" " "
Dale J. Readel	Health Programmer Eid, NM (505)538-5318	P.O. Box 2575, Silver City, NM 88062
Jack Greber	Project Mgr. (513)782-4700 Pedco Environmental Inc.	11499 Chester Rd. Cincinnati, OH 45246
Betty Davila	City of Bayard Clerk Treasurer (513)537-3327	City Hall Bayard, NM 88023

REVIEWED BY (6SA-SC): SL

REVIEWED BY (GREEN) DATE 12/17/81

Continued From Front

III. INSPECTION INFORMATION (continued)

D. GENERATOR INFORMATION (sources of waste)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Kennecott Copper	(505)537-3381	Elgea St., Hurley, NM 88043	Acid waste water contaminated with heavy metals

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
N/A			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
5/27/81	10:15 am	[X] 1. PERMISSION [ ] 2. WARRANT

J. WEATHER (describe)
Cloudy; 64°F

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER			
b. SURFACE WATER			
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify)	X	No samples were taken during this inspection	

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
None		

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS
   - [ ] a. GROUND
   - [X] b. AERIAL

2. PHOTOS IN CUSTODY OF: EPA Region VI (See Attachments)

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS: EPA Region VI (See Attachments B & C)

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 32°40'36"N
2. LONGITUDE (deg.-min.-sec.): 108°06'43"W

V. SITE INFORMATION

A. SITE STATUS

- [X] 1. ACTIVE (Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)
- [ ] 2. INACTIVE (Those sites which no longer receive wastes.)
- [ ] 3. OTHER (specify): _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

- [ ] 1. NO
- [X] 2. YES (specify generator's four-digit SIC Code): 3331

C. AREA OF SITE (in acres): 2,240

D. ARE THERE BUILDINGS ON THE SITE?

- [ ] 1. NO
- [X] 2. YES (specify): Office, production and maintenance buildings

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP	X	2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND	X	4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

- [ ] 1. STORAGE
- [ ] 2. INCINERATION
- [ ] 3. LANDFILL
- [X] 4. SURFACE IMPOUNDMENT
- [ ] 5. DEEP WELL
- [ ] 6. CHEM/BIO/PHYS TREATMENT
- [ ] 7. LANDFARM
- [X] 8. OPEN DUMP
- [ ] 9. TRANSPORTER
- [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

- [X] 1. LIQUID
- [X] 2. SOLID
- [X] 3. SLUDGE
- [ ] 4. GAS

B. WASTE CHARACTERISTICS

- [X] 1. CORROSIVE
- [ ] 2. IGNITABLE
- [ ] 3. RADIOACTIVE
- [ ] 4. HIGHLY VOLATILE
- [X] 5. TOXIC
- [ ] 6. REACTIVE
- [ ] 7. INERT
- [ ] 8. FLAMMABLE
- [ ] 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Only partial records of tailings disposed between 1971 and 1980 (See attachment D).

Continue On Reverse

Continued From Front

VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit of measure)* of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: None	AMOUNT: None	AMOUNT: None	AMOUNT: Unknown	AMOUNT: *Unknown	AMOUNT: None
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER *(specify)*:	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER *(specify)*:	(3) CAUSTICS	X (3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	X (4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER *(specify)*:			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER *(specify)*:
			(6) CYANIDE	(6) OTHER *(specify)*: Spent vanadium pentoxide catalyst *See attachment D for tailings disposed in tailing ponds	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			X (10) METALS		
			(11) OTHER *(specify)*:		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

1. SUBSTANCE	2. FORM *(mark 'X')* a. SOLID	b. LIQ.	c. VAPOR	3. TOXICITY *(mark 'X')* a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT	6. UNIT
Arsenic	X			X				7440-38-2	Unknown	
Lead	X	X		X				7439-92-1	"	
Cadmium	X	X		X				7440-43-9	"	
Chromium	X	X		X				7440-47-3	"	
Selenium	X	X		X				7882-49-2	"	
Beryllium	X	X			X			7440-41-7	"	
Nickel	X	X			X			7440-02-0	"	
Molybdenum	X	X				X		7439-98-7	"	
Copper	X	X				X		7440-50-8	"	
Vanadium pentoxide	X					X		1314-62-1	"	
Zinc	X	X				X		7440-66-6	"	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

___ A. HUMAN HEALTH HAZARDS

Continued From Page 4

VIII. HAZARD DESCRIPTION *(continued)*

☐ B. NON-WORKER INJURY/EXPOSURE

☐ C. WORKER INJURY/EXPOSURE

☒ D. CONTAMINATION OF WATER SUPPLY

According to the state, water supply was contaminated as early as 1947 (first case documented by the state). There are a number of residential water wells located 1-4 miles from the site which are contaminated with heavy metals. None of these, however are used as a drinking water source.

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER See VIII D

☐ G. CONTAMINATION OF SURFACE WATER

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☐ J. CONTAMINATION OF AIR

☐ K. NOTICEABLE ODORS

☒ L. CONTAMINATION OF SOIL

Soil on White Water Creek upstream of plant is heavily contaminated, (see photo 1-4) Flow of water in the creek only occupies a small area of the total bed of the creek. Soil on White Water Creek downstream of plant has some obvious contamination (see photos 8, 9 & 12).

☐ M. PROPERTY DAMAGE

Continue On Page 7

Continued From Page 6

VIII. HAZARD DESCRIPTION *(continued)*

[ ] N. FIRE OR EXPLOSION

[X] O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Equipment malfunctions cause overflow of lake one into White Water Creek. This creek goes into San Vicente Arroyo which discharges in the Mimbres River.

[X] P. SEWER, STORM DRAIN PROBLEMS

Lake one overflows into White Water Creek when heavy rain occurs.

[X] Q. EROSION PROBLEMS

Slight erosion caused by rain was observed in the tailing ponds walls.

[ ] R. INADEQUATE SECURITY

[ ] S. INCOMPATIBLE WASTES

Continue On Reverse

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

☐ U. OTHER (specify):

This inspection was limited by Kennecotts refusal to supply any smelter process information, site well locations or underground water data. Kennecott claims that Pedco Environmental, Inc. from Cincinnati, Ohio is the only authorized EPA contractor to get underground water information. Pedco is presently conducting a long term study on underground water for EPA-Office of Research & Development in Cincinnati (contract #68-03-2900), and also a solid-waste study for EPA Headquarters in Washington. Under these projects, Pedco is collecting solid-waste and water well samples.

The major problem with this site is the potential of underground water contamination. It is recommended that EPA Region VI obtain from Pedco the analyses results of samples taken from water wells and also with a profile of soils at White Water Creek (upstream and downstream), San Vincente Arroyo (downstream) and Mimbres River (downstream). Kennecott officials stated that a project to eliminate discharges from lake one is under construction and will be finished in 1983.

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	1,350	1,350	375	1 mile
2. IN COMMERCIAL OR INDUSTRIAL AREAS	150	150	15	1 mile
3. IN PUBLICLY TRAVELLED AREAS	1,500	1,500	0	1 mile
4. PUBLIC USE AREAS (parks, schools, etc.)	300	300	1	1 mile

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
50-100 ft. Alluvial Aquifer	S & SE	Drinking
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
25-100 gpm	On Site	South side of site, south of smelter plant and tailing ponds.

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS*

☒ 2. COMMUNITY (specify town): Hurley, NM > 15 CONNECTIONS

☐ 3. SURFACE WATER

☒ 4. WELL

Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
None (there are 16 100-400 ft. wells on the south side of the site. No information on these wells was supplied by Kennecott).				

I. RECEIVING WATER

1. NAME: Mimbres River

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS

☐ 4. LAKES/RESERVOIRS ☒ 5. OTHER (specify): Closed Basin

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Irrigation; domestic water supply; high quality cold-water fishery; livestock and wildlife watering; secondary contact recreation.

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☒ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
X	1. SAND	X	Gravel facies, Pleistocene alluvial fan deposits		
X	2. CLAY	X	" "		
X	3. GRAVEL	X	" "		

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☒ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: 0-10% at plant 0-25% near plant

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: South; good

J. OTHER GEOLOGICAL DATA

The site rests atop gravel facies of a Pleistocene alluvial fan originating from the highlands to the north. These sediments are highly permeable due to their unconsolidated nature; groundwater held in these sediments is fossil and is not being recharged to sustain current levels of use.

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X')		
					1. YES	2. NO	3. UNKNOWN
RCRA		NM007396930	2/18/81	--			X
NPDES	State	NM020435	7/19/80	7/18/85			X

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

X NONE ___ YES *(summarize in this space)*

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Pond - lake one (disposal and storage)

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
☐ YES ☒ NO

7. IMPOUNDMENT HAS LINER SYSTEM
☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
☐ YES ☐ NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
☒ YES ☐ NO One

10. LENGTH, WIDTH, AND DEPTH
LENGTH 1500 ft. WIDTH 1500 ft. DEPTH 5 ft.

11. CALCULATED VOLUMETRIC CAPACITY
12 million cubic feet

12. PERCENT OF CAPACITY REMAINING
30%

13. ESTIMATE FREEBOARD
1.5 feet

14. SOLIDS DEPOSITION
☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD
None performed

16. OTHER EQUIPMENT

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Pond - lake one extension (storage and disposal)

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☐ NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

☐ YES ☒ NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH 1500 ft. WIDTH 530 ft. DEPTH 6 ft.

11. CALCULATED VOLUMETRIC CAPACITY

4.8 million cubic feet

12. PERCENT OF CAPACITY REMAINING

42%

13. ESTIMATE FREEBOARD

25 ft.

14. SOLIDS DEPOSITION

☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD

None performed

16. OTHER EQUIPMENT

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Pond - process lake two (storage and disposal)

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☐ NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

☐ YES ☒ NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH 1800 ft. WIDTH 1000 ft. DEPTH 10 ft. (est.)

11. CALCULATED VOLUMETRIC CAPACITY

18 million cubic feet

12. PERCENT OF CAPACITY REMAINING

20%

13. ESTIMATE FREEBOARD

2 ft. (est.)

14. SOLIDS DEPOSITION

☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD

None performed

16. OTHER EQUIPMENT

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Pond - axflow lake (storage and disposal)

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☐ NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

☐ YES ☒ NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH 2100 ft. WIDTH 1500 ft. DEPTH 10 ft. (est.)

11. CALCULATED VOLUMETRIC CAPACITY

31.5 million cubic feet

12. PERCENT OF CAPACITY REMAINING

20%

13. ESTIMATE FREEBOARD

2 ft. (est.)

14. SOLIDS DEPOSITION

☐ YES ☒ NO

15. DREDGING DISPOSAL METHOD

None performed

16. OTHER EQUIPMENT

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Tailing ponds (11) for disposal and storage

2. STABILITY CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

[X] YES [ ] NO Some minor erosion in ponds walls

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM

[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

[ ] YES [ ] NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

[X] YES [ ] NO Three barrier wells

10. LENGTH, WIDTH, AND DEPTH

LENGTH WIDTH DEPTH 2,000 acres, an average of 200 ft. deep

11. CALCULATED VOLUMETRIC CAPACITY

17.4 billion cubic feet total capacity

12. PERCENT OF CAPACITY REMAINING 5% (est.)

Ponds dams are elevated by increments of 35 ft. Dams are to be raised one or two more increments in the future

13. ESTIMATE FREEBOARD

2-3 ft.

14. SOLIDS DEPOSITION

[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD

None performed

16. OTHER EQUIPMENT

Open dump (fly ash, trash)

STORAGE FACILITIES SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. STORAGE AREA HAS CONTINUOUS IMPERVIOUS BASE
[ ] YES [X] NO

2. STORAGE AREA HAS A CONFINEMENT STRUCTURE
[ ] YES [X] NO

3. EVIDENCE OF LEAKAGE/OVERFLOW *(If "Yes", document where and how much runoff is overflowing or leaking from containment)*
[ ] YES [X] NO

4. ESTIMATE TYPE AND NUMBER OF BARRELS/CONTAINERS
Approximate dimensions of pile - 150 X 100 X 20' (300,000 ft.^{3})

5. GLASS OR PLASTIC STORAGE CONTAINERS USED
[ ] YES [X] NO

6. ESTIMATE NUMBER AND CAPACITY OF STORAGE TANKS
N/A

7. NOTE LABELING ON CONTAINERS
N/A

8. EVIDENCE OF LEAKAGE CORROSION OR BULGING OF BARRELS/CONTAINERS/STORAGE TANKS *(If "Yes", document evidence. Describe location and extent of damage. Take PHOTOGRAPHS)*
[ ] YES [ ] NO N/A

9. DIRECT VENTING OF STORAGE TANKS
[ ] YES [ ] NO N/A

10. CONTAINERS HOLDING INCOMPATIBLE SUBSTANCES *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO
No incompatible substances in pile

11. INCOMPATIBLE SUBSTANCES STORED IN CLOSE PROXIMITY *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
[ ] YES [X] NO

12. ADEQUATE CONTAINER WASHING AND REUSE PRACTICES
[ ] YES [ ] NO N/A

13. ADEQUATE PRACTICES FOR DISPOSAL OF EMPTY STORAGE CONTAINERS
[ ] YES [ ] NO N/A

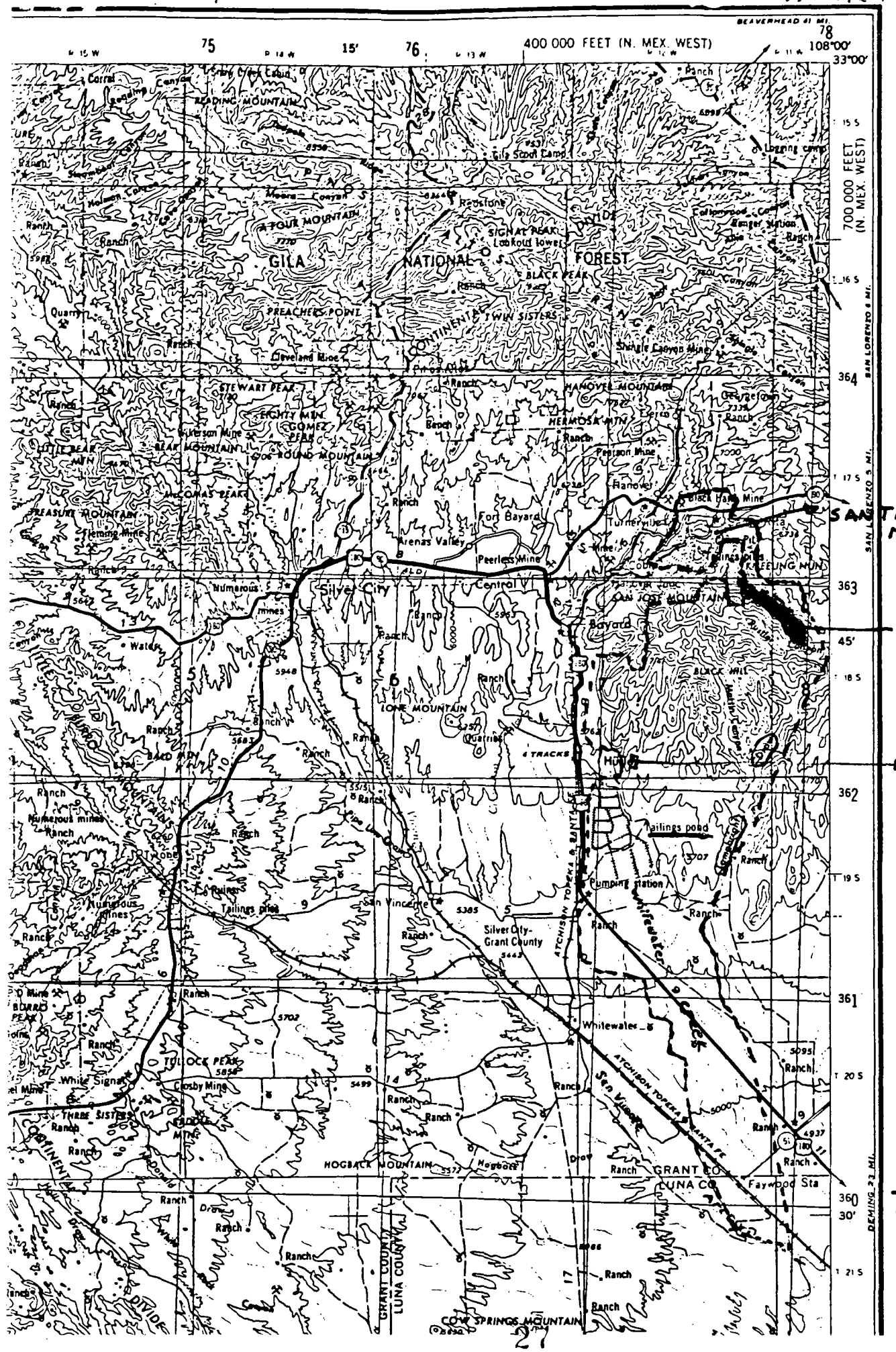
ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
I.i.	This facility is a copper smelter plant. The most important copper ores mined are chalcoprite ($CuFeS_2$) and chalocite (Cu_2S). These areas are brought to the smelter plant by railroad from the Santa Rita mine (7 miles n.e.). Copper recovered at the mine (from the dumps, precipitation plant and launder plant) is also brought by railroad to the smelter plant. The plant has four lakes (see attachment C and photos) for storage and recirculation of the White Water Creek waters and the process water from the smelter plant. Discharge of waters off the site occurs only during rainfall or when equipment malfunctions. The site also has a series of 11 huge tailing ponds (see attachment C) where the tailing slurry from the site concentrator is discharged. The liquid from the tailing slurry is decanted and sent back to one of the storage lakes. The site has 16 water wells which supply drinking water to the Kennecott smelter plant and the City of Hurley. Three barriers water wells are located on the site to control existing seepage.

NI 12-12
ATTACHMENT



EPA

POTENTIAL HAZARDOUS WASTE SITE
TENTATIVE DISPOSITION PA/SI

REGION	SITE NUMBER
6	NM 779

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME	B. STREET	
KENNECOTT COPPER	E of US180 & S of NM 90	
C. CITY	D. STATE	E. ZIP CODE
HURLEY (GRANT COUNTY)	NM	88043

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED -- NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.)			X		
C. REMEDIAL ACTION NEEDED (If yes, complete Section IV.)					
D. ENFORCEMENT ACTION NEEDED (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)					

E. RATIONALE FOR DISPOSITION

the site consists of 120,000 total acres, including 2240 acres of mine tailings. Operations include an open-pit copper mine, beneficiation unit, and smelter. Drinking water for the city of Hurley is provided by 400 foot deep onsite wells. Depth to groundwater is 100 feet and soil permeability is high (recharge zone). Monitoring wells are onsite, but sampling of these and of the Hurley water supply has revealed no contamination. Some offsite migration of heavy metals into Whitewater Creek has occurred from accidental discharges. The facility has

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo., day, & yr.)

undertaken plans to retrofit their operations such that they will become compliant with air and water regulations. These changes are being made through the NPDES permitting process.

G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOPED (mo., day, & yr.)

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Amy M. Lopez, 6AW-SC	(214) 767-6421	5/13/85.

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

Continued monitoring of groundwater/drinking water by NMEID will be required.

B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed Information)

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION (mo, day, & yr)	3. TO BE PERFORMED BY (EPA, Contractor, State, etc.)	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION				
(1) Sampling	FY85	State		
(2)				
(3)				
b. TYPE OF MONITORING				
(1)				
(2)				
c. TYPE OF SAMPLING				
(1) Water				
(2)				

EPA Form T2070-4 (10-79) cc 6W-SP (w/report)

Continue On Reverse

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT PA/SI

REGION	SITE NUMBER (to be assigned by HQ)
6	NM00779

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT - MITSUBISHI - Chino Mines Co - Mine Concentrator - Smelter

B. STREET (or other identifier): East of US 180 & South of NM 90 (see attachment)

C. CITY: Hurley

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. SITE OPERATOR INFORMATION

1. NAME: David Kinneyburg, General Manager; Robert Malone, Director of Environmental Affairs

2. TELEPHONE NUMBER: (505) 537-3381

3. STREET: ELDEA

4. CITY: Hurley

5. STATE: NM

6. ZIP CODE: 88043

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: Kennecott Corporation (see attachment)
PO Box 11248 - 10 E. South Temple

2. TELEPHONE NUMBER: (801) 322-7000

3. CITY: Salt Lake City

4. STATE: UT

5. ZIP CODE: 84147

I. SITE DESCRIPTION: (see attachment)

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.): April 23, 1984

B. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☒ 2. MEDIUM ☒ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: Robert Louy

2. TELEPHONE NUMBER: (505) 984-0020

3. DATE (mo., day, & yr.): March 13, 1985

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: Robert M Louy

2. TITLE: Project Manager RCRA 3012

3. ORGANIZATION: NM Environmental Improvement Division (NMEID) PO Box 968, Santa Fe, NM 87504-0968

4. TELEPHONE NO. (area code & no.): (505) 984-0020

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Robert Louy	NMEID - Santa Fe (as above)	as above
David Rees	NMEID - Silver City Field Office PO Box 2575, Silver City, NM 88062	(505) 538-5318

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
David Kinneyburg	General Manager	c/o Kennecott - Mitsubishi Chino Mines Div.
Maurice Madden	Director, Env. Control	Hurley, NM (505) 537-3381
Robert Malone	Director, Environmental Affairs	c/o Kennecott - Mitsubishi PO Box 11248
Gerald Schurtz	Manager, Environmental Health	Salt Lake City, UT (801) - 322 - 7000

Reviewed by 6AW-SC date 5/14/85

Continued From Front

INSPECTION INFORMATION (contin

D. GENERATOR INFORMATION (sources of waste)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Kennecott	(505) 537-3381	Hurley, NM	Mine tailings Smelter wastes
			Vanadium Pentoxide

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
Lubbock Waste Oil	(806) 747-6219	2112 E. 48th St. Lubbock, TX 79408	Waste Oil
Power Masters Inc.	(714) 983-2676	801 E. Holt Ontario, CA 91761	Vanadium Pentoxide

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
July 19, 1984	0930	☒ 1. PERMISSION ☐ 2. WARRANT

J. WEATHER (describe)
Clear, temperature 80-85°

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X		
b. SURFACE WATER	X	NM Health and Environment Dept	OCT 1984
c. WASTE		Scientific Laboratory Division	
d. AIR		700 Camino de Salud NE Albuquerque, NM 87103	
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify) Hurley Water Supply	X		

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
N/A		

SAMPLE INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS: N/A

☐ a. GROUND ☐ b. AERIAL

2. PHOTOS IN CUSTODY OF:

D. SITE MAPPED?

☒ YES. SPECIFY LOCATION OF MAPS: Maps included with report

E. COORDINATES TAILINGS AREA

1. LATITUDE (deg.-min.-sec.): 32d 42m

2. LONGITUDE (deg.-min.-sec.): 108d 7m

V. SITE INFORMATION

A. SITE STATUS

☒ 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

☐ 2. INACTIVE (Those sites which no longer receive wastes.)

☐ 3. OTHER (specify): (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES (specify generator's four-digit SIC Code): 3331

C. AREA OF SITE (in acres)

2240 - Tailings

120,000 - all Property

D. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES (specify): offices, millings building, production and maintenance buildings

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
X	1. RAIL	X	1. PILE – SLAG	X	1. FILTRATION	X	1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE	X	3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
X	4. TRUCK	X	4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
X	5. PIPELINE	X	5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY	X	8. OTHER (specify): Tailings
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

☐ 1. STORAGE ☐ 2. INCINERATION ☐ 3. LANDFILL ☐ 4. SURFACE IMPOUNDMENT ☐ 5. DEEP WELL

☐ 6. CHEM/BIO/PHYS TREATMENT ☐ 7. LANDFARM ☐ 8. OPEN DUMP ☐ 9. TRANSPORTER ☐ 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

☒ 1. LIQUID ☒ 2. SOLID ☐ 3. SLUDGE ☒ 4. GAS

B. WASTE CHARACTERISTICS

☒ 1. CORROSIVE ☐ 2. IGNITABLE ☐ 3. RADIOACTIVE ☐ 4. HIGHLY VOLATILE

☒ 5. TOXIC ☐ 6. REACTIVE ☐ 7. INERT ☐ 8. FLAMMABLE

☐ 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Yes – records of tailings production

VII. WASTE RELATED INFORMATION (continued)

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: NONE	AMOUNT: 3000	AMOUNT: included with	AMOUNT: 500	AMOUNT: 37,000	AMOUNT: 4
UNIT OF MEASURE:	UNIT OF MEASURE: gal / month	UNIT OF MEASURE: oil wastes	UNIT OF MEASURE: gal / day	UNIT OF MEASURE: ton / day	UNIT OF MEASURE: ton / year
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY, PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	X (2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	X (3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	X (5) NON-FERROUS SMLTG. WASTES	X (5) OTHER (specify): Vanadium Pentoxide
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER (specify):		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X') a. SOLID	b. LIQ.	c. VAPOR	3. TOXICITY (mark 'X') a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT
Arsenic	X			X				7440-38-2	
Lead	X			X				7439-92-1	
Cadmium	X			X				7440-43-9	
Chromium	X			X				7440-47-3	
Selenium	X			X				7782-49-2	
Beryllium	X				X			7440-41-7	
Nickel	X				X			7440-02-0	
Molybdenum	X					X		7439-98-7	
Copper	X					X		7440-50-8	
Vanadium (Pentoxide)	X					X		1314-62-1	
Zinc	X					X		7440-66-6	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

☐ A. HUMAN HEALTH HAZARDS

N/A

☐ B. NON-WORKER INJURY/EXPOSURE

N/A

☐ C. WORKER INJURY/EXPOSURE

N/A

☐ D. CONTAMINATION OF WATER SUPPLY

Sample of drinking water supply from Marias Cafe, in Hurley, did not contain hazardous substances.

☐ E. CONTAMINATION OF FOOD CHAIN

N/A

☐ F. CONTAMINATION OF GROUND WATER

Sample from a Kennecott monitor well at base of tailings was cleaner than Maria Cafe water sample (i.e. lower Se concentrations). Monitor well was chosen completely at random.

☒ G. CONTAMINATION OF SURFACE WATER

Whitewater Creek water sample had elevated levels of:

Cadmium	.140 ppm
Cobalt	.980 ppm
Copper	18 ppm
Lead	.220 ppm
Nickel	.360 ppm

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

☐ H. DAMAGE TO FLORA/FAUNA

N/A

☐ I. FISH KILL

N/A

☐ J. CONTAMINATION OF AIR

N/A

☐ K. NOTICEABLE ODORS

N/A

☐ L. CONTAMINATION OF SOIL

N/A

☐ M. PROPERTY DAMAGE

N/A

Continued From Page 6

VIII. HAZARD DESCRIPTION (contin

☐ N. FIRE OR EXPLOSION

N/A

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Pipeline spills or connection leaks have been a recurring problem at the Kennecott facility. Documented spills occurred on JUL 30, 1983, JAN 18, 1984, JUL 17, 1984, SEP 12, 1984, DEC 11 & 13, 1984, DEC 28, 1984 (200,000 gal effluent and 75 tons tailings escaped), and FEB 11, 1985. A letter describing the DEC 28, 1984 incident is included with this report.

☐ P. SEWER, STORM DRAIN PROBLEMS

N/A

☐ Q. EROSION PROBLEMS

N/A

☐ R. INADEQUATE SECURITY

N/A

☐ S. INCOMPATIBLE WASTES

N/A

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

N/A

☒ U. OTHER (specify):

The potential for environmental damage due to the Kennecott tailings pile is great mainly on account of the tremendous volumes of materials involved. However, Kennecott has bought a proportionately large amount of land around and downstream of the facility. Thus, it is just as unlikely that human health will be endangered, since Kennecott will not open the region to residential development.

The greatest danger to population would be through the drinking water supply which is furnished by Kennecott wells. The Maria Cafe sample showed no danger from this source.

(See attachment for continuation of narrative).

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	2500	0	800	$\frac{1}{2}$ mi
2. IN COMMERCIAL OR INDUSTRIAL AREAS	200	200	15	$\frac{1}{2}$ mi
3. IN PUBLICLY TRAVELLED AREAS	2500	200	UNK	$\frac{1}{2}$ mi
4. PUBLIC USE AREAS (parks, schools, etc.)	300	0	< 5	$\frac{1}{2}$ mi

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
100 feet	South and southeast	Drinking
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
25-100 GPM	On-site	to south-southeast

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS ☐ 2. COMMUNITY (specify town): > 15 CONNECTIONS

☐ 3. SURFACE WATER ☒ 4. WELL - Kennecott wells @ 400 ft depths

 Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
		Kennecott supplies municipal drinking		
		water supplies for Hurley from 400 foot		
		wells on-site.		

I. RECEIVING WATER

1. NAME: Mimbres

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Irrigation, livestock and wildlife watering. Mimbres River supplies drinking water supplies several miles downstream.

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN: N/A

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☐ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
X	1. SAND	X	Gila Conglomerate		
	2. CLAY				
X	3. GRAVEL	X			

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☒ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS: To Mimbres River

I. SLOPE

1. ESTIMATE % OF SLOPE: 2 %

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: to South and Southeast

J. OTHER GEOLOGICAL DATA

Tailings sit on Gila Conglomerate and partially on alluvial fill.

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X') 1. YES	2. NO	3. UNKNOWN
Groundwater Discharge	EID	DP 213 DP 214 DP 274	6-7-82 4-22-83 4-22-83	6-4-87 4-22-88 4-22-88	X X X		
RCRA	EID	NM007396930	UNK		X		
NPDES	EID	NM020435	7/19/80	7/18/85	X	- illegal discharges have occurred due to mechanical breakdowns	
Air Quality	EID	# 298 # 376	6-6-80 6-13-81	— —	X X		

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☒ NONE ☐ YES (summarize in this space)

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition (*Section II*) information on the first page of this form.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
IB	The Kennecott-Mitsubishi (hereafter known as the company) properties lie in the following geographic areas: T17S R12W (south ½) T18S R11W (west ½) T18S R12W (all) T19S R12W (all) T20S R12W (approximately 300 acres bordering Whitewater Creek) T21S R12W - See enclosed map labeled Attachment A
IH	Kennecott Corporation operates mining concerns of the SOHIO Co. Midland Bldg Cleveland, OH
Ii	The facility includes a copper mine and ore beneficiation - smelter operation. The company disposes of tailings wastes at a 2000 acre pile which is divided into 4 alternating active ponds. Waters are decanted from the ponds and pumped back to concentrator plant. The company operates a pump-back well system around the east and south perimeter of the tailings to prevent migration of contamination. Thus, tailings seepage is diluted by mixing and returns to facility through pump-back system. The company also operates 25-30 water wells that supply beneficiation operations and drinking water for Hurley, NM.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
II (cont)	Thus, the company claims that it will achieve zero discharge through its water recycling scheme, when completed. The company operates an open-pit copper mine and beneficiation unit at Santa Rita. The smelter is located at Hurley, approximately 7 mi southwest of Santa Rita. Ore is transported from mine to concentrator by direct truck-haulage. Copper concentrate is pumped via slurry pipeline to smelter. Tailings from the concentrator is pumped via slurry pipeline to the tailings disposal area. Low-grade ore is leached at one of two sites: Lampbright or Whitewater dump. "Cement" copper is produced from dump leachate and shipped to the smelter by rail. Whitewater creek begins at the Whitewater cement-copper precipitation plant and is diverted around the tailings area. The company is installing a 15 million gallon reservoir at the precipitation facility to come into compliance with NPDES zero discharge and State of N. M. discharge regulations. After construction is complete, the only discharge in Whitewater Creek will be derived from Hanover Creek and from local, natural, surface runoff. Untreated sewage from the towns of Bayard, Central, Hurley, Ft. Bayard is discharged to Cananea's tailings area.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
VIII U	Kennecott has recently entered a partnership arrangement with Mitsubishi Corp. Terms of the partnership will provide Kennecott with sufficient capital to undertake retrofit improvement at their facility to come into environmental compliance with air and water quality regulations. It is the recommendation of this inspector that State and Federal agencies maintain environmental monitoring of the Kennecott facility. However, after reviewing the data obtained during this investigation, it does not appear that this facility requires a follow-up investigation.

Continued From Front

III. INVESTIGATIVE ACTIVITY NEEDED and PART B - PROPOSED INVESTIGATIVE ACTIVITY (Continued)

d. TYPE OF LAB ANALYSIS (1)				
(2)				
e. OTHER (specify) (1)				
(2)				

C. ELABORATE ON ANY OF THE INFORMATION PROVIDED IN PART B (on front & above) AS NEEDED TO IDENTIFY ADDITIONAL INVESTIGATIVE WORK.

D. ESTIMATED MANHOURS BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES	1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES
a. EPA		b. STATE	
c. EPA CONTRACTOR		d. OTHER (specify)	

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY STRATEGY (On Site & Off-Site): List all emergency actions needed to bring site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of Key Words for each of the actions to be used in the space below.

1. ACTION	2. EST. START DATE (mo,day,&yr)	3. EST. END DATE (mo,day,&yr)	4. ACTION AGENCY (EPA, State, Private Party)	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED
				$	
				$	
				$	
				$	
				$	
				$	

B. LONG TERM STRATEGY (On Site & Off-Site): List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. EST. START DATE (mo,day,&yr)	3. EST. END DATE (mo,day,&yr)	4. ACTION AGENCY (EPA, State Private Party)	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED
				$	
				$	
				$	
				$	
				$	
				$	

C. ESTIMATED MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES	1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES
a. EPA			b. STATE		
c. PRIVATE PARTIES			d. OTHER (specify)		

EPA

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION	SITE NUMBER (to be assigned by Hq)
VI	NM00272

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT COPPER-Chino Mine Division-Santa Rita Mine

B. STREET *(or other identifier)*: S. of Hwy. 90

C. CITY: Santa Rita

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. OWNER/OPERATOR *(if known)*

1. NAME: Kennecott Copper Corp.-David Kinneyburg, Plant Manager

2. TELEPHONE NUMBER: (505)537-3381

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

See Attachment A

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*: New Mexico, EID

K. DATE IDENTIFIED *(mo., day, & yr.)*: 7/10/78

L. PRINCIPAL STATE CONTACT

1. NAME: Jack Ellvinger

2. TELEPHONE NUMBER: (505)827-5271 Ext. 275

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☒ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION

☐ 1. NO ACTION NEEDED *(no hazard)*

☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION

1. NAME: for R. D. Malone / Jairo Guevara

2. TELEPHONE NUMBER: (214)742-4521

3. DATE *(mo., day, & yr.)*: 7/8/81

III. SITE INFORMATION

A. SITE STATUS

☒ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

☐ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify)*: *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES *(specify generator's four-digit SIC Code)*: 1021

C. AREA OF SITE *(in acres)*: 10,240

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 32°47'30"N

2. LONGITUDE *(deg.-min.-sec.)*: 108°04'00"W

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES *(specify)*: Maintenance, equipment and production buildings

REVIEWED BY (GAEGH) DATE 8/13/81

T2070-2 (10-79)

Continue On Reverse

Continued From Front

IV. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
X	1. RAIL	X	1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP	X	2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND	X	4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

There are two creeks which receive discharges from seeps or overflows of ponds during rainfall or equipment malfunctions: a) East of the mine-Lampbright Draw b) West of the mine-Whitewater Creek which is continuation of Santa Rita Creek.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

[ ] 1. UNKNOWN [X] 2. LIQUID [ ] 3. SOLID [ ] 4. SLUDGE [ ] 5. GAS

B. WASTE CHARACTERISTICS

[ ] 1. UNKNOWN [X] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE
[X] 6. TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

[ ] 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

No

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT: None	AMOUNT: None	AMOUNT: None	AMOUNT: Unknown	AMOUNT: 770	AMOUNT: None
UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE: Million Tons	UNIT OF MEASURE:
'X' (1) PAINT, PIGMENTS	'X' (1) OILY WASTES	'X' (1) HALOGENATED SOLVENTS	'X' X (1) ACIDS	'X' (1) FLYASH	'X' (1) LABORATORY PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	(3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	X (6) OTHER (specify): Waste material containing very small amounts of ore. *1978 waste material production 88,000 tons/day.	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			X (10) METALS		
			(11) OTHER (specify)		

 Continue On Page 3

Continued From Page 2

V. WASTE RELATED INFORMATION (continued)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

As, Pb, Cd, Cr, Ni, Se, Be, Cu, Zn, SO4's

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

During dry weather the Lampbright Draw is dry. The Whitewater Creek receives small discharges from seeps in and near the lower dam (basin at the precipitation plant).

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH				
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY		X		Several cases documented in state files. No contamination found during inspection.
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER		X	1976 to 1981	Samples taken by Kennecott from 1976 to 1981 show contamination of (See Attach. A)
8. CONTAMINATION OF SURFACE WATER		X	1976 to 1981	Samples taken by Kennecott show contamination of White (See Attach. A)
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL		X	5/27/81	Soil on Santa Rita Creek, and on Whitewater Creek downstream of mine (See Attach. A)
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS		X		Constant seepage run-off. Overflow of surface impoundment due to equipment (See Attach. A)
17. SEWER, STORM DRAIN PROBLEMS		X		Overflow of surface impoundments due to rainfall.
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				

Continued From Front

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

NM020435

- [X] 1. NPDES PERMIT
- [ ] 2. SPCC PLAN
- [ ] 3. STATE PERMIT *(specify)*: _____
- [ ] 4. AIR PERMITS
- [ ] 5. LOCAL PERMIT
- [ ] 6. RCRA TRANSPORTER
- [ ] 7. RCRA STORER
- [ ] 8. RCRA TREATER
- [ ] 9. RCRA DISPOSER
- [ ] 10. OTHER *(specify)*: _____

B. IN COMPLIANCE?

- [ ] 1. YES
- [ ] 2. NO
- [X] 3. UNKNOWN
- 4. WITH RESPECT TO *(list regulation name & number)*: _____

VIII. PAST REGULATORY ACTIONS

- [X] A. NONE
- [ ] B. YES *(summarize below)*

IX. INSPECTION ACTIVITY *(past or on-going)*

- [X] A. NONE
- [ ] B. YES *(complete items 1,2,3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

X. REMEDIAL ACTIVITY *(past or on-going)*

- [X] A. NONE
- [ ] B. YES *(complete items 1, 2, 3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-2

Corresponding number on form	Additional Remark and/or Explanation
I.i.	A large open copper pit mine with a heap leach operation. The mined copper ore is transported by railroad to the smelter plant 7 miles to the s.w. Recovery of wasted copper from huge finger dumps is eventually made at the precipitation plant and at the launder plant. There are three major surface impoundments designed to contain and recycle the aqueous acid solution used in the wasted copper recovery leach operation.
VI.7.	five residents wells with heavy metals.
VI.8.	water Creek with heavy metals downstream of the mine.
VI.13.	is heavily contamination with heavy metals.
VI.16.	malfunction at lower dam.

EPA IDENTIFICATION AND PRELIMINARY ASSESSMENT

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

REVIEWED BY:

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II (Preliminary Assessment). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT COPPER (Mine Ops.)

B. STREET (or other identifier): S. of Hwy. 90 @ Santa Rita

C. CITY: Santa Rita

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. OWNER/OPERATOR (if known)

1. NAME: Kennecott Copper Corp., Metal Mining

2. TELEPHONE NUMBER: (505) 537-3381

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

A large open pit mine with a heap leach operation with its effluent running down a nearby creek.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)

SIA

K. DATE IDENTIFIED (mo., day, & yr.)

7/10/78

L. PRINCIPAL STATE CONTACT

1. NAME: Jack Ellvinger

2. TELEPHONE NUMBER: (505) 827-5271 Ext 275

II. PRELIMINARY ASSESSMENT (complete this section last)

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION

☐ 1. NO ACTION NEEDED (no hazard)

☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: ?
b. WILL BE PERFORMED BY:

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 4. SITE INSPECTION NEEDED (low priority)

C. PREPARER INFORMATION

1. NAME: Jack Ellvinger

2. TELEPHONE NUMBER: (505) 827-5271 Ext. 275

3. DATE (mo., day, & yr.): 11/25/80

III. SITE INFORMATION

A. SITE STATUS

☒ 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if inactive currently.)

☐ 2. INACTIVE (Those sites which no longer receive wastes.)

☐ 3. OTHER (specify): (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES (specify generator's four-digit SIC Code): 1021

C. AREA OF SITE (in acres)

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE (deg.-min.-sec.): 32 47 30

2. LONGITUDE (deg.-min.-sec.): 108 04 00

E. ARE THERE BUILDINGS ON THE SITE?

☒ 1. NO ☐ 2. YES (number):

TS079-2 (10-77)

Continue On Reverse

Continued From Front

IV. CHARACTERIZATION OF SITE ACTIVI SEE Part E

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

The suspect material is the effluent from an acid/each pile which is moved to a nearby smelter via Whitewater Creek for further copper removal.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

[ ] 1. UNKNOWN [X] 2. LIQUID [ ] 3. SOLID [ ] 4. SLUDGE [ ] 5. GAS

B. WASTE CHARACTERISTICS

[ ] 1. UNKNOWN [X] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE
[X] 6. TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

[ ] 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Possibly process weights will give an indication.

2. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	AMOUNT	AMOUNT	AMOUNT Unknown	AMOUNT	AMOUNT
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER (specify):	(3) CAUSTICS	(3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
(5) OTHER (specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			X (10) METALS		
			(11) OTHER (specify)		

V. WASTE RELATED INFORMATION (cont.)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in order of hazard).

Metals
Corrosives
Salts

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	X			
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY	X			
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	X			
8. CONTAMINATION OF SURFACE WATER	X			
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL				
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify)				

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

- [ ] 1. NPDES PERMIT
- [ ] 2. SPCC PLAN
- [ ] 3. STATE PERMIT (specify):
- [ ] 4. AIR PERMITS
- [ ] 5. LOCAL PERMIT
- [ ] 6. RCRA TRANSPORTER
- [ ] 7. RCRA STORER
- [ ] 8. RCRA TREATER
- [ ] 9. RCRA DISPOSER
- [ ] 10. OTHER (specify): Applicability of NPDES Permit is being Adjudicated.

B. IN COMPLIANCE?

- [ ] 1. YES
- [ ] 2. NO
- [ ] 3. UNKNOWN

C. WITH RESPECT TO (list regulation name & number): NA

VIII. PAST REGULATORY ACTIONS

- [X] A. NONE
- [ ] B. YES (summarize below)

IX. INSPECTION ACTIVITY (past or on-going)

- [X] A. NONE
- [ ] B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

X. REMEDIAL ACTIVITY (past or on-going)

- [X] A. NONE
- [ ] B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment (Section II) information on the first page of this form.

EID 063

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION	REGION VI	SITE NUMBER NM 00272

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME	B. STREET (or other identifier)		
Kennecott Copper (Mine Operation)	S. of Hwy 90 @ Santa Rita		
C. CITY	D. STATE	E. ZIP CODE	F. COUNTY NAME
Santa Rita	NM	88043	Grant

G. OWNER/OPERATOR (if known)

1. NAME	2. TELEPHONE NUMBER
Kennecott Copper Corp., Metal Mining	505 537-3381

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

A large open pit mine with a heap leach operation with its effluent running down a nearby creek.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.)	K. DATE IDENTIFIED (mo., day, & yr.)
SIA	7/10/79

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

Possible contamination of nearby wells with mining wastes.

M. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE (mo., day, & yr.)
Jack Ellvinger	(505)827-5271 Ext. 275	11/25/80

EPA Form 2070-8 (5-80)

02-8107-17

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by Hq)
6	NM00272

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: KENNECOTT COPPER- Chino Mine Division-Santa Rita Mine

B. STREET (or other identifier): South of Hwy. 90

C. CITY: Santa Rita

D. STATE: NM

E. ZIP CODE: 88043

F. COUNTY NAME: Grant

G. SITE OPERATOR INFORMATION

1. NAME: David Kinneyburg, Plant Manager

2. TELEPHONE NUMBER: (505)537-3381

3. STREET: Elgea

4. CITY: Hurley

5. STATE: NM

6. ZIP CODE: 88043

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: Same

2. TELEPHONE NUMBER:

3. CITY:

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION: See Attachment A

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):

B. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☒ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: for Jairo Guevara

2. TELEPHONE NUMBER: (214)742-4521

3. DATE (mo., day, & yr.): 7/10/81

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: Jairo Guevara

2. TITLE: FIT-Chemical Engineer

3. ORGANIZATION: Ecology & Environment, Inc., 1509 Main St., Suite 814 Dallas, TX 75201

4. TELEPHONE NO. (area code & no.): (214)742-4521

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Larry Landry	Ecology & Environment, Inc.	(214)742-4521

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Maurice Madden	Environmental Control Director (505)537-3381	Elgea St. Hurley, NM 88043
Bill Hooks	Environmental Control Engineer (505)537-3381	" "
Dale J. Readel	Health Programmer EID Silver City (505)538-5318	P.O. Box 2575, Silver City NM, 88062
Jack Greber	Project Mgr. (513)782-4700 Pedco Environmental, Inc.	11499 Chester Rd. Cincinnati, OH 45246
Betty Davila	City of Bayard Clerk Treasurer (513)537-3327	City Hall Bayard, NM 88023

REVIEWED BY (6SA-SC): K Sobel

REVIEWED BY (6AEGH) DATE 8/3/81

Continued From Front

III. INSPECTION INFORMATION (continued)

D. GENERATOR INFORMATION (sources of waste)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
Kennecott Copper	(505)537-3381	Elgea St., Hurley, NM 88043	Acid waste-water contaminated with heavy metals

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
Kennecott Copper	(505)537-3381	Elgea St., Hurley, NM 88043	Copper ore and copper recovered from dumps containir heavy metals

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
5/27/81	9:00 am	[X] 1. PERMISSION [ ] 2. WARRANT

J. WEATHER (describe)

Cloudy; 65°F

IV. SAMPLING INFORMATION

A. Mark "X" for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark "X")	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER			
b. SURFACE WATER			
c. WASTE			
d. AIR			
e. RUNOFF	X(1)	EPA Houston Lab 6608 Hornwood Dr., Houston, TX 77074	June 29, 81
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify)			

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
None		

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS

[X] a. GROUND [ ] b. AERIAL

2. PHOTOS IN CUSTODY OF: EPA Region VI (See Attachments)

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS: EPA Region VI (See Attachments B, C & D)

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 32°47'30"N

2. LONGITUDE (deg.-min.-sec.): 108°04'00"W

V. SITE INFORMATION

A. SITE STATUS

[X] 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

[ ] 2. INACTIVE (Those sites which no longer receive wastes.)

[ ] 3. OTHER (specify): _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

[ ] 1. NO [X] 2. YES (specify generator's four-digit SIC Code): 1021

C. AREA OF SITE (in acres): 10,240

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [X] 2. YES (specify): Maintenance, equipment and production buildings

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
X	1. RAIL	X	1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP	X	2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND	X	4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this form.

[ ] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [X] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [X] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [X] 2. SOLID [ ] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[X] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [ ] 4. HIGHLY VOLATILE

[X] 5. TOXIC [ ] 6. REACTIVE [ ] 7. INERT [ ] 8. FLAMMABLE

[ ] 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

Only production records to calculate wastes deposited on mine dumps.

Continued From Front

VII. WASTE RELATED INFORMATION (continued)

1. Estimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	* e. SOLIDS	f. OTHER
AMOUNT: None	AMOUNT: None	AMOUNT: None	AMOUNT: Unknown	AMOUNT: 770	AMOUNT: None
UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE:	UNIT OF MEASURE: Million Tons	UNIT OF MEASURE:
___ (1) PAINT PIGMENTS	X (1) OILY WASTES	___ (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY PHARMACEUT.
___ (2) METALS SLUDGES	___ (2) OTHER (specify):	___ (2) NON-HALOGNTD. SOLVENTS	___ (2) PICKLING LIQUORS	___ (2) ASBESTOS	___ (2) HOSPITAL
___ (3) POTW		___ (3) OTHER (specify):	___ (3) CAUSTICS	___ (3) MILLING/MINE TAILINGS	___ (3) RADIOACTIVE
___ (4) ALUMINUM SLUDGE			___ (4) PESTICIDES	___ (4) FERROUS SMELTING WASTES	___ (4) MUNICIPAL
___ (5) OTHER (specify):			___ (5) DYES/INKS	___ (5) NON-FERROUS SMLTG. WASTES	___ (5) OTHER (specify):
			___ (6) CYANIDE	X (6) OTHER (specify): Waste material containing small amounts of ore. *1978 waste material production (last figure known) 88,000 tons/day.	
			___ (7) PHENOLS		
			___ (8) HALOGENS		
			___ (9) PCB		
			X (10) METALS		
			___ (11) OTHER (specify):		

2. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X') a. SOLID	b. LIQ.	c. GAS FOR	3. TOXICITY (mark 'X') a. HIGH	b. MED.	c. LOW	d. NONE	4. CAS NUMBER	5. AMOUNT	6. UNIT
Arsenic	X			X				7440-38-2	Unknown	
Lead	X	X		X				7439-92-1	"	
Cadmium	X	X		X				7440-43-9	"	
Chromium	X	X		X				7440-47-3	"	
Selenium	X	X		X				7882-49-2	"	
Beryllium	X	X			X			7440-41-7	"	
Nickel	X	X			X			7440-02-0	"	
Molybdenum	X	X				X		7439-98-7	"	
Copper	X	X				X		7440-50-8	"	
Zinc	X	X				X		7440-66-6	"	
Iron	X	X				X		7439-89-6	"	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

___ A. HUMAN HEALTH HAZARDS

Continued From Page 4

VIII. HAZARD DESCRIPTION (continued)

☐ B. NON-WORKER INJURY/EXPOSURE

☐ C. WORKER INJURY/EXPOSURE

☒ D. CONTAMINATION OF WATER SUPPLY

There werefive cases of residential water wells contaminated with heavy metals. (See attachments D, 6-10.) These wells (see attachment D for approximate locations) are located 1-5.5 miles from the site in the area between the mine and the Kennecott smelter plant in Hurley, NM. None of these wells are presently being used as a drinking water supply. The Ward's well (#6 in attachment D), however, is being used to water their livestock (horses).

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER

The major problem with this site is the potential of underground water contamination. The precipitation plant seepage sample collected off-site during this inspection shows metals concentrations which exceed EPA levels in water (see attachments E&F). These metals are arsenic, beryllium, cadmium, chromium, copper, iron, nickel and zinc. The pH (2.8) of the sample collected was very low. The results of this sample analysis is very similar to the results of the sample type of samples collected by Kennecott between 1973 and 1980. These results are shown on attachment G.

☒ G. CONTAMINATION OF SURFACE WATER

There is also surface water contamination in Whitewater Creek downstream from the site. This is evidenced by the analyses results of the sample taken during this inspection. Also, attachment H (#2A, #3, #4, #5, #11 & #12) shows the analyses of samples collected by Kennecott between 1976 and 1981 from the Whitewater Creek downstream from the precipitation plant. As shown in these analyses, the concentrations of arsenic, cadmium, copper, iron, nickel, lead and zinc exceeded the EPA limits for these metals in water. (See Attachment A)

Continued From Front

VIII. HAZARD DESCRIPTION (continued)

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☐ J. CONTAMINATION OF AIR

☐ K. NOTICEABLE ODORS

☒ L. CONTAMINATION OF SOIL

Soil in Whitewater Creek downstream of mine is heavily contaminated with metals. (Photos 1 thru 4 in Kennecott Smelter Plant Report - Hazsit No. NM00779) Soil on Santa Rita Creek where the pregnant copper liquid leaches is also heavily contaminated with metals.

☐ M. PROPERTY DAMAGE

Continued From Page 6

VIII. HAZARD DESCRIPTION (continued)

[ ] N. FIRE OR EXPLOSION

[X] O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Equipment malfunctions and seepages due to geological faults cause flow into Whitewater Creek and Lampbright Draw.

[X] P. SEWER, STORM DRAIN PROBLEMS

Lower dam and dam eight overflow into Whitewater Creek and Lampbright Draw when heavy rain occurs (see photos 13 thru 16). Kennecott is constructing a catching basin downstream of the lower dam. Any seepage going to this basin will be recycled to the reservoir. Basin will be provided with adequate instrumentation. In this way Kennecott plans to eliminate any discharge from the lower dam (precipitation plant).

[ ] Q. EROSION PROBLEMS

[ ] R. INADEQUATE SECURITY

[ ] S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

☒ U. OTHER (specify):

During the inspection it was learned that Kennecott is installing a second mill at the mine to increase production 75% by the spring of 1983. With this unit, a 7 mile pipeline along the Whitewater Creek will be constructed to carry tailing pond slurry from the mine to the present location of the tailing ponds at the smelter plant in Hurley. This pipeline could create another environmental hazard due to potential spills that can occur by breakage of the line.

This inspection was limited by Kennecott's refusal to supply any underground water information. Kennecott claims that Pedco Environmental, Inc., from Cincinnati, OH is the only authorized EPA Contractor to get underground water information. Pedco is presently conducting a long term study on underground water for the EPA Office of Research and Development in Cincinnati, OH. (Contract #68-03-2900), and also a solid waste study for EPA Headquarters in Washington, DC. Under these projects, Pedco is collecting solid-waste and water well samples.

As Pedco Environmental is the EPA National Contractor for studies at the Kennecott mine, it is recommended that they provide EPA Region VI with a profile of samples of Whitewater Creek between the precipitation plant and Lake One, samples of water wells along the same traject of Whitewater Creek and underground water studies from the vicinity of the four waste dumps.

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	1500	1500	400	1 mile
2. IN COMMERCIAL OR INDUSTRIAL AREAS	150	150	10	1 mile
3. IN PUBLICLY TRAVELLED AREAS	1500	1500	0	1 mile
4. PUBLIC USE AREAS (parks, schools, etc.)	600	600	5	1 mile

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
50-100 ft. alluvial aquifer	SW &S	Drinking
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
25-100 gpm (San Vicente Arroyo)	2 miles	SW

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY < 15 CONNECTIONS* ☒ 2. COMMUNITY (specify town): City of Bayard, NM > 15 CONNECTIONS

☐ 3. SURFACE WATER ☒ 4. WELL

 Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

F. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
None				

G. RECEIVING WATER

1. NAME: Mimbres River

2. SEWERS [ ] 3. STREAMS/RIVERS [X]

4. LAKES/RESERVOIRS [ ] 5. OTHER (specify): [X] Closed Basin

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

Irrigation; domestic water supply; high quality cold water fishery; livestock and wildlife watering; secondary contact recreation.

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

[X] A. KNOWN FAULT ZONE [ ] B. KARST ZONE [ ] C. 100-YEAR FLOOD PLAIN [ ] D. WETLAND

[ ] E. A REGULATED FLOODWAY [ ] F. CRITICAL HABITAT [ ] G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
X	1. SAND	X	Shales, sandstones, quartzites		
X	2. CLAY	X	Sills and limestones of the cretaceous age Colorado formation.		
X	3. GRAVEL	X			

XIII. SOIL PERMEABILITY

[ ] A. UNKNOWN [ ] B. VERY HIGH (100,000 to 1000 cm/sec.) [X] C. HIGH (1000 to 10 cm/sec.)

[ ] D. MODERATE (10 to .1 cm/sec.) [ ] E. LOW (.1 to .001 cm/sec.) [ ] F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

[ ] 1. YES [X] 2. NO 3. COMMENTS:

H. DISCHARGE AREA

[ ] 1. YES [X] 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: Varies (10%-60%)

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: S&SW; condition of slope good

J. OTHER GEOLOGICAL DATA

See Attachment A

 Continue On Reverse

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, yr.)	E. EXPIRATION DATE (mo., day, yr.)	F. IN COMPLIANCE (Check "X") 1. YES	2. NO	3. UNKNOWN
NPDES	State	NM020435	7/19/80	7/18/85			X
	(Applicability of NPDES permit is being adjudicated)						

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

X NONE ___ YES (summarize in this space)

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition (*Section II*) information on the first page of this form.

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
SE dumps catching basin (photo 3)

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [ ] NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 200 ft. WIDTH 70 ft. DEPTH 5 ft.

11. CALCULATED VOLUMETRIC CAPACITY
35,000 cubic feet

12. PERCENT OF CAPACITY REMAINING
80%

13. ESTIMATE FREEBOARD
4 ft.

14. SOLIDS DEPOSITION
[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD
None performed

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Dam 8 (photos 6 & 7)

2. STABILITY/CONDITION OF EMBANKMENTS
Good (10 feet dikes)

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [ ] NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 500 ft. WIDTH 100 ft. DEPTH 12-14 ft.

11. CALCULATED VOLUMETRIC CAPACITY
300,000 cubic feet

12. PERCENT OF CAPACITY REMAINING
77%

13. ESTIMATE FREEBOARD
10 ft.

14. SOLIDS DEPOSITION
[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD
None performed

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Lower dam (photo 12)

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☐ YES ☒ NO

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☐ NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

☐ YES ☒ NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH 300 ft. WIDTH 150 ft. DEPTH 35 ft.

11. CALCULATED VOLUMETRIC CAPACITY

12 million gallons

12. PERCENT OF CAPACITY REMAINING

6%

13. ESTIMATE FREEBOARD

2 ft.

14. SOLIDS DEPOSITION

☒ YES ☐ NO

15. DREDGING DISPOSAL METHOD

None performed

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

SURFACE IMPOUI .ENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Dam eight catching basin (photo 10)

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [ ] NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 15 ft. WIDTH 12 ft. DEPTH 4 ft.

11. CALCULATED VOLUMETRIC CAPACITY
720 cubic feet

12. PERCENT OF CAPACITY REMAINING
25%

13. ESTIMATE FREEBOARD
1 ft.

14. SOLIDS DEPOSITION
[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD
None performed

16. OTHER EQUIPMENT

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Lower dam catching basin (photo 14)

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [ ] NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 15 ft. WIDTH 12 ft. DEPTH 10 ft.

11. CALCULATED VOLUMETRIC CAPACITY
1800 cubic feet

12. PERCENT OF CAPACITY REMAINING
80%

13. ESTIMATE FREEBOARD
8 ft.

14. SOLIDS DEPOSITION
[X] YES [ ] NO

15. DREDGING DISPOSAL METHOD
None performed

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

Fresh pond (photo 8)

2. STABILITY/CONDITION OF EMBANKMENTS

Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*

[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

[ ] YES [X] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

[ ] YES [ ] NO N/A

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

[ ] YES [ ] NO N/A

7. IMPOUNDMENT HAS LINER SYSTEM

[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

[ ] YES [ ] NO N/A

7b. FINDINGS

N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE

High permeability

9. MONITORING WELLS

[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH

LENGTH 50 ft. WIDTH 40 ft. DEPTH 8 ft.

11. CALCULATED VOLUMETRIC CAPACITY

16,000 cubic feet

12. PERCENT OF CAPACITY REMAINING

100%

13. ESTIMATE FREEBOARD

8 ft.

14. SOLIDS DEPOSITION

[ ] YES [X] NO

15. DREDGING DISPOSAL METHOD

N/A

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

SURFACE IMPOUNDMENTS SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT
Lampbright Draw Pond (see photo 11)

2. STABILITY/CONDITION OF EMBANKMENTS
Good

3. EVIDENCE OF SITE INSTABILITY *(Erosion, Settling, Sink Holes, etc.)*
[ ] YES [X] NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE
[X] YES [ ] NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT
[X] YES [ ] NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT
[ ] YES [X] NO

7. IMPOUNDMENT HAS LINER SYSTEM
[ ] YES [X] NO

7a. INTEGRITY OF LINER SYSTEM CHECKED
[ ] YES [ ] NO N/A

7b. FINDINGS
N/A

8. SOIL STRUCTURE AND SUBSTRUCTURE
High permeability

9. MONITORING WELLS
[ ] YES [X] NO

10. LENGTH, WIDTH, AND DEPTH
LENGTH 20 ft. WIDTH 12 ft. DEPTH 1.5 ft.

11. CALCULATED VOLUMETRIC CAPACITY
360 cubic feet

12. PERCENT OF CAPACITY REMAINING
67%

13. ESTIMATE FREEBOARD
1 ft.

14. SOLIDS DEPOSITION
[ ] YES [X] NO

15. DREDGING DISPOSAL METHOD
N/A

16. OTHER EQUIPMENT

EPA Form T2070-3C (10-79)

Four Finger Waste Dumps (Photos 1,2,12 & 13)

STORAGE FACILITIES SITE INSPECTION REPORT
(Supplemental Report)

INSTRUCTION
Answer and Explain as Necessary.

1. STORAGE AREA HAS CONTINUOUS IMPERVIOUS BASE
☐ YES ☒ NO

2. STORAGE AREA HAS A CONFINEMENT STRUCTURE
☐ YES ☒ NO

3. EVIDENCE OF LEAKAGE/OVERFLOW *(If "Yes", document where and how much runoff is overflowing or leaking from containment)*
☒ YES ☐ NO
See site description

4. ESTIMATE TYPE AND NUMBER OF BARRELS/CONTAINERS
Four dumps-total area is 1,700 acres, 300 ft. high.

5. GLASS OR PLASTIC STORAGE CONTAINERS USED
☐ YES ☐ NO N/A

6. ESTIMATE NUMBER AND CAPACITY OF STORAGE TANKS
N/A

7. NOTE LABELING ON CONTAINERS
N/A

8. EVIDENCE OF LEAKAGE CORROSION OR BULGING OF BARRELS/CONTAINERS/STORAGE TANKS *(If "Yes", document evidence. Describe location and extent of damage. Take PHOTOGRAPHS)*
☐ YES ☐ NO
N/A

9. DIRECT VENTING OF STORAGE TANKS
☐ YES ☐ NO N/A

10. CONTAINERS HOLDING INCOMPATIBLE SUBSTANCES *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
☐ YES ☐ NO N/A

11. INCOMPATIBLE SUBSTANCES STORED IN CLOSE PROXIMITY *(If "Yes", document evidence. Describe location and identity of hazardous waste. Take PHOTOGRAPHS.)*
☐ YES ☒ NO

12. ADEQUATE CONTAINER WASHING AND REUSE PRACTICES
☐ YES ☐ NO N/A

13. ADEQUATE PRACTICES FOR DISPOSAL OF EMPTY STORAGE CONTAINERS
☐ YES ☐ NO N/A

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
I.i.	A large copper mine with a heap leach operation. The main ores mined are chalcopyrite ($CuFeS_2$) and chalocite Cu_2S. Recovery of wasted copper at the mine is made from huge finger dumps located throughout the mine area. The dump leaching operation begins with the introduction of a sulfuric acid solution containing varying amounts of ferrous and ferric sulfate onto the surface of the dumps for the dissolution of copper minerals. The final recovery of copper is made at the precipitation (photo 12) and launder plants. There are three major surface impoundments which contain the acidic solution after copper is extracted. (See surface impoundments 1-3, supplemental sheets). This solution is recycled to the dumps. Make-up water is added to these impoundments to compensate for the water lost by evaporation. There are four other impoundments (see surface impoundments #4-7, supplemental sheets) which serve to collect overflow rainwater and seepage. Two creeks receive any discharge from the impoundments. The Whitewater Creek, located west of the site, is heavily contaminated with heavy metals. This creek receives discharges from the Tower Dam which impounds the Santa Rita Creek. The Santa Rita Creek receives the leach solutions flow from the west, north and south dumps. On the east side of the mine, the Lampbright Draw receives discharges from Dam Eight. This draw receives the aqueous acid solutions from the southeast (Lampbright) dumps (photo 2). Normally the Lampbright Draw is dry.
VIII.G.	In the comtaminated traject of the Whitewater Creek being discussed, there are two other discharges which are caused by ASARCO and the Bayard sewer plant. Kennecott blames the ASARCO discharge to be the main cause of contamination in the creek. However, data from the Kennecott samples of the ASARCO discharge do not support this claim. On the contrary, the ASARCO discharge sample analysis shows equal or lesser concentrations of metals than the other samples taken in the creek profile (see #2, attachment H).

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-3.

Corresponding number on form	Additional Remark and/or Explanation
(Con't.) VIII.G.	Since the ASARCO discharge, however, also exceeded EPA water limits for several of the metals (Cd, Cu, Ni, Pb and Zn), it is recommended that the ASARCO Groundhog Mine in Santa Rita, NM be inspected at some future date. Based on the analysis of sample results, the Bayard Sewage Plant does not appear to contribute to the heavy metal contamination in Whitewater Creek (see #1 & #5, attachment H). As mentioned in the Kennecott Smelter Plant Report (Hazsit Number NM00779), the Whitewater Creek is impounded by Lake One and no discharge occurs from Lake One unless there is heavy rainfall or an equipment malfunction. When this occurs, the Whitewater Creek eventually discharges into the Mimbres River which is a closed basin.
XIII.J.	At the mine, there are four major locations for potential seepage into the groundwater through the rock and soil types that underlie the area: (1) the north waste dumps, (2) the west waste dumps, (3) the southeast dumps, and (4) the lower dam. At the dumps, there are several local northeast faults which pass through the area. One of the most pronounced faults is along Hanover Creek (west side of site). The Groundhog Fault is the predominant geological structure at the lower dam. The fault crosses Whitewater Creek about 1,000 ft. below the dam (south). The east side of the lower dam abuts into a small landslide which may be a direct result of the dam construction and associate reservoir. Some seepage exists at the downstream toe of the slide.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by HQ)
VI	NM 01783

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: Hanover Creek Mining District

B. STREET (or other identifier): intersection of SR 90 and SR 356

C. CITY: Hanover

D. STATE: NM

E. ZIP CODE: 88041

F. COUNTY NAME: Grant

G. SITE OPERATOR INFORMATION

1. NAME: Sharon Steel Corporation

2. TELEPHONE NUMBER: (505) 537-3391

3. STREET: PO Box 406

4. CITY: Hanover

5. STATE: NM

6. ZIP CODE: 88041

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME: as above;

2. TELEPHONE NUMBER:

3. CITY:

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION

Abandoned copper, lead, zinc mills w/ assoc. bldgs; immense tailings piles in area.

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):

B. APPARENT SERIOUSNESS OF PROBLEM

☒ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: Steven J. Cary

2. TELEPHONE NUMBER: (505) 827-2898

3. DATE (mo., day, & yr.): March 14, 1986

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: Steven J. Cary

2. TITLE: MSCA PA/SI Project Manager

3. ORGANIZATION: New Mexico Environmental Improvement Division

4. TELEPHONE NO. (area code & no.): (505) 827-2898

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Richard A. Rawlings	NM EID, Ground Water & Hazardous Waste Bur.	(505) 827-2911
Rock L. Vendrely	NM EID, Silver City Field Office	(505) 538-5318

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS

Continued From Front

III. INSPECTION INFORMATION (continued)

D. GENERATOR INFORMATION (sources of e)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERATED
generator history is long, complicated, and presently unknown			mill tailings from
			processing of lead,
			zinc, and copper

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORTED
as above			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
10/1/85	0950-1330	XX 1. PERMISSION ☐ 2. WARRANT

J. WEATHER (describe)

IV. SAMPLING INFORMATION

A. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X	Scientific Laboratory Division	
b. SURFACE WATER	X	700 Camino de Salud	
c. WASTE	X	Albuquerque, NM 87103	1/8/85
d. AIR			
e. RUNOFF	X		
f. SPILL			
g. SOIL	X		
h. VEGETATION			
i. OTHER (specify)			

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS: [X] a. GROUND [ ] b. AERIAL
2. PHOTOS IN CUSTODY OF: attached

D. SITE MAPPED?

[XX] YES. SPECIFY LOCATION OF MAPS: USGS Santa Rita Quadrangle; copy attached

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 32-48-42 N
2. LONGITUDE (deg.-min.-sec.): 108-05-00 W

V. SITE INFORMATION

A. SITE STATUS

[ ] 1. ACTIVE (Those inductrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if intrequently.)

[XX] 2. INACTIVE (Those sites which no longer receive wastes.)

[ ] 3. OTHER (specify): _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

[ ] 1. NO [X] 2. YES (specify generator's four-digit SIC Code): 1011, 1021, 1031, 1041, 1094

C. AREA OF SITE (in acres): approx. 500 acres of tailings

D. ARE THERE BUILDINGS ON THE SITE?

[ ] 1. NO [XX] 2. YES (specify): mills, offices, residences, workshops

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL	XX	1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION	X	3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
X	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

[ ] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [ ] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [X] 2. SOLID [ ] 3. SLUDGE [ ] 4. GAS

tailings at one pile were deposited via slurry pipeline

B. WASTE CHARACTERISTICS

[X] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [ ] 4. HIGHLY VOLATILE

[X] 5. TOXIC [ ] 6. REACTIVE [ ] 7. INERT [ ] 8. FLAMMABLE

[ ] 9. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

NO

VII. WASTE RELATED INFORMATION *(continued)*

2. Estimate the amount *(specify unit c* *asure)* of waste by category; mark 'X' to indi which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT at least 2 million	AMOUNT
UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE cubic yards	UNIT OF MEASURE
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY, PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER *(specify)*:	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER *(specify)*:	(3) CAUSTICS	X (3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER *(specify)*:			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER *(specify)*:
			(6) CYANIDE	(6) OTHER *(specify)*:	
			(7) PHENOLS	this is for one pile only	
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER *(specify)*:		

D. LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE *(place in descending order of hazard)*

1. SUBSTANCE	2. FORM *(mark 'X')*			3. TOXICITY *(mark 'X')*				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
lead	X			X				7439921	2 million	tons
copper	X			X				7440508	unknown	
zinc	X			X				7440666	unknown	
arsenic	X			X				7440382	unknown	
cadmium	X			X				7440439	unknown	
mercury	X			X				7439976	unknown	

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

X A. HUMAN HEALTH HAZARDS

Lead concentrations in the tailings are as high as 1070 ppm. At least two piles are unsecured and there is evidence of human activity on the tailings (see photos). The tailings are uncontained and there is potential for contamination of air, soil, surface water and ground water.

Continue On Page 5

Continued From Page 4

VIII. HAZARD DESCRIPTION (continued)

☐ B. NON-WORKER INJURY/EXPOSURE

☐ C. WORKER INJURY/EXPOSURE

☒ D. CONTAMINATION OF WATER SUPPLY

Private domestic wells and public non-community wells along Hanover Crees have been abandoned due to contamination by low pH, several heavy metals, dissolved solids, and nitrates. A community water supply system was constructed to the Hanover Creek area in the early 1980s. As a result, most of the formerly contaminated wells are no longer in use.

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER

Tailings are uncontained and have been placed in the channel of Hanover Creek, where recharge to the alluvial and underlying bedrock aquifer is probable. Wells (shallow) occur throughout the area. Also see D. above.

☒ G. CONTAMINATION OF SURFACE WATER

Tailings occur directly in the channel of Hanover Creek. Other tailings piles are badly eroded by runoff.

Continued From Front

VIII. HAZARD DESCRIPTION *(continued)*

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☒ J. CONTAMINATION OF AIR

Dust blowing from at least one tailings pile impacts nearby residents directly. Fences are almost completely buried by windblown tailings (see photos).

☐ K. NOTICEABLE ODORS

☒ L. CONTAMINATION OF SOIL

Runoff from, and leaching through, the tailings have probably resulted in soil contamination. Also see G. and J. above.

☐ M. PROPERTY DAMAGE

Continued From Page 6

VIII. HAZARD DESCRIPTION (continued)

☐ N. FIRE OR EXPLOSION

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

Runoff has eroded tailings piles, which are uncontained and uncontoured.

☐ P. SEWER, STORM DRAIN PROBLEMS

☒ Q. EROSION PROBLEMS

see O. above.

☒ R. INADEQUATE SECURITY

A caretaker is on-site at one area. However, the tailings are in the creek bed and are legally accessible to the public. There are no physical barriers to public access in most areas. One tailings area is fenced on one side, but the gate is not locked.

☐ S. INCOMPATIBLE WASTES

VIII. HAZARD DESCRIPTION (continued)

☐ T. MIDNIGHT DUMPING

☒ U. OTHER (specify):

Mine workings and spoils are evident throughout the valley. Specific areas highlighted on the attached map are some of the most obvious and menacing piles of mill tailings. The entire Hanover Creek drainage south of Hanover Mountain has probably been affected adversely, including surface water and shallow ground water contamination. Tailings have been disposed in the channel of Hanover Creek. In addition, tailings have been displaced by wind erosion in some areas. Tailings contain several toxic heavy metals in high concentrations, perhaps reflecting the relatively low product recovery efficiencies of turn-of-the-century milling processes.

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	250	250	100	½ mi radius
2. IN COMMERCIAL OR INDUSTRIAL AREAS	50	50	10	½ mi radius
3. IN PUBLICLY TRAVELLED AREAS	500 (250 veh./hr.)			
4. PUBLIC USE AREAS (parks, schools, etc.)	---------			

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
6 - 36 feet	SSW	domestic, drinking, livestock
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
1/5 - 20 gpm	on-site	on-site

G. TYPE OF DRINKING WATER SUPPLY

☐ 1. NON-COMMUNITY (< 15 CONNECTIONS) ☒ 2. COMMUNITY (specify town) Hanover (> 15 CONNECTIONS)

☐ 3. SURFACE WATER ☒ 4. WELL

Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
		see attached table with well records		

I. RECEIVING WATER

1. NAME: Hanover Creek

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

coldwater fishery, irrigation, livestock and wildlife watering, secondary contact recreation.

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☒ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☒ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☒ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
X	1. SAND	X	igneous intrusives (Cret./Tertiary)		
	2. CLAY	X	conglomerate, ss, shale (Cret./Tertiary)		
X	3. GRAVEL	X	limestone and shale (Pennsylvanian)		

XIII. SOIL PERMEABILITY

☒ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☐ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☐ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS: flow in Hanover Creek recharges alluvial/bedrock aquifer

H. DISCHARGE AREA

☐ 1. YES ☒ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE: variable

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.: variable

J. OTHER GEOLOGICAL DATA

Stratigraphy is complex. In valley, shallow thickness of alluvium overlies Cretaceous/Tertiary igneous intrusives, which serve as the principal aquifer. Alluvium bears water, but is undependable in dry season. Igneous rocks were intruded into Pennsylvanian sedimentary strata, chiefly limestones. The sedimentary strata bear water locally.

 Continue On Reverse

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X')		
					1. YES	2. NO	3. UNKNOWN
NA							

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

XX NONE ☐ YES *(summarize in this space)*

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

EPA **POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION**

REGION	SITE NUMBER
VI	NM01783

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

A. SITE NAME
HANOVER CREEK MINING DISTRICT

B. STREET *(or other identifier)*
No. of NM ROUTE 90

C. CITY
FIERO (AND HANOVER)

D. STATE
NM

E. ZIP CODE
~~NONE~~ 88041

F. COUNTY NAME
GRANT 017

G. OWNER/OPERATOR *(if known)*
1. NAME Abandoned mine tailings — no operators
2. TELEPHONE NUMBER —

H. TYPE OF OWNERSHIP *(if known)*
☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION
From 300-500 acres of tailings exist at the headwaters, along hillsides and near publically travelled roads in the district. The mining activities date from the early 1900's. Ore was processed to extract Pb, Zn, & Cu plus other preeious metals. Cyanide extraction processes were probably used.

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*
RCRA 3012

K. DATE IDENTIFIED *(mo., day, & yr.)*
9-28-80

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM
The mine tailings are adjacent to or in ~~cd~~ close proximity to Hanover Creek. Hanover Creek is the primary recharge system for ground waters in the vicinity of Central, Bayard, Hanover and Fiero. Ground water is the primary source of potable water in the area. Suspected contaminants include cyanide, Pb, and other heavy metals. Some of the tailings were used to line water-pipe ditches in the Central area. These tailings were later found to be above EP toxicity levels for heavy metals.

M. PREPARER INFORMATION
1. NAME Robert M. Levy
2. TELEPHONE NUMBER 505/984-0020 ex 362
3. DATE (mo., day, & yr.) 9-28-84

EPA Form 2070-8 (5-80)

EPA

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION	SITE NUMBER (to be assigned by HQ)
VI	NM01783

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: HANOVER CREEK MINING DISTRICT

B. STREET *(or other identifier)*: HANOVER CREEK & STATE ROAD 90

C. CITY: HANOVER - FIERO

D. STATE: NM

E. ZIP CODE: 88062

F. COUNTY NAME: GRANT

G. OWNER/OPERATOR *(if known)*

1. NAME: NONE

2. TELEPHONE NUMBER:

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

The Hanover Creek Mining District was one of the most productive from the late 1880's to the present. Mining included Cu, Pb, Fe ore beneficiation; tailings were simply left along the side of the Creek. Municipalities downstream include Ft Bayard, Bayard, Central, and Hurley.

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*: RCRA 3012

K. DATE IDENTIFIED *(mo., day, & yr.)*:

L. PRINCIPAL STATE CONTACT

1. NAME: ROBERT M. LOWY - NMEID

2. TELEPHONE NUMBER: (505) 984-0020 ex 362

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☒ 5. UNKNOWN

B. RECOMMENDATION

☐ 1. NO ACTION NEEDED *(no hazard)*

☒ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION

1. NAME: ROBERT M. LOWY - NMEID
PO BOX 968
Santa Fe, NM 87504-0968

2. TELEPHONE NUMBER: (505) 984-0020 ex 362

3. DATE *(mo., day, & yr.)*: JAN 16, 1985

III. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if intermittently.)*

☒ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify)*: *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☒ 1. NO ☐ 2. YES *(specify generator's four-digit SIC Code)*:

C. AREA OF SITE *(in acres)*: 48,000 ac (8 sections)

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE *(deg.—min.—sec.)*: 32d 46m 52 dm

2. LONGITUDE *(deg.—min.—sec.)*: 108d 3.5m - 7.5m

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES *(specify)*: 84

Continue On Reverse

Continued From Page 2

V. WASTE RELATED INFORMATION (contin)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

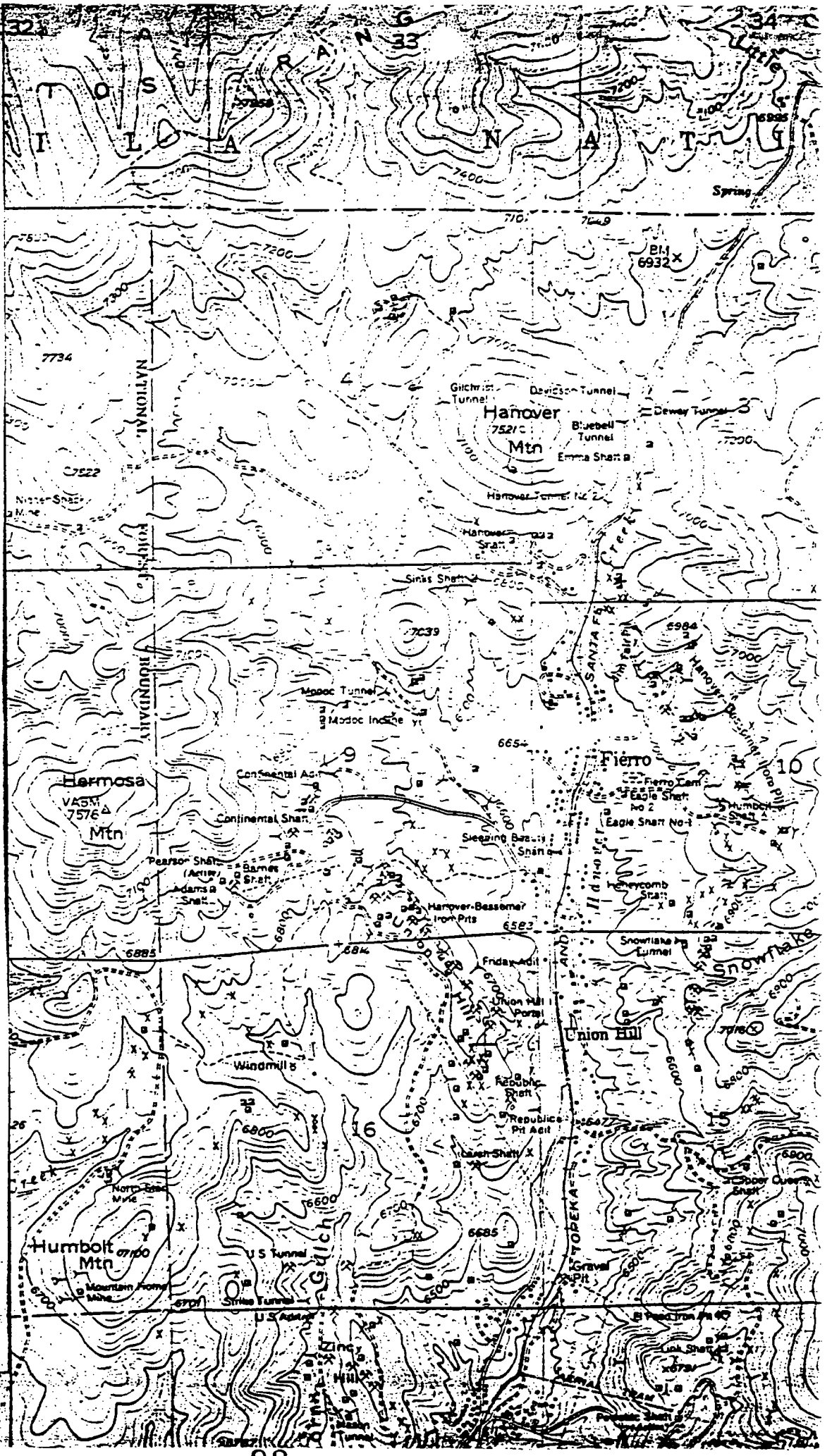
Pb
Cu
Zn
other heavy metals

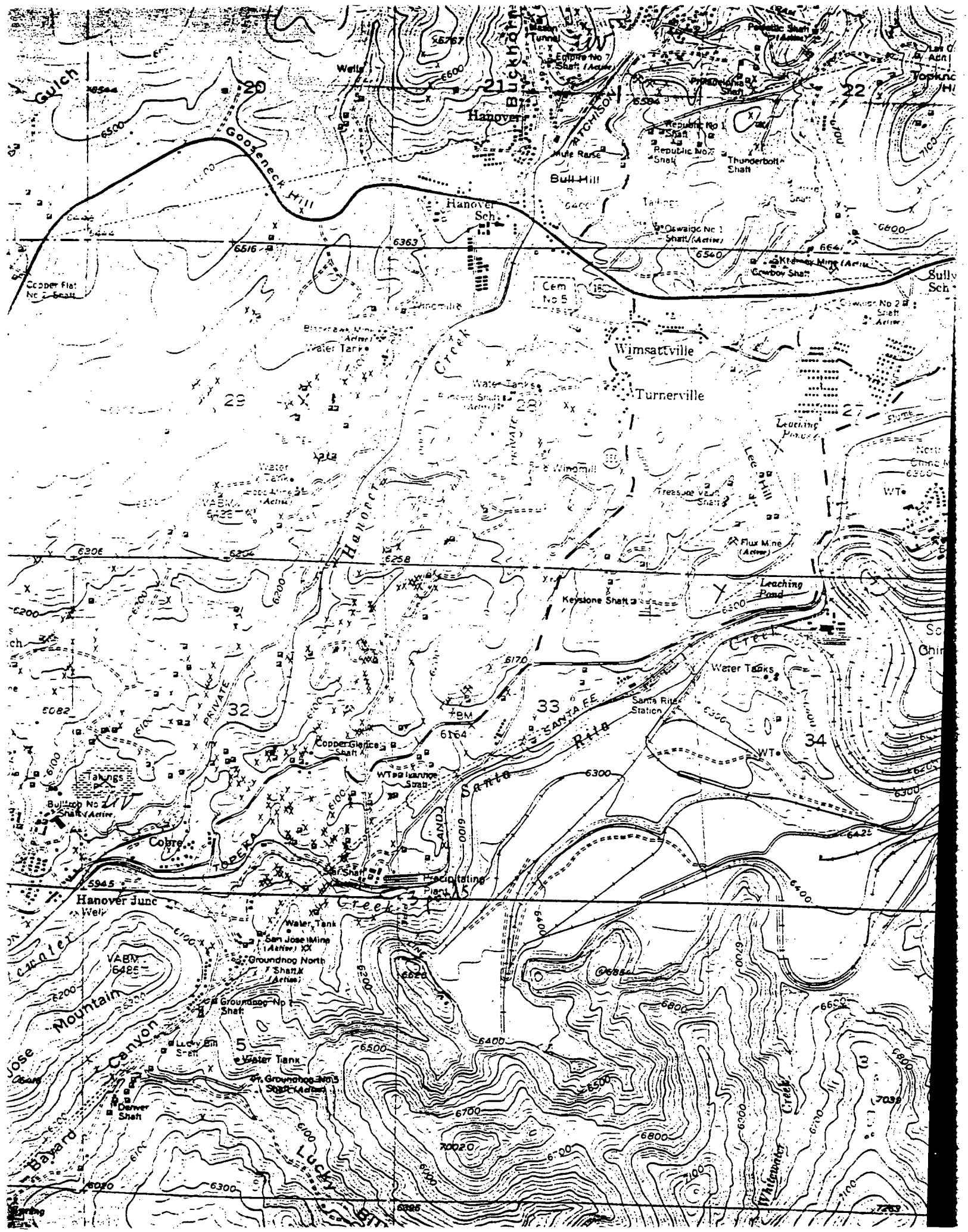
4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

Water supplies for towns of Central + Bayard are from wells. Aquifer is shallow and thin; recharge for wells is largely from Hanover Creek drainage.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH	X			
3. NON-WORKER INJURY/EXPOSURE	X			
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY	X			
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	X			
8. CONTAMINATION OF SURFACE WATER	X			
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL	X			
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				


Hanover
Mtn
Gilchrist Tunnel
Davidson Tunnel
Dewey Tunnel
Bluebell Tunnel
Emma Shaft
Hanover Tunnel No 2
Hanover Shaft
Sinks Shaft
Modoc Tunnel
Modoc Incline
Hermosa
Mtn
Continental Adit
Continental Shaft
Pearson Shaft
Barnes Shaft
Adams Shaft
Sleeping Beauty Shaft
Hanover-Bessemer Iron Pits
Fierro
Fierro Cam
Eagle Shaft No 2
Eagle Shaft No 1
Humbolt Shaft
Honeycomb Shaft
Snowflake Tunnel
Snowflake
Friday Adit
Union Hill Portal
Union Hill
Windmills
Republic Shaft
Republic Pit Adit
Lesh Shaft
Copper Queen Shaft
Humbolt Mtn
Mountain Home Mine
U S Tunnel
Strike Tunnel
Gravel Pit
Zinc Hill
Lost Shaft
Pennsylvania Shaft
Gulch
NATIONAL
MOUNTAIN
SANTA FE
TOPEKA
AND


Gulch
Gooseneck Hill
Hanover
Buckhorn
Bull Hill
Hanover Sch.
Wimsattville
Turnerville
Leaching Pond
Lee Hill
Hanover Creek
Keystone Shaft
Water Tanks
Santa Rita Station
SANTA FE
Santa Rita
Cobre
TOPEKA
Precipitating Plant
Hanover Junc
Water Tank
San Jose Mine
Groundhog North Shaft
Groundhog No 1 Shaft
Lucky Bill Shaft
Water Tank
Groundhog No 3 Shaft
Denver Shaft
Bayard Canyon
Lucky Bill
Whitewater Creek
Copper Flat No 2 Shaft
Cem No 5
Flux Mine
Tailings
Bullfrog No 1 Shaft
Copper Glence Shaft
Wellington Shaft
Mule Raise
Oswaldo No 1 Shaft
Cowboy Shaft
Thunderbolt Shaft
Republic No 1 Shaft
Republic No 2 Shaft
Empire No 7 Shaft
Pyramid Shaft
Pedestal Shaft
Wells
Water Tanks
Windmill
Treasure Vault Shaft
Leaching Pond
Bisbee Mine
Water Tank
VABM 6485
VABM 6426
BM 6164
20
21
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6500
6600
6700
6800
6900
7000
7100
6300
6400
6200
6100
6000
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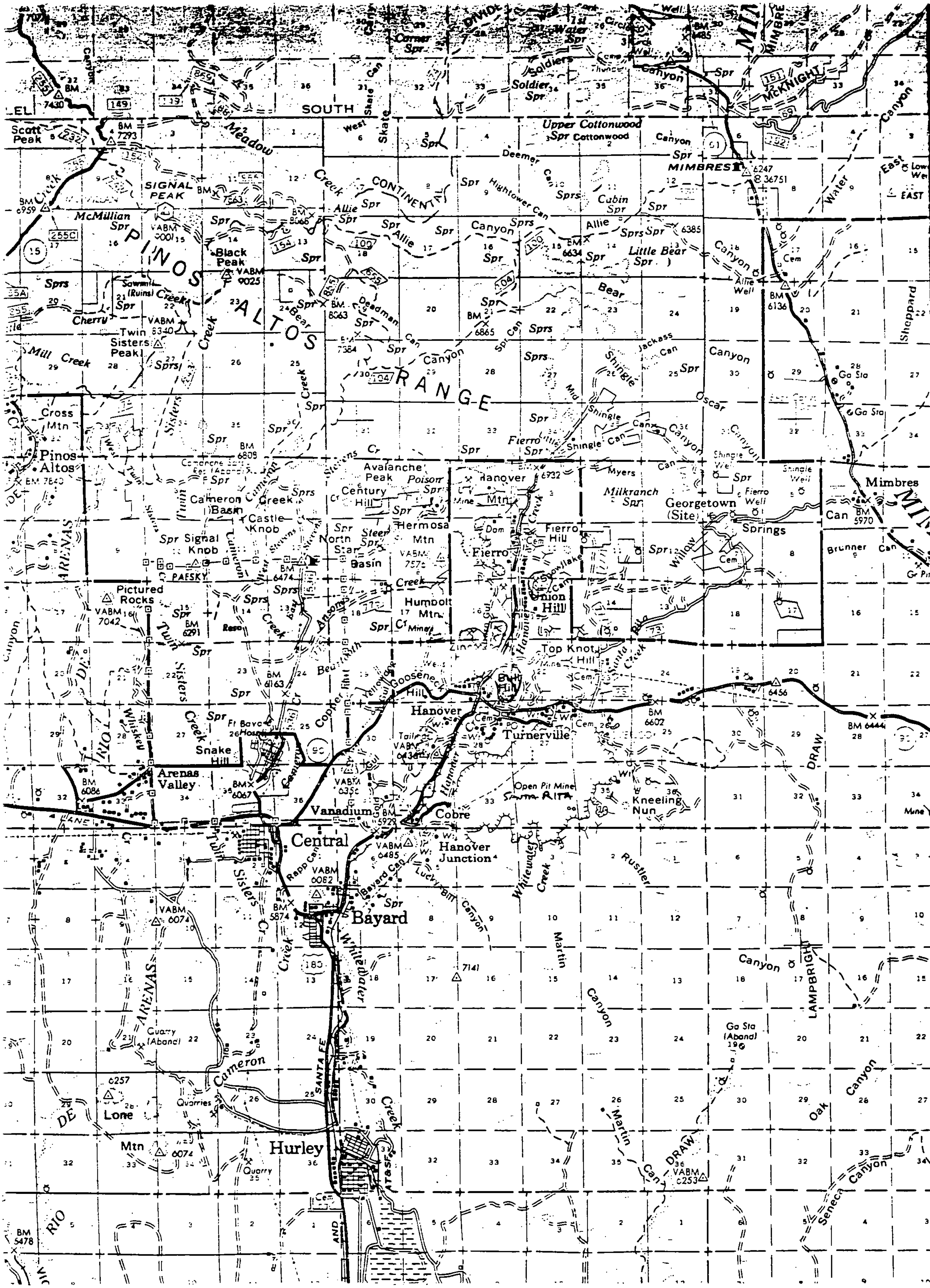
6626
6884
7020
7039
6295



SOUTH
Scott Peak
Meadow
SIGNAL PEAK
McMillian Spr
PINOS ALTOS
Black Peak
CONTINENTAL
Upper Cottonwood Spr
Cottonwood
MIMBRES
Soldier Spr
Allie Spr
Little Bear Spr
Hightower Can
Cabin Spr
Deemer Can
Twin Sisters Peak
Mill Creek
Cherry
RANGE
Deadman Can
Jackass Can
Shingle
Oscar
Cross Mtn
Pinos Altos
Avalanche Peak
Century Hill
Hanover Mtn
Myers
Milkranch Spr
Georgetown (Site)
Mimbres
Springs
Fierro Well
Cameron Creek
Cameron Basin
Castle Knob
Signal Knob
North Star Basin
Hermosa Mtn
Fierro
Fierro Hill
Brunner Can
Sheppard
PAFSKY
Pictured Rocks
Humbolt Mtn
Union Hill
Twin Sisters Creek
Top Knot Hill
Gooseneck Hill
Hanover
Turnerville
Snake Hill
Arenas Valley
Whiskey
Open Pit Mine
SANTA RITA
Kneeling Nun
Vanadium
Cobre
Central
Hanover Junction
Rustler
Whitewater Creek
Bayard
Lucky Bill Canyon
Martin Canyon
LAMPBRIGHT
DRAW
ARENAS
Quarry (Abano)
Go Sta (Aband)
Cameron
Quarries
Lone Mtn
Hurley
SANTA FE
Quarry
Oak Canyon
Seneca Canyon
Martin Can
DRAW
RIO
DE

REFERENCE 11

Excerpts from Discharge Plans
Chino Mines Company

Chino Mines Company
Hurley, New Mexico 88043
505 537-3381

Rec'd from R. Mitzelfelt by technical staff on July 15, 1988

June 30, 1988

HAND DELIVERED

Mr. Richard Mitzelfelt
Deputy Director
N.M. Environmental Improvement Division
P.O. Box 968
Santa Fe, NM 87504-0968

Dear Mr. Mitzelfelt:

Re: Proposed Discharge Plan for Tailing Pond No. 7 (DP-484)

This letter represents Chino Mines Company's (CMC) response to the Division's offer to approve Discharge Plan 484 (the Plan) with certain conditions. We believe the conditions outlined below and the materials submitted with this letter adequately address all items agreed to during our meeting, and CMC hereby requests immediate approval of the Plan for a five-year period.

1. CMC will retain a consultant to conduct a study to determine the feasibility of seepage reduction measures to the sand beach area of the No. 7 Tailing Pond. A report on this investigation will be sent to the EID within 180 days from the date of discharge plan approval.

2. CMC will compile the documentation of the assumptions used in the modeling conducted of seepage flow from the No. 7 Tailing Pond and send this documentation to the EID within 45 days from the date of discharge plan approval.

3. Within 2-1/2 years from the date of discharge plan approval, CMC will install and begin to operate an interceptor well system downgradient of the No. 7 Tailing Pond. A study will be conducted during the first 18 months of discharge plan approval to define the aquifer characteristics and determine the location and configuration of the interceptor well system.

   Each well in the interceptor well system will be started on an individual basis when sulfate levels reach 600 mg/l at the well. A well may be turned off if the sulfate level falls below 600 mg/l and restarted if the sulfate level rises again.

   CMC will pump each well of the interceptor well system until such time that the concentration of sulfate remains below 600 mg/l for 8 consecutive quarters after cessation of tailing deposition on the No. 7

Tailing Pond or until the time that seepage from the No. 7 Tailing Pond will no longer elevate the concentration of sulfate in the groundwater to the standard in the WQCC regulations at the property line as indicated by modeling.

4. Prior to the well installation outlined above but no later than 30 months from the date of discharge plan approval, CMC will model the seepage flow from the No. 7 Tailing Pond in the same manner as has been done during the present period of EID consideration of the proposed discharge plan, except that the sulfate concentration to the model will be the actual sulfate concentration in the No. 7 Tailing Pond decant return water at that time. Also, the seepage rate to the model will be the seepage rate determined by a water balance conducted at the No. 7 Tailing Pond during the period from 24 to 30 months after approval of the discharge plan.

   A report on this modeling will be sent to the EID by 33 months from the date of discharge plan approval. If this modeling continues to show that the seepage from the No. 7 Tailing Pond will not result in a violation of the sulfate standard of 600 mg/l at the property line, CMC will conduct no further modeling.

   If this model indicates that the seepage from the No. 7 Tailing Pond will result in a violation of the sulfate standard at the property line with the operation of the interceptor well system, CMC will immediately begin a study to determine how the sulfate standard will be protected at the property line. A report on this study, if deemed to be necessary, will be sent to the EID by 36 months from the date of discharge plan approval.

5. CMC will comply with all commitments contained in submittals relating to this Plan made to the EID beginning with the original Proposed Discharge Plan dated May 6, 1987, which are integral to the present formulation of this Plan as outlined herein. These submittals are as follows:

05/06/87	Original DP-484
12/15/87	Pump Testing Plan
02/09/87	Well Closure Plan to State Engineer
04/28/88	Letter to Ms. Ardito Containing First Contingency Plan Proposal
05/04/88	Letter to Ms. Ardito Containing Additional Information
06/01/88	Letter to Ms. Ardito Containing Second Contingency Plan Proposal
06/06/88	Letter to Ms. Ardito Containing Supplemental Information

The CMC proposal contained in the June 1, 1988 and June 6, 1988 submittals concerning the net removal of sulfate from the Whitewater Creek drainage has been supplanted by the interceptor well system described above.

6. CMC believes that the 1,500 gpm input to the modeling effort represents a very conservative estimate of that value. The initial modeling efforts conducted by Golder Associates for CMC utilized excessively conservative estimates of tailing pond seepage quantity and quality of 2,000 gpm seepage and 2,000 mg/l sulfate.

   In order to quantify the seepage more accurately, two approaches were utilized. The first was to develop an analytical approach to estimating seepage. The second method was to assume that seepage from Tailing Pond No. 7 will not differ greatly from existing Tailing Pond No. 6 and that water balance calculations could be used to estimate seepage quantities. On the basis of these two methods, we determined that a still conservative yet more appropriate seepage rate of 1,500 gpm should be used with the No. 7 Tailing Pond. Descriptions of the two methods have already been supplied to you.

   CMC instructed Golder Associates to study the seepage contribution from only Tailing Pond No. 7 assuming seepage quality inputs of 2,000 mg/l sulfate. Recent water quality data for Tailing Pond No. 7 decant water indicates that 2,000 mg/l sulfate is a reasonable seepage quality estimate during the time that mine water is treated at the current rate of 800-1,000 gpm.

   Historically, decanted tailing effluent has had sulfate values averaging 1,000 to 1,200 mg/l. In the future, we will treat mine water at a reduced rate currently estimated at 300-400 gpm. Accordingly, the conservative sulfate concentrations input to the model are 2,000 mg/l for the first five years and 1,500 mg/l thereafter. The 1,500 mg/l sulfate level represents a conservative estimate of the quality value, based upon the expected ratio of decant tailing effluent to treated mine water.

   Other assumptions employed in the modeling are:

   1. Seepage quantity inputs from all sources besides Tailing Pond No. 7 were as assumed in Golder's original model.

   2. Seepage quality from sources other than Tailing Pond No. 7 was assumed to be at background sulfate value of 50 mg/l.

   3. For the first five years, seepage inputs in Tailing Pond No. 7 were concentrated along the original Whitewater Creek drainage.

   Using the inputs described above, a modeling exercise was conducted to determine the efficacy of an interceptor/pumpback system. A network of 13 interceptor wells, pumping at 150 gpm each for a total of 1,950 gpm was represented in the model. The system was considered to have begun after five years of pond operation and continued until ten years after cessation of operation. Plate 2 clearly shows the 600 mg/l contour to have nearly disappeared and to be well within the Chino property boundary after 28 years of pumping. We believe, therefore, that we have demonstrated the feasibility of an interceptor well system for preventing the exceedance of standards at the property line from operation of Tailing Pond No. 7. Plate 3 shows the overall view of the sulfate plume after operation of the pumpback system, and Plate 4 is a no-pumping scenario included for comparison.

Plates 3 and 4 show a net benefit to groundwater quality over a 30-year period by comparing groundwater quality with the operation of the No. 7 Tailing Pond and interceptor well system to quality without operation of this Pond and interceptor well system. CMC believes this modeling represents a conservative estimate of the likely results from the operation of Pond No. 7. The actual results may be better than what is shown here. Based upon this information, we believe the Plan is approvable.

7. During the meeting on June 29, 1988, CMC was instructed by the EID to remodel at 30 years utilizing what CMC believes to be an unrealistically conservative seepage rate of 2,000 gpm as an input to the model with all other conditions remaining the same to demonstrate the effect on sulfate concentration flow using this seepage rate. CMC does not believe this shows what realistically could be expected from the operation of Pond No. 7 and submits this information only in accordance with the request of EID. CMC believes that the 1,500 gpm rate outlined in the previous section represents a conservative estimate of the likely seepage. Enclosed as Attachment A to this letter are the results of this modeling using the seepage rate input specified by the EID.

   These results show no violation of the sulfate standard at the property line due to seepage from Tailing Pond No. 7 for 30 years with the use of the interceptor well system previously described. Also shown is that there continues to be a net improvement to the system as more sulfate is removed than is inputted from Tailing Pond No. 7.

   CMC believes that the above described groundwater modeling, which includes the EID specified case analysis, shows that the discharge plan should be approved as per Subsection 3-109.C.2 of the NMWQCC Regulations or that the discharge plan approval will not result in concentrations in excess of the standards of Section 3-103 or the presence of any toxic pollutant listed in Section 1-101.U.U. at any place of withdrawal of water for present or reasonably foreseeable future use.

8. CMC will begin the following groundwater and decant return water monitoring program upon approval of the proposed discharge plan.

   1. Samples of decant return water from Tailing Pond No. 7 will be obtained quarterly during the months of January, April, July, and October by bailing.

   2. Samples of groundwater will be obtained at the following wells during the months of January, April, July, and October by bailing or pumping.

7AD	7FS
7BS	7GS
7BD	7LS
7CS	7MS
7DS	7IS
7KS	7JS
7ES	7NS
7ED	7HS
DM5S	DM19S
DM5D	DM19D
DM10S	DM10D

Wells DM-5 (S&D), DM-10 (S&D), and DM-19 (S&D) are within the No. 7 Tailing Pond area. These wells will be monitored for as long as possible before plugging.

3. The depth to water in all monitor wells will be measured prior to bailing or pumping.

4. The results of the analyses will be sent to the EID upon receipt by CMC.

5. The interceptor wells will be sampled frequently and the samples analyzed for pH, conductivity, and sulfate concentration. This data will be used to operate the interceptor well system. Alternately, continuous reading conductivity meters may be used for this purpose when sulfate concentration can be correlated to conductivity. A report on the operation of the interceptor well system will be sent to the EID on a quarterly basis during the months of January, April, July, and October.

Please contact me if there are any questions or comments on the above information and commitments. Based upon these submissions and our agreement, we look forward to the receipt of your immediate approval of the Plan.

Very truly yours,

D. P. Milovich

D. P. Milovich
Manager

MRK:lgm

Attachments

Received 11/2/88 EEN by Chino

NEW MEXICO
HEALTH AND ENVIRONMENT
DEPARTMENT

ENVIRONMENTAL IMPROVEMENT DIVISION
Harold Runnels Bldg. -1190 St. Francis Drive
Santa Fe, New Mexico 87503

Richard Mitzelfelt
Director

GARREY CARRUTHERS
Governor

CARLA L. MUTH
Secretary

MICHAEL J. BURKHART
Deputy Secretary

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

October 31, 1988

RECEIVED
NOV 08 1988
GROUND WATER BUREAU

D.P. Milovich, Manager
Chino Mines Company
Hurley, NM 88043

RE: Discharge Plan Approval (DP-484)

Dear Mr. Milovich:

This letter confirms that on June 30, 1988 I approved Chino Mines Company's ("CMC") proposed discharge plan (DP-484) for Tailings Pond 7, located at Hurley, Grant County, New Mexico. The approved discharge plan consists of CMC's plan dated May 6, 1987 and the materials dated December 15, 1987, February 9, 1988, April 28, 1988 (excluding contingency plan), May 4, 1988, June 1, 1988 (excluding contingency plan), June 6, 1988, June 15, 1988, June 24, 1988, June 30, 1988 (as clarified/modified herein), and July 1, 1988, submitted as supplements to the discharge plan.

At the time I approved the plan, I stated that the conditions relating to that approval would follow. In addition to confirming my approval of the plan, this letter serves as your notice of those conditions. In general, those conditions are clarifications/modifications to the CMC letter of June 30, 1988 and are described below.

(?) 1. Confusion and disagreement exist between the CMC's June 30, 1988 letter and its verbal commitments made on June 29, 1988 and earlier. The final location of monitor wells must be negotiated between CMC and EID technical staff. Therefore, my approval of DP-484 is conditioned on CMC and EID reaching agreement within thirty (30) days of the date of this letter on the number, specifications, and placement of monitoring wells. The monitoring wells shall be sufficient in number and properly constructed, placed and maintained to identify the effects, to the extent technically feasible, on ambient ground water quality of discharges authorized by DP-484 and the accuracy of the modeling submitted by CMC in support of DP-484.

2. Within thirty (30) days of the date of this letter, CMC shall submit to EID the name of the consultant hired by CMC for the seepage study addressed in Item 1 of the June 30, 1988 letter and a copy of the study's scope. The thirty day requirement is necessary in order to meet the 180-day deadline for completion of the study. The EID will review the proposed scope of study and will comment on its adequacy for meeting the intent of Item 1. The EID will provide its comments within thirty (30) days after receipt of the scope of study.

3. EID staff, on July 15, 1988, observed seepage/flow from the starter dam drain blanket at Tailings Pond 7. As soon as possible, but no later than thirty (30) days of the date of this letter, CMC shall provide a plan to the EID for completely capturing and handling this flow.

4. To fulfull and supplement the commitments in Item 2 of CMC's June 30, 1988 letter, within thirty (30) days of the date of this letter, CMC shall submit hard copies of computer input and output for the modeling studies upon which this approval is based, including Tailings Pond 6 and other sources; Tailings Pond 7, at a seepage rate of 1500 gpm, plus Pond 6 and other sources; and Tailings Pond 7, at a seepage rate of 2000 gpm, plus Pond 6 and other sources.

5. With reference to Item 3 of CMC's letter, CMC shall submit the name of the consultant which has been contracted for the study of the interceptor well system and a copy of the scope of study. EID will review the scope of study and will comment on its adequacy. The study must consider the need for methods, such as monitor wells or geophysical techniques, to ensure that the system is designed and operated properly. The study shall also consider the need for the installation of continuous reading, water-level measurement devices on the recovery wells. In order to meet the 15-month deadline of February 1, 1990, the scope of study shall be submitted to the EID by February 1, 1989. EID will provide its comments within thirty (30) days of receipt of the scope of study. These deadlines are necessary due to the time that has already elapsed in the development of this letter.

6. With reference to paragraph 3 of Item 3 of CMC's June 30, 1988 letter, cessation of the interceptor well pumping must be based on accumulated data and must be approved by EID, prior to such cessation.

7. With reference to Item 4 in the CMC letter, it is important that the best possible estimates of seepage rate be obtained using the proposed water balance calculations. In this regard, a rain gauge and an evaporation pan utilizing decant water must be operated and maintained at the site for use in calculating the water balance. Additionally, to obtain the best possible estimates of water quality for the seepage, a horizontal seepage collection device shall be

installed at the bottom of Tailings Pond 7. If CMC considers this to be infeasible, CMC must demonstrate such infeasibility in writing. CMC shall provide a written response to EID concerning these matters within thirty (30) days after the date of this letter.

8. CMC may only discharge treated mine water (neutralized to a pH at or above 9.0) in the quantities proposed in its June 30, 1988 letter into Tailings Pond 7. The authorization to dispose of mine water into Pond 7 may be re-evaluated by the Division as a result of ongoing studies and evaluations by CMC and EID with respect to the treatment of mine water.

9. With reference to Item 8 of the CMC June 30, 1988 letter, the monitoring shall be as described on the attached discharge plan summary.

The deadlines specified in paragraphs 1-7 above, may be extended upon a showing by CMC that it was unable to meet the deadline because of conditions beyond CMC's control. A request for such an extension must be submitted in writing, before the expiration of the referenced deadline and must fully explain the reasons for the extension and shall propose a new deadline.

The conditions stated above are necessary in order to assure that ground water at places of present or reasonably foreseeable future use is protected and will not exceed the water quality standards contained in WQCC Reg. 3-103. The conditions relating to effluent and ambient monitoring, and the number, design and construction of monitoring and interceptor wells are particularly important because of the nature of the evidence supporting the approvability of the discharge plan.

My determination that the discharge from Pond 7 "will not result in either concentrations in excess of the standards of Section 3-103 or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use," WQCC Reg. 3-109.C.2, is based on modeling submitted by CMC which considered the effect of discharges from Pond 7, assuming an interceptor well system and discharge, in accordance with other approved discharge plans, on the present and future quality of ground water. I found it persuasive that the approval of the proposed discharge plan for Pond 7, including an interceptor well system, will not cause an increase in concentration or areal extent of ground water contamination at the site. The monitoring wells and additional monitoring and data analysis is necessary to evaluate the validity of the modeling analysis and to prevent the resultant ground water contamination if the modeling is found to be invalid.

Further, as a result of that modeling, I am concerned that significant ground water impacts are resulting and will result from the approved discharge plan for Pond 6. As a result, I have asked Stuart Castle, Chief of the EID's Ground Water Bureau, to evaluate the approved discharge plan for Pond 6 and, if necessary, initiate action to modify that plan to assure ground water quality is protected.

The monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet(s). Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with those requirements.

The discharge plan was submitted pursuant to WQCC Reg. 3-106 and is approved pursuant to WQCC Reg. 3-109. Please note WQCC Reg. 3-109.E. and F. provide for possible future amendment of the plan. Pursuant to WQCC Reg. 3-109.G.4., this plan approval is for a period of five (5) years and thus, will expire June 30, 1993. CMC should submit an application for new approval in ample time before that date.

The approval of this plan does not relieve CMC of liability should CMC's operation result in actual pollution of surface or ground waters which may be actionable under other laws and/or regulations. Further, approval of this ground-water discharge plan does not relieve CMC the responsibility to comply with any other applicable local laws and regulations, such as zoning requirements and nuisance ordinances.

Please note that WQCC Reg. 3-104 requires that "discharges must be consistent with the terms and conditions of the [approved discharge] plan." Also, please be aware that in this discharge plan CMC has made commitments which are legally enforceable under the New Mexico Water Quality Act (Sections 74-6-1 to 74-6-13 NMSA 1978). These include constructing all aspects of your installation as designed, properly installing any required monitor wells in the prescribed locations and completely fulfilling any required monitoring commitments on schedule. CMC may be fined should it not fulfill these commitments.

If CMC is dissatisfied with the action taken by the Division, it may file a petition for hearing before the Commission. Pursuant to Section 74-6-5.K, NMSA 1978 and WQCC Reg. 3-112, the petition must be made in writing to the Director within thirty (30) days after CMC has received this letter. Unless a timely request for hearing is made, the Division's decision shall be final.

Sincerely,

Richard Mitzelfelt
Director

RM:lr

Enclosures

cc: Jon F. Thompson, Deputy Director for Community Protection
Stuart Castle, Chief, Ground Water Bureau
Ken Smith, EID District III Manager, Las Cruces
Mike Koranda, Phelps Dodge, Tyrone Branch
Steve Cary, EID Superfund Section, Santa Fe
Louis W. Rose, Deputy General Counsel, HED
Scott Crozier, Phelps Dodge, Phoenix

GROUND WATER SECTION
Environmental Improvement Division
Health and Environment Department
Santa Fe, N.M. 87503
Phone: (505) 827-2900

Summary of Discharge Plan

October 26, 1988

DP number: 484 Facility name: CHINO MINES CO. - POND 7
Alternate name: PHELPS DODGE
Type of facility: MINING-COPPER-TAILINGS
Means of discharge: TAILINGS

County: GRANT EID District 3 T19S, R12W, Sec. 16.000
Location: NEAR SILVER CITY Nearest city: HURLEY

	Responsible person:	Contact or consultant person:
	D. P. MILOVICH	TIM OLIVER
Title:	MANAGER	ENVIRONMENTAL SUPERVISOR
Address:	CHINO MINES COMPANY	CHINO MINES COMPANY
City, zip:	HURLEY NM 88043-	HURLEY NM 88043-
Phone:	505-537-3381	505-537-3381

The Ground Water Section staff reviewer is CYNTHIA ARDITO.
The plan was received 05/08/87 and Public Notice published 06/05/87.
The plan was approved 06/30/88 and expires 06/30/93.
(Application for renewal should be submitted in ample time before expiration.)

Monitoring Requirements summary

No. of monitoring reports required annually: 4
Monitoring reports are due no later than July 30, April 30, January 30, and October 30 of each year.

Sampling required	Annual freq.	# of sites	Comments, description
Water levels:	4	35	MONITOR WELLS AND RECOVERY WELLS
Disch. vols:	12	15	MONTHLY CUMUL. AMOUNTS DISCHARGE, DECANT, 13 WELLS
Major ions:	4	38	MONITOR WELLS, RECOVERY WELLS, DECANT, SEEPAGE,P3A
Heavy metals:	4	38	MONITOR WELLS, RECOVERY WELLS, DECANT, SEEPAGE,P3A
N Species:	0	0	
Organics:	0	0	
Other:			WATER BALANCE CALCULATIONS (see page 2 of summary)

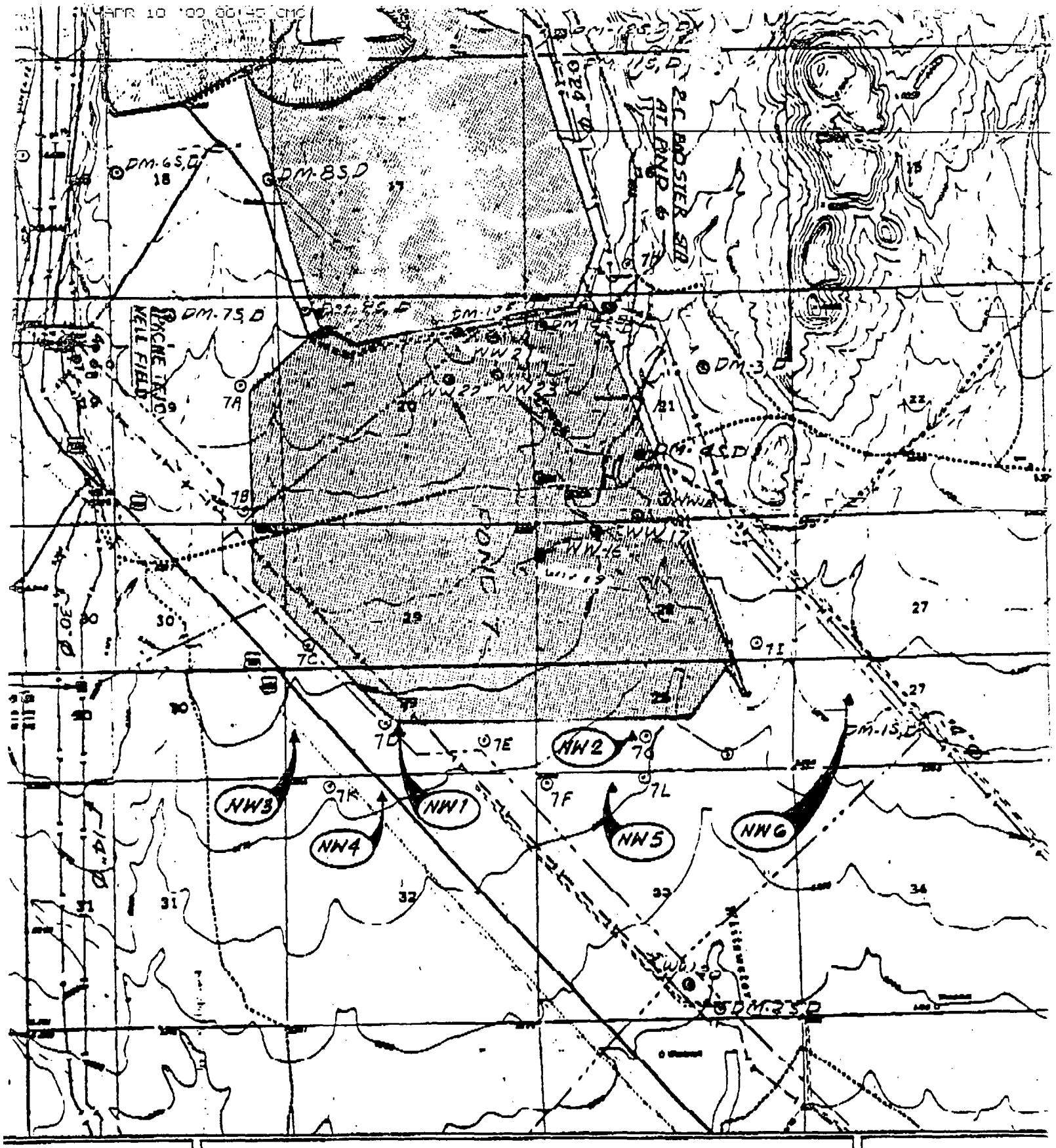
✓ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet.
Any inadvertent omission from this summary does not relieve the discharger of responsibility for compliance with that requirement.
Send monitoring reports to the address at top, "Attention: CYNTHIA ARDITO, re: DP-484".

Attachment to Discharge Plan Summary

Monitoring Requirements:

DP- 484 Facility name: Chino Mines Co. Pond #7

Sampling site or ID	Parameter(s)	Date due
Monitor Wells and Recovery Wells	Continuous reading W.L.to be installed on all thirteen recovery wells	Jan., April, July, Oct.
Discharge, Decant, Recovery Wells	Monthly cumulative amounts of water to tailings lines, decant return, and recovery wells must have totalizing flow meters on each	Jan., April July, Oct.
Monitor Wells, Recovery Wells, Decant, Seepage, P3A	Field pH and Conductivity, Ca, Mg, K, Na, HCO3-CO3, SO4, Cl, TDS P3A = piezometer	Jan., April, July, Oct.
Monitor Wells, Recovery Wells, Decant, Seepage, P3A	Cu, Mn, Ni, Cr, Cd, Mo, Pb, Se, Zn (Lab must have detection limit at or below standards)	Jan., April, July, Oct.
Water Balance Calculations	During a period of 6 to 30 months after approval of the Discharge Plan and quarterly thereafter	



SCALE:
1" = APPROX.
1/2 MILE

SITE PLAN
WELL LOCATION

CHINO
MINES
COMPANY
FIGURE 2

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 004515-08
Clnt Smp:
Descript: WATER
Location: 7FS
Samp D/T: 06/09/90
Sampler.: B. PLACENIDO/M. SANCHEZ
Trans By: U.P.S.
Recvd By: G. GUIDO
Date Rcv: 06/19/90
Date Rpt: 06/30/90

Analysis			MDL	Results
401	ALK	ALKALINITY		51
33.076	HCO3	BICARBONATE		102
213.1	Cd	CADMIUM		103
215.1	Ca	CALCIUM		85.1
33.076C	CO3	CARBONATE		<4
325.3	Cl	CHLORIDE		36
218.3	Cr(T)	CHROMIUM (TOTAL)		0.019
220.1	Cu	COPPER		0.009
239.1	Pb	LEAD		<0.02
242.1	Mg	MAGNESIUM		11.8
243.1	Mn	MANGANESE		0.002
246.1	Mo	MOLYBDENUM		0.007
249.1	Ni	NICKEL		<0.004
258.1	K	POTASSIUM		3.4
270.3	Se	SELENIUM		<0.005
273.1	Na	SODIUM		20.6
375.4	SO4	SULFATE		170
160.1	TDS	TOTAL DISSOLVED SOLIDS		519

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
MDL is the Method Detection Limit.

Analyst(s)

3441 East Milber St. Tucson, AZ 85714
Phoenix 602-866-3110
Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 004515-08
Clnt Smp:
Descript: WATER
Location: 7FS
Samp D/T: 06/09/90
Sampler.: B. PLACENIDO/M. SANCHEZ
Trans By: U.P.S.
Recvd By: G. GUIDO
Date Rcv: 06/19/90
Date Rpt: 06/30/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.012

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

OCD R. COPY

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 003881-19
Clnt Smp:
Descript: WATER
Location: 7GS
Samp D/T: 04/11/90
Sampler.: CLIENT
Trans By: EMERY WORLDWIDE
Recvd By: G. GUIDO
Date Rcv: 04/16/90
Date Rpt: 04/27/90

Analysis			MDL	Results
401	ALK	ALKALINITY		61
33.076	HCO3	BICARBONATE		99.8
213.1	Cd	CADMIUM		0.009
215.1	Ca	CALCIUM		805
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		94
218.3	Cr(T)	CHROMIUM (TOTAL)		<0.002
220.1	Cu	COPPER		0.14
239.1	Pb	LEAD		<0.02
242.1	Mg	MAGNESIUM		73
243.1	Mn	MANGANESE		0.006
246.1	Mo	MOLYBDENUM		0.076
249.1	Ni	NICKEL		0.033
258.1	K	POTASSIUM		5.7
270.3	Se	SELENIUM		<0.005
273.1	Na	SODIUM		31
375.4	SO4	SULFATE		2040
160.1	TDS	TOTAL DISSOLVED SOLIDS		3170

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 003881-19
Clnt Smp:
Descript: WATER
Location: 7GS
Samp D/T: 04/11/90
Sampler.: CLIENT
Trans By: EMERY WORLDWIDE
Recvd By: G. GUIDO
Date Rcv: 04/16/90
Date Rpt: 04/27/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.55

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
MDL is the Method Detection Limit.

Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 003881-26
Clnt Smp:
Descript: WATER
Location: DM-10S
Samp D/T: 04/10/90
Sampler.: CLIENT
Trans By: EMERY WORLDWIDE
Recvd By: G. GUIDO
Date Rcv: 04/16/90
Date Rpt: 04/27/90

Analysis			MDL	Results
401	ALK	ALKALINITY		74
33.076	HCO3	BICARBONATE		90
213.1	Cd	CADMIUM		0.006
215.1	Ca	CALCIUM		399
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		113
218.3	Cr(T)	CHROMIUM (TOTAL)		<0.002
220.1	Cu	COPPER		0.116
239.1	Pb	LEAD		<0.02
242.1	Mg	MAGNESIUM		47.5
243.1	Mn	MANGANESE		0.09
246.1	Mo	MOLYBDENUM		0.049
249.1	Ni	NICKEL		0.025
258.1	K	POTASSIUM		6.4
270.3	Se	SELENIUM		0.005
273.1	Na	SODIUM		31.5
375.4	SO4	SULFATE		1065
160.1	TDS	TOTAL DISSOLVED SOLIDS		1820

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 003881-26
Clnt Smp:
Descript: WATER
Location: DM-10S
Samp D/T: 04/10/90
Sampler.: CLIENT
Trans By: EMERY WORLDWIDE
Recvd By: G. GUIDO
Date Rcv: 04/16/90
Date Rpt: 04/27/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.04

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-05
Clnt Smp:
Descript: WATER SAMPLE
Location: 7DS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
401	ALK	ALKALINITY		42
33.076	HCO3	BICARBONATE		141
213.1	Cd	CADMIUM		0.005
215.1	Ca	CALCIUM		123
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		54.1
218.3	Cr(T)	CHROMIUM (TOTAL)		0.06
220.1	Cu	COPPER		<0.004
239.1	Pb	LEAD		0.029
242.1	Mg	MAGNESIUM		37.5
243.1	Mn	MANGANESE		<0.0004
246.1	Mo	MOLYBDENUM		0.06
249.1	Ni	NICKEL		0.03
258.1	K	POTASSIUM		5.50
270.3	Se	SELENIUM		<0.005
373.1	Na	SODIUM		67.2
375.4	SO4	SULFATE		420
160.1	TDS	TOTAL DISSOLVED SOLIDS		897

Comments:
All units are MG/L unless otherwise specified.
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MDL is the Method Detection Limit.

Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110 Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-05
Clnt Smp:
Descript: WATER SAMPLE
Location: 7DS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.03

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION

Sample..: 002936-07
Clnt Smp:
Descript: WATER SAMPLE
Location: 7ED
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
401	ALK	ALKALINITY		74.1
33.076	HCO3	BICARBONATE		188
213.1	Cd	CADMIUM		0.005
215.1	Ca	CALCIUM		38.3
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		6.4
218.3	Cr(T)	CHROMIUM (TOTAL)		0.051
220.1	Cu	COPPER		0.10
239.1	Pb	LEAD		0.03
242.1	Mg	MAGNESIUM		13.8
243.1	Mn	MANGANESE		0.006
246.1	Mo	MOLYBDENUM		0.06
249.1	Ni	NICKEL		0.04
258.1	K	POTASSIUM		4.04
270.3	Se	SELENIUM		<0.005
373.1	Na	SODIUM		28.4
375.4	SO4	SULFATE		45.6
160.1	TDS	TOTAL DISSOLVED SOLIDS		262

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110 Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-07
Clnt Smp:
Descript: WATER SAMPLE
Location: 7ED
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.02

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
MDL is the Method Detection Limit.

Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-08
Clnt Smp:
Descript: WATER SAMPLE
Location: 7FS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
401	ALK	ALKALINITY		32.5
33.076	HCO3	BICARBONATE		141
213.1	Cd	CADMIUM		0.005
215.1	Ca	CALCIUM		95.6
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		18.1
218.3	Cr(T)	CHROMIUM (TOTAL)		0.05
220.1	Cu	COPPER		0.01
239.1	Pb	LEAD		0.035
242.1	Mg	MAGNESIUM		15
243.1	Mn	MANGANESE		<0.0004
246.1	Mo	MOLYBDENUM		<0.04
249.1	Ni	NICKEL		<0.03
258.1	K	POTASSIUM		2.28
270.3	Se	SELENIUM		<0.005
373.1	Na	SODIUM		17.4
375.4	SO4	SULFATE		170
160.1	TDS	TOTAL DISSOLVED SOLIDS		450

Comments:
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110

Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-08
Clnt Smp:
Descript: WATER SAMPLE
Location: 7FS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.02

Comments:
All units are MG/L unless otherwise specified.
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-09
Clnt Smp:
Descript: WATER SAMPLE
Location: 7GS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
401	ALK	ALKALINITY		38.1
33.076	HCO3	BICARBONATE		118
213.1	Cd	CADMIUM		0.007
215.1	Ca	CALCIUM		760
33.076C	CO3	CARBONATE		<4.0
325.3	Cl	CHLORIDE		39.6
218.3	Cr(T)	CHROMIUM (TOTAL)		0.08
220.1	Cu	COPPER		0.145
239.1	Pb	LEAD		0.07
242.1	Mg	MAGNESIUM		81
243.1	Mn	MANGANESE		0.009
246.1	Mo	MOLYBDENUM		0.07
249.1	Ni	NICKEL		0.05
258.1	K	POTASSIUM		3.74
270.3	Se	SELENIUM		<0.005
373.1	Na	SODIUM		26.5
375.4	SO4	SULFATE		1880
160.1	TDS	TOTAL DISSOLVED SOLIDS		3180

Comments:
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110 Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 215945

SAMPLE INFORMATION
Sample..: 002936-09
Clnt Smp:
Descript: WATER SAMPLE
Location: 7GS
Samp D/T: 01/09/90
Sampler.: J. HUMPHREY
Trans By: J. HUNPHREY
Recvd By: K. JACKSON
Date Rcv: 01/11/90
Date Rpt: 01/26/90

Analysis			MDL	Results
289.1	Zn	ZINC		0.53

Comments:
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110

Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 006230-02
Clnt Smp:
Descript: WATER
Location: NW-6
Samp D/T: 12/19/90
Sampler.: B. PLACENCIO
Trans By: UPS
Recvd By: L. STALLARD
Date Rcv: 12/21/90
Date Rpt: 01/04/91

Analysis			MDL	Results
310.2	ALK	ALKALINITY		86.2
33.076	HCO3	BICARBONATE		<4.0
213.1	Cd	CADMIUM		<0.0007
215.1	Ca	CALCIUM		2.78
33.076C	CO3	CARBONATE		59.5
325.2	Cl	CHLORIDE		15.2
218.3	Cr(T)	CHROMIUM (TOTAL)		0.007
220.1	Cu	COPPER		0.020
340.2	F	FLUORIDE		1.2
236.1	Fe	IRON		0.030
239.1	Pb	LEAD		<0.02
242.1	Mg	MAGNESIUM		0.369
243.1	Mn	MANGANESE		0.001
246.1	Mo	MOLYBDENUM		0.016
249.1	Ni	NICKEL		<0.004
258.1	K	POTASSIUM		8.5
273.1	Na	SODIUM		69.1
375.4	SO4	SULFATE		39.5

Comments:
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Analyst(s)

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 006230-02
Clnt Smp:
Descript: WATER
Location: NW-6
Samp D/T: 12/19/90
Sampler.: B. PLACENCIO
Trans By: UPS
Recvd By: L. STALLARD
Date Rcv: 12/21/90
Date Rpt: 01/04/91

Analysis			MDL	Results
160.1	TDS	TOTAL DISSOLVED SOLIDS		256
289.1	Zn	ZINC		0.005

Comments:
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714
Phoenix: 602 866 3110
Tucson: 602 889 5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 006206-04
Clnt Smp:
Descript: WATER
Location: 7JS
Samp D/T: 12/17/90
Sampler.: B. PLACENCIO
Trans By: UPS
Recvd By: L. STALLARD
Date Rcv: 12/20/90
Date Rpt: 01/03/91

Analysis			MDL	Results
310.2	ALK	ALKALINITY		83.9
33.076	HCO3	BICARBONATE		<4.0
213.1	Cd	CADMIUM		<0.0007
215.1	Ca	CALCIUM		17.9
33.076C	CO3	CARBONATE		59.5
325.2	Cl	CHLORIDE		16.8
218.3	Cr(T)	CHROMIUM (TOTAL)		0.003
220.1	Cu	COPPER		0.020
340.2	F	FLUORIDE		1.1
236.1	Fe	IRON		0.030
239.1	Pb	LEAD		<0.02
242.1	Mg	MAGNESIUM		0.474
243.1	Mn	MANGANESE		0.030
246.1	Mo	MOLYBDENUM		0.003
249.1	Ni	NICKEL		0.004
258.1	K	POTASSIUM		8.0
273.1	Na	SODIUM		46.0
375.4	SO4	SULFATE		22.4

Comments:
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Analyst(s)

3441 East Milber St. Tucson, AZ 85714
Phoenix 602-866-3110
Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN.: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 242179

SAMPLE INFORMATION
Sample..: 006206-04
Clnt Smp:
Descript: WATER
Location: 7JS
Samp D/T: 12/17/90
Sampler.: B. PLACENCIO
Trans By: UPS
Recvd By: L. STALLARD
Date Rcv: 12/20/90
Date Rpt: 01/03/91

Analysis			MDL	Results
160.1	TDS	TOTAL DISSOLVED SOLIDS		210
289.1	Zn	ZINC		0.020

Comments:
All units are MG/L unless otherwise specified.
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MDL is the Method Detection Limit.

Analyst(s)

3441 East Milber St. Tucson, AZ 85714

Phoenix 602-866-3110

Tucson 602-889-5787

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 284825

SAMPLE INFORMATION
Sample..: 011614-20
Clnt Smp: [illegible]
Descript: WATER
Location: 7GS
Samp D/T: 06/19/92
Sampler.: J. BELANGER/B. PLACENIO
Trans By: UPS
Recvd By: B. LUNDT
Date Rcv: 06/23/92
Date Rpt: 07/03/92

Analysis		MCL	Results	Date
310.2	ALKALINITY		172	06/24/92
33.076	BICARBONATE		192	06/25/92
CD200.7	CADMIUM		<0.0007	07/02/92
CA200.7	CALCIUM		606	07/01/92
33.076C	CARBONATE		<4	06/25/92
325.2	CHLORIDE		89.6	06/24/92
CR200.7	CHROMIUM (TOTAL)		<0.003	07/02/92
CU200.7	COPPER		0.004	07/02/92
FE200.7	IRON		0.040	07/02/92
PB200.7	LEAD		<0.02	07/02/92
MG200.7	MAGNESIUM		87.9	07/01/92
MN200.7	MANGANESE		0.008	07/02/92
MO200.7	MOLYBDENUM		<0.003	07/02/92
NI200.7	NICKEL		0.045	07/02/92
150.1	PH (ELECTROM.) STANDARD UNITS		7.4	06/25/92
258.1	POTASSIUM		4.70	06/26/92
270.3	SELENIUM		<0.005	07/02/92
273.1	SODIUM		37.4	06/26/92

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
MDL is the Method Detection Limit.

Analyst(s)

3441 East Milber St. Tucson, AZ 85714
Tel 602-889-5787 800-658-8601 FAX [illegible]

American Analytical Laboratories

LABORATORY ANALYSIS REPORT

Code: CHINOM
CHINO MINES COMPANY
ATTN: EDDIE HUMPHREY
P. O. BOX 7
HURLEY, NM 88043-
PO #: 284825

SAMPLE INFORMATION
Sample..: 011614-20
Clnt Smp:
Descript: WATER
Location: 7GS
Samp D/T: 06/19/92
Sampler.: J. BELANGER/B. PLACENIO
Trans By: UPS
Recvd By: B. LUNDT
Date Rcv: 06/23/92
Date Rpt: 07/03/92

Analysis		MCL	Results	Date
375.2	SULFATE		1780	06/29/92
160.1	TOTAL DISSOLVED SOLIDS		3220	06/23/92
ZN200.7	ZINC		10.1	07/02/92
000	ZZ-CATION/ANION BALANCE RATIO		0.93	07/03/92

Comments:
All units are MG/L unless otherwise specified.
ND means analyte not detected.
MDL is the Method Detection Limit.

Analyst(s)

3441 East Milber St. Tucson, AZ 85714
Tel 602-889-5787 800-658-8601 FAX 602-294-1753

State of New Mexico
ENVIRONMENT DEPARTMENT
Harold Runnels Building
1190 St. Francis Drive, P.O. Box 26110
Santa Fe, New Mexico 87502

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

P 757 743 846

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9 September 1991

Mr. D. P. Milovich
Chino Mines Company
Hurley, NM 88043

RE: Discharge Plan renewal for Whitewater Leach Dumps (DP-526)

Dear Mr. Milovich:

Pursuant to Water Quality Control Commission (WQCC) Reg. 3-109, the discharge plan renewal application for DP-526, submitted by Chino Mines Company (CMC) for the discharge of 21,600,000 gallons per day of leach solution to Whitewater Leach Dumps is hereby approved, subject to the conditions listed below. The facility is located approximately 1 mile south of Hanover in Sections 22, 28, 29, 32, 33, and 34, T17S, R12W, Grant County.

The approved Whitewater Leach Dumps consists of two main dump areas, the South Dump which covers approximately 800 acres and the West Dump, approximately 520 acres. The leaching system is briefly described as follows: low grade ore dumps are sprayed with acidic leach solution called raffinate to recover copper. The raffinate pH ranges from 3.0 to 3.5. The pregnant leachate solution (PLS) is collected in the PLS Launder and flows to the precipitation plant pump sump by open channels. From the precipitation plant (P-plant) pump sump, PLS is conveyed by stainless steel lines to the P-plant south of the dumps, and the copper is recovered. The raffinate is then recirculated to the Whitewater Leach Dumps. PLS has a pH between 2.5 and 3.0 and contains on the average (mg l^{-1}) 250-500 Cu; 2,000-3,000 Fe; 10,000-15,000 sulfate; and 40,000-60,000 total dissolved solids.

The approved discharge plan consists of the information and materials dated 15 October 1987, 4 April 1988, 5 August 1988, 10 October 1988, 21 December 1988, 9 January 1989, 28 January 1991, 5 February 1991, 14 March 1991, 24 July 1991, 7 August 1991, and 12 August 1991. In addition, the discharge plan includes information and materials submitted as part of the discharge plan approved 3 February 1989 describing the methods or techniques that CMC uses or processes CMC expected to naturally occur which CMC believed would ensure compliance with regulations.

SPECIFIC REQUIREMENTS

A. The specific requirements of the approved discharge plan are summarized below:

1. Discharge is approved to the West Dump area denoted as the "restricted leach area" on the map submitted 12 August 1991 at an average rate of 1000 gpm with a maximum rate of 1500 gpm, to the South Dump area delineated on the map submitted 12 August 1991 at a rate of 14,000 gpm and to the PLS collection system at the base of the West and South Dumps. Discharges from West Dump PLS feed line and distribution system pipelines, return water pipeline from Dams 10 and 11, pipelines into or out of the P-plant pump sump or any other pipeline not on the leached area, or from the West Dump outside of the restricted leach area, equal to or greater than 50,000 gallons must be reported as described under **GENERAL DISCHARGE PLAN REQUIREMENTS** ¶ **D.-- Record Keeping**. Discharges from pipelines on top of the leach dumps within the approved leaching area and in the collection channels are excluded from these requirements.

2. No leaching or discharge shall occur within 200 feet east of the topographic divide along the top of the West Dump. The leaching boundaries shall remain visibly staked at all times.

3. The minimum pumping capacity of Whitewater reservoir shall be 6000 gpm.

4. Under standard operating procedures, CMC shall not operate Whitewater reservoir with less than fifteen (15) feet of freeboard measured from the 3000 gpm pump platform.

5. The storm water runoff permanent containments by north and south seeps at the West Dump, referred to as Dams 10 and 11 respectively, shall be de-watered and pumped dry within 24 hours to the P-plant. This discharge plan does not authorize the use of the storm water runoff permanent containments as PLS ponds.

6. As discussed in the Whitewater Leach Dumps Hydrogeological Study prepared by Golder Associates Inc. for CMC on 30 July 1990, the highest hydraulic conductivity found was for well WD-6S (subsequently referred to as monitor wells WD-6B and WD-6), which is located in a fairly wide faulted/fracture zone. Monitor

well data collected from these wells indicate that the ground water has been adversely affected in this area. CMC is granted additional time to demonstrate the effectiveness of Dams 10 and 11 in containing seeps and preventing further deterioration of the ground water. Accordingly, NMED has agreed to use data collected from monitor wells WD-6, WD-6B, WD-9 and WD-9A, for a period of two (2) years after Dams 10 and 11 of the storm runoff permanent containments are completed, to determine if the quality of the ground water has significantly improved. If data collected show otherwise, and NMED notifies CMC that synthetic liners are needed along the flow channel from the toe of the West Dump to the concrete sumps at Dams 10 and 11, CMC shall have thirty (30) days after notification to submit plans and specifications to NMED for approval and a total of ninety (90) days to complete installation of NMED approved synthetic liners.

7. Recommendations from the Runoff Curve Verification Program conducted at the Lampbright Leaching System, under discharge plan 376, shall also apply to the Whitewater Leach Dumps. This information will assist in defining the hydraulic flow in the leaching system and determine if the assumptions used in determining runoff from the Soil Conservation Service Runoff Curve Number were realistic.

8. CMC shall submit to the NMED by 1 October 1991, an Emergency Response Plan for the Whitewater Leach Dumps facility, including operating protocol and elevations that would trigger specific environmental control responses at Whitewater Reservoir.

9. Automatic submersible pumps with a minimum pumping capacity of 500 gpm shall be installed by north and south seep containments, Dams 10 and 11 respectively. Backup pumps shall also be available in case of pump failure.

10. This discharge plan is approved only for the discharges specified above. Any discharge of process fluids or the transport of contaminants which exceed the numerical standards of WQCC Reg. 3-103, with or without the assistance of rainfall, beyond the boundary of the leach dump as defined by the dashed line for the West and South Dumps and the solid line for the P-plant pump sump and outfall 001 on the map submitted 12 August 1991 is a violation of this plan and WQCC Reg. 3-104. The numerical standards of WQCC Reg. 3-103 shall remain in effect unless CMC demonstrates to NMED's satisfaction

that the background condition of ground water exceeds these standards. At that time NMED may adopt the new background condition as cleanup standards for this facility.

B. CMC shall make the submittals and/or take the actions required on or before the dates indicated below:

12 August 1991	CMC shall submit a workplan for the Hanover Creek Surface Water Quality study to determine the background levels of contaminants prior to entering CMC property, for NMED review and approval. In addition, the Hanover Creek study will assist in defining background levels for the well remediation program when acceptable background data are not available and to determine the relationship between surface and ground water. Water samples shall be collected from a minimum of five (5) locations mutually agreed upon by CMC and NMED. Sample collection shall be similar to the Lampbright Draw Surface Water Quality study. Water samples shall be collected at two (2) separate times during each rain event that flow occurs. The installed sampling devices will collect water samples during the rise of the hydrograph to determine initial flow quality. Where possible, subsequent sampling during the residual flow stage will determine the quality of the residual flow. Rainfall intensity and duration, and flow rate along Hanover Creek shall also be submitted to NMED. Water samples shall be analyzed for all constituents listed under monitoring requirements. Quarterly reports with data analysis shall be submitted to CMC as part of the monitoring requirements.
1 September 1991	NMED shall supply comments to CMC on Hanover Creek Surface Water Quality study workplan.
	CMC shall submit to NMED for review and approval, a list of the monitor wells to be addressed based on the recent Golder Associates study, a workplan and time frame to complete the future actions proposed. The workplan will include an investigation

	to assess the extent of contamination at the Whitewater Leach Dumps and appropriate remediation action to be taken.
1 September 1991	Monitor Wells WD-6, WD-6B, WD-9, and WD-9A have been identified as contaminated wells as a result of CMC's past mining practices. For these four wells, CMC shall submit a remediation proposal for NMED review and approval.
15 September 1991	CMC shall initiate the Hanover Creek Surface Water Quality study. The study shall continue for two (2) years, after which time CMC shall submit a final report to NMED. This report shall include interpretations of results, CMC's recommendations for background levels of contaminants, and proposed remediation plan for contaminated monitor wells not previously addressed.
1 October 1991	CMC shall complete construction of Dams 10 and 11, the north and south seep storm water runoff permanent containments, respectively. CMC shall notify NMED upon completion of structures and verification by certified professional engineer that plans were completed according to plans and specifications submitted to NMED on 14 March 1991. A survey of the capacity of the north and south permanent containments shall also be completed and submitted to NMED.
1 November 1991	NMED shall supply comments to CMC on report submitted to address the extent of contamination at the Whitewater Leach Dumps and proposed remediation recommendations. NMED shall also supply comments for remediation proposal of wells WD-6, WD-6B, WD-9, and WD-9A.
	CMC shall submit to NMED for review and approval plans to address the runoff problem by the bermed area near the South Booster Station and monitor well WD-1.

1 December 1991	CMC shall submit to NMED for review and approval a workplan and time schedule to determine areal extent of perched water in the West Dump, transmissivity of dump, and ability of large diameter wells to capture leachate. Based on the findings of this study, the discharge plan may be modified to include leaching of areas currently exempt. Quarterly progress reports on the large diameter well study in the West Dump shall be submitted to NMED including any data available and a summary of results to date. NMED shall supply comments on the large diameter well workplan submitted to CMC within ninety (90) days from receipt of proposed work plan for large diameter wells in West Dumps.
1 January 1992	NMED shall supply comments to CMC on plans to address the runoff problem by the bermed area near the South Booster Station.
1 February 1992	CMC shall commence work on NMED approved workplan for remediation of all contaminated wells.
1 April 1992	CMC shall commence work on NMED approved plan to address the runoff problem by the bermed area near the South Booster Station. This project shall be completed no later than 1 October 1992.
1 November 1993	CMC shall submit final report on Hanover Creek Surface Water Quality study to NMED for review and approval.
1 February 1993	NMED shall supply comments to CMC on final report of the Hanover Creek Surface Water Quality study.
1 March 1994	CMC shall initiate NMED approved remediation plan of contaminated wells based on findings of the Hanover Creek Surface Water Quality study.

CONDITIONAL REQUIREMENTS

The approval is subject to the following conditions:

1. All contaminated soil with elevated levels of heavy metals surrounding the storm water runoff permanent containments or along previous seep flow paths shall be removed and placed east of the staked topographic divide boundary.

2. CMC shall remediate contaminated ground water and other areas to the ground water standards in WQCC Reg. 3-103 or cleanup standards approved by NMED. This requirement shall not apply if CMC's Hanover Creek Surface Water Quality study demonstrates to NMED's satisfaction that CMC is not responsible for any of the contamination seen in monitor wells WD-1, WD-2, WD-5, WD-7, WD-8, WD-8A, WD-10, and WD-11. CMC shall submit a remediation plan as part of the Hanover Creek Surface Water Quality study final report due 1 November 1993. The NMED approved remediation plan shall begin no later than 1 March 1994.

3. CMC shall collect daily rainfall data at the CMC Engineering Office and record daily pumping schedules. This information shall be compiled on a monthly basis, and submitted monthly to NMED. Rainfall gauge strip charts shall be made available to NMED upon request. If NMED requires more detailed rainfall data, CMC shall have six (6) months from date of request to supply requested data and future data on formatted disks to NMED.

4. CMC shall install and operate water samplers at a minimum of three mutually agreed upon locations along the boundary of the West Dump delineated by dashed lines on the map submitted 12 August 1991. These samplers shall be operative for the 1992 rainy season, defined as 15 June - 15 September for these purposes. Data shall be submitted with the monitor report due 31 October 199~~1~~2 unless determined reportable under WQCC Reg. 1-203. NMED shall review the data presented and determine future needs for this type of information.

Condition 1 allows CMC time to prove to NMED the source(s) of contamination and background levels for remediation purposes. Condition 2 will minimize the areas which could potentially contribute to ground water contamination. Condition 3 provides time for NMED to evaluate CMC's current rainfall recording practices and allots time to convert system if deemed necessary.

Condition 4 allows CMC time to provide NMED with information on the quality of the first slug of runoff from the West Dump area not actively leached after rain events.

GENERAL DISCHARGE PLAN REQUIREMENTS

In addition to any other requirements provided by law, DP-526 approval is subject to the following general requirements:

Monitoring and Reporting

Monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheets. Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Record Keeping

A. CMC shall maintain at the facility a written record of ground water, process water and other water quality analyses as required under this discharge plan.

   The following information shall be recorded and made available upon request by NMED:

   1. the dates, exact place and times of sampling or field measurements;

   2. the name and job title of the individual who performed the sampling or field measurements;

   3. the dates the analyses were performed;

   4. the name and job title of the individual who performed the analyses;

   5. the analytical techniques or methods used;

   6. the results of such analyses; and

   7. the results of any split sampling, spikes or repeat sampling.

B. CMC shall maintain a written record of process water flow rates and storage volumes.

C. CMC shall maintain a written record of areas actively being leached. These maps shall be archived for two (2) years.

D. CMC shall maintain a written record of any spills, seeps, and/or leaks of contaminated water which must be reported to the NMED Ground Water Section Program Manager. Written records kept by CMC shall include results of inspections for seeps, spills, and/or leaks along dumps and pipelines, estimates of volumes, and corrective action recorded on a monthly basis. Records of inspections must be reported ~~Mr~~. whether or not seeps, spills, and/or leaks are detected. Coordinates of seeps, spills, and/or leaks shall be included in monitor report.

Any seeps, spills, and/or leaks discovered of a quantity equal to or greater than 50,000 gallons, that may directly or indirectly leave the boundary of the restricted leach area of the West Dump and the South Dump boundary, as defined by the map submitted 12 August 1991, and those areas listed under **SPECIFIC REQUIREMENTS** ¶ **A.1**, which may transport contaminants with or without the assistance of rainfall must be reported verbally within twenty-four (24) hours after operator is aware of the discharge. The following information shall be provided:

a. date, time, location, and duration of the discharge;

b. flow path of discharge;

c. the source and cause of the discharge;

d. the estimated volume of the discharge; and

e. any actions taken to mitigate immediate damage from the discharge and stop source of discharge.

Within one (1) week after CMC has learned of the discharge, CMC shall send written notification to Program Manager, Ground Water Bureau, NMED. Within thirty (30) days of written notification, a written report describing corrective actions taken to stop the discharge shall be submitted to NMED.

Any seeps, spills and/or leaks, of any volume, that leave the boundary of the leach dump as defined by the dashed line for the West and South Dumps and the solid line for the P-plant pump sump and outfall 001 on the map submitted 12 August 1991, must be reported and corrective action taken as required by WQCC Reg. 1-203.

E. CMC shall maintain a written record of operation/maintenance and repair of facilities/equipment used to treat, store and/or dispose of process water.

Inspection and Entry

In accordance with Sections 74-6-9.B & E NMSA 1974 and WQCC Reg. 3-107.D, CMC shall allow the Secretary or her authorized representative, upon the presentation of credentials to:

A. Enter at regular business hours or at other reasonable times upon CMC's premises or where records must be kept under the conditions of this discharge plan;

B. Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of the discharge plan;

C. Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this discharge plan;

D. Sample or monitor, at reasonable times for the purpose of assuring discharge plan compliance or as otherwise authorized by the New Mexico Water Quality Act, any effluent, process water, tailings, sludge or other waste products at any location before or after discharge or any groundwater or vadose zone monitoring at any location.

Duty to Provide Information

In accordance with Section 74-6-9.B NMSA 1978 and WQCC Reg. 3-107.D, CMC shall furnish to the NMED, within a reasonable time, any relevant information which it may request to determine whether cause exists for modifying, terminating and/or renewing this discharge plan or to determine compliance with this plan. CMC shall furnish to the NMED, upon request, copies of records required to be kept by this discharge plan.

Unauthorized Discharges

This discharge plan is approved for the discharges specified under the **SPECIFIC REQUIREMENTS** section. Any unauthorized discharge beyond the boundary of the leach dump as defined by the dashed line for the West and South Dumps and the solid line for the P-plant pump sump and outfall 001 on the map submitted 12 August 1991 is a violation of the discharge plan and WQCC Reg. 3-104, and must be reported to the NMED and remediated in Mr.

accordance with the procedures specified in WQCC Reg. 1-203.

Retention of Records

CMC shall retain records of all monitoring information, including but not limited to, calibration and maintenance records, copies of all reports required by this discharge plan, and records of all data used to complete the application for this discharge plan for a period of at least five years from the date of the sample collection, measurement, report, or application, unless specified otherwise. This period may be extended by request of the Secretary at any time.

Enforcement

Failure to grant the Secretary or her authorized representative access to the records required to be kept by this discharge plan or to allow an inspection of the discharge facilities or to the collection of samples is a violation of this discharge plan and the WQCC Regulations. Such violations as well as other violations of the discharge plan, may subject CMC to civil penalties and injunctive relief pursuant to Sections 74-6-5.P and 74-6-10 NMSA 1978, and/or modification or termination of this discharge plan pursuant to Section 74-6-5.J NMSA 1978. In addition, anyone who knowingly makes any false statement, representation, or certification in any record, report or other document required to be kept by this discharge plan shall, upon conviction, be punished by a fine of not less than $300 or more than $10,000 per day or by imprisonment for not more than one year or both, pursuant to Section 74-6-5.O NMSA 1978.

Modifications and/or Amendments

CMC shall notify NMED, pursuant to WQCC Reg. 3-107.C, of any modifications or additions to the Whitewater Leaching System, including structural and management changes to the system as approved under this discharge plan. CMC is not required to notify NMED of modifications or additions that occur at the point of raffinate discharge on top of the dumps that involve changes in placement of leach lines or additions of lifts to the leach dumps. CMC shall obtain NMED's approval, as a discharge plan modification, prior to any increase in the quantity or concentration of constituents in the leachate above those approved in this plan. Please note that WQCC Regs. 3-109.E and F provide for possible future amendment of the plan.

Other Requirements

Please be advised that the approval of this plan does not relieve you of liability should your operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations.

RIGHT TO APPEAL

If you are dissatisfied with this action taken by NMED, you may file a petition for hearing before the WQCC. This petition shall be in writing to the Secretary of NMED within thirty (30) days of the receipt of this letter. Unless a timely request for hearing is made, the decision of the NMED shall be final.

PERIOD OF APPROVAL

Pursuant to WQCC Reg. 3-109.G.4, this discharge plan approval is for a period of five (5) years. This approval will expire 9 September 1996, and you should submit an application for new approval six (6) months before that date.

On behalf of the staff of the Ground Water Section, I wish to thank you and your staff for their cooperation during the discharge plan review.

Sincerely,

Robert M. Dallegan

for Steven J. Cary
Acting Chief
Ground Water Bureau

SJC:MPM/mm

Enclosure(s)

cc: Ken Smith, NMED District III Manager, Las Cruces
David Rees, NMED Field Office, Silver City
J. E. Humphrey, Chino Mines Company, Hurley
Louis W. Rose, Office of General Counsel
Kathleen Sisneros, Director, Water and Waste Division

GROUND WATER SECTION
NM Environment Department
1190 St. Francis Dr., P.O. Box 26110
Santa Fe, N.M. 87502
Phone: (505) 827-2900

Summary of Discharge Plan

September 6, 1991

DP number: 526 Facility name: CHINO MINES CO.W WATER LEACH
Alternate name: WHITEWATER LEACH DUMPS
Type of facility: MINING - COPPER
Means of discharge: LEACH DUMP/METALURGICAL EXTRCT

County: GRANT NMED district 3 T17S, R12W, Sec. 33.000
Location: W.AND S. OF SANTA RITA PIT Nearest city: HANOVER

	Responsible person:	Contact or consultant person:
	D.P. MILOVICH	TIM OLIVER
Title:	MANAGER	ENVIRONMENTAL SUPERVISOR
Address:	CHINO MINES	CHINO MINES
City, zip:	HURLEY NM 88043-	HURLEY NM 88043-
Phone:	505-537-3381	505-537-3381

The Ground Water Section staff reviewer is MICHELLE MILLER.
Application was received 07/31/90 and Public Notice published 03/21/91.
The plan was approved 09/09/91 and expires 09/09/96.
(Application for renewal should be submitted in ample time before expiration.)

Monitoring Requirements summary

No. of monitoring reports required annually: 2
Monitoring reports are due no later than April 30 and October 31 of each year.

Sampling required	Annual freq.	# of sites	Comments, description
Water levels:	2	12	MONITOR WELLS 1,2,3A,4,5,6,6B,7,8,8A,9,9A,10,11
Disch. vols:	0	0	
Major ions:	2	12	MONITOR WELLS
Heavy metals:	2	12	MONITOR WELLS
N Species:	0	0	
Organics:	0	0	
Other:	12	0	INSPECTIONS FOR SEEPS, SPILLS AND/OR LEAKS

✓ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet.
Any inadvertent omission from this summary does not relieve the discharger of responsibility for compliance with that requirement.
Send monitoring reports to the address at top, "Attention: MICHELLE MILLER, re: DP-526".

MONITOR REQUIREMENTS

Chino Mines Company - Whitewater Leach Dumps (DP-526)

Reports are due by **30 April** and **31 October** of each year

Reports are to include monitor well requirements.

INSPECTIONS:

1. To be performed on a monthly basis for seeps, spills, and/or leaks along dumps and pipelines. Records of inspections must be reported whether or not seeps, spills, and/or leaks are detected. Coordinates of seeps, spills, and/or leaks shall be included in the monitor report.

2. Any seeps, spills, and/or leaks discovered of a quantity equal to or greater than 50,000 gallons, that may directly or indirectly leave the boundary of the restricted leach area of the West Dump and the South Dump boundary, as defined by the map submitted 12 August 1991, and those areas listed under **SPECIFIC REQUIREMENTS ¶ A.1**, which may transport contaminants with or without the assistance of rainfall must be reported as described under **GENERAL DISCHARGE PLAN REQUIREMENTS ¶ D.--Record Keeping**.

3. Results of inspection for seeps, spills, and/or leaks that are less than 50,000 gallons and are within the boundary of the leach dump facility shall be reported **semiannually**.

4. The boundary of the West Dump, defined by the dashed line on the map submitted 12 August 1991, shall be inspected a minimum of once per week on the same day each week for seeps, spills and/or leaks during the rainy season defined as 15 June - 15 September. At all other times, this area shall be inspected monthly. All seeps shall be sampled and analyzed for parameters required for monitor wells, reported, and corrective action taken as required under WQCC Reg. 1-203 when the numerical standards of WQCC Reg. 3-103 have been exceeded. In addition, rainfall data shall be submitted to NMED, including date, duration and amount.

   The area on top of the leach dump is excluded from these requirements.

At the time a seep is reported, a map showing area actively being leached at that time shall be included in the report.

Chino Mines Company - Whitewater Leach Dumps (DP-526)

Reports are due by **30 April** and **31 October** of each year

1. Collected fluids from both permanent containments at the north and south seeps, Dams 10 and 11 respectively, shall be pumped within 24 hours to the precipitation plant.

2. Reservoirs and desilting basins shall be visually inspected for sedimentation and structural integrity on a monthly basis and reported **semiannually.**

3. Hanover Creek Surface Water Quality data, rainfall intensity and duration data for each rain event that samples are collected, and summary of results shall be submitted to NMED ~~**quarterly.**~~ Agreed to semi-annual 2/24/92

4. Daily rainfall data shall be collected at the CMC Engineering Office and daily pumping schedule recorded, compiled on a monthly basis, and submitted ~~**monthly.**~~ Agreed to semi-annual 2/24/92

5. Water quality monitoring data shall be submitted to NMED on formatted disks along with a hard copy.

MONITOR REQUIREMENTS Cont'd

Chino Mines Company - Whitewater Leach Dumps (DP-526)

Reports are due by **30 April** and **31 October** of each year

Sampling locations:

Monitor Wells:	WD-1	WD-6	WD-9
	WD-2	WD-6B	WD-9A
	WD-3A	WD-7	WD-10
	WD-4	WD-8	WD-11
	WD-5	WD-8A	

Large diameter well at West Dump

North and South Seeps

Testing Parameters for all Wells and Seeps:

Field Measurements:	Static water level Field temperature Field pH Field conductivity
Major cations/anions:	Ca, Cl, F, $CO_3^{=}$, HCO_3^{-}, K, Mg, Na, $SO_4^{=}$, TDS
Heavy Metals:	Cr, Cd, Co, Cu, Fe, Mn, Ni, Pb, Zn Detection level should be at least that of WQCC standards.

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Rcvd. 4-29-92

P 028 900 445

Receipt for Certified Mail
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to William S. Brack	
Street and No. DP-214	
P.O., State and ZIP Code	
Postage	$

STATE OF NEW MEXICO
ENVIRONMENT DEPARTMENT

April 22, 1993

William S. Brack, Manager
Chino Mines Company
Hurley, NM 88043

RE: Discharge Plan Renewal, Chino Mines
DP-214 Whitewater Creek

Dear Mr. Brack:

Pursuant to Water Quality Control Commission (WQCC) Reg. 3-109, the application for discharge plan renewal for DP-214, submitted by Chino Mines Company (CMC) involving the Hurley Smelter, Lake 1, Axiflo Lake, and the Old Tailings Ponds 1,2,B,C,4,6-East,6-West, is hereby approved, subject to the condition listed below. Tailings Pond No. 7 is covered by a separate discharge plan DP-484. The facilities and areas included in this discharge plan are located from Hurley, NM, to the confluence of Whitewater Creek with San Vicente Arroyo approximately 12 miles south of Hurley, NM, in several sections of T17S, R12W; T18S, R12W; and T19S, R12W; Grant County. In approving this discharge plan, the New Mexico Environment Department (NMED) has determined that the requirements of WQCC Reg. 3-109.C have been met.

The approved discharge plan is based on work plans that will lead to eventual closure with remediation where necessary. Emergency flows to Tailings Ponds No.4, 6-East, and 6-West and routine flows to Axiflo Lake are permitted. Decanted process water from Tailings Pond No.7 and fresh make-up water from wells are stored in Axiflo Lake prior to pumping to the concentrator. The mixed water in Axiflo Lake contains 1470 mg/l TDS and 924 mg/l SO4 at a pH of 7.0. Seeps to Whitewater Creek from the precipitation plant or the adjacent stormwater retention Dam No. 2 will be covered under a modification to the Whitewater Dump Leach System DP-526. All other unnatural discharges will be eliminated during the approval period.

DP-214 is briefly described as follows:

Historically Whitewater Creek has been impacted by several different types of mining activities. Acidic metal-laden

Bruce King
Governor

Judith M. Espinosa
Secretary

Ron Curry
Deputy Secretary

Harold Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-2850
FAX (505) 827-2836

DRUG FREE

GROUND WATER SECTION
Groundwater Bureau
Environment Department
Santa Fe, N.M. 87503
(505) 827-2900

SUMMARY OF DISCHARGE PLAN April 21, 1993

DP number: 214
Facility Name: CHINO MINES-WHITEWATER CR.
Facility Desc: PONDS 1-6,LAKE 1,SMELTER,LOW
Waste Type: MINING
Discharge / Treatment: TAILING POND / METALURGICAL EXTRACTION

County: GRANT ED District: 3 T17S R12W Sec. .000

Location: SANTA RITA Nearest City: HURLEY

Responsible Person:
WILLIAM S. BRACK
Title: MANAGER
Address: CHINO MINES COMPANY
City, zip: HURLEY NM 88043
Phone: 505-537-3381

Contact or Consultant Person
J.(EDDIE) HUMPHREY
ENV. SUPERVISOR
CHINO MINES CO.
HURLEY NM 88043
505-537-4305

The Ground Water Section staff reviewer is ALAN JAGER .
Application was received 27-JAN-83 and Public Notice published 20-JAN-89 .
The plan was approved 22-APR-93 and expires 22-APR-98 .
(Application for renewal should be submitted in ample time before expiration.)

MONITORING REQUIREMENTS SUMMARY

No. of monitoring reports required annually: 2
Monitoring reports are due no later than: 15-APR and 15-NOV of each year.

Sampling required	Annual freq.	No of sites	Comments, description
Water Levels	2	49	See field data sheet list, Nov.24,1992
pH	4	1	Daily pH log for Lake 1
Other	2	49	pH,temp.,conductivity,TDS
Major Ions	2	49	Cl,HCO3,SO4,Ca,K,Na
Heavy Metals	2	49	Cu,Fe,Mg,Mn,Mo,Pb

____ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet. Any inadvertent omission from this summary does not relieve the discharger of responsibility for compliance with that requirement.

Send monitoring reports to the address at top, "Attention: ALAN JAGER re: DP - 214 ."

discharges from the Hurley Smelter to old tailings and underlying sediments of Lake 1 are being eliminated and the tailings are to be recycled or capped. Discharges from the Hurley Smelter are presently being processed, neutralized and recycled to eliminate additional contamination. The old inactive Tailings Ponds 1,2,B,C,4, 6-East and 6-West, are to be closed except for emergency discharges to Tailings Ponds No.4, 6-East and 6-West. The impact of seepage from Axiflow Lake is being assessed. The facilities and area from the precipitation plant to the confluence of Whitewater Creek with San Vicente Arroyo are to be evaluated for contaminant impact and final closure.

The approved discharge plan renewal consists of the materials submitted by CMC dated January 7, 1993 and April 7, 1993. In addition, the discharge plan includes information and materials submitted as part of the original discharge plan approved on April 22, 1983, and materials submitted prior to renewal on April 22, 1988. Approval of this discharge plan renewal does not relieve CMC of its responsibility to comply with any conditions or requirements of the previously approved discharge plan, DP-214, or any other applicable federal, state and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

CONDITIONS FOR APPROVAL

This discharge plan approval is subject to the following conditions for the following reasons:

1. CMC must submit a financial assurance plan to NMED which is subject to approval by the Secretary of the NMED, and which addresses the following:

   a. A cost estimate for tasks associated with your preliminary environmental closure plan, including post closure monitoring, must be submitted by September 1, 1993.

   b. A financial assurance instrument must be proposed which is of an amount equal to the costs included in a. above. This proposal must be submitted along with your cost estimate, by September 1, 1993.

   c. The financial assurance instrument must be made payable to or name the New Mexico Environment Department as the beneficiary of the instrument.

d. The financial assurance plan must include a method for adjustments due to inflation, new technologies, or revisions to the closure plan based on continued investigations.

e. The financial assurance plan must include the date that the financial assurance instrument will be in place. This date must not be later than 180 days from the date the financial assurance plan is approved.

The reason for this condition is to comply with Section 74-6-9 of the Water Quality Act and Sections 3-106.C.7 and 3-107.A.4, 10, and 11 of the WQCC Regulations.

SPECIFIC REQUIREMENTS

The terms and conditions of this approval contain specific requirements which are summarized below.

1. CMC is authorized to continue work plans dated with completion dates as outlined in CMC's letter to the NMED dated April 7, 1993. These work plans describe activities designed to collect data for the eventual elimination of all sources of contaminants, for the remediation of impacted areas, and the closure with post-closure monitoring of parts of the facility. DP-214 covers the area from the Hurley Smelter to the confluence of Whitewater Creek with San Vicente Arroyo.

a. Lake 1
Activities include a plan for the elimination of all discharges from the Hurley Smelter to Lake 1 and the elimination of Lake 1 as a source of contamination. The eventual closure could include recycling or covering.

b. Hurley Smelter
Activities include an investigation to collect and eliminate all discharges to the Lake 1 area, including the flow of cooling water from the slag and matte pits, effluent from the truck washing facilities, storm runoff, and the neutralized smelter blowdown effluent. Systems will be engineered to capture and contain unauthorized discharges due to failures of pipelines that pass through the area.

c. Tailings Pond 6 & Older Tailings Piles
The environmental impacts to ground water will be

investigated for Lake 1; Tailings Ponds 1,2,B,C,4,6-East,6-West, and Axiflo Lake to determine compliance with WQCC Regulations upon closure. Tasks are summarized as compilation of historic data, determination of quantity and quality of discharges to ground water from all tailings ponds (including Lake 1 and Axiflo Lake), an update of ground water models, a final report on source characterization and a tailings closure plan.

d. Lower Whitewater Creek Hydrogeologic Study
A hydrogeologic investigation of Whitewater Creek will be performed from just south of Tailings Pond 7 to the confluence of Whitewater Creek and San Vicente Arroyo. The study plan will include data review; characterization of stream bed conditions by mapping, an electrical resistivity geophysical survey, and sediment sampling; installation of monitor wells; compilation of hydrogeologic data by collecting water level and water quality data; ground water model integration; prediction of long-term impacts; evaluation of remedial strategies; analysis; and final report submittal which includes a recommended remedial strategy.

2. All final work plans and reports must be submitted to the NMED, Ground Water Section within 30 days of receipt by CMC.

3. Within 60 days of identification of a recommended remedial strategy or closure plan for a specific area, CMC will submit a schedule for closure.

GENERAL DISCHARGE PLAN REQUIREMENTS

In addition to any other requirements provided by law, approval of discharge plan, DP-214, is subject to the following general requirements:

Monitoring and Reporting

Monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet(s). Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Record Keeping

1. The discharger shall maintain at the facility, a written

record of ground water and waste water quality analyses. The following information shall be recorded and shall be made available to the NMED upon request.

a. The dates, exact place and times of sampling or field measurements.

b. The name and job title of the individuals who performed the sampling or measurements.

c. The dates the analyses were performed.

d. The name and job title of the individuals who performed the analyses.

e. The analytical techniques or methods used.

f. The results of such analyses, and

g. The results of any split, spikes or repeats.

2. The discharger shall maintain a written record of any spills, seeps, and/or leaks of effluent, leachate and/or process fluids not authorized by this discharge plan.

3. The discharger shall maintain a written record of the operation, maintenance and repair of facilities/equipment used to treat, store and/or dispose of waste water; to measure flow rates; and/or to monitor water quality. This will include repairs, replacement or calibration of any monitoring equipment and repairs or replacement of any equipment used in CMC's waste or wastewater treatment and disposal system.

4. The discharger shall maintain a written record of the amount of effluent discharged.

Inspection and Entry

In accordance with § 74-6-9.B & E NMSA 1978 and WQCC Reg. 3-107.D., the discharger shall allow the Secretary or her authorized representative, upon the presentation of credentials, to:

1. Enter at regular business hours or at other reasonable times upon the discharger's premises or where records must be kept under the conditions of this discharge plan.

2. Inspect and copy, during regular business hours or at

other reasonable times, any records required to be kept under the conditions of the discharge plan.

3. Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this discharge plan.

4. Sample or monitor, at reasonable times for the purpose of assuring discharge plan compliance or as otherwise authorized by the New Mexico Water Quality Act, any effluent at any location before or after discharge.

Duty to Provide Information

In accordance with § 74-6-9.B NMSA 1978 and WQCC Reg. 3-107.D., the discharger shall furnish to the NMED, within a reasonable time, any relevant information which it may request to determine whether cause exists for modifying, terminating and/or renewing this discharge plan or to determine compliance with this plan. The discharger shall furnish to the NMED, upon request, copies of records required to be kept by this discharge plan.

Spills, Leaks and Other Unauthorized Discharges

This approval authorizes only those discharges specified in the discharge plan. Any unauthorized discharges violate WQCC Reg. 3-104, and must be reported to the NMED and remediated as required by WQCC Reg. 1-203. This requirement applies to all seeps, spills, and/or leaks discovered from the facilities or system.

Retention of Records

The discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this discharge plan, and records of all data used to complete the application for this discharge plan, for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the Secretary at any time.

Enforcement

Failure to grant the Secretary or her authorized representative access to the records required to be kept by

this discharge plan or to allow an inspection of the discharge facilities or to the collection of samples is a violation of this discharge plan and the WQCC Regulations. Such violations as well as other violations of the discharge plan, may subject the discharger to civil penalties and injunctive relief pursuant to § 74-6-5.P and § 74-6-10 NMSA 1978, and/or modification or termination of this discharge plan pursuant to § 74-6-5.J NMSA 1978. In addition, anyone who knowingly makes any false statement, representation or certification in any record, report or other document required to be kept by this discharge plan shall, upon conviction, be punished by a fine of not less than $300 or more than $10,000 per day or by imprisonment for not more than one year or both, pursuant to § 74-6-5.O NMSA 1978.

Modifications and/or Amendments

The discharger shall notify NMED, pursuant to WQCC Regs. 3-107.C, of any modifications or additions to CMC's waste water disposal system, including any increase in waste water flow rate or waste water storage and disposal management changes to the system as approved under this discharge plan. The discharger shall obtain NMED's approval, as a discharge plan modification, prior to any increase in the quantity or concentration of constituents in the leachate above those approved in this plan. Please note that WQCC Regs. 3-109.E and F provide for possible future amendment of the plan.

Other Requirements

Please be advised that the approval of this plan does not relieve CMC of liability should your operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations.

RIGHT TO APPEAL

If CMC is dissatisfied with this action taken by NMED, CMC may file a petition for hearing before the WQCC. This petition shall be in writing to the Secretary of NMED within thirty (30) days of the receipt of this letter. Unless a timely request for hearing is made, the decision of the NMED shall be final.

TRANSFER OF DISCHARGE PLAN

Prior to any transfer of ownership, the discharger shall provide the transferee a copy of the discharge plan, including a copy of this approval letter and shall document

such to the NMED.

PERIOD OF APPROVAL

Pursuant to WQCC Reg. 3-109.G.4., this discharge plan approval is for a period of five years. This approval will expire April 22, 1998, and you should submit an application for new approval in ample time before that date.

Sincerely,

Steven J. Cary, Chief
Ground Water Protection &
Remediation Bureau

SJC:ARJ

Enclosures

cc: Kenneth Smith, Dist. Manager, NMED Dist. 3
David Rees, HPM, NMED Silver City Field Office
File

STATE OF NEW MEXICO
ENVIRONMENT DEPARTMENT

May 25, 1993

William S. Brack, Manager
Chino Mines Company
Hurley, NM 88043

RE: Minor Modification of Discharge Plan DP-214

Dear Mr. Brack:

Pursuant to Water quality Control Commission (WQCC) Reg. 3-109, the request for discharge plan modifications for DP-214 made May 19, 1993, by Chino Mines Company (CMC), is hereby approved. The facilities and areas included in this discharge plan are located from Hurley, NM to the confluence of Whitewater Creek with San Vicente Arroyo approximately 12 miles south of Hurley, NM, in several sections of T17S, R12W; T18S, R12W; and T19S, R12W; Grant County. In approving this discharge plan modification, the New Mexico Environment Department (NMED) has determined that the requirements of WQCC Reg. 3-109.C have been met.

The approved modifications to discharge plan DP-214 are described as follows:

Condition #1 under "Conditions For Approval" in the April 22, 1993, letter of approval shall be modified to read:

1. CMC must submit a financial assurance plan to NMED which is subject to approval by the Secretary and addresses the following:

   a. A cost estimate for tasks associated with the closure of Lake 1, Tailings Pond 6 and all other older tailings piles, including post-closure monitoring, must be submitted by September 1, 1993. The cost estimate shall be based on the existing information available from the tailings dams closure feasibility studies. The cost estimate may be modified upon submittal of the closure plan, or if significant additional information becomes available.

   b. A means of financial assurance must be proposed for an amount sufficient to cover the costs included in a. above. This proposal must be submitted with CMC's cost

Bruce King
Governor

Judith M. Espinosa
Secretary

Ron Curry
Deputy Secretary

Harold Runnels Building
1190 St. Francis Drive
P.O. Box 26110
Santa Fe, NM 87502
(505) 827-2850
F (505) 827-2836

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estimate by September 1, 1993, for approval by the Secretary. Upon approval, the financial assurance shall be incorporated as a minor modification of DP-214. The decision of the Secretary may be appealed by CMC in accordance with Sections 3-112.A and 3-113 of the WQCC Regulations.

c. If the financial assurance proposes a payee or beneficiary, NMED must be named as the payee or beneficiary.

d. The means of financial assurance must include a method for adjustments due to inflation, new technologies, or NMED approved revisions to the closure plan, based on continued investigations.

e. The financial assurance shall be evaluated, compared, and, if necessary, revised to comply with WQCC financial assurance regulations, if and when such regulations are promulgated and become effective.

f. An NMED review of remaining closure measures may be requested by CMC no more than once every twelve months, or as allowed by WQCC financial assurance regulations, if and when such regulations are promulgated and become effective. The application for closure review shall describe the closure measures completed and contain a cost estimate for remaining closure measures.

g. The financial assurance shall be released or modified when the NMED determines by closure review that closure measures covered by the financial assurance have been completed.

The reason for this condition is to comply with Section 74-6-9 of the Water Quality Act and Sections 3-106.C.7 and 3-107.A.4, 10, and 11 of the WQCC Regulations.

Corrections to the April 22, 1993, approval letter are:

Page 1, 2nd paragraph, line 9, should read "Corrective action to eliminate seeps to Whitewater Creek..."

Page 1, 2nd paragraph, lines 12 &13, strike "All other unnatural discharges will be eliminated during the approval period."

Page 2, 1st paragraph, line 10, should read "...from Hurley, NM to the confluence..."

Monitoring parameters to be added are: CO3, As, Cd, Cr, Ni, and Zn.

Approval of these modifications, corrections, and additions to CMC's discharge plan does not relieve CMC of responsibility to comply with any other conditions or requirements of the approved discharge plan DP-214 or any other applicable federal, state, and/or local laws and regulations, such as zoning requirements and nuisance ordinances.

OTHER REQUIREMENTS

Please be advised that the approval of this plan modification does not relieve CMC of liability should your operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations.

PERIOD OF APPROVAL

This modification approval expires on April 22, 1998, which is the same date cited in the last renewal. CMC should submit an application for new approval in ample time before that date.

If you have any questions, please contact Alan Jager, Ground Water Section at 827-2904.

Sincerely,

Steven J. Cary, Chief
Ground Water Protection &
Remediation Bureau

SJC:ARJ

cc: Kenneth Smith, Manager, Dist. 3
David Rees, HPM, NMED Field Office, Silver City
File

GROUND WAT SECTION
Groundwater Bureau
Environment Department
Santa Fe, N.M. 87503
(505) 827-2900

SUMMARY OF DISCHARGE PLAN May 24, 1993

DP number: 214 Facility Name: CHINO MINES-WHITEWATER CR.
Facility Desc: PONDS 1-6,LAKE 1,SMELTER,LOW
Waste Type: MINING
Discharge / Treatment: TAILING POND / METALURGICAL EXTRACTION

County: GRANT ED District: 3 T17S R12W Sec. .000

Location: SANTA RITA Nearest City: HURLEY

Responsible Person:
WILLIAM S. BRACK
Title: MANAGER
Address: CHINO MINES COMPANY
City, zip: HURLEY NM 88043
Phone: 505-537-3381

Contact or Consultant Person
J.(EDDIE) HUMPHREY
ENV. SUPERVISOR
CHINO MINES CO.
HURLEY NM 88043
505-537-4305

The Ground Water Section staff reviewer is ALAN JAGER .
Application was received 27-JAN-83 and Public Notice published 20-JAN-89 .
The plan was approved 22-APR-93 and expires 22-APR-98 .
(Application for renewal should be submitted in ample time before expiration.)

MONITORING REQUIREMENTS SUMMARY

No. of monitoring reports required annually: 2
Monitoring reports are due no later than: 15-APR and 15-NOV of each year.

Sampling required	Annual freq.	No of sites	Comments, description
Water Levels	2	49	See field data sheet list, Nov.24,1992
pH	4	1	Daily pH log for Lake 1
Other	2	49	pH,temp.,conductivity,TDS
Major Ions	2	49	Cl,HCO3,SO4,Ca,K,Na,CO3
Heavy Metals	2	49	Cu,Fe,Mg,Mn,Mo,Pb,As,Cd,Cr,Ni,Zn

____ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet. Any inadvertent omission from this summary does not relieve the discharger of responsibility for compliance with that requirement.

Send monitoring reports to the address at top, "Attention: ALAN JAGER re: DP - 214 ."

REFERENCE 12

Excerpts from Discharge Plan
Bayard Mining Company

State of New Mexico

ENVIRONMENT DEPARTMENT

BRUCE KING
GOVERNOR

JUDITH M. ESPINOSA
SECRETARY

RON CURRY
DEPUTY SECRETARY

CERTIFIED MAIL - RETURN RECEIPT REQ

P 667 234 154
Certified Mail Receipt
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)
UNITED STATES POSTAL SERVICE
Sent to Mr. Richard Burcham
Street & No. Bayard Mng. Corp
P.O., State & ZIP Code
Postage $

September 28, 1992

Mr. Richard Burcham
Bayard Mining Corporation
P.O. Box 406
Hanover, NM 88041

RE: Discharge Plan Modification, DP-181 Baya

Dear Mr. Burcham:

Pursuant to Water Quality Control Commission (WQCC) Reg. 3-109, the application for discharge plan modification for DP-181, dated May 28, 1992, submitted by Bayard Mining Corporation (BMC) for the discharge of an average of 10 million gallons per day of concentrator tailings from the BMC concentrators is hereby approved, subject to the conditions listed below. The facility is located approximately one-half mile west of Fierro, NM, in Sections 4 and 9, T17S, R12W, Grant County. In approving this discharge plan modification, the New Mexico Environment Department (NMED) has determined that the requirements of WQCC Reg. 3-109.C have been met.

The previously approved discharge plan authorized the discharge of 120,000 gallons per day of magnetite slurry to a proposed additional magnetite dam/pond after removal of copper by flotation methods. This additional magnetite dam/pond was never built. DP-181, as modified herein, provides for the operation of two concentrators, the discharge of tailings slurries to an existing main tailings impoundment, the conditional discharge of magnetite to the existing magnetite dam/pond and the construction of an additional magnetite dam/pond. The system can be described briefly as follows: copper ore will be mined, crushed, ground, and concentrated in two conventional flotation concentrators at a combined total through-put rate of 10,000 tons of ore per day. Magnetite in the ore will be magnetically separated and conducted to the existing or the proposed magnetite dam/pond. The concentrator tailings are thickened and conducted to an existing tailings pond where the solids settle out. Decanted water is reclaimed and pumped back to the concentrators for re-use in the mill circuit.

The approved discharge plan modification consists of the modification application submitted by BMC dated May 28, 1992. In addition, the discharge plan includes information and materials

submitted as part of the original discharge plan approved on October 28, 1981, and the renewal approved on March 5, 1986.

However, approval of this discharge plan does not relieve you of your responsibility to comply with any other applicable local laws and regulations, such as zoning requirements and nuisance ordinances.

CONDITIONS FOR APPROVAL

This discharge plan approval is subject to the following conditions:

1. The contingency plan is as follows: during operations, the concentrator superintendent or shift foreman on duty is responsible for the tailings line, tailings discharge, and general dam and pond operation related to his area of responsibility. The tailings disposal systems will be inspected at least once per shift for these and all related functions: a) overall dam condition; b) full length of the tailings line in use; c) all discharge points and the stream path in the pond. If a leak is found in the tailings line, the flow must be diverted to another line. Leaks in either dam must be sealed immediately. Significant changes in the characteristics of either dam will be considered to be an emergency, and all discharges into the affected pond must be stopped immediately. If an emergency condition exists, posing a threat to life, property or ground water, downstream residents and civil authorities must be notified immediately.

The reason for this is to comply with WQCC Reg. 3-107.A.10.

2. A free-board surge capacity of 13.35 acre-feet will be maintained in the main tailings pond during normal operations to hold a 100-year 24 hour storm event. The surge capacity should be restored within 30 days after each storm event.

The reason for this is to control the flooding potential pursuant to WQCC Reg. 3-106.C.4.

3. The concentrator tailings and process water are to be conducted to the main tailings pond with the exception of the magnetite that is to be separated magnetically and conducted to the existing or the additional proposed magnetite dam/pond. The proposed new magnetite dam/pond is permitted to be built 800-1,000 feet downstream from the present magnetite dam/pond under approved discharge plan DP-181. Permission to continue to utilize the existing magnetite dam/pond by replacing material removed during the shut-down period, must be secured from the New Mexico State Engineers Office.

SPECIFIC REQUIREMENTS

The terms and conditions of this modification approval contain specific requirements which are summarized below:

1. The amount of tailings discharged from the concentrators may not exceed an annual average of 10 million gallons per day.

2. Five ground water monitor wells will be installed before start-up of operations in accordance with NMED specifications. Monitor well locations and two surface water sampling points are shown on Figure 6 of the modification application, dated May 28, 1992.

3. The five ground water monitor wells, two surface water seeps, the concentrator make-up water and the effluent to the tailings pond will be sampled quarterly and analyzed for the following parameters:

Nitrates (N)	Cu	Cd	Results will be reported each quarter.
SO4	Fe	Hg	
TDS	Zn	Pb	
pH	Mn	CN	
conductivity	Ni	Cl	

4. Flows will be metered as they flow from each concentrator to the main tailings pond and magnetite ponds and reported quarterly.

5. After the mine shuts down, BMC will continue to analyze monitor well and surface water samples for the above parameters for a period of two years or a period agreed to by the NMED. BMC will also remove unused reagents from the site and continue to operate seepage control facilities for a minimum of two years or the end of the agreed period. For the purposes of DP-181, a shut-down is defined as no significant production of copper concentrate or magnetite for a period of six months or more.

GENERAL DISCHARGE PLAN REQUIREMENTS

In addition to any other requirements provided by law, the approval of modifications to DP-181 is subject to the following general requirements:

Monitoring and Reporting

Monitoring and reporting shall be as specified in the discharge plan and supplements thereto. These requirements are summarized on the attached sheet. Any inadvertent omissions from this summary of a discharge plan monitoring or reporting requirement shall not relieve you of responsibility for compliance with that requirement.

Record Keeping

1. The discharger shall maintain at the facility, a written record of ground water and waste water quality analyses.

The following information shall be recorded and shall be made available to the NMED upon request.

a. The dates, exact place and times of sampling or field measurements.

b. The name and job title of the individuals who performed the sampling or measurements.

c. The dates the analyses were performed.

d. The name and job title of the individuals who performed the analyses.

e. The analytical techniques or methods used.

f. The results of such analyses, and

g. The results of any split sampling, spikes or repeat sampling.

2. The discharger shall maintain a written record of any spills, seeps, and/or leaks of effluent, leachate and/or process fluids not authorized by this discharge plan.

3. The discharger shall maintain a written record of the operation, maintenance and repair of facilities/equipment used to treat, store and/or dispose of waste water; to measure flow rates; and/or to monitor water quality. This will include repairs, replacement or calibration of flow meters or repairs or replacement of pond liners.

4. The discharger shall maintain a written record of the amount of tailings discharged to the tailings pond.

Inspection and Entry

In accordance with § 74-6-9.B & E NMSA 1978 and WQCC Reg. 3-107.D., the discharger shall allow the Secretary or her authorized representative, upon the presentation of credentials, to:

1. Enter at regular business hours or at other reasonable

times upon the discharger's premises or where records must be kept under the conditions of this discharge plan.

2. Inspect and copy, during regular business hours or at other reasonable times, any records required to be kept under the conditions of the discharge plan.

3. Inspect, at regular business hours or at other reasonable times, any facility, equipment (including monitoring and control equipment), practices or operations regulated or required under this discharge plan.

4. Sample or monitor, at reasonable times for the purpose of assuring discharge plan compliance or as otherwise authorized by the New Mexico Water Quality Act, any effluent at any location before or after discharge.

Duty to Provide Information

In accordance with § 74-6-9.B NMSA 1978 and WQCC Reg. 3-107.D., the discharger shall furnish to the NMED, within a reasonable time, any relevant information which it may request to determine whether cause exists for modifying, terminating and/or renewing this discharge plan or to determine compliance with this plan. The discharger shall furnish to the NMED, upon request, copies of records required to be kept by this discharge plan.

Spills, Leaks and Other Unauthorized Discharges

This approval authorizes only those discharges specified in the discharge plan. Any unauthorized discharges violate WQCC Reg. 3-104, and must be reported to the NMED and remediated as required by WQCC Reg. 1-203. This requirement applies to all seeps, spills, and/or leaks discovered from the system.

Retention of Records

The discharger shall retain records of all monitoring information, including all calibration and maintenance records, copies of all reports required by this discharge plan, and records of all data used to complete the application for this discharge plan, for a period of at least five years from the date of the sample collection, measurement, report or application. This period may be extended by request of the Secretary at any time.

Enforcement

Failure to grant the Secretary or her authorized representative access to the records required to be kept by this discharge plan

or to allow an inspection of the discharge facilities or to the collection of samples is a violation of this discharge plan and the WQCC Regulations. Such violations as well as other violations of the discharge plan, may subject the discharger to civil penalties and injunctive relief pursuant to § 74-6-5.P and § 74-6-10 NMSA 1978, and/or modification or termination of this discharge plan pursuant to § 74-6-5.J NMSA 1978. In addition, anyone who knowingly makes any false statement, representation or certification in any record, report or other document required to be kept by this discharge plan shall, upon conviction, be punished by a fine of not less than $300 or more than $10,000 per day or by imprisonment for not more than one year or both, pursuant to § 74-6-5.O NMSA 1978.

Modifications and/or Amendments

The discharger shall notify NMED, pursuant to WQCC Regs. 3-107.C, of any modifications or additions to the BMC's waste water disposal system, including any increase in waste water flow rate and waste water storage and disposal management changes to the system as approved under this discharge plan. Major changes in the quality of surface or monitor well samples will be reviewed by the NMED staff. Such changes could require additional monitor wells and surface sampling points and increase sampling frequency. The discharger shall obtain NMED's approval, as a discharge plan modification, prior to any increase in the quantity or concentration of constituents in the leachate above those approved in this plan. Please note that WQCC Regs. 3-109.E and F provide for possible future amendment of the plan.

Other Requirements

Please be advised that the approval of this plan does not relieve BMC of liability should your operation result in actual pollution of surface or ground water which may be actionable under other laws and/or regulations.

RIGHT TO APPEAL

If BMC is dissatisfied with this action taken by NMED, BMC may file a petition for hearing before the WQCC. This petition shall be in writing to the Secretary of NMED within thirty (30) days of the receipt of this letter. Unless a timely request for hearing is made, the decision of the NMED shall be final.

TRANSFER OF DISCHARGE PLAN

Prior to any transfer of ownership, the discharger shall provide the transferee a copy of the discharge plan, including a copy of

this modification approval letter and shall document such to the NMED.

PERIOD OF APPROVAL

This modification approval expires on May 6, 1996, the same date as the renewed plan, dated May 6, 1991, and you should submit an application for new approval in ample time for that date.

Sincerely,

Steven J. Cary, Chief
Ground Water Protection &
Remediation Bureau

SJC:ARJ

cc: Kenneth Smith, Dist. Manager, NMED Dist. 3

Peter Maggiore, Camp Dresser & McKee inc., 2400 Louisiana Blvd. NE, Suite 740, American Financial Center, Bldg 5, Albuquerque, NM 87110

GROUND WAT SECTION
Groundwater Bureau
Environment Department
Santa Fe, N.M. 87503
(505) 827-2900

SUMMARY OF DISCHARGE PLAN

September 22, 1992

DP number: 181

Facility Name: BAYARD MINING CORPORATION
Facility Desc: METALLIC VENTURES INC.
Waste Type: MINING
Discharge / Treatment: TAILING POND / METALURGICAL EXTRACTION

County: GRANT ED District: 3 T17S R12W Sec. 9.000

Location: 1/2 MILE WEST OF FIERRO Nearest City: FIERRO, NM

Responsible Person:
RICHARD BURCHAM
Title:
Address: P.O. BOX 406
City, zip: HANOVER NM 88041
Phone: 505-534-2225

Contact or Consultant Person
PETER MAGGIORE
CAMP DRESSER & MCKE
2400 LOUISIANA BLVD.#740
ALBUQUERQUE NM 87110-
505-881-3077

The Ground Water Section staff reviewer is ALAN JAGER .
Application was received 17-JUN-81 and Public Notice published 20-JUN-81 .
The plan was approved 06-MAY-91 and expires 06-MAY-96 .
(Application for renewal should be submitted in ample time before expiration.)

MONITORING REQUIREMENTS SUMMARY

No. of monitoring reports required annually: 4
Monitoring reports are due no later than: 31-AUG, 30-NOV, 29-FEB and 31-MAY of each year.

Sampling required	Annual freq.	No of sites	Comments, description
pH	4	7	Same TDS,pH,conductivity
Disch. Vols	4	2	Metered at discharge from both concentrators
Major Ions	4	7	Mon.Wells 1-5 & 2 sample points;Cl,CN,SO4
Heavy Metals	4	7	Same Cu,Fe,Zn,Mn,Ni,Cd,Hg,Pb
Nitrate, TKN	4	7	Same N,

____ If this space is checked, monitoring requirements are summarized or explained in more detail on the attached sheet. Any inadvertent omission from this summary does not relieve the discharger of responsibility for compliance with that requirement.

Send monitoring reports to the address at top, "Attention: ALAN JAGER re: DP - 181 ."

ENVIRONMENT DEPARTMENT ROUTING SLIP

LETTER TO: Richard Burcham

FOR: S. Carey SIGNATURE

DRAFTED BY: AR Jager Sep. 22, 1992 DATE

SUBJECT: DP Modification, DP-181 Bayard Mining Corp.

FINAL DECISION NEEDED BY: _____ REASON _____

REVIEW:

		INITIAL	DATE REC'D	DATE APPROVED
E. Rebuck	PROGRAM MANAGER	ER	9/22	9/23/92
STEVE CARY	BUREAU CHIEF	SC		9/30
	DISTRICT MANAGERS			
	GRANTS			
	ACCOUNTING			
	BUDGETS			
	LEGAL REVIEW			
	ASD DIRECTOR			
KATHLEEN SISNEROS	WWM DIRECTOR			
	ERD DIRECTOR			
RON CURRY	DEPUTY SECRETARY			
JUDITH ESPINOSA	SECRETARY			
	OTHER			

COMMENTS BY DRAFTER OR REVIEWER(S):

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION

DISCHARGE PLAN APPLICATION - PART A - Page 1

Name of Facility: Continental Mine

Name of person legally responsible for discharge: Richard Burcham

Address:	Bayard Mining Corporation
	P.O. Box 406
	Hanover, NM 88041
Telephone:	505-537-3391

Name of local representative or contact person if different from above: Peter Maggiore

Address:	Camp Dresser & McKee Inc.
	2400 Louisiana Blvd., NE
	AFC No. 5, Suite 740
	Albuquerque, Nm 87110
Telephone:	505-881-3077

1. Location:

County: Grant SW 1/4 of Sec. 4 T17S R12W and the
NW 1/4 and NE 1/4 of Sec. 9 T17S R12W

Use State coordinates or latitude/longitude on unsurveyed land

(See Site Plan - Figure 1)

2. Type of operation, facility or development:

Copper mining and milling

3. Type of treatment and/or storage - type of discharge (septic tank - leachfield, package treatment plant - lagoon, lagoon - land application, etc.):

main tailings pond, waste rock piles, and tailings dam toe seepage

4. Quantity. Total volume in gallons per day (gpd) of each discharge. Describe how the flow will be metered or estimated:

10,000,000 gpd will be generated via the processing of approximately 6500 tons/day ore from open pit and 3500 tons/day underground ore. Flow will be metered as it exits each mill as it is returned to main tailings pond (See Continental Mine Water Balance Flow Chart - Figure 2).

8554.005

NEW MEXICO ENVIRONMENTAL IMPROVEMENT DIVISION

DISCHARGE PLAN APPLICATION - PART A - Page 2

5. Quality. Concentrations in milligrams per liter (mg/l) of any contaminant listed in Section 3-103 of the New Mexico Water Quality Control Commission (WQCC) regulations, total nitrogen (sum of nitrate, ammonia and TKN), and any toxic pollutants as defined in Subsection 1-101.UU. of the WQCC regulations that may be present in the discharge:

Contaminant	Concentration (mg/l)
Cl	48.5
Total Nitrate	0.6
Sulfate	1295
TDS	2300
Copper	0.08
Zinc	0.07
Cyanide	0.03
Iron	1.6
Manganese	2.0
Mercury	ND
Cadmium	ND
Lead	0.0025

NOTE: Above levels represent average concentrations obtained from water samples retrieved from the apron at the toe of the main tailings pond and seepage from the toe of main tailings pond (See Figure 3). A Table A-1 showing the complete chemical analyses from these two samples, as well as the analytical laboratory reports appear in Appendix A.

(Average discharge sample = (1 + 2) 0.5 (Table A-1)

6. Location of any water supply wells, injection wells, seeps, springs, bodies of water or watercourses within a one mile radius of the discharge site. Please locate on a topographic map or detailed aerial photograph.

See attached map (Figure 3). None of the wells are used as a domestic water supply.

7. Depth to ground water: between 15 and 150 feet (Trauger, 1972) (See Figure 4)

Total dissolved solids (TDS) concentration of the ground water below the discharge site: average for five (5) wells is 1843 milligrams per liter.

Reference or source of information: EID Conrad Report (1987) (Table listing wells appears as Table A-2 (Appendix A)). Note: local occurrence of shallow groundwater is present immediately adjacent to drainages. This is not believed to be regional groundwater, rather it is believed to represent stream flow loss. EID Conrad report (1987) data appears as Appendix B.

8. Flooding potential of the discharge site: Please indicate if discharge site is in a defined floodplain or has the potential for flash floods.

The main tailings pond site is not located in a defined floodplain as registered by the Federal Emergency Management Agency (FEMA). FEMA maps exist only for the area within and in the immediate vicinity of the Town of Silver City.

Based upon the surface drainage patterns and the physiographic setting of the discharge site, the potential for flash flooding does exist. Any stormwater generated in the undeveloped area north (upstream) of the tailings pond would be collected in the upper decent pond located north of the main tailings pond. The drainage area above the property is relatively small (approximately 325 acres). Any stormwater accumulation would be both incorporated into the makeup water and, if enough volume is accumulated (greater than 20 to 40 acre feet), the excess would flow into the pond decant tower. This water would then flow to the decant water pump house below the main tailings dam and be pumped back onto the main tailings pond and recycled. Such a rainfall event has not occurred during the history of this mine.

Find summarized below the estimated flow volumes for various storm events for the drainage basin that is captured by the main tailings pond at the Bayard Mining Corporation's Continental Mine.

RUNOFF FLOW VOLUMES (AC-FT)

STORM EVENT	6HR.	24 HR.
2 YR.	0	0.08
10 YR.	1.06	3.61
25 YR.	3.61	7.42
100 YR.	8.31	13.35

Input Parameters and Assumptions

- SCS Type II Storm Event
- Precipitation Data from: U.S. Dept. of Commerce - National Oceanic and Atmospheric Administration (NOAA). 1973. NOAA Atlas 2, Precipitation - Frequency, Atlas of the Western United States, Volume IV, New Mexico
- Drainage Area - 325 acres
- Curve Number - 58 for Pinyon-Juniper in fair condition and hydrologic soil group B (Soils with moderate infiltration when wet, and chiefly moderately deep, well-drained and of moderately fine to course textured)
- Time of concentration - 2.415 hrs.

Based upon this calculated volume of 13.35 acre-feet and the estimated operating condition pond storage capacity, more than adequate stormwater storage capacity is available.

Computer runs simulating the storm events are provided - Appendix C.

Flooding protection measures (berms, channels, other, if applicable): A collection sump and pump back system is constructed at the toe of the main tailings dam. Sufficient freeboard will be maintained in the trailings pond to reduce the potential of catastrophic loss.

9. Geologic description of discharge site, if driller's logs(s) are available, please attach.

See drilling logs attached to the Dames and Moore Report (1977) - Appendix D.

The soil types mapped by the Soil Conservation Service (SCS) in the Soil Survey of Grant County in the immediate area of the Continental Mine include:

(1) Oro Grande - Rock outcrop complex
(2) Pits - Dumps associate (mine site features)
(3) Santa Fe - Rock outcrop complex

A brief description of each of these soil types as described by the SCS is listed below:

(1) - Shallow, well drained, very cobbly loam
- it is formed in residuum derived dominantly from dolomitic limestone
- permeability is moderate and available water capacity is very low.

(2) Pits are open excavations from which soil and underlying material have been removed, exposing rock.

- dumps are accumulations of waste rock, mine spoils and other refuse.

(3) - Shallow, well drained, gravely, loam
- It is formed in residuum derived dominantly from acid igneous rock
- permeability is moderate

Aquifer material (e.g. alluvium, sandstone, volcanic, etc.): Aquifer material is alluvium in only most local instances (along Hanover Creek). In general, groundwater will occur in Pennsylvanian Oswaldo and Syrena Formations (limestone) and Colorado Formation (sandstone and shale).

Thickness of alluvium, i.e. depth to bedrock (if available): 0-5 feet

10. Describe actions taken to minimize potential contaminant seepage, e.g. lining of ponds, leakage detection/collection systems, etc.

Main pond was constructed by placing a layer of fines across the entire base of the pond. A decant tower system allows water to be pumped back to holding tanks and recirculated for use as makeup water (See Figure 5).

11. Describe the proposed monitoring system. This should include sampling point locations for effluent, leachate, and/or groundwater; sampling protocol; and the parameters to be tested for.

The monitoring system will include sampling the following:

- makeup water - quarterly;
- effluent to tailings pond - quarterly;
- groundwater monitor wells - quarterly; and
- surface water points - quarterly.

Samples to be analyzed for:

- TDS	- Ni	- Cl	- pH (field)	- Cd	-Hg
- Cu	- Zn	- Fe	- conductivity (field)	- Pb	
- SO_4	- total nitrates		- Mn	-CN	

Describe the location(s) of existing or proposed wells to be used for monitoring ground water quality. Specify below and locate on a survey plot plan or scaled drawing of the property.

Well ID	Township	Range	Section	1/4 of	1/4 of	1/4
MW-1	17S	12W	4	NE	NW	SW
MW-2	17S	12W	9	SE	NW	NE
MW-3	17S	12W	9	NE	NE	SE
MW-4	17S	12W	16	NW	NE	NE
MW-5	17S	12W	16	NW	NW	NW

Proposed groundwater monitor well locations and surface water sampling points are shown in Figure 6 (attached). A schematic groundwater monitor well completion diagram appears as Figure 7.

12.a Describe the contingency plan to be implemented should ground water standards be threatened or spills or failures occur.

Monthly monitoring would be implemented, followed by a review of engineering controls which could reasonably be implemented.

12.b Closure Plan statement - After mine closure, Bayard Mining Corporation proposes to implement the following program in order to protect groundwater quality:

- continue groundwater quality monitoring for a minimum of two (2) years from the date of mine closure for the parameters listed in Section 11 (above).
- remove or secure any unused reagents associated with the milling process. The proposed reagent list, description of reagent use, and associated Material Safety Data Sheets are attached.
- continue to operate seepage control facilities for a minimum of two (2) years.

12.c Process Diagrams - Schematic diagrams of the grinding and flotation circuits appear as Figures 8 and 9, respectively.

13. Three (3) copies of plans and specifications must be submitted to the Ground Water Section of the Environmental Improvement Division. Plans and specifications should include a survey plot plan or scaled drawing of the property which shows all buildings on the property, the location and size of all septic tanks and leach fields or other systems used for the treatment and discharge of waste water, and the location and size of all pipelines used for the conveyance and distribution of effluent with valves and distribution boxes as appropriate. Include as part of the specifications, the size in acres of the facility. Use separate attachments as appropriate.

Description of Discharge

The discharge at the Continental Mine site is associated with mining and milling operations of copper producing ore. The facility plans to process up to 10,000 tons per day. The operations require water in the process of crushing, transporting (conveyor) and for process floatation. The mill tailings and process water are then released to the main tailings pond with the exception of the magnetic separated wastes which are transported to the magnetic tailings pond (currently permitted).

The tailings pond is built up from the floor at the headwaters of a tributary of Hanover Creek (See Figure 1). The tailings pond dam was originally constructed in conjunction with the mine's opening in 1967. The existing tailings disposal system was reported (Dames and Moore, 1977) to consist of two ponds: one for copper tailings; and the other for magnetite tailings. These ponds then occupied approximately 80 acres and 9 acres, respectively.

In 1977, Dames and Moore prepared a "Report on Tailings Disposal System Design Bayard Operations Near Bayard, New Mexico for UV Industries, Inc.". In 1982, Dames and Moore prepared a "Report of Geotechnical Evaluation Proposed Tailings Pond Expansion Main Tailings Pond Near Bayard, New Mexico for Sharon Steel Corporation". Finally, in 1991, George C. Toland Consulting Geotechnical Engineers prepared a report titled "1991 Yearly Report - Engineering Inspection of Tailings Ponds - Bayard Operations Near Bayard, New Mexico. These documents are all included as Appendix E to this application.

Domestic effluent is discharged to a Case/Cotter, Inc. extended aeration sewage treatment plant. During peak mine operation, it is estimated that a maximum of 8,750 gallons per day of effluent will be discharged. This estimate assumes 25 gallons per day per worker, with 350 workers working 3 shifts per day. Liquid effluent from the package sewage treatment plant is directed to the main tailings pond. Solids are transported to a local landfill and the liquids are pumped back to the tailings pond.

Minor seepage is generated at the toe of the main dam and waste rock piles. This discharge is controlled by earthen berms. Excessive accumulations will be pumped back into the tailings pond.

I certify that I am familiar with the information contained in the application and that to the best of my knowledge and belief such information is true, complete and accurate.

Richard Buchan 5-28-92

Signature of person legally Responsible for the Discharge — Date

REFERENCES

Burcham, Richard (1992), Bayard Mining Corporation, On Site Maintenance Coordinator, personal communications

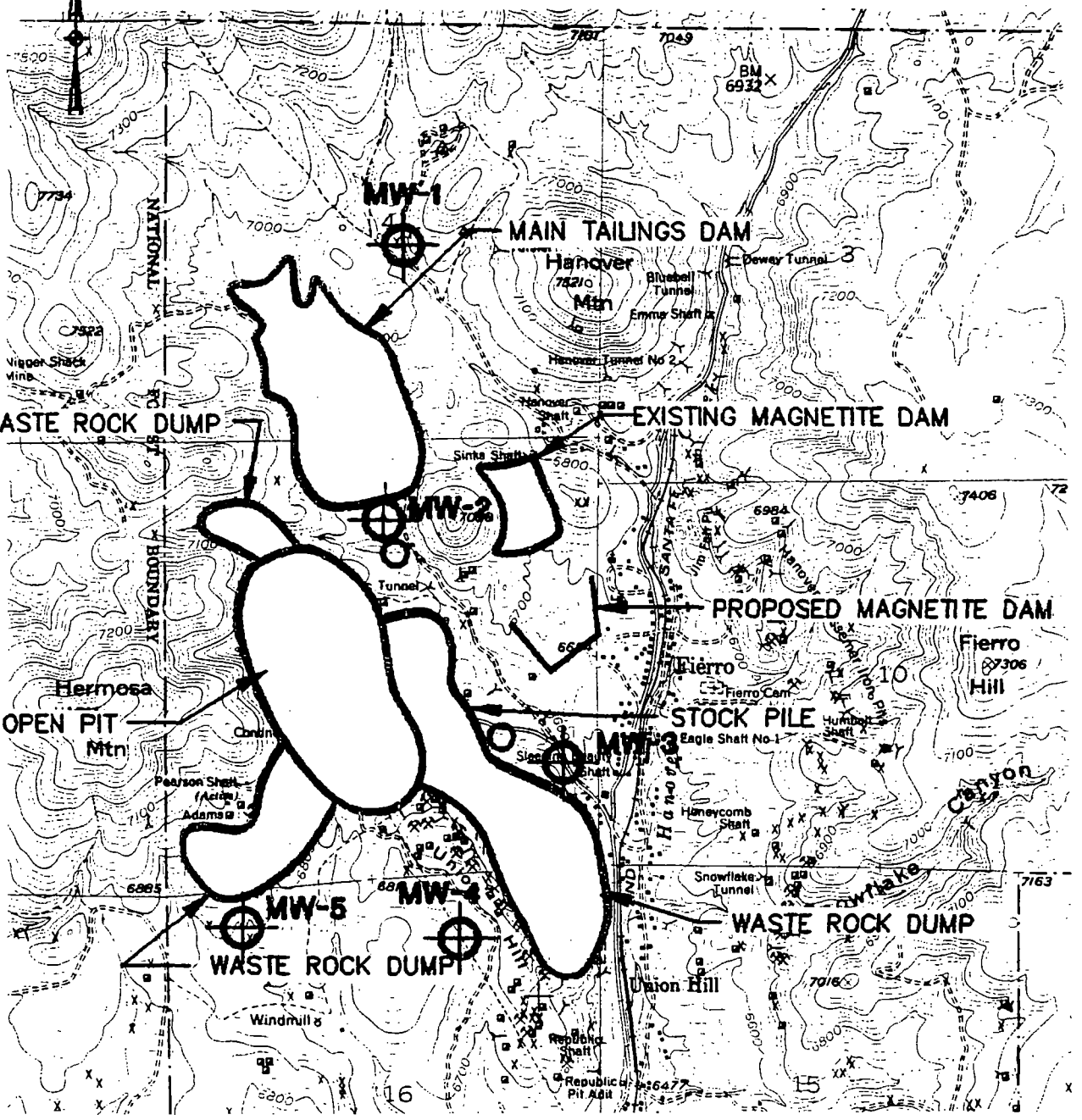
Dames and Moore (1977), Report on Tailings Disposal Systems Design, Bayard Operations near Bayard, New Mexico: Prepared for UV Industries Incorporated, 50 p.

Dames and Moore (1982), Report of Geotechnical Evaluation Proposed Tailings Pond Expansion, Main Tailings Pond near Bayard, New Mexico. Prepared for Sharon Steel Corporation.

Schwab, P.J. and Warner, Richard C., 1987: SECAD + Sediment, Erosion, Discharge by Computer Aided Design. University of Kentucky Agricultural Engineering Department, Civil Software Design.

Toland, George C., 1991: 1991 Yearly Report: Engineering Inspection of Tailings Ponds, Bayard Operations near Bayard, New Mexico. Prepared for Bayard Mining Corporation, 16 p.

Trauger, F.D., 1972: Water Resources and General Geology of Grant County: New Mexico State Bureau of Mines and Mineral Resources Hydrologic Report No. 2, 211 p.



LEGEND

MW-4 PROPOSED MONITOR WELL LOCATION

PROPOSED SURFACE WATER SAMPLE LOCATION

1 MILE

DATA FROM DAMES & MOORE (1982)
ADAPTED FROM U.S.G.S. SANTA RITA QUADRANGLE T 17 S, R 12 W

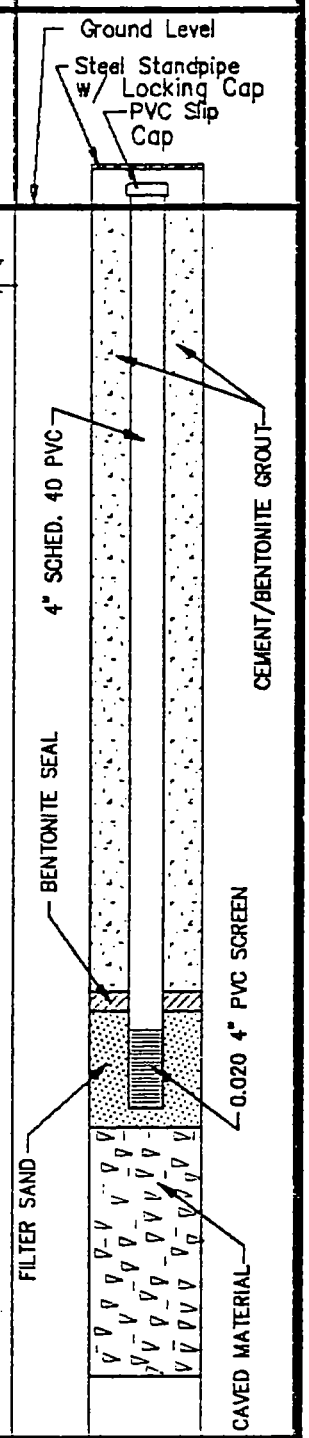
MONITORING POINT LOCATION MAP	CDM environmental engineers, scientists planners & management consultants	METALLIC VENTURES HANOVER, N.M.	Figure No. 6

METMWPT.DWG 5/22/92 em 3554-110

MONITOR WELL NO. 1

DEPTH, FT.	SYMBOL(USCS)	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING INTERVAL	MOISTURE	CONTAMINATION: ORGANIC VAPOR CONC. (PPM)	CONTAMINATION: VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL
25	SS	0–300', SANDSTONE, light gray, locally dark gray, coarse grained, soft, thin bedded; interbedded with SHALE, dark gray, soft, thin bedded, average bed thickness 0 to 5'; trace magnesium, quartz, and chalcanthite locally; 5% pyrite throughout (bleb, diss., vnlt.) w/ lt. FeOx after py.						25		
50								50		
75								75		
100		making < 1 gpm at 200' making 1 gpm at 245' making 2 gpm at 300' pumps 0.8 gpm from finished well						100		
125								125		
150								150		
175								175		
200								200		
225								225		
250								250		
275								275		
300								300		

MONITOR WELL DETAILS



Client: METALLIC VENTURES Job No.: 8554–111–CG–REPT Date Drilled: 9/20–9/29/92 Well No.: 1

Site: WEST OF CARPENTER SHOP Top of Casing Elevation: N/A

Total Depth: 300' Casing Type & Size: 4" SCHED. 40 PVC Slot Size: 0.020 Drilling Method: AIR ROTARY

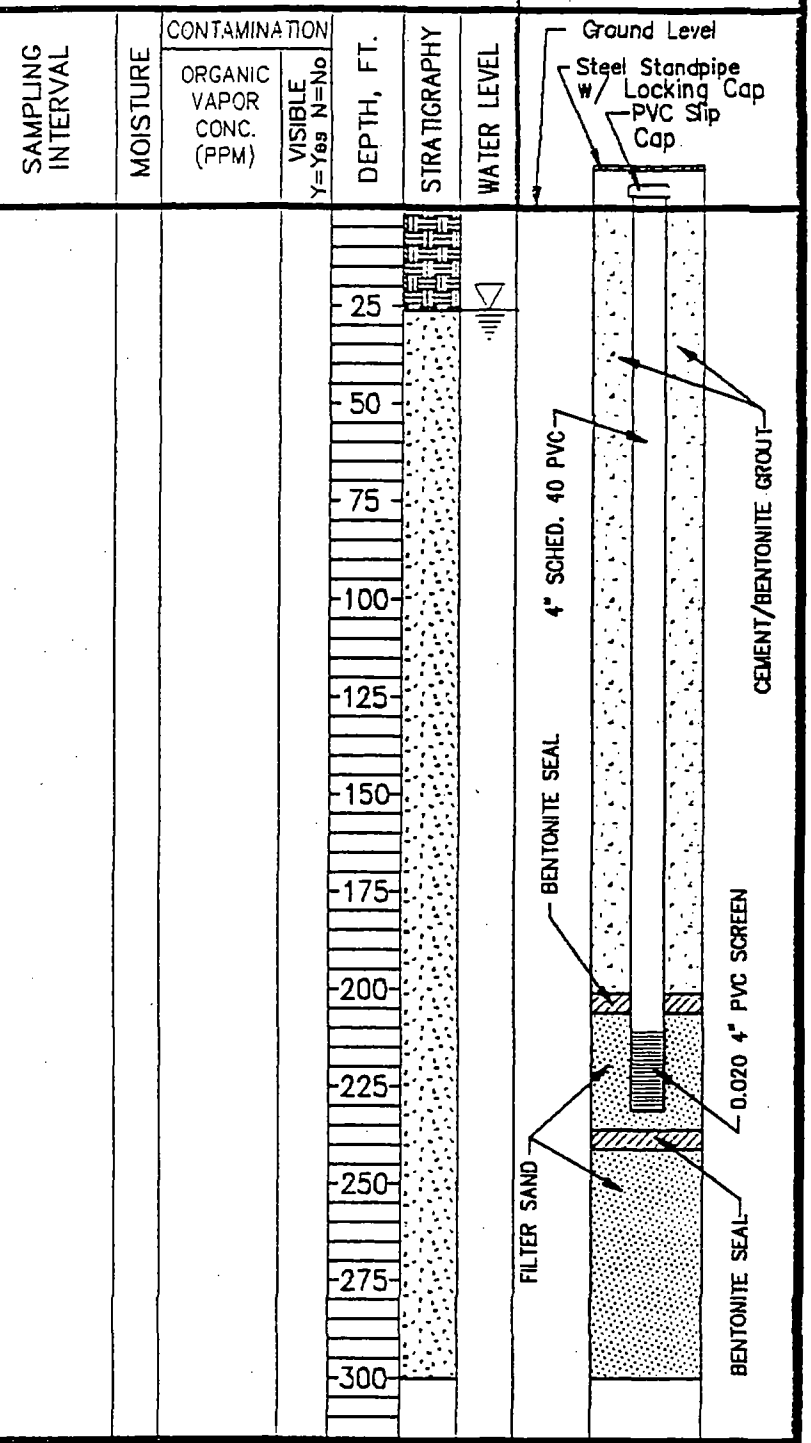
Comments:

Driller: BADGER–WESTERN Logged by: C.T. IRWIN

MONITOR WELL AND COMPLETION DETAIL MW-1	GDM environmental engineers, scientists, planners, & management consultants	METALLIC VENTURES CONTINENTAL MINE HANOVER, N.M.	Figure No. 1

MONITOR WELL NO. 2

DEPTH, FT.	SYMBOL(USCS)	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING INTERVAL	MOISTURE	CONTAMINATION: ORGANIC VAPOR CONC. (PPM)	CONTAMINATION: VISIBLE Y=Yes N=No
		0–26' OVERBURDEN, soil and alluvium					
25	GD	26–300' BIOTITE GRANODIORITE greenish gray to gray, hard; prominent biotite plates and books throughout; quartz to 25% (26'–65'); disseminated, bleb and vnlt. pyrite (tr.–5%) throughout; hornblende locally altered to epidote; magnetite throughout; trace chalcanthite and galena locally; producing 1/4 g.p.m at 0' to 215' and producing ~3 g.p.m. at 217'					
50							
75							
100		pumps 3 gpm from finished well					
125							
150							
175							
200							
225							
250							
275							
300							



Client: METALLIC VENTURES Job No.: 8554-111-CG-REPT Date Drilled: 9/14-9/17/92 Well No.: 2

Site: LOCATED BELOW MILL TAILINGS DAM Top of Casing Elevation: N/A

Total Depth: 300' Casing Type & Size: 4" SCHED. 40 PVC Slot Size: 0.020 Drilling Method: AIR ROTARY

Comments:

Driller: BADGER-WESTERN Logged by: C.T. IRWIN

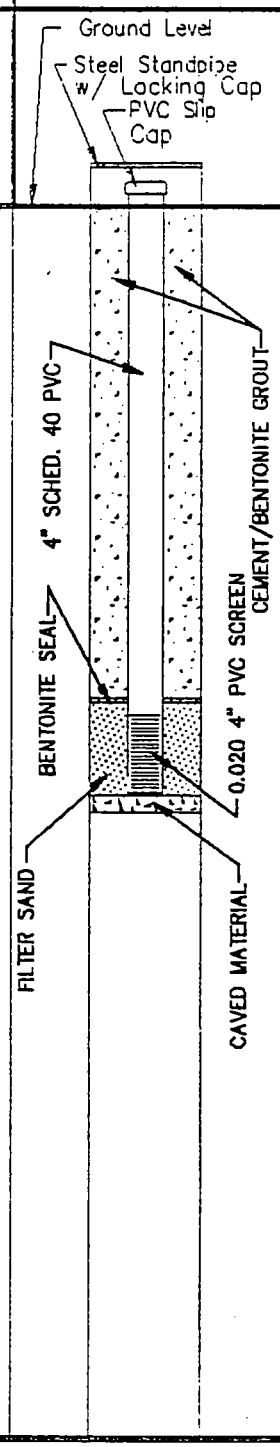
MONITOR WELL AND COMPLETION DETAIL MW-2	GDM environmental engineers, scientists, planners, & management consultants	METALLIC VENTURES CONTINENTAL MINE HANOVER, N.M.	Figure No. 2

GMWSCMV1.DWG 10/7/92 EAC 8554-111-CG-REPT

MONITOR WELL NO. 3

DEPTH, FT.	SYMBOL (USCS)	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING INTERVAL	MOISTURE	CONTAMINATION: ORGANIC VAPOR CONC. (PPM)	CONTAMINATION: VISIBLE Y=Yes N=No
		0–5' OVERBURDEN, soil and alluvium					
25, 50, 75, 100, 125	GD	5–130' BIOTITE GRANODIORITE, gray, hard, equigranular with prominent biotite plates and books, epidote after hornblende; trace – 1% pyrite and magnesium throughout; lt. FeOx after pyrite.					
150	PPY	130–155' QUARTZ PORPHYRY; gray (green when wet) with arg., feldspar and epidote after h'blende.					
175		making < 1gpm at 105' making 5 gpm at 130' making 15 gpm at 155'					
200							
225		pumps 1.25 gpm from finished well					
250							
275							
300							

MONITOR WELL DETAILS



Client: METALLIC VENTURES Job No.: 8554–111–CG–REPT Date Drilled: 9/18–10/1/92 Well No.: 3

Site: ROAD BELOW MINE DUMP Top of Casing Elevation: N/A

Total Depth: 155' Casing Type & Size: 4" SCHED. 40 PVC Slot Size: 0.020 Drilling Method: AIR ROTARY

Comments:

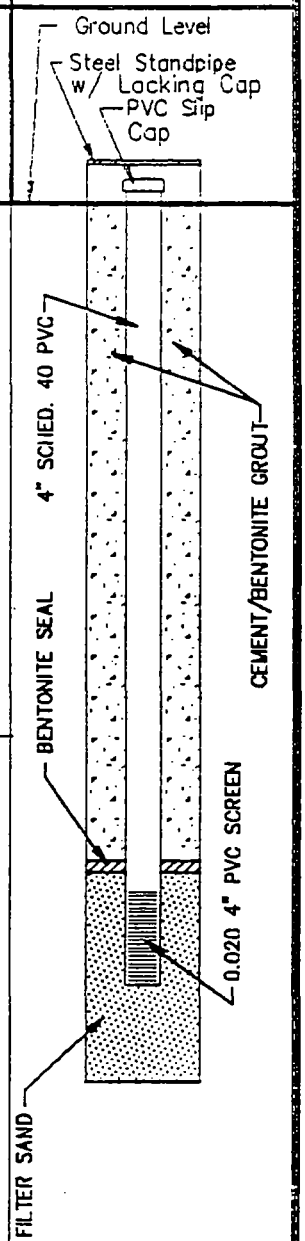
Driller: BADGER–WESTERN Logged by: C.T. IRWIN

MONITOR WELL AND COMPLETION DETAIL MW-3	GDM environmental engineers, scientists, planners, & management consultants	METALLIC VENTURES CONTINENTAL MINE HANOVER, N.M.	Figure No. 3

MONITOR WELL NO. 4

DEPTH, FT.	SYMBOL(USCS)	SAMPLE DESCRIPTION	SAMPLE NO.	SAMPLING INTERVAL	MOISTURE	CONTAMINATION: ORGANIC VAPOR CONC. (PPM)	CONTAMINATION: VISIBLE Y=Yes N=No	DEPTH, FT.	STRATIGRAPHY	WATER LEVEL
25	QZT	0–225' QUARTZITE, calcareous on fractures, well sorted, well graded, locally lt. FeOx mtrx., light magnetite, trace chlorite.						25		
50								50		
75								75		
100								100		
125								125		
150	QZT	145–180' QUARTZITE w/ tr. magnetite; 1–2% cpy., trace chalcanthite, hematite, lt. chlorite, and soft, white calcite vnlts.						150		
175								175		
200		pumps 0.25 gpm from finished well						200		
225								225		
250								250		
275								275		
300								300		

MONITOR WELL DETAILS



Client: METALLIC VENTURES Job No.: 8554–111–CG–REPT Date Drilled: 10/8/92 Well No.: 4

Site: WEST OF UNION HILL Top of Casing Elevation: N/A

Total Depth: 225' Casing Type & Size: 4" SCHED. 40 PVC Slot Size: 0.020 Drilling Method: AIR ROTARY

Comments:

Driller: BADGER–WESTERN Logged by: C.T. IRWIN

MONITOR WELL AND COMPLETION DETAIL MW-4	CDM environmental engineers, scientists, planners, & management consultants	METALLIC VENTURES CONTINENTAL MINE HANOVER, N.M.	Figure No. 4

REFERENCE 13

Walder, 1993
Report of Bullfrog tailings

REPORT PREPARED FOR MINING REMEDIAL RECOVERY COMPANY, TUCSON, ARIZONA, ON THE TOPIC:

BULLFROG MILL TAILINGS:

CHEMICAL AND MINERALOGICAL CHARACTERIZATION AND HEAVY METAL MOBILITY OF THE FOUR MILL TAILINGS (FROM Zn-Pb SKARN DEPOSITS) AND SURROUNDING AREAS AT VANADIUM, GRANT COUNTY, NEW MEXICO

BY

INGAR F. WALDER, Ph.D.

GEOCHEMIST

March 5, 1993

7116 SAN FRANCISCO RD. NE

ALBUQUERQUE NM, 87109

PHONE/FAX: 505/857-0984

MAR 1993
RECEIVED

EXECUTIVE SUMMARY

Four mill tailings piles (850,000 m^3) from Zn-Pb skarn deposits (Bullfrog mine), at Vanadium, Grant County, New Mexico, have been chemically and mineralogically characterized emphasizing metal mobility in the tailings material and the potential for groundwater contamination from the tailings material. Chemical analyses were made of Zn, Cu, Pb, As, Se, Cd, Co, Ag, Ni and Bi in 257 solid samples of tailings surface material, drill cores (eleven drill holes to the bottom of the tailings), soil, and wind-blown material. In addition, 20% of the samples were analyzed for Hg and all drill-core samples were analyzed for Zr. Twenty-one drill-core samples have been analyzed for acid producing potential and acid neutralizing potential. Two samples of pooled water on the tailings were analyzed for major anaion and cation and heavy metals. Mineralogical analyses include microscopy of heavy-mineral separates polished sections of twenty six samples, XRD analyses of both light and heavy mineral separates, and electron microprobe analyses of individual mineral grains from thirteen of the polished sections.

The following table gives the ranges and means for solid analyses of soil samples (2), mix samples (59; surface soil contaminated with wind-blown tailings material), tailings surface (53), and tailings core (91).

Cadmium, Zn, Ag, Pb, and Zr concentrations increase with depth while Cu, Ni, and Co concentrations decrease with depth. All these

ELEMENT	SOIL		MIX		TAILINGS SURF.		TAILINGS CORE	
	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN
Co	22-65	44	16-135	55.5	2-150	79	nd-150	56.6
Ni	2-10	6	nd-28	10.3	0-38	15.5	nd-38	13.6
Cu	65-125	95	70-520	269	65-7100	1038	90-2300	497
Zn	370-1950	1160	205-7100	1056	110-30500	3587	315-18500	5396
As	5-5.5	5.3	3.0-26	9.7	5.5-90	20.1	2.6-170	29.4
Se	0.2-0.4	0.3	nd-2.1	0.8	0.4-4	1.7	0.2-8.5	2.1
Ag	0.8-1.4	1.1	0.2-4.2	1.2	0.4-15	3.2	0.7-11	4.0
Cd	0.5-5	3.8	0.8-16	3.0	0.5-80	9.0	0.3-65	12.8
Hg	0.1	0.1	0.01-0.10	0.04	0.02-0.08	0.12	0.02-0.18	0.08
Pb	160-800	480	42-1150	244	8-2700	388	nd-4900	855
Bi	1.1-1.7	1.4	0.5-8.5	2	0.3-40	7.3	nd-75	10.5

Element concentrations are given in ppm. Soil samples below the tailings at the bottom of the drill-core, size fraction samples, samples of individual layers in the tailings, and trench samples are not included in the means and ranges. nd - not detected.

elements except for Zr, are expected to be leached under oxidizing conditions and Cu, Ag, and Pb will precipitate under reducing conditions. All analyzed elements except Ag have lower concentrations in mix samples relative to tailings surface samples, however, there is no successive decrease in metal concentrations in prevalent wind direction from the tailings.

The main sulfide mineral is pyrite constituting 2-10% by volume of the tailings material. Minor to trace amounts of chalcopyrite, sphalerite, and galena were also observed. Specular hematite found as a primary gangue mineral gives a reddish-brown color to several layers in the tailings. Garnet (andradite and grossulare) is the main gangue mineral beside magnetite, hematite, quartz, and calcite. Pyroxene (hedenbergite and augite), geothite, ankerite, and apatite were observed in minor amounts.

Pyrite is mostly unaltered, shows a thin rim of oxidation in some surface samples, and is totally oxidized in a few surface samples. Hematite/goethite replaces pyrite where alteration occurs. Chalcopyrite, sphalerite, and galena show no alteration.

The silicate minerals show no indication of alteration.

Grains from most of the mineral types observed were chemically analyzed for major elements (Si, O, Al, Fe, K, Ca, P, and S) and heavy metals (Cd, Ag, As, Se, Pb, Cu, Zn, and Co). Cadmium is mainly detected in sphalerite, and constitutes up to 0.1 wt.% of the sphalerite. Silver and As were not detected in any specific minerals and probably occur as trace elements in several minerals. Lead was detected in anomalous concentrations in Fe-hydroxides, Mn-oxides, and hematite besides galena.

The acid neutralizing potential (ANP) exceeds the acid producing potential (APP) of the tailings material in all but two of the twenty-one samples analyzed. The ANP gives a measure of total carbonate that will neutralize acids, while the APP gives a measurement of how much acid that can naturally be produced in the analyzed material. This acid will mainly be produced from oxidation of pyrite and the iron released by dissolution of pyrite.

The top of the Main and Mid Bullfrog tailings show no or very little alteration from the original gray and brownish color at surface or towards depth. The side slopes of these two tailings, the top of the North-East (NE)(1-2 m) and the Small tailings show distinct surface alteration. Samples of the altered tailings material at Main and Mid Bullfrog tailings contains high amounts of Pb, As, and Ag, and low concentrations of Zn and Cd relative to other tailings samples.

The pooled water collected at the tailings is neutral to basic with low concentrations of potential harmful metals such as Ag, Pb,

Cd, As, and Se (below detection limits). Sulfate is the main anion (2000 ppm). The major cations are Ca and Mg. However, water collected in a stagnant pond had low pH (3.3) high Pb and Cd concentrations (1.6 and 3.5 ppm, respectively), and high TDS (20,000 ppm) relative to the pooled water.

There are variations in element concentrations with depth which reflect primary variation through time as the tailings ponds were filled during mine operation. The observed element distribution indicates that no or very little leaching has taken place since emplacement of the tailings. This lack of leaching is substantiated by little or no alteration of the sulfide minerals, where calcite and lime is present in high enough amounts to control the pH and inhibit oxidation of pyrite and chalcopyrite for most of the tailings. The similarities in chemistry between upper part of the Main tailings and the Mid and NE tailings (where Main tailings pond was filled before the Mid and NE tailings ponds) support the interpretation that the chemical variation with depth is caused by ore variation (or recovery changes) rather than leaching of metals through time after the tailings were deposited. Element concentrations of samples surrounding the tailings reflect underlying mineralized zones.

The Small Bullfrog tailings has much higher metal concentrations than the other tailings and is altered. It is therefore recommended that this tailings pile be treated differently than the other tailings in the remediation process.

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IFW-92HBF-1

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mobility under most conditions relative to Ag, Cu, Zn, Cd, Ni, and Co and is immobilized under reducing conditions, and Zr is considered immobile under all natural surface conditions (Hoffmann, 1986; Levinson, 1980). Assessments of these elements mobility in the tailings material have been performed.

There are four mill tailings at the Bullfrog site (Fig. 1):

1. Main Bullfrog, by far the largest tailings, covering an area of 0.054 km^2
2. Mid Bullfrog, which is located north west of the Main tailings covering an area of 0.025 km^2.
3. North East (NE) Bullfrog, which is located north east of the Main tailings covering an area of 0.017 km^2.
4. Small Bullfrog, which is located south west of the Main tailings covering less than 0.003 km^2.

The Main tailings were filled first followed by Mid and finally by NE tailings. The Small tailings impoundment was used for mill overflow during upset conditions and as such is markedly different in composition. The volume of these tailings piles have been calculated based on drill-hole depth (Attachment I) and are: Main Bullfrog: 650,000 m^3; Mid Bullfrog: 150,000 m^3; NE Bullfrog: 42,000 m^3; Small Bullfrog: 3,800 m^3.

The bedrock under the Bullfrog tailings is a hornblende quartz diorite sill. Bedrock west of the Main tailings is sandstone of the Colorado Formation. Northeast of the tailings are

REFERENCE 14

Walder, 1993
Report of Hanover (Bull Hill) tailings

REPORT PREPARED FOR MINING REMEDIAL RECOVERY COMPANY, TUCSON, ARIZONA, ON THE TOPIC:

HANOVER MILL TAILINGS:

CHEMICAL AND MINERALOGICAL CHARACTERIZATION AND HEAVY METAL MOBILITY OF A MILL TAILINGS (FROM Zn-Pb SKARN DEPOSITS) AND SURROUNDING AREAS AT HANOVER, GRANT COUNTY, NEW MEXICO

BY

INGAR F. WALDER, Ph.D.

GEOCHEMIST

February 26, 1993

7116 SAN FRANCISCO RD. NE

ALBUQUERQUE NM, 87109

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EXECUTIVE SUMMARY

One mill tailings pile (1.8 million m^3) from Zn-Pb skarn deposits (Empire Zinc mine), at Hanover, east of Bull Hill, Grant County, New Mexico, has been chemically and mineralogically characterized emphasizing metal mobility in the tailings material and the potential for groundwater contamination from the tailings material. Chemical analyses were made of Zn, Cu, Pb, As, Se, Cd, Co, Ag, Ni, and Bi in 282 solid samples of tailings surface material, drill cores (six drill holes to the bottom of the tailings), soil, and wind-blown material. In addition 20% of the samples where analyzed for Hg and all core samples were analyzed for Zr. Three samples of surface water from the tailings, and two underground water samples were analyzed for major cations, anions, and heavy metals. Mineralogical analyses include microscopy of heavy-mineral separates polished sections of 32 samples, x-ray diffraction analyses of both light and heavy mineral separates, and electron microprobe analyses of individual mineral grains from 13 of the polished sections. Seventeen drill-core samples have been analyzed for acid producing potential and acid neutralizing potential. Tailings material west of Bull Hill along Hanover Creek has not been characterized.

The following table gives the ranges and means for the solid analyses of soil (12 samples), mix (76 samples of surface soil contaminated with wind-blown tailings material), tailings surface (35 samples), and tailings core (94 samples).

Cadmium and Zn concentrations increase with depth and Ag and

ELEMENT	SOIL		MIX		TAILINGS SURF.		TAILINGS CORE	
	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN	RANGE	MEAN
Co	12-46	21.8	16-65	38	18-60	38	16-75	27.2
Ni	8-40	25.1	nd-42	21	2-28	11.7	nd-38	8.2
Cu	60-510	159	160-830	392	105-1600	707	95-1600	506
Zn	620-46000	8406	880-28000	4331	175-16500	4454	185-60000	9040
As	3.0-15	7.7	5.5-70.0	14.4	5-24	14.9	3.8-185	15.6
Se	0.1-1.0	0.4	nd-2.0	0.9	0.3-3.6	1.3	0.5-4.2	1.6
Ag	0.4-4.2	1.9	0.2-6.1	1.6	0.6-5.7	2.1	0.4-12	3.0
Cd	1.7-48	16	0.9-50	12.4	0.2-120	17.7	0.3-170	29
Hg	0.02-0.08	0.05	0.04-0.14	0.07	0.02-0.08	0.05	0.02-0.8	0.10
Pb	38-1300	605	85-2950	439	2.0-1800	303	4-2550	951
Bi	0.5-18	7.6	0.8-24	5.0	1.2-14	4.3	0.3-22	9.0

Element concentrations are given in ppm. Soil samples below the tailings at the bottom of the drill cores, size-fraction samples, and samples of individual layers are not included in the means and ranges. nd - not detected

Pb are low for the uppermost core samples (five foot interval), while Cu, Ni, and partly Co concentrations are highest for the uppermost core samples. Except for these elements there are no systematic element concentration variations with depth.

The tailings surface samples average lower Pb and Zn concentrations than the surrounding samples, but there are zones on the tailings surface with heavy metal concentrations 3 to 4 times higher than surrounding areas including Pb and Zn. The concentrations of Pb and Zn are higher in the core samples than the surface samples. Co, Ni, and Cu have lower concentrations in core samples relative to tailings surface samples.

Elevated metal concentrations in samples surrounding the tailings are found close to mineralized areas. There is no successive decrease in metal concentrations in prevalent wind-direction away from the tailings.

The main sulfide mineral observed in polished sections is pyrite with minor to trace amounts of chalcopyrite, sphalerite, and galena. The sulfides constitute approximately 2 to 10% by volume of the tailings material. The heavy minerals constitute the major

part of the tailings. Garnet (andradite) is the main gangue mineral besides hematite (earthy and specular), magnetite, quartz, and calcite. Pyroxene (hedenbergite and augite), geothite, ankerite, and apatite were observed in minor amounts.

Pyrite is mostly unaltered but occasionally shows a thin rim of oxidation (goethite/hematite) in some surface samples. This iron-oxide rim on the pyrite is the only trace of secondary minerals found by microscopic analysis (traces of Zn-sulfate were detected by microprobe). Chalcopyrite, sphalerite, and galena show no alteration. Specular hematite found as a primary ore mineral gives a reddish-brown color to several layers in the tailings.

Most minerals observed under the microscope were chemically analyzed by electron microprobe (O, Si, Al, Fe, K, P, Se, Pb, Ag, Cd, Cu, Zn, Co). Silver, Cd, and As were not detected in any specific minerals and probably occur as trace elements in several minerals. Lead was detected in anomalous concentrations in Fe-hydroxides, Mn-oxides, and hematite besides galena.

The acid neutralizing potential (ANP) exceeds the acid producing potential (APP) of the tailings material by factors of 3.8 to 11.1 in all samples analyzed. The ANP gives a measure of total carbonate (and lime added during flotation) that will neutralize acids, while the APP gives a measurement of how much acid can naturally be produced in the analyzed material (mainly pyrite oxidation). Both ANP and APP are higher in the upper parts than the lower parts of the tailings.

The ponded surface water samples collected on the tailings are

neutral to alkaline with low concentrations of Ag, Pb, Cd, As, Hg, and Se (below detection limit). Sulfate is the main anion measuring 200-1300 ppm, higher for underground samples than surface samples. The major cations are Ca and Mg.

The tailings material does not show any oxidation/alteration or metal leaching with depth since emplacement. The results of this study indicate that the potential harmful elements analyzed are stable in the tailings material. Element variations seen with depth reflect the natural variation of the processed ore through time and variation in recovery. The sulfide minerals are stabilized by natural occurring carbonate (mainly calcite) and lime added during ore processing. If there should be some acid generation at the surface it will be neutralized at depth forming secondary minerals that trap the metals transported in acidic water. There is low risk for groundwater contamination of heavy metals from the tailings. There are sufficient amounts of neutralizing minerals to keep the tailings material chemically stable. Element concentrations of surface samples surrounding the tailings reflect underlying mineralized zones.

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H. COPY OF Dr. W.X. CHAVEZ MINERALOGICAL REPORTS.....

Bismuth has low mobility under most conditions relative to Ag, Cu, Zn, Cd, Ni, and Co and is immobilized under reducing conditions, and Zr is considered immobile under all natural surface conditions (Hoffmann, 1986; Levinson, 1980). Assessments of these elements mobility in the tailings material have been performed.

The surrounding and underlying rocks of the Hanover tailings are mainly Magdalena Group limestones (Syrena Formation and Oswaldo Formation). These limestones are intruded by quartz diorite porphyry dikes and hornblende quartz diorite sills of upper Cretaceous to lower Tertiary age (Jones et al., 1967). Some Lake Valley Limestone of Lower Mississippian age is present on the northern side the Hanover-Fierro granodiorite porphyry (Jones et al., 1967). The Hanover mill tailings cover an area of appoximately 0.20 km^2.

The ore from which the mill tailings have been produced is a massive sphalerite replacement deposit in limestone (skarn deposit) around the Hanover-Fierro stock (Jones and Hernon, 1973). The main primary ore mineral is sphalerite with higher abundance of chalcopyrite than galena (Jones and Hernon, 1973; Schmitt, 1939). The sphalerite contains 0.04-1.0 wt.% Mn, 0-0.3 wt.% Pb, and 0.03-0.2 wt.% Cd (Jones and Hernon, 1973). Andradite is the most abundant silicate mineral replacing limestone. Pyroxene (hedenbergite to ferrosalite), ankerite, specular hematite, pyrite, and pyrrhotite are also common gangue minerals. Flotation was the

REFERENCE 15

NMED, Superfund Section
Standard Operating Procedures manual

CONRAD

STANDARD OPERATING PROCEDURES

FOR

SITE INVESTIGATION FIELD PRACTICES

SUPERFUND SECTION
ENVIRONMENTAL IMPROVEMENT DIVISION
HEALTH AND ENVIRONMENT DEPARTMENT
SANTA FE, NEW MEXICO

APRIL, 1988
Revised 2/21/89

PREFACE

These Standard Operating Procedures(SOP) for field sampling and testing were prepared to be utilized by the Superfund Section of the Environmental Improvement Division. The SOP document is not intended to cover every contingency one encounters in undertaking field sampling and testing. At times, experience and professional judgement may override sections of the SOP and deem variations from one or another of the procedures. In those cases, modification of the SOP should be duly noted in the relevant field notebook. Although some portions of the SOP may be utilized by other sections of the EID, this SOP was geared exclusively for use by Superfund. Some brief references are made toward QA/QC practices but by and large this type of documentation will be covered in another manual.

This SOP was prepared by Ron Conrad of the Superfund Section with assistance from other members of the Superfund Section staff and Albert Dye of the Ground Water Section. Darlene Roybal of the Superfund Section typed the manuscript.

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REFERENCE 16

USEPA

User's guide to Contract Laboratory Program

United States
Environmental Protection
Agency

Office of Emergency and
Remedial Response
Washington, DC 20460

EPA/540/8-89/012
December 1988

Superfund

EPA

User's Guide to Contract Laboratory Program

EPA/540/8-89/012
December 1988

USER'S GUIDE TO CONTRACT LABORATORY PROGRAM

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF EMERGENCY AND REMEDIAL RESPONSE
401 M STREET SW

Washington, DC 20460

REFERENCE 17

CLP Data Sheets and Data Validation

TAL metals analysis for water

TABLE 3: LSI METALS ANALYSES FOR GROUND WATER SAMPLES, WHITEWATER & HANOVER CREEKS SITE (Values in ug/L)

CLP No.	MFQ202	MFQ218	MFQ208	MFN651	MFQ201	MFQ219	MFQ220
Site No.	CO92W-B	CO92W-EQB	CO92W-SPR	CO92W-MW1	CO92W-MW1	CO92W-MW2	CO92W-MW2
Location	TripBlank	EquipBlank	Fiero Spr	Continental Well 1	Continental Well 1	Continental Well 2	Continental Well 2
Sample type	Total	Total	Total	Total	Dissolved	Total	Dissolved
Sample Index			GW1	GW3	GW3	GW4	GW4

CLP No.	MFQ216	MFQ217	MFQ214	MFQ215	MFQ206	MFQ207	MFQ213
Site No.	CO92W-MW3	CO92W-MW3	CO92W-MW3	CO92W-MW3	CO92W-MW4	CO92W-MW4	CO92W-ESC
Location	Continental Well 3	Continental Well 3 Dupl	Continental Well 3	Continental Well 3 Dupl	Continental Well 4	Continental Well 4	[redacted]
Sample type	Total	Total	Dissolved	Dissolved	Total	Dissolved	Total
Sample Index	GW5	GW5	GW5	GW5	GW6	GW6	GW2

CLP No.	MFQ240	MFQ241	MFQ342	MFQ227	MFQ343	MFQ230
Site No.	CH92W-SW	CH92W-SW	CH92W-16S	CH92W-16S	CH92W-WD4	CH92W-WD4
Location	[redacted]	[redacted]	Chino Well 16S	Chino Well 16S	Chino Well WD4	Chino Well WD4
Sample type	Total	Dissolved	Dissolved	Total	Dissolved	Total
Sample Index	GW7	GW7	GW8	GW8	GW9	GW9

CLP No.	MFQ344	MFQ229	MFQ228	MFQ231	MFQ226	MFQ232
Site No.	CH92W-WD10	CH92W-WD10	CH92W-7GS	CH92W-7GS	CH92W-CB6D	CH92W-CB6D
Location	Chino Well WD10	Chino Well WD10	Chino Well 7GS	Chino Well 7GS	Chino Well CB6D	Chino Well CB6D
Sample type	Dissolved	Total	Dissolved	Total	Dissolved	Total
Sample Index	GW10	GW10	GW11	GW11	GW12	GW12

TABLE 7: LSI METALS ANALYSIS FOR SURFACE WATER SAMPLES, WHITEWATER & HANOVER CREEKS SITE (Values in ug/L)

CLP No.	MFQ209	MFQ237	MFQ203	MFQ204	MFQ212	MFQ238	MFQ239	MFQ242
Site No.	O92W-HCB	CH92W-LB	CO92W-MT1	CO92W-MT2	CO92W-HCU	H92W-HCB	CH92W-HCBH	H92W-HCW
	Background							
Location	Hanover Cr FierroSpr	LuckyBill	ContMainTail Seep	ContMainTail SurfDecant	Hanover Cr Un. Hill	Hanover Cr BulllHill	Hanover Cr BlackHawk	Hanover Cr WDump
Sample index	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8

2/10/93

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

Site Name Whitewater

Case# 19220

SDG# MFQ-226

Date: 2-8-1993

Subject: **CLP Data Review**

From: Dr Melvin Ritter , Chemist , Region VI M.C. Ritter

To : K. Hill , 6H-MA , Region VI

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.
Samples were:

INORGANIC:	MFQ-226 TO	MFQ-344		
	MFQ-232			
	MFQ-237 TO			
	MFQ-242			
	MFQ-342 TO			
ORGANIC:				

The data was found:

( ) Acceptable

(X) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HO
Mike Hiatt, EMSL/Las Vegas
Regional TPO
Mitzie Dovel,Mantech ENV,VA

FEB 1993 RECEIVED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: 2-8-1993

Subject: CLP Data Review

From: Mahmoud El-Feky, Data Coordinator ,Region VI

To: Dr. Melvin Ritter , Chemist , Region VI

Attached is the data review summary for Site Whitewater
Case # 19220
SDG # MFO-226

Data was found: ( ) Acceptable

(X) Provisional

( ) Unacceptable

Action required by TPO: ( ) Yes

(X) No

COMMENTS:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099
INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19220
LABORATORY SKINER(MA)
CONTRACT # 68-D0-0108
SDG # MFQ226
SOW# ILM02.1
ACCT # 3TGBDN77 SF # TGBUZZ

SITE Whitewater
NO. OF SAMPLES/
MATRIX 16/water
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Nhan Tran
COMPLETION DATE Feb. 3, 1993

SAMPLE NO.: MFQ226, MFQ227, MFQ228, MFQ229, MFQ230, MFQ231, MFQ232, MFQ237, MFQ238, MFQ239, MFQ240, MFQ241, MFQ242, MFQ342, MFQ343, MFQ344

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	O	O	O	NA
3. BLANKS	X	O	O	NA
4. ICS	O			
5. LCS	O	O		
6. DUPLICATE ANALYSIS	X	O	O	NA
7. MATRIX SPIKE	O	M	O	NA
8. MSA		X		
9. SERIAL DILUTION	X			
10. SAMPLE VERIFICATION	O	O	O	NA
11. OTHER QC	O	M	O	NA
12. OVERALL ASSESSMENT	X	M	O	NA

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
N/A= Not applicable

ACTION ITEMS: Matrix spike recoveries were outside of the quality control limits; a serial dilution difference exceeded the quality control limit; furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 43 of 64 determinations; FAA analytical spike recoveries were below 10% for both the initial and the repeated determinations; percent relative standard deviations for duplicate FAA injections were above 20% for both the initial and the repeated determination; method of standard addition correlation coefficients were below 0.995; a difference between duplicate results exceeded the quality control limit, and blank concentrations were above the instrument detection limits.

AREAS OF CONCERN:

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

COMMENTS:

Sixteen water samples were analyzed at low concentrations for total metals. The data package is provisional because: the selenium results below the instrument detection limit are unusable; matrix spike recoveries were outside of the quality control limits; a serial dilution difference exceeded the quality control limit; furnace atomic absorption analytical spike recoveries were below 10% for both the initial and the repeated determinations; percent relative standard deviations for duplicate FAA injections were above 20% for both the initial and the repeated determination; furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 43 of 64 determinations; method of standard addition correlation coefficients were below 0.995; a difference between duplicate results exceeded the quality control limit, and blank concentrations were above the instrument detection limits.

1. Holding Times

All holding time criteria were met.

2. Calibrations

All calibrations were acceptable.

3. Blanks

A. Calibration Blanks

The concentrations of aluminum, cadmium, calcium, chromium, cobalt, copper, manganese, potassium, silver, sodium, and zinc in the calibration blanks were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). The reviewer verified that the calcium and potassium results are not significantly affected.

However, the following sample results should be considered undetected because they were greater than the IDLs but less than five times the highest associated blank concentrations:

aluminum results for samples MFQ228 and MFQ237 (further qualified due to the presence of aluminum in the preparation blank);

cadmium results for samples MFQ231 and MFQ239;

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

3. Blanks, Calibration Blanks (continued):

chromium results for samples MFQ226, MFQ227, MFQ229, MFQ231, MFQ232, MFQ237, MFQ238, MFQ240, MFQ241, MFQ242, MFQ342, and MFQ344;

cobalt results for samples MFQ228, MFQ231 and MFQ238;

copper results for samples MFQ226, MFQ232, MFQ237, and MFQ238; and

silver results for samples MFQ231, MFQ237, and MFQ343.

The following sample results are biased high by the indicated calibration blank concentrations:

aluminum results for sample MFQ238 and MFQ239 by a 42.5 ug/L concentration;

the cadmium result for sample MFQ242 by a 3.0 ug/L concentration;

chromium results for samples MFQ230 and MFQ343 by a 7.4 ug/L concentration;

the cobalt result for sample MFQ242 by a 5.9 ug/L concentration;

copper results for samples MFQ228, MFQ239, and MFQ231 by concentrations of 17.4 to 21.4 ug/L;

manganese results for samples MFQ231, MFQ237, MFQ238, and MFQ239 by a 14.5 ug/L concentration;

the silver result for sample MFQ230 by a 3.2 ug/L concentration; and

zinc results for samples MFQ237 and MFQ238 by an 8.1 ug/L concentration.

The concentrations of iron and sodium in the calibration blanks were above both the absolute value of the negative IDL and the positive IDL. It is not possible to determine the net bias. There are no false negatives.

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

B. Preparation Blanks

The concentrations of aluminum and sodium in the preparation blank were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). The reviewer verified that the sodium results are not significantly affected.

However, the aluminum result for sample MFQ228 should be considered undetected because this result was greater than the IDL but less than five times the aluminum concentration in the preparation blank.

The aluminum results for samples MFQ237, MFQ238, and MFQ239 are biased high by the presence of 31.5 ug/L aluminum in the preparation blank.

C. All other blank results were acceptable.

4. ICS

Interference check sample criteria were met.

5. LCS

All laboratory control sample results were acceptable.

6. Duplicate Analysis

The 1121.4 ug/L difference between duplicate copper results exceeded the technical limit of 25.0 ug/L (CRDL). The copper results in all samples are qualified as estimated (J and UJ).

All other duplicate results met technical quality control criteria.

7. Matrix Spike

The following sample results are qualified due to possible physical or chemical interferences present in the samples:

all selenium sample results except MFQ239 are qualified as unusable (R) due to a 0.0% pre-digestion matrix spike recovery and false negatives are possible for selenium in all samples except MFQ239;

the selenium result for sample MFQ239 is qualified as estimated (J) due to the 0.0% pre-digestion matrix spike recovery and is the lowest at which it is present;

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

7. Matrix Spike (continued):

all arsenic sample results except MFQ343 are qualified as estimated (UJ) due to a 58.9% pre-digestion matrix spike recovery; and

all lead sample results are qualified as estimated (J and UJ) due to a 73.9% pre-digestion matrix spike recovery.

All other analytes had acceptable pre-digestion matrix spike recoveries.

8. MSA

The lead results for samples MFQ232, MFQ240, MFQ242, and MFQ344 are qualified as estimated (J) due to method of standard addition correlation coefficients below 0.995. Physical or chemical interferences may be present in the samples.

All other method of standard addition correlation coefficients were acceptable.

9. Serial Dilutions

All beryllium sample results are qualified as estimated (J and UJ) due to a 15.1% serial dilution difference. Physical or chemical interferences may exist due to the sample matrix.

All other serial dilution results met quality control criteria.

10. Sample Verification

The IDL's for both arsenic and selenium were reported as 2.9 ug/L and 3.8 ug/L, respectively, on Form 14 and Form 1. The raw data for both of them were reported as 3.7 ug/L and 3.3 ug/L, respectively.

11. Other QC

A. Furnace Atomic Absorption Quality Control

The following sample results are qualified due to possible physical or chemical interferences present in the samples:

the arsenic results for samples MFQ226, MFQ227, MFQ228, MFQ229, MFQ231, MFQ232, MFQ238, MFQ239, MFQ240, MFQ241, and MFQ344 are qualified as estimated

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

11. Other QC (continued):

(UJ) due to FAA analytical spike recoveries of between 40.0% and 82.7%;

the arsenic result for sample MFQ343 is qualified as unusable (R) because the FAA analytical spike recoveries were below 10% for the initial determination and after dilution;

the lead results for samples MFQ227, MFQ228, MFQ230, MFQ231, MFQ238, MFQ241, MFQ342, and MFQ343 are qualified as estimated (J and UJ) due to FAA analytical spike recoveries of between 58.7% and 82.2%, respectively;

the lead result for sample MFQ237 is qualified as estimated (J) because the percent relative standard deviations for duplicate injections were above 20% for both the initial and the repeated determination; and

the thallium results for samples MFQ227, MFQ228, MFQ229, MFQ230, MFQ231, MFQ238, MFQ239, MFQ240, MFQ241, and MFQ242 are qualified as estimated (UJ) due to FAA analytical spike recoveries between 58.5% and 83.4%, respectively.

B. There were no other Section 11 quality control problems.

12. Overall Assessment

The data package is provisional due to the following deficiencies.

The arsenic result for MFQ343 is unusable. Furnace atomic absorption analytical spike recoveries were below 10% for both the initial and the repeated determinations.

Arsenic, lead, and selenium matrix spike recoveries were outside of the quality control limits. The selenium results below the instrument detection limit are unusable.

The beryllium serial dilution difference exceeded the quality control limit.

Percent relative standard deviations for duplicate FAA injections were above 20% for both the initial and the repeated determination for lead in MFQ237.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFQ226 Site Whitewater Lab SKINER(MA)

12. Overall Assessment (continued):

Furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 43 of 64 determinations.

Method of standard addition correlation coefficients were below 0.995 for lead in four samples.

The difference between duplicate copper results exceeded the quality control limit.

Blank concentrations were above the instrument detection limits. Cadmium, calcium, chromium, cobalt, copper, iron manganese, potassium, silver, and zinc sample results are affected by the calibration blanks. Aluminum and sodium sample results are affected by both the calibration blanks and the preparation blank.

In Reference to Case
19220 SDG MFQ226
Page 1 of 1 pages

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

FAX Record Log

Date of FAX: January, 5 1993

Laboratory Name: SKINER

Lab Contact: Kirk Johnson

Region: 6

Regional Contact: Nhan Tran (ESAT)

FAX Initiated by: Region

In reference to data for the following sample numbers:

SAMPLE NO.: MFQ226, MFQ227, MFQ228, MFQ229, MFQ230, MFQ231, MFQ232, MFQ237, MFQ238, MFQ239, MFQ240, MFQ241, MFQ242, MFQ342, MFQ343, MFQ344

Summary of Questions/Issues:

The IDL's for both arsenic and selenium were reported as 2.9 ug/L and 3.8 ug/L, respectively, on Form 14 and Form 1. The raw data for both of them were reported as 3.7 ug/L and 3.3 ug/L, respectively. Please explain.

Summary of Resolutions:

The EPA expects the laboratory to look into items and submit data within fourteen days to Christy Macdowell, U.S. EPA, 10625 Fallstone Road, Houston TX 77099.

Signature 2/5/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

ManTech Environmental Technology
ESAT Region 6

c/o US EPA 10625 Fallstone Rd, Houston, TX 77099 TEL:(713) 983-2125

FACSIMILE COVER SHEET

Please deliver the following pages to:

Name Kirk Johnson

Firm SKINNER

City Waltham **State** MA

Telephone (617) 890-7200 **Ext.** _____

Fax Telephone No. (617) 890-3883 **Ext.** _____

Sender:

Name Nhan Tran ESAT

Date January 5, 1993 **Time** _____

Total Number of pages including this Cover Sheet 2

If you do not receive all the pages or if any pages are unclear, please call: (713) 983-2125

MESSAGES: _____

Fax Model No. Panafax UF-620 Fax No. (713) 983-2248

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No.	19220	SDG No.	MFQ226	SDG Nos. To Follow	SAS No.	Date Rec	1/19/93

EPA Lab ID: SKINNER

Lab Location: Waltham, MA

Region: 6 Audit No.: 19220/MFQ226

Re_Submitted CSF? Yes ____ No X

Box No(s): ONE

COMMENTS:

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

	Signature	Printed Name/Title	Date
Audited by:	for Kathleen Nguyen	K. T. Nguyen/Associate Scientist	1/27/93
Audited by:			
Audited by:			

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature Printed Name/Title

DATA SUMMARY

Case No. 19220 / MFQ 226

Laboratory SKINER

Matrix WATER

Units UG/L

EPA TR #	MFQ 226	MFQ 227	MFQ 228	MFQ 229	MFQ 230	MFQ 231	MFQ [illegible]	MFQ 237	MFQ 238	MFQ 239	MFQ 240	MFQ 241	MFQ 242	COMMENTS
Lab I.D.	12196-01S	12196-02S	12196-03S	12196-04S	12196-05S	12196-06S	12196-[illegible]	12196-08S	12196-09S	12196-10S	12196-11S	12196-12S	12196-13S	
Aluminum	7830	101000	141 B	55700	767000	1400	7100	207	238	765	85600	85900	7560	
Antimony					24.8 B		16.9 B							
Arsenic	WN 69.3	WN 42.4	WN 66.2	WN 59.2	N	WN 63.1	WN 74.0	N	WN 52.7	WN 74.4	WN 39.1	WN 44.7	N	
Barium	15.0 B	26.6 B	43.3 B	79.9 B	21.6 B	45.7 B	15.0 B	24.1 B	39.7 B	16.6 B	9.0 B	11.6 B	16.6 B	
Beryllium	27.7 E	28.3 E	0.54 BE	15.0 E	11 E	0.40 BE	27.7 E	E	E	E	19.7 E	20.2 E	1.6 BE	
Cadmium	159	123		87.6	603	1.0 B	151			7.0	56.0	57.5	23.9	
Calcium	481000	483000	478000	467000	416000	827000	466000	19000	412600	339000	304000	307000	393000	
Chromium	9.9 B	29.6		21.7	52.0	17.2	8.9 B	3.9 B	6.2 B		9.8 B	8.0 B	6.6 B	
Cobalt	1670	1750	3.3 B	452	10500	5.3 B	1580		3.3 B		1410	1410	30.1 B	
Copper	6.5 B*	186000*	195 *	8130*	250000*	122 *	71.6 *	76.9 *	89.2 *	97.5 *	6210 *	6360 *	937 *	
Iron	92500	157000	259	99100	6810	32.1 B	89500	181	218	389	585	30.2	11200	
Lead	11.2 N	3.6 WN	WN	235 N	WN	2.6 BWN	6.8 + N	3.8 WN	2.5 BWN	6.7 N	9.0 + N	3.5 WN	8.9 + N	
Magnesium	414000	148000	91700	551000	1270000	92400	398000	6910	179000	96800	216000	217000	24000	
Manganese	119000	28400	39.6	59600	513000	207	113000	150	124	88.6	43600	43800	5440	
Mercury		0.24												
Nickel	471	546		301	3430	7.4 B	454				506	509	19.7 B	
Potassium	4060 B	26000	6340	20900	8980	6910	3960 B	2250 B	6340	4590 B	1710 B	1790 B	3890 B	
Selenium	WN	WN	N	WN	EN	WN	WN	N	WN	8.8 SN	WN	WN	WN	
Silver					26.4	1.2 B		1.5 B						
Sodium	58400	113000	73300	122000	93300	75500	76500	1500	95300	97500	66800	67000	75500	
Thallium		2.7 BW	W	W	W	W			W	W	W	1.7 BW	W	
Tin														
Vanadium		38.0 B	5.0 B	4.9 B		11.5 B	8.5 B	3.6 B	3.6 B					
Zinc	68600	8750	3260	37700	102000	2760	62700	[illegible]	[illegible]	9170	[illegible]	16300	10900	
Cyanide														
% Solids	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

DATA SUMMARY

Case No. 19220 / MFQ 226

Laboratory SKINER

Matrix WATER

Units UG/L

EPA TR #	MFQ342	MFQ343	MFQ344											COMMENTS
Lab I.D.	12196-142	12196-153	12196-165											
Aluminum	13000	748000	48800											
Antimony														
Arsenic	11	EN 22	WN 32.4											
Barium	35.0B	25.0B	11.6B											
Beryllium	38.4E	111E	17.1E											
Cadmium	140	573	20.7											
Calcium	545000	414000	412000											
Chromium	18.6	38.7	12.1											
Cobalt	1930	10200	408											
Copper	204000*	275000*	6740*											
Iron	177000	7130	76700											
Lead	4.7WN	42.0BWN	37.2+N											
Magnesium	169000	1410000	473000											
Manganese	32000	554000	53100											
Mercury														
Nickel	609	3360	270											
Potassium	28700	8420	16500											
Selenium	WN	EN	EN											
Silver		16.6												
Sodium	128000	92900	106000											
Thallium	2.9B													
Tin														
Vanadium	43.1B		19.8B											
Zinc	9610	94800	30300											
Cyanide														
% Solids	0.0	0.0	0.0											

R

COVER SHEET

LABORATORY RESPONSE TO RESULTS OF
CONTRACT COMPLIANCE SCREENING (CCS)

Response To: (Check One) _____ Organic CCS

✓ Inorganic CCS

Response materials should be sent to the attention of the CCS Coordinator.

Labcode: SICTNER

Response Date 1/28/93

Date Screening
Results Received
at Laboratory 1/27/93

EPA Contract No. 68-D0-0108

Case No. 19220

SDG No. MFQ22

Samples Nos.* All

*Only list sample numbers that require reconciliation.

This form is used to identify materials sent in response to results of Contract Compliance Screening (CCS). A separate form must accompany the response for each SDG.

Please indicate (on the attached continuation form) which fractions and/or which criteria correspond with your resubmission. Response materials sent to CCS should also be copied to the Region and to EMSL/LV, each with this blue Cover Sheet.

Laboratory Response to Results of CCS

Criterion	Comments
234	
510	
511	
521	Resubmit forms 1, 3, 5, 6, 10 and the diskette with the arsenic values reported to the correct ID.
231	
930	
933	
1315	
MO3	Resubmit ~~form~~ page 115 with corrected EPA sample ID for MFQ231.
MO4	No sample MFQ227A was analyzed because no spike values exceeded the control limits.
	Note: pages 123 – 165 were submitted in the incorrect chronological order. These pages are resubmitted in the correct order.

R/10/93 TB

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
EPA HOUSTON LABORATORY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

RESUBMITTED DATA REVIEW REPORT

DATE: 2/8/93 CASE #: 19220

SAS #:

TO: K. Hill 6H-MA SDG #: MFQ226

USEPA Region 6 SITE NAME: Whitewater

FROM: Nhan Tran LAB NAME: SKINER
ESAT

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

1. The resubmitted information does not affect the data review.
2. Corrected IDL for arsenic was re-submitted with diskette, Forms 1, 3, 5, 6, and 10.
3. Page 115 was re-submitted with corrected EPA sample ID for MFQ231.
4. Pages 123 to 165 were re-submitted in the corrected chronological order.

FEB 1993 RECEIVED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

FEB 1993 RECEIVED

FY-93

INORGANIC DATA REVIEW

ESAT WORK ASSIGNMENT DIRECTIVE

From: Michael Daggett
ESAT RPO

To: Bill Blanton
ESAT Team Manager

Date Deliverable Needed: 2-3-1993
Date to ESAT: 1-20-1993

Originated By: Mahmoud El-Feky M. El-Feky Date: 1-20-1993

Approved By: _____ Date: _____
(Section Chief)

Activity Name: Whitewater
Activity No. 3TGBDN77
TID No. 06-9209-201
Project No. 19220/MFQ226

DESCRIPTIONS OF ALL ACTIVITIES TO BE COMPLETED AND PRODUCT(S) TO BE DELIVERED:

Review the attached inorganic data package, CCS resubmissions, and other laboratory resubmissions using the Region VI guidelines for data validation. Prepare the data validation report and any required resubmission reports.

Laboratory: SKINER Number of Samples: 16
This assignment has a Low priority.

Data Requested Accepted by ESAT: 1-21-93

Target Date For Delivery of Products: ASAP

From: Bill Blanton
Bill Blanton, ETM

To: Michael Daggett
ESAT RPO, Region VI

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

Federal Express Airbill #6836314877

January 15, 1993

USEPA Contract Laboratory Program (CLP)
Sample Management Office (SMO)
300 North Lee Street, Suite 200
Alexandria, VA 22314

Attention: Data Receiver

Dear Sir:

Enclosed is the Sample Data Package for the Inorganic Analyses of Case 19220 and SDG MFQ226. The samples were analyzed under Skinner and Sherman Work Order #S212196.

Please feel free to call if there are any questions concerning the enclosed.

Sincerely,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Kirk Johnson
Contract Laboratory Program
EPA Data Manager

KDJ

Encl.
Data Audit Staff, EMSL-LV, Federal #6836314886
Meg Jou, USEPA Region VI, Federal #6836314904

FULL INORGANICS
COMPLETE SDG FILE (CSF)
INVENTORY SHEET

Lab Name: SKINNER AND SHERMAN LABS **City/State:** WALTHAM, MA

Case No. 19220 **SDG No.** MFQ226 **SDG Nos. to Follow:** _____ _____ _____

SAS No. _____ **Contract No.** 68-D0-0108 **SOW No.** 3/90

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II D and Section III V)

		Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region
1.	Inventory Sheet (DC-2) (Do not number)			✓	✓
2.	Cover Page		1	✓	✓
3.	Inorganic Analysis Data Sheet (Form I-IN)	2	17	✓	✓
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	18	25	✓	✓
5.	CRDL Standards (Form IIB-IN)	26	28	✓	✓
6.	Blanks (Form III-IN)	29	33	✓	✓
7.	ICP Interference Check Sample (Form IV-IN)		34	✓	✓
8.	Spike Sample Recovery (Form VA-IN)		35	✓	✓
9.	Post Digest Spike Sample Recovery (Form VB-IN)		NA	✓	
10.	Duplicates (Form VI-IN)		36	✓	✓
11.	Lab Control Sample (Form VII-IN)		37	✓	✓
12.	Standard Addition Results (Form VIII-IN)		38	✓	✓
13.	ICP Serial Dilution (Form IX-IN)		39	✓	✓
14.	Instrument Detection Limits (Form X-IN)	40	43	✓	✓
15.	ICP Interelement Correction Factors (Form XIA-IN)		44	✓	✓
16.	ICP Interelement Correction Factors (Form XIB-IN)		45	✓	✓
17.	ICP Linear Ranges (Form XII-IN)		46	✓	✓
18.	Preparation Log (Form XIII-IN)	47	49	✓	✓
19.	Analysis Run Log (Form XIV-IN)	50	73	✓	✓
20.	ICP Raw Data	74	122	✓	✓
21.	Furnace AA Raw Data	123	209	✓	✓
22.	Mercury Raw Data	210	216	✓	✓
23.	Cyanide Raw Data		NA	✓	

	Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region
24. Traffic Report	230	232	✓	✓
25. EPA Shipping/Receiving Documents			✓	
Airbill (No. of Shipments 1)		233		✓
Chain-of-Custody Records	230	232	✓	✓
Sample Tags	238A	238P	✓	✓
Sample Log-In Sheet (Lab & DCl)	234 ~~234~~	236	✓	✓
SDG Cover Sheet KJ 1/13/93		237	✓	✓
26. Misc. Shipping/Receiving Records (list all individual records)				
Telephone Logs				
27. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)				
28. Internal Original Sample Prep & Analysis Records (describe or list)				
Prep Records	217	220	✓	✓
Analysis Records		NA	✓	
Description STANDARDS PREP LOG	224	229	✓	✓
29. Other Records (describe or list)				
Telephone Communication Log		NA	✓	
ORIGINAL SHIPPING DOCUMENTS	239	240	✓	✓
ORIGINAL RAW DATA		NA	✓	

30. Comments:

Completed by (CLP Lab):

(Signature)	(Print Name & Title)	(Date)
[signature]	KIRK JOHNSON USEPA DATA MANAGER	1/15/93

Audited by (EPA):

(Signature)	(Print Name & Title)	(Date)
Kathleen Thanh Nguyen	KATHLEEN T. NGUYEN / SCIENTIST ASSOCIATE	01-27-93

PAGES 32A-47A ADDED AFTER PAGINATION

These are the duplicate pages from Reference 19

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ226

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-01S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7830			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	15.0	B		P
7440-41-7	Beryllium	27.7		E	P
7440-43-9	Cadmium	159			P
7440-70-2	Calcium	481000			P
7440-47-3	Chromium	9.9	B		P
7440-48-4	Cobalt	1670			P
7440-50-8	Copper	6.5	B	*	P
7439-89-6	Iron	92500			P
7439-92-1	Lead	11.2		SN	F
7439-95-4	Magnesium	414000			P
7439-96-5	Manganese	119000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	471			P
7440-09-7	Potassium	4060	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	58400			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	68600			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

002

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ227

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-02S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	101000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	26.6	B		P
7440-41-7	Beryllium	28.3		E	P
7440-43-9	Cadmium	123			P
7440-70-2	Calcium	483000			P
7440-47-3	Chromium	29.6			P
7440-48-4	Cobalt	1750			P
7440-50-8	Copper	186000		*	P
7439-89-6	Iron	157000			P
7439-92-1	Lead	3.6		WN	F
7439-95-4	Magnesium	148000			P
7439-96-5	Manganese	28400			P
7439-97-6	Mercury	0.24			CV
7440-02-0	Nickel	546			P
7440-09-7	Potassium	26000			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	113000			P
7440-28-0	Thallium	2.7	B	W	F
7440-62-2	Vanadium	38.0	B		P
7440-66-6	Zinc	8750			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

003

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ228

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-03S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	141	B		P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	43.3	B		P
7440-41-7	Beryllium	0.54	B	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	798000			P
7440-47-3	Chromium	4.5	U		P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	195		*	P
7439-89-6	Iron	259			P
7439-92-1	Lead	2.0	U	WN	F
7439-95-4	Magnesium	91700			P
7439-96-5	Manganese	39.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	6340			P
7782-49-2	Selenium	19.0	U	N	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	73300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	5.0	B		P
7440-66-6	Zinc	3260			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

004

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ229

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-04S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	55700			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	79.9	B		P
7440-41-7	Beryllium	15.0		E	P
7440-43-9	Cadmium	87.6			P
7440-70-2	Calcium	467000			P
7440-47-3	Chromium	21.7			P
7440-48-4	Cobalt	452			P
7440-50-8	Copper	8130		*	P
7439-89-6	Iron	99100			P
7439-92-1	Lead	235		N	F
7439-95-4	Magnesium	551000			P
7439-96-5	Manganese	59600			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	301			P
7440-09-7	Potassium	20900			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	122000			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	14.9	B		P
7440-66-6	Zinc	37700			P
	Cyanide				NR

Color Before: GREY Clarity Before: CLOUDY Texture:

Color After: GREY Clarity After: CLOUDY Artifacts:

Comments:

005

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ230

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-05S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	767000			P
7440-36-0	Antimony	24.8	B		P
7440-38-2	Arsenic	14.5	U	N	F
7440-39-3	Barium	21.6	B		P
7440-41-7	Beryllium	111		E	P
7440-43-9	Cadmium	603			P
7440-70-2	Calcium	416000			P
7440-47-3	Chromium	52.0			P
7440-48-4	Cobalt	10500			P
7440-50-8	Copper	250000		*	P
7439-89-6	Iron	6810			P
7439-92-1	Lead	10.0	U	WN	F
7439-95-4	Magnesium	1270000			P
7439-96-5	Manganese	513000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3430			P
7440-09-7	Potassium	8980			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	26.9			P
7440-23-5	Sodium	93300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	102000			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

006

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ231

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-06S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1400			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	45.7	B		P
7440-41-7	Beryllium	0.49	B	E	P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	827000			P
7440-47-3	Chromium	17.2			P
7440-48-4	Cobalt	5.3	B		P
7440-50-8	Copper	122		*	P
7439-89-6	Iron	82.1	B		P
7439-92-1	Lead	2.6	B	WN	F
7439-95-4	Magnesium	92400			P
7439-96-5	Manganese	207			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.4	B		P
7440-09-7	Potassium	6910			P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	4.2	B		P
7440-23-5	Sodium	75500			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	11.5	B		P
7440-66-6	Zinc	2760			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

007

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ232

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-07S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7100			P
7440-36-0	Antimony	16.9	B		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	15.0	B		P
7440-41-7	Beryllium	27.7		E	P
7440-43-9	Cadmium	151			P
7440-70-2	Calcium	466000			P
7440-47-3	Chromium	8.9	B		P
7440-48-4	Cobalt	1580			P
7440-50-8	Copper	71.6		*	P
7439-89-6	Iron	89500			P
7439-92-1	Lead	6.8		+N	F
7439-95-4	Magnesium	398000			P
7439-96-5	Manganese	113000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	454			P
7440-09-7	Potassium	3960	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	56500			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	8.5	B		P
7440-66-6	Zinc	63700			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

008

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ237

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-08S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	207			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	N	F
7440-39-3	Barium	34.9	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	19000			P
7440-47-3	Chromium	8.9	B		P
7440-48-4	Cobalt	2.7	U		P
7440-50-8	Copper	76.9		*	P
7439-89-6	Iron	181			P
7439-92-1	Lead	3.8		MN	F
7439-95-4	Magnesium	6910			P
7439-96-5	Manganese	150			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	2250	B		P
7782-49-2	Selenium	19.0	U	N	F
7440-22-4	Silver	2.5	B		P
7440-23-5	Sodium	11500			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	3.6	B		P
7440-66-6	Zinc	96.5			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

009

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ238

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-09S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	238			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	39.9	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	442000			P
7440-47-3	Chromium	6.2	B		P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	89.2		*	P
7439-89-6	Iron	218			P
7439-92-1	Lead	2.5	B	WN	F
7439-95-4	Magnesium	179000			P
7439-96-5	Manganese	124			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	6340			P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	85300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	3.6	B		P
7440-66-6	Zinc	107			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

010

EPA SAMPLE NO.

MFQ239

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-10S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	565			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	26.6	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	7.0			P
7440-70-2	Calcium	332000			P
7440-47-3	Chromium	4.5	U		P
7440-48-4	Cobalt	2.7	U		P
7440-50-8	Copper	97.5		*	P
7439-89-6	Iron	889			P
7439-92-1	Lead	6.7		SN	F
7439-95-4	Magnesium	96800			P
7439-96-5	Manganese	88.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	4590	B		P
7782-49-2	Selenium	8.8		sN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	97300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	2170			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

011

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ240

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-11S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	85600			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	10.0	B		P
7440-41-7	Beryllium	19.7		E	P
7440-43-9	Cadmium	56.0			P
7440-70-2	Calcium	504000			P
7440-47-3	Chromium	9.8	B		P
7440-48-4	Cobalt	1410			P
7440-50-8	Copper	6310		*	P
7439-89-6	Iron	585			P
7439-92-1	Lead	9.0		+N	F
7439-95-4	Magnesium	216000			P
7439-96-5	Manganese	43600			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	506			P
7440-09-7	Potassium	1710	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	66800			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	16800			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

012

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ241

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-12S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	85800			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	11.6	B		P
7440-41-7	Beryllium	20.2		E	P
7440-43-9	Cadmium	57.5			P
7440-70-2	Calcium	507000			P
7440-47-3	Chromium	8.0	B		P
7440-48-4	Cobalt	1410			P
7440-50-8	Copper	6360		*	P
7439-89-6	Iron	302			P
7439-92-1	Lead	5.5		WN	F
7439-95-4	Magnesium	217000			P
7439-96-5	Manganese	43800			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	509			P
7440-09-7	Potassium	1790	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	67000			P
7440-28-0	Thallium	1.7	B	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	16900			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

013

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ242

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-13S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7560			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	N	F
7440-39-3	Barium	16.6	B		P
7440-41-7	Beryllium	1.6	B	E	P
7440-43-9	Cadmium	23.9			P
7440-70-2	Calcium	393000			P
7440-47-3	Chromium	6.6	B		P
7440-48-4	Cobalt	30.1	B		P
7440-50-8	Copper	937		*	P
7439-89-6	Iron	11200			P
7439-92-1	Lead	8.9		+N	F
7439-95-4	Magnesium	104000			P
7439-96-5	Manganese	5440			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	19.7	B		P
7440-09-7	Potassium	3890	B		P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	75500			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	10900			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

014

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ342

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-14S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	113000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	14.5	U	N	F
7440-39-3	Barium	25.0	B		P
7440-41-7	Beryllium	28.4		E	P
7440-43-9	Cadmium	140			P
7440-70-2	Calcium	545000			P
7440-47-3	Chromium	18.6			P
7440-48-4	Cobalt	1930			P
7440-50-8	Copper	204000		*	P
7439-89-6	Iron	177000			P
7439-92-1	Lead	4.7		WN	F
7439-95-4	Magnesium	169000			P
7439-96-5	Manganese	32000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	608			P
7440-09-7	Potassium	28700			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	128000			P
7440-28-0	Thallium	2.9	B		F
7440-62-2	Vanadium	42.1	B		P
7440-66-6	Zinc	9610			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

015

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ343

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-15S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	748000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	14.5	U	EN	F
7440-39-3	Barium	25.0	B		P
7440-41-7	Beryllium	111		E	P
7440-43-9	Cadmium	573			P
7440-70-2	Calcium	414000			P
7440-47-3	Chromium	38.7			P
7440-48-4	Cobalt	10200			P
7440-50-8	Copper	275000		*	P
7439-89-6	Iron	7130			P
7439-92-1	Lead	12.0	B	WN	F
7439-95-4	Magnesium	1410000			P
7439-96-5	Manganese	554000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3360			P
7440-09-7	Potassium	8420			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	16.6			P
7440-23-5	Sodium	92900			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	94800			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

016

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ344

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-16S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	48800			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	2.9	U	WN	F
7440-39-3	Barium	11.6	B		P
7440-41-7	Beryllium	17.1		E	P
7440-43-9	Cadmium	60.7			P
7440-70-2	Calcium	412000			P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	408			P
7440-50-8	Copper	6740		*	P
7439-89-6	Iron	76700			P
7439-92-1	Lead	37.2		+N	F
7439-95-4	Magnesium	473000			P
7439-96-5	Manganese	53100			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	270			P
7440-09-7	Potassium	16500			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	106000			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	19.8	B		P
7440-66-6	Zinc	30300			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

017

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

SOW No.: ILM02.1

EPA Sample No.	Lab Sample ID.
MFQ226	12196-01S
MFQ226D	12196-01S2
MFQ227	12196-02S
MFQ227S	12196-02DS
MFQ228	12196-03S
MFQ229	12196-04S
MFQ230	12196-05S
MFQ231	12196-06S
MFQ232	12196-07S
MFQ237	12196-08S
MFQ238	12196-09S
MFQ239	12196-10S
MFQ240	12196-11S
MFQ241	12196-12S
MFQ242	12196-13S
MFQ342	12196-14S
MFQ343	12196-15S
MFQ344	12196-16S

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name: Kirk D. Johnson 001

Date: 1/15/93 Title: USEPA Data Manager

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BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	21.4	U	48.8	B	30.7	B	42.5	B	31.540	B	P
Antimony	16.9	U	16.9	U	16.9	U	16.9	U	16.900	U	P
Arsenic	3.7	U	3.7	U	3.7	U	3.7	U	3.700	U	F
Barium	2.9	U	2.9	U	2.9	U	3.3	B	2.900	U	P
Beryllium	0.4	U	0.4	U	0.4	U	0.4	U	0.400	U	P
Cadmium	1.0	U	1.6	B	1.7	B	3.0	B	1.000	U	P
Calcium	25.9	U	36.7	B	25.9	U	25.9	U	25.900	U	P
Chromium	4.5	U	4.5	U	6.2	B	7.1	B	4.500	U	P
Cobalt	2.7	U	2.7	U	3.9	B	5.9	B	2.700	U	P
Copper	3.5	U	3.5	U	4.1	B	17.4	B	3.500	U	P
Iron	11.6	U	21.2	B	-17.0	B	11.6	U	11.600	U	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Magnesium	40.8	U	40.8	U	40.8	U	40.8	U	40.800	U	P
Manganese	-5.2	B	4.7	U	4.7	U	14.5	B	4.700	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.100	U	CV
Nickel	5.4	U	5.4	U	5.4	U	5.4	U	5.400	U	P
Potassium	241.8	U	241.8	U	241.8	U	241.8	U	241.800	U	P
Selenium	3.8	U	3.8	U	3.8	U	3.8	U	3.800	U	F
Silver	2.5	B	2.5	U	3.1	B	2.5	U	2.500	U	P
Sodium	53.4	B	94.7	B	215.2	B	314.1	B	117.900	B	P
Thallium	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	F
Vanadium	2.8	U	2.8	U	2.8	U	2.8	U	2.800	U	P
Zinc	4.1	B	3.2	B	4.0	B	8.1	B	2.200	U	P
Cyanide											NR

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BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			33.7	B	49.7	B					P
Antimony			16.9	U	16.9	U					P
Arsenic			3.7	U	3.7	U					F
Barium			2.9	U	2.9	U					P
Beryllium			0.4	U	0.4	U					P
Cadmium			1.0	U	1.2	B					P
Calcium			25.9	U	31.2	B					P
Chromium			4.5	U	7.4	B					P
Cobalt			3.3	B	2.7	U					P
Copper			21.4	B	19.1	B					P
Iron			11.6	U	15.2	B					P
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium			40.8	U	40.8	U					P
Manganese			7.1	B	4.7	U					P
Mercury			0.1	U							CV
Nickel			5.4	U	5.4	U					P
Potassium			342.7	B	272.3	B					P
Selenium			3.8	U							F
Silver			2.8	B	3.2	B					P
Sodium			-109.2	B	-131.6	B					P
Thallium			1.3	U	1.3	U	1.3	U			F
Vanadium			2.8	U	2.8	U					P
Zinc			3.5	B	3.8	B					P
Cyanide											NR

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BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	3.7	U	3.7	U	3.7	U	3.7	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium			1.3	U	1.3	U					F
Vanadium											NR
Zinc											NR
Cyanide											NR

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BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			3.7	U	3.7	U					F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	2.0	U	2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.8	U	3.8	U					F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	3.7	U	3.7	U	3.7	U	3.7	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MFQ227S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		109590.0000		101300.0000		2000.00	414.5		P
Antimony	75-125	502.9700		16.9000	U	500.00	100.6		P
Arsenic	75-125	23.5510		3.7000	U	40.00	58.9	N	F
Barium	75-125	1930.1000		26.6200	B	2000.00	95.2		P
Beryllium	75-125	78.0200		28.3400		50.00	99.4		P
Cadmium	75-125	180.7600		122.7200		50.00	116.1		P
Calcium									NR
Chromium	75-125	213.6200		29.6000		200.00	92.0		P
Cobalt	75-125	2311.5000		1749.2000		500.00	112.5		P
Copper		196870.0000		185710.0000		250.00	4464.0		P
Iron		166370.0000		157030.0000		1000.00	934.0		P
Lead	75-125	18.4120		3.6310		20.00	73.9	N	F
Magnesium									NR
Manganese		30255.0000		28403.0000		500.00	370.4		P
Mercury	75-125	1.1055		0.2385		1.00	86.7		CV
Nickel	75-125	1054.2000		546.1300		500.00	101.6		P
Potassium									NR
Selenium	75-125	3.8000	U	19.0000	U	10.00	0.0	N	F
Silver	75-125	47.7800		2.5000	U	50.00	95.6		P
Sodium									NR
Thallium	75-125	46.0885		2.7030	B	50.00	86.8		F
Vanadium	75-125	509.0100		38.0200	B	500.00	94.2		P
Zinc		9846.7000		8750.0000		500.00	219.3		P
Cyanide									NR

Comments:

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DUPLICATES

EPA SAMPLE NO.

MFQ226D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		7828.5000		8603.0000		9.4		P
Antimony		16.9000	U	16.9000	U			P
Arsenic		3.7000	U	3.7000	U			F
Barium		14.9700	B	18.3000	B	20.0		P
Beryllium		27.7200		27.1900		1.9		P
Cadmium		158.9700		159.0300		0.0		P
Calcium		480770.0000		478920.0000		0.4		P
Chromium	10.0	9.9000	B	14.3600		36.8		P
Cobalt		1666.7000		1664.7000		0.1		P
Copper	25.0	6.5000	B	1127.9000		197.7	*	P
Iron		92530.0000		92781.0000		0.3		P
Lead	3.0	11.2000		8.8000		24.0		F
Magnesium		413540.0000		414450.0000		0.2		P
Manganese		118550.0000		116890.0000		1.4		P
Mercury		0.1000	U	0.1000	U			CV
Nickel		471.4500		476.9500		1.2		P
Potassium		4055.8000	B	4195.2000	B	3.4		P
Selenium		19.0000	U	19.0000	U			F
Silver		2.5000	U	2.5000	U			P
Sodium		58396.0000		58777.0000		0.7		P
Thallium		1.3000	U	1.3000	U			F
Vanadium		2.8000	U	3.5500	B	200.0		P
Zinc		68563.0000		68928.0000		0.5		P
Cyanide								NR

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F4

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	3.8	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

F4: THERMO JARRELL-ASH VIDEO 22E (#2664)

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number: F4

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	3.7	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F4: THERMO JARRELL-ASH VIDEO 22E (#2664)

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Analysis Report Thu 01-14-93 08:06:47 PM page 1

Method: CLP0LDP1 Sample Name: S212196-06;S Operator: LP
Run Time: 01/14/93 20:04:19
Comment: MFQ~~227A~~ 231 1(D) 1/28/93
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.3983	-.00643	.01327	.04574	.00050	.00105	826.52
SDev	.0532	.01213	.02149	.00255	.00081	.00169	2.49
%RSD	3.8027	188.79	161.91	5.5873	162.74	161.13	.30068
#1	1.3469	-.01953	-.01091	.04869	.00003	-.00077	823.66
#2	1.3948	-.00416	.03019	.04426	.00144	.00258	828.14
#3	1.4531	.00442	.02054	.04426	.00003	.00133	827.76

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01719	.00534	.12157	.08208	.02751	92.441	.20710
SDev	.00129	.00092	.01240	.01157	.00366	.872	.00314
%RSD	7.5260	17.320	10.203	14.090	13.302	.94338	1.5160
#1	.01793	.00587	.11007	.07687	.02965	91.456	.20350
#2	.01794	.00587	.11992	.07403	.02328	92.756	.20848
#3	.01570	.00427	.13471	.09533	.02958	93.113	.20931

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00743	6.9065	.00422	75.533	.01153	2.7634
SDev	.00223	.2056	.00241	.687	.00210	.0523
%RSD	30.000	2.9764	57.220	.90949	18.192	1.8930
#1	.00966	6.6789	.00632	74.764	.01395	2.7035
#2	.00520	6.9620	.00158	75.752	.01033	2.7861
#3	.00743	7.0786	.00475	76.085	.01032	2.8004

C L P M E T A L S 3.02e

S212196--ARSENIC

Run id: F4 9301404
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1019
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	15:18
2	10 PPB	WS1	F			S10	01/14/93	15:23
3	50 PPB	WS2	F			S50	01/14/93	15:27
4	100 PPB	WS3	F			S100	01/14/93	15:32
5	ICV-2	ICV	F			ICV	01/14/93	15:39
6	CAL BLK	ICB	F			ICB	01/14/93	15:43
7	CRA	CRA0	F			CRA	01/14/93	15:48
8	50 PPB	CCV	F			CCV	01/14/93	15:53
9	CAL BLK	CCB	F			CCB	01/14/93	15:58
10	PB	PBW	F	1267	01/11/93	PBW	01/14/93	16:03
11	PB	ASPBW	F	1267		PBWA	01/14/93	16:07
12	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	16:12
13	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	16:17
14	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	16:22
15	S212196-01	AS	F	1267		MFQ226A	01/14/93	16:27
16	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	16:31
17	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	16:36
18	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	16:41
19	S212196-02	AS	F	1267		MFQ227A	01/14/93	16:46
20	50 PPB	CCV	F			CCV	01/14/93	16:51
21	CAL BLK	CCB	F			CCB	01/14/93	16:55
22	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	17:00
23	X	X	F			ZZZZZZ	01/14/93	17:05
24	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	17:10
25	S212196-03	AS	F	1267		MFQ228A	01/14/93	17:14
26	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	17:19
27	S212196-04	AS	F	1267		MFQ229A	01/14/93	17:24
28	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	17:29
29	S212196-05	AS	F	1267		MFQ230A	01/14/93	17:34
30	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	17:38
31	S212196-06	AS	F	1267		MFQ231A	01/14/93	17:43
32	50 PPB	CCV	F			CCV	01/14/93	17:48
33	CAL BLK	CCB	F			CCB	01/14/93	17:53
34	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	17:58
35	S212196-07	AS	F	1267		MFQ232A	01/14/93	18:02
36	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	18:07
37	S212196-08	AS	F	1267		MFQ237A	01/14/93	18:12
38	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	18:17
39	S212196-09	AS	F	1267		MFQ238A	01/14/93	18:22
40	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	18:[illegible]
41	S212196-10	AS	F	1267		MFQ239A	01/14/93	18:31
42	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	18:36
43	S212196-11	AS	F	1267		MFQ240A	01/14/93	18:41

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KDJ 1/28/93

S212196--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	18:46
45	CAL BLK	CCB	F			CCB	01/14/93	18:50
46	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	18:55
47	S212196-12	AS	F	1267		MFQ241A	01/14/93	19:00
48	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	19:05
49	S212196-13	AS	F	1267		MFQ242A	01/14/93	19:10
50	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	19:14
51	S212196-14	AS	F	1267		MFQ342A	01/14/93	19:19
52	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	19:24
53	S212196-15	AS	F	1267		MFQ343A	01/14/93	19:29
54	X	X	F			ZZZZZZ	01/14/93	19:53
55	X	X	F			ZZZZZZ	01/14/93	19:58
56	50 PPB	CCV	F			CCV	01/14/93	20:03
57	CAL BLK	CCB	F			CCB	01/14/93	20:08

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VJ 1/28/93
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C L P M E T A L S 3.02e

S212196--SELENIUM

Run id: F4 9301454
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1021
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	15:18
2	5 PPB	WS1	F			S5	01/14/93	15:23
3	50 PPB	WS2	F			S50	01/14/93	15:27
4	100 PPB	WS3	F			S100	01/14/93	15:32
5	ICV-2	ICV	F			ICV	01/14/93	15:39
6	CAL BLK	ICB	F			ICB	01/14/93	15:43
7	CRA	CRA0	F			CRA	01/14/93	15:48
8	50 PPB	CCV	F			CCV	01/14/93	15:53
9	CAL BLK	CCB	F			CCB	01/14/93	15:58
10	PB	PBW	F	1267	01/11/93	PBW	01/14/93	16:03
11	PB	ASPBW	F	1267		PBWA	01/14/93	16:07
12	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	16:12
13	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	16:17
14	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	16:22
15	S212196-01	AS	F	1267		MFQ226A	01/14/93	16:27
16	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	16:31
17	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	16:36
18	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	16:41
19	S212196-02	AS	F	1267		MFQ227A	01/14/93	16:46
20	50 PPB	CCV	F			CCV	01/14/93	16:51
21	CAL BLK	CCB	F			CCB	01/14/93	16:55
22	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	17:00
23	X	X	F			ZZZZZZ	01/14/93	17:05
24	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	17:10
25	S212196-03	AS	F	1267		MFQ228A	01/14/93	17:14
26	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	17:19
27	S212196-04	AS	F	1267		MFQ229A	01/14/93	17:24
28	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	17:29
29	S212196-05	AS	F	1267		MFQ230A	01/14/93	17:34
30	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	17:38
31	S212196-06	AS	F	1267		MFQ231A	01/14/93	17:43
32	50 PPB	CCV	F			CCV	01/14/93	17:48
33	CAL BLK	CCB	F			CCB	01/14/93	17:53
34	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	17:58
35	S212196-07	AS	F	1267		MFQ232A	01/14/93	18:02
36	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	18:07
37	S212196-08	AS	F	1267		MFQ237A	01/14/93	18:12
38	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	18:17
39	S212196-09	AS	F	1267		MFQ238A	01/14/93	18:22
40	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	18:26
41	S212196-10	AS	F	1267		MFQ239A	01/14/93	18:31
42	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	18:36
43	S212196-11	AS	F	1267		MFQ240A	01/14/93	18:41

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S212196--SELENIUM

Pos	Sample	Code	Preparation Meth Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F		CCV	01/14/93	18:46
45	CAL BLK	CCB	F		CCB	01/14/93	18:50

BGJ 1/28/93

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

Page 1 of 2

AA Sequence # 2321 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/14/93 Reviewed By: [illegible] Standards Prepared: 8:00 1/14/93

Operator: [illegible]

Disk # 33

Acq

SAMIN ✓ S212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	93014 04		RUN ID:	93014 54	
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[✓] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	PBW		
	11	PBWA		
	12	LCSW		
	13	LCSWA		
	14	01		<40
	15	01A		
	16	01D		<40
	17	01DA		
	18	02		<40
	19	02A		
	20	CCV		
	21	CCB		
	22	025		
	23	X		
	24	03		<40
	25	03A		
	26	04		<40
	27	04A		
<40%	28	05		<40
	29	05A		
	30	06		
	31	06A		127
	32	CCV		
	33	CCB		
	34	07		<40 A ~~136~~
	35	07A		1/28/93
	36	08		<40
	37	08A		~~135~~
	38	09		
	39	09A 37		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2321
Page 2 of 2

	40	10		Mg
	41	10A		
<40	42	11		<40
	43	11A		
	44	CCV		
	45	CCB		
	46	12		
	47	12A		
	48	13		Se CCV
	49	13A		
<40	50	14		pwr
	51	14A		
<40	52	15		
	53	15A		
	54	X ~~16~~	SG 11/14/93	
	55	X ~~16A~~		
	56	CCV		
	57	CCB		
	58			
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	90			128
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	92			~~137~~
	93			
	94			
	95			11/23/93

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	15:18

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/14/93	15:23

	<-As->		<-Se->	
Burns (Abs)	0.028 A	0.031 A	0.019A	0.019A
Mean	0.0295		0.0190	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	15:27

	<-As->		<-Se->	
Burns (Abs)	0.155 A	0.157 A	0.144A	0.151A
Mean	0.1560		0.1475	
CV %	0.00		3.36	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	15:32

	<-As->		<-Se->	
Burns (Abs)	0.287 A	0.291 A	0.244A	0.240A
Mean	0.2890		0.2420	
CV %	0.00		0.00	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003302634	0.003494462
Coef[2]:	-4.101406e-006	-1.07527e-005
Correl. coef.:	0.9998	0.9999

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/14/93	15:39

	<-As->		<-Se->	
Burns (Conc)	52.123	52.819	47.611	50.066
Mean	52.4710		48.8385	
CV %	0.94		3.55	
Sample value	52.47		48.84	

ARGOS MODEL SA4 Version 1.29

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KJ 1/28/93
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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	15:43

	<-As->		<-Se->	
Burns (Conc)	1.213	-0.605	-0.856	-1.708
Mean	0.3040		-1.2820	
CV %	422.87		46.99	
Sample value	2.90U		3.80U	

7	CRA	CRA	CRA	1.00x	01/14/93	15:48

	<-As->		<-Se->	
Burns (Conc)	9.498	8.879	4.645	2.596
Mean	9.1885		3.6205	
CV %	4.76		40.02	
Sample value	9.19		3.80U	

8	50 PPB	CCV	CCV	1.00x	01/14/93	15:53

	<-As->		<-Se->	
Burns (Conc)	52.123	50.734	50.896	50.066
Mean	51.4285		50.4810	
CV %	1.91		1.16	
Sample value	51.43		50.48	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	15:58

	<-As->		<-Se->	
Burns (Conc)	0.909	0.606	-0.286	-0.571
Mean	0.7575		-0.4285	
CV %	28.28		47.03	
Sample value	2.90U		3.80U	

10	PB	PBW	PBW	1.00x	01/14/93	16:03

	<-As->		<-Se->	
Burns (Conc)	0.303	-1.209	-2.555	-1.141
Mean	-0.4530		-1.8480	
CV %	236.01		54.10	
Sample value	2.90U		3.80U	

11	PB	ASPBW	PBWA	1.00x	01/14/93	16:07

	<-As->		<-Se->	
Burns (Conc)	18.914	19.232	7.920	9.431
Mean	19.0730		8.6755	
CV %	1.18		12.32	
Sample value	19.07		8.68	
Spike added	20.00		10.00	
Spike recovery, %	95.36		86.75	

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ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	LCSFW	LCSW	LCSW	1.00x	01/14/93	16:12

	<-As->		<-Se->	
Burns (Conc)	48.662	46.601	44.417	45.207
Mean	47.6315		44.8120	
CV %	3.06		1.25	
Sample value	47.63		44.81	

13	LCSFW	ASLCSW	LCSWA	1.00x	01/14/93	16:17

	<-As->		<-Se->	
Burns (Conc)	67.412	65.599	54.281	54.711
Mean	66.5055		54.4960	
CV %	1.93		0.56	
Sample value	66.51		54.50	
Spike added	20.00		10.00	
Spike recovery, %	94.37		96.84	

14	S212196-01	S	MF0226	1.00x	01/14/93	16:22

	<-As->		<-Se->	
Burns (Conc)	-0.907	0.303	-2.555	-1.708
Mean	-0.3020		-2.1315	
CV %	283.31		28.10	
Sample value	2.90U		3.80U	

15	-01	AS	MF0226A	1.00x	01/14/93	16:27

	<-As->		<-Se->	
Burns (Conc)	14.806	12.925	2.016	-1.425
Mean	13.8655		0.2955	
CV %	9.59		823.40	
Sample value	13.86		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	69.32 ***		0.00 ***	

16	-01	S2	MF0226D	1.00x	01/14/93	16:31

	<-As->		<-Se->	
Burns (Conc)	-3.617	-3.017	-3.958	-1.991
Mean	-3.3170		-2.9745	
CV %	12.79		46.76	
Sample value	2.90U		3.80U	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-01	ASS2	MFQ226DA	1.00x	01/14/93	16:36

	<-As->		<-Se->	
Burns (Conc)	11.675	14.178	0.573	0.861
Mean	12.9265		0.7170	
CV %	13.69		28.40	
Sample value	12.93		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	64.64 ***		0.00 ***	

18	-02	S	MFQ227	1.00x	01/14/93	16:41

	<-As->		<-Se->	
Burns (Conc)	-6.011	-7.797	-6.729	-4.237
Mean	-6.9040		-5.4830	
CV %	18.29		32.14	
Sample value	2.90U		3.80U	

19	-02	AS	MFQ227A	1.00x	01/14/93	16:46

	<-As->		<-Se->	
Burns (Conc)	7.025	10.119	-6.454	-4.516
Mean	8.5720		-5.4850	
CV %	25.52		24.98	
Sample value	8.57		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	42.86 ***		0.00 ***	

20	50 PPB	CCV 2	CCV	1.00x	01/14/93	16:51

	<-As->		<-Se->	
Burns (Conc)	50.388	53.866	43.241	51.313
Mean	52.1270		47.2770	
CV %	4.72		12.07	
Sample value	52.13		47.28	

21	CAL BLK	CCB 2	CCB	1.00x	01/14/93	16:55

	<-As->		<-Se->	
Burns (Conc)	-0.303	0.303	-2.555	-2.837
Mean	-0.0000		-2.6960	
CV %	>9999.99		7.40	
Sample value	2.90U		3.80U	

22	-02	DS	MFQ227S	1.00x	01/14/93	17:00

	<-As->		<-Se->	
Burns (Conc)	24.677	22.425	-3.398	-1.708
Mean	23.5510		-2.5530	
CV %	6.76		46.81	
Sample value	23.55		3.80U	

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~~101~~ 100 1/28/93

ARGOS MODEL SA4 Version 1.29

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	X	X	ZZZZZZ	1.00x	01/14/93	17:05

	<-As->		<-Se->	
Burns (Conc)	17.329	14.806	3.764	4.645
Mean	16.0675		4.2045	
CV %	11.10		14.82	
Sample value	16.07		4.20	

24	-03	S	MFQ228	1.00x	01/14/93	17:10

	<-As->		<-Se->	
Burns (Conc)	-5.414	-6.607	-1.425	-1.991
Mean	-6.0105		-1.7080	
CV %	14.04		23.43	
Sample value	2.90U		3.80U	

25	-03	AS	MFQ228A	1.00x	01/14/93	17:14

	<-As->		<-Se->	
Burns (Conc)	12.612	13.864	0.286	1.726
Mean	13.2380		1.0060	
CV %	6.69		101.22	
Sample value	13.24		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	66.19 ***		0.00 ***	

26	-04	S	MFQ229	1.00x	01/14/93	17:19

	<-As->		<-Se->	
Burns (Conc)	-3.617	-1.813	-5.349	-5.902
Mean	-2.7150		-5.6255	
CV %	46.98		6.95	
Sample value	2.90U		3.80U	

27	-04	AS	MFQ229A	1.00x	01/14/93	17:24

	<-As->		<-Se->	
Burns (Conc)	11.052	12.612	-3.679	-3.118
Mean	11.8320		-3.3985	
CV %	9.32		11.67	
Sample value	11.83		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	59.16 ***		0.00 ***	

28	-05	S	MFQ230	1.00x	01/14/93	17:29

	<-As->		<-Se->	
Burns (Conc)	-10.462	-9.871	-8.913	-15.043
Mean	-10.1665		-11.9780	
CV %	4.11		36.19	
Sample value	2.90U		3.80U	

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KOf/12/93
~~142~~

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-05	AS	MFQ230A	1.00x	01/14/93	17:34

	<-As->		<-Se->	
Burns (Conc)	4.262	5.181	-8.641	-9.184
Mean	4.7215		-8.9125	
CV %	13.76		4.31	
Sample value	4.72		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	23.61 ***		0.00 ***	

30	-06	S	MFQ231	1.00x	01/14/93	17:38

	<-As->		<-Se->	
Burns (Conc)	-27.521	-1.511	-21.221	-2.837
Mean	-14.5160		-12.0290	
CV %	126.70		108.07	
Sample value	2.90U		3.80U	

31	-06	AS	MFQ231A	1.00x	01/14/93	17:43

	<-As->		<-Se->	
Burns (Conc)	12.925	12.299	5.828	2.596
Mean	12.6120		4.2120	
CV %	3.51		54.26	
Sample value	12.61		4.21	
Spike added	20.00		10.00	
Spike recovery, %	63.06 ***		42.12 ***	

32	50 PPB	CCV 3	CCV	1.00x	01/14/93	17:48

	<-As->		<-Se->	
Burns (Conc)	51.775	53.168	50.896	48.016
Mean	52.4715		49.4560	
CV %	1.88		4.12	
Sample value	52.47		49.46	

33	CAL BLK	CCB 3	CCB	1.00x	01/14/93	17:53

	<-As->		<-Se->	
Burns (Conc)	-0.303	0.909	-2.273	-1.141
Mean	0.3030		-1.7070	
CV %	282.84		46.89	
Sample value	2.90U		3.80U	

34	-07	S	MFQ232	1.00x	01/14/93	17:58

	<-As->		<-Se->	
Burns (Conc)	-2.716	-2.415	-1.425	-3.398
Mean	-2.5655		-2.4115	
CV %	8.30		57.85	
Sample value	2.90U		3.80U	

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2/01/28/93
~~143~~

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-07	AS	MFQ232A	1.00x	01/14/93	18:02

	<-As->		<-Se->	
Burns (Conc)	13.551	16.066	0.861	0.861
Mean	14.8085		0.8610	
CV %	12.01		0.00	
Sample value	14.81		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	74.04 ***		0.00 ***	

36	-08	S	MFQ237	1.00x	01/14/93	18:07

	<-As->		<-Se->	
Burns (Conc)	-0.605	-1.209	-2.273	3.179
Mean	-0.9070		0.4530	
CV %	47.09		851.03	
Sample value	2.90U		3.80U	

37	-08	AS	MFQ237A	1.00x	01/14/93	18:12

	<-As->		<-Se->	
Burns (Conc)	19.232	19.232	2.306	4.645
Mean	19.2320		3.4755	
CV %	0.02		47.59	
Sample value	19.23		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	96.16		0.00 ***	

38	-09	S	MFQ238	1.00x	01/14/93	18:17

	<-As->		<-Se->	
Burns (Conc)	-1.813	-3.017	1.726	-3.118
Mean	-2.4150		-0.6960	
CV %	35.25		492.13	
Sample value	2.90U		3.80U	

39	-09	AS	MFQ238A	1.00x	01/14/93	18:22

	<-As->		<-Se->	
Burns (Conc)	15.750	17.329	6.125	5.531
Mean	16.5395		5.8280	
CV %	6.75		7.21	
Sample value	16.54		5.83	
Spike added	20.00		10.00	
Spike recovery, %	82.70 ***		58.28 ***	

ARGOS MODEL SA4 Version 1.29

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KCJ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-10	S	MFQ239	1.00x	01/14/93	18:26

	<-As->		<-Se->	
Burns (Conc)	-1.209	-1.209	9.735	7.920
Mean	-1.2090		8.8275	
CV %	0.00		14.54	
Sample value	2.90U		8.83	

41	-10	AS	MFQ239A	1.00x	01/14/93	18:31

	<-As->		<-Se->	
Burns (Conc)	15.435	15.121	14.686	13.433
Mean	15.2780		14.0595	
CV %	1.45		6.30	
Sample value	15.28		14.06	
Spike added	20.00		10.00	
Spike recovery, %	76.39 ***		52.32 ***	

42	-11	S	MFQ240	1.00x	01/14/93	18:36

	<-As->		<-Se->	
Burns (Conc)	-7.203	-7.500	-5.349	-4.516
Mean	-7.3515		-4.9325	
CV %	2.86		11.94	
Sample value	2.90U		3.80U	

43	-11	AS	MFQ240A	1.00x	01/14/93	18:41

	<-As->		<-Se->	
Burns (Conc)	4.874	11.052	-1.141	-2.837
Mean	7.9630		-1.9890	
CV %	54.86		60.29	
Sample value	7.96		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	39.81 ***		0.00 ***	

44	50 PPB	CCV 4	CCV	1.00x	01/14/93	18:46

	<-As->		<-Se->	
Burns (Conc)	50.388	49.006	45.604	47.207
Mean	49.6970		46.4055	
CV %	1.97		2.44	
Sample value	49.70		46.41	

45	CAL BLK	CCB 4	CCB	1.00x	01/14/93	18:50

	<-As->		<-Se->	
Burns (Conc)	-0.907	0.606	-0.571	-1.991
Mean	-0.1505		-1.2810	
CV %	710.87		78.38	
Sample value	2.90U		3.80U	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
46	-12	S	MFQ241	1.00x	01/14/93	18:55

	<-As->		<-Se->	
Burns (Conc)	-3.017	-3.317	-2.555	-8.097
Mean	-3.1670		-5.3260	
CV %	6.70		73.58	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-12	AS	MFQ241A	1.00x	01/14/93	19:00

	<-As->		<-Se->	
Burns (Conc)	11.052	6.717	-4.516	-5.902
Mean	8.8845		-5.2090	
CV %	34.50		18.81	
Sample value	8.89		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	44.43 ***		0.00 ***	

Se CCV out 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	-13	S	MFQ242	1.00x	01/14/93	19:05

	<-As->		<-Se->	
Burns (Conc)	-2.114	-2.415	4.057	-0.286
Mean	-2.2645		1.8855	
CV %	9.40		162.87	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
49	-13	AS	MFQ242A	1.00x	01/14/93	19:10

	<-As->		<-Se->	
Burns (Conc)	18.279	16.381	5.828	6.721
Mean	17.3300		6.2745	
CV %	7.74		10.06	
Sample value	17.33		6.27	
Spike added	20.00		10.00	
Spike recovery, %	86.65		62.74 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	-14	S	MFQ342	1.00x	01/14/93	19:14

	<-As->		<-Se->	
Burns (Conc)	-11.051	-7.797	-8.369	-6.454
Mean	-9.4240		-7.4115	
CV %	24.42		18.27	
Sample value	2.90U		3.80U	

ARGOS MODEL SA4 Version 1.29

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~~146~~ KJ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 10

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-14	AS	MFQ342A	1.00x	01/14/93	19:19

	<-As->		<-Se->	
Burns (Conc)	4.874	10.119	-2.273	-7.824
Mean	7.4965		-5.0485	
CV %	49.47		77.75	
Sample value	7.50		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	37.49 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-15	S	MFQ343	1.00x	01/14/93	19:24

	<-As->		<-Se->	
Burns (Conc)	-5.712	-23.535	-6.729	-21.221
Mean	-14.6235		-13.9750	
CV %	86.18		73.33	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-15	AS	MFQ343A	1.00x	01/14/93	19:29

	<-As->		<-Se->	
Burns (Conc)	5.181	-8.391	-6.729	-12.670
Mean	-1.6050		-9.6995	
CV %	597.93		43.31	
Sample value	2.90U		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	0.00 ***		0.00 ***	

Dev out 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	X	X	ZZZZZZ	1.00x	01/14/93	19:53

	<-As->		<-Se->	
Burns (Conc)	-0.605	0.303	-1.708	-2.273
Mean	-0.1510		-1.9905	
CV %	425.20		20.07	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	X	X	ZZZZZZ	1.00x	01/14/93	19:58

	<-As->		<-Se->	
Burns (Conc)	1.213	0.909	-1.141	0.000
Mean	1.0610		-0.5705	
CV %	20.26		141.42	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	50 PPB	CCV 5	CCV	1.00x	01/14/93	20:03

	<-As->		<-Se->	
Burns (Conc)	46.601	48.318	43.632	41.307
Mean	47.4595		42.4695	
CV %	2.56		3.87	
Sample value	47.46		42.47 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 11

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB 5	CCB	1.00x	01/14/93	20:08

	<-As->		<-Se->	
Burns (Conc)	0.303	-0.907	-0.856	0.000
Mean	-0.3020		-0.4280	
CV %	283.31		141.42	
Sample value	2.90U		3.80U	

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~~148~~ 1/28/93

C L P M E T A L S 3.02e

S212196--ARSENIC

Run id: F4 9301405
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1023
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:20
2	10 PPB	WS1	F			S10	01/14/93	21:25
3	50 PPB	WS2	F			S50	01/14/93	21:30
4	100 PPB	WS3	F			S100	01/14/93	21:34
5	ICV-2	ICV	F			ICV	01/14/93	21:42
6	CAL BLK	ICB	F			ICB	01/14/93	21:47
7	CRA	CRA0	F			CRA	01/14/93	21:52
8	50 PPB	CCV	F			CCV	01/14/93	21:57
9	CAL BLK	CCB	F			CCB	01/14/93	22:02
10	X	X	F			ZZZZZZ	01/14/93	22:06
11	X	X	F			ZZZZZZ	01/14/93	22:11
12	X	X	F			ZZZZZZ	01/14/93	22:16
13	X	X	F			ZZZZZZ	01/14/93	22:21
14	X	X	F			ZZZZZZ	01/14/93	22:25
15	X	X	F			ZZZZZZ	01/14/93	22:30
16	X	X	F			ZZZZZZ	01/14/93	22:35
17	X	X	F			ZZZZZZ	01/14/93	22:40
18	X	X	F			ZZZZZZ	01/14/93	22:45
19	X	X	F			ZZZZZZ	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:54
21	CAL BLK	CCB	F			CCB	01/14/93	22:59
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	23:04
23	S212196-16	AS	F	1267		MFQ344A	01/14/93	23:08
24	X	X	F			ZZZZZZ	01/14/93	23:13
25	X	X	F			ZZZZZZ	01/14/93	23:18
26	X	X	F			ZZZZZZ	01/14/93	23:23
27	X	X	F			ZZZZZZ	01/14/93	23:27
28	X	X	F			ZZZZZZ	01/14/93	23:32
29	X	X	F			ZZZZZZ	01/14/93	23:37
30	X	X	F			ZZZZZZ	01/14/93	23:42
31	X	X	F			ZZZZZZ	01/14/93	23:47
32	50 PPB	CCV	F			CCV	01/14/93	23:51
33	CAL BLK	CCB	F			CCB	01/14/93	23:56
34	X	X	F			ZZZZZZ	01/15/93	00:01
35	X	X	F			ZZZZZZ	01/15/93	00:06
36	S212196-05	S	F	1267	01/11/93	MFQ230	01/15/93	00:10
37	S212196-05	AS	F	1267		MFQ230A	01/15/93	00:15
38	X	X	F			ZZZZZZ	01/15/93	00:20
39	X	X	F			ZZZZZZ	01/15/93	00:25
40	X	X	F			ZZZZZZ	01/15/93	00:29
41	X	X	F			ZZZZZZ	01/15/93	00:34
42	X	X	F			ZZZZZZ	01/15/93	00:39
43	X	X	F			ZZZZZZ	01/15/93	00:44

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~~149~~ 100/1/28/93

S212196--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/15/93	00:48
45	CAL BLK	CCB	F			CCB	01/15/93	00:53
46	S212196-11	S	F	1267	01/11/93	MFQ240	01/15/93	00:58
47	S212196-11	AS	F	1267		MFQ240A	01/15/93	01:03
48	S212196-14	S	F	1267	01/11/93	MFQ342	01/15/93	01:08
49	S212196-14	AS	F	1267		MFQ342A	01/15/93	01:12
50	S212196-15	S	F	1267	01/11/93	MFQ343	01/15/93	01:17
51	S212196-15	AS	F	1267		MFQ343A	01/15/93	01:22
52	X	X	F			ZZZZZZ	01/15/93	01:27
53	X	X	F			ZZZZZZ	01/15/93	01:32
54	X	X	F			ZZZZZZ	01/15/93	01:37
55	X	X	F			ZZZZZZ	01/15/93	01:41
56	50 PPB	CCV	F			CCV	01/15/93	01:46
57	CAL BLK	CCB	F			CCB	01/15/93	01:51

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~~150~~

KOJ 1/22/93

C L P M E T A L S 3.02e

S212196--SELENIUM

Run id: F4 9301455
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1026
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:20
2	5 PPB	WS1	F			S5	01/14/93	21:25
3	50 PPB	WS2	F			S50	01/14/93	21:30
4	100 PPB	WS3	F			S100	01/14/93	21:34
5	ICV-2	ICV	F			ICV	01/14/93	21:42
6	CAL BLK	ICB	F			ICB	01/14/93	21:47
7	CRA	CRA0	F			CRA	01/14/93	21:52
8	50 PPB	CCV	F			CCV	01/14/93	21:57
9	CAL BLK	CCB	F			CCB	01/14/93	22:02
10	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	22:06
11	S212196-12	AS	F	1267		MFQ241A	01/14/93	22:11
12	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	22:16
13	S212196-13	AS	F	1267		MFQ242A	01/14/93	22:21
14	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	22:25
15	S212196-14	AS	F	1267		MFQ342A	01/14/93	22:30
16	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	22:35
17	S212196-15	AS	F	1267		MFQ343A	01/14/93	22:40
18	X	X	F			ZZZZZZ	01/14/93	22:45
19	X	X	F			ZZZZZZ	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:54
21	CAL BLK	CCB	F			CCB	01/14/93	22:59
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	23:04
23	S212196-16	AS	F	1267		MFQ344A	01/14/93	23:08
24	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	23:13
25	S212196-01	AS	F	1267		MFQ226A	01/14/93	23:18
26	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	23:23
27	S212196-02	AS	F	1267		MFQ227A	01/14/93	23:27
28	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	23:32
29	S212196-03	AS	F	1267		MFQ228A	01/14/93	23:37
30	X	X	F			ZZZZZZ	01/14/93	23:42
31	X	X	F			ZZZZZZ	01/14/93	23:47
32	50 PPB	CCV	F			CCV	01/14/93	23:51
33	CAL BLK	CCB	F			CCB	01/14/93	23:56
34	S212196-04	S	F	1267	01/11/93	MFQ229	01/15/93	00:01
35	S212196-04	AS	F	1267		MFQ229A	01/15/93	00:06
36	S212196-05	S	F	1267	01/11/93	MFQ230	01/15/93	00:10
37	S212196-05	AS	F	1267		MFQ230A	01/15/93	00:15
38	S212196-07	S	F	1267	01/11/93	MFQ232	01/15/93	00:20
39	S212196-07	AS	F	1267		MFQ232A	01/15/93	00:25
40	S212196-08	S	F	1267	01/11/93	MFQ237	01/15/93	00:29
41	S212196-08	AS	F	1267		MFQ237A	01/15/93	00:34
42	X	X	F			ZZZZZZ	01/15/93	00:39
43	X	X	F			ZZZZZZ	01/15/93	00:44

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~~151~~ 1/20/93

S212196--SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/15/93	00:48
45	CAL BLK	CCB	F			CCB	01/15/93	00:53
46	S212196-11	S	F	1267	01/11/93	MFQ240	01/15/93	00:58
47	S212196-11	AS	F	1267		MFQ240A	01/15/93	01:03
48	S212196-14	S	F	1267	01/11/93	MFQ342	01/15/93	01:08
49	S212196-14	AS	F	1267		MFQ342A	01/15/93	01:12
50	S212196-15	S	F	1267	01/11/93	MFQ343	01/15/93	01:17
51	S212196-15	AS	F	1267		MFQ343A	01/15/93	01:22
52	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/15/93	01:27
53	S212196-01	ASS2	F	1267		MFQ226DA	01/15/93	01:32
54	X	X	F			ZZZZZZ	01/15/93	01:37
55	X	X	F			ZZZZZZ	01/15/93	01:41
56	50 PPB	CCV	F			CCV	01/15/93	01:46
57	CAL BLK	CCB	F			CCB	01/15/93	01:51

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2322 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8:00 1/14/93
Operator: SG

Disk # 52
Acq
SAMIN ✓ 5212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:	9301405		Channel B:	9301455	
RUN ID:			RUN ID:		
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[✓] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	12		<40%
	11	12A		
	12	13		
Se/only	13	13A		
	14	14		<40%
	15	14A		
	16	15		<40%
	17	15A		
	18	X		
	19	X		
	20	CCV		
	21	CCB		
≠ RSD	22	16		<40%
	23	16A		
	24	01	1:4	RSD
Se/only	25	01A		
	26	02	1:4	
	27	02A		
	28	03	1:4	
	29	03A		
	30	X		
	31	X		KG 1/28/93
	32	CCV		
	33	CCB		0 ~~153~~
Se/only	34	04	1:4	RSD 144
	35	04A		
	36	05	1:4	
	37	05A		~~152~~
Se/only	38	07 54	1:4	
	39	07A		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2322
Page 2 of 2

Se/only	40	08	J1:4	RSD
	41	08A		
	42	X		
	43	X		
	44	CCV		
	45	CCB		
	46	11	J1:4	
	47	11A		
	48	14	J1:4	
	49	14A		
	50	15	J1:4	
	51	15A		
Se/only	52	01D	J1:4	
	53	01DA		
	54	X		
	55	X		
	56	CCV		
	57	CCB		
	58			
	59			
	60			
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	90			10/11/93
	91			
	92			~~154~~
	93			
	94			145
	95			

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	21:20

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/14/93	21:25

	<-As->		<-Se->	
Burns (Abs)	0.034 A	0.007 A	0.024A	-0.002A
Mean	0.0205		0.0110	
CV %	93.13		167.13	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	21:30

	<-As->		<-Se->	
Burns (Abs)	0.154 A	0.150 A	0.140A	0.149A
Mean	0.1520		0.1445	
CV %	0.00		4.40	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	21:34

	<-As->		<-Se->	
Burns (Abs)	0.276 A	0.272 A	0.243A	0.231A
Mean	0.2740		0.2370	
CV %.	0.00		3.58	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003175423	0.003365102
Coef[2]:	-4.267605e-006	-9.925924e-006
Correl. coef.:	0.9978	0.9993

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/14/93	21:42

	<-As->		<-Se->	
Burns (Conc)	52.886	49.963	48.143	48.976
Mean	51.4245		48.5595	
CV %	4.02		1.21	
Sample value	51.42		48.56	

ARGOS MODEL SA4 Version 1.29

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CCJ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	21:47

	<-As->		<-Se->	
Burns (Conc)	2.211	0.630	0.000	-0.593
Mean	1.4205		-0.2965	
CV %	78.70		141.42	
Sample value	2.90U		3.80U	

7	CRA	CRA	CRA	1.00x	01/14/93	21:52

	<-As->		<-Se->	
Burns (Conc)	9.248	10.218	2.394	5.436
Mean	9.7330		3.9150	
CV %	7.05		54.94	
Sample value	9.73		3.91	

8	50 PPB	CCV	CCV	1.00x	01/14/93	21:57

	<-As->		<-Se->	
Burns (Conc)	52.519	50.691	47.729	46.494
Mean	51.6050		47.1115	
CV %	2.51		1.85	
Sample value	51.60		47.11	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	22:02

	<-As->		<-Se->	
Burns (Conc)	0.630	-0.315	2.093	1.492
Mean	0.1575		1.7925	
CV %	424.26		23.71	
Sample value	2.90U		3.80U	

10	S212196-12	S	MFQ241	1.00x	01/14/93	22:06

	<-As->		<-Se->	
Burns (Conc)	-7.174	-5.005	-1.479	-0.593
Mean	~~-6.0895~~		-1.0360	
CV %	~~25.19~~	Se only	60.47	
Sample value	2.90U	1/15/93 KN	3.80U	

11	-12	AS	MFQ241A	1.00x	01/14/93	22:11

	<-As->		<-Se->	
Burns (Conc)	15.108	9.894	0.000	-4.979
Mean	12.5010		-2.4895	
CV %	29.49 ***		141.42	
Sample value	12.50		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	62.51 ***		0.00 ***	

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KCJ 1/28/93

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-13	S	MFQ242	1.00x	01/14/93	22:16

	<-As->		<-Se->	
Burns (Conc)	0.000	-0.315	0.000	3.301
Mean	-0.1575		1.6505	
CV %	141.42		141.42	
Sample value	2.90U		3.80U	

Se only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-13	AS	MFQ242A	1.00x	01/14/93	22:21

	<-As->		<-Se->	
Burns (Conc)	17.083	20.399	8.849	7.600
Mean	18.7410		8.2245	
CV %	12.51		10.74	
Sample value	18.74		8.22	
Spike added	20.00		10.00	
Spike recovery, %	93.70		82.24 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-14	S	MFQ342	1.00x	01/14/93	22:25

	<-As->		<-Se->	
Burns (Conc)	-5.005	-7.174	-8.409	-11.497
Mean	-6.0895		-9.9530	
CV %	28.19		21.94	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-14	AS	MFQ342A	1.00x	01/14/93	22:30

	<-As->		<-Se->	
Burns (Conc)	8.280	6.032	-8.692	-8.692
Mean	7.1560		-8.6920	
CV %	22.21		0.00	
Sample value	7.16		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	35.78 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-15	S	MFQ343	1.00x	01/14/93	22:35

	<-As->		<-Se->	
Burns (Conc)	-15.124	-24.098	-15.352	-15.624
Mean	-19.6110		-15.4880	
CV %	32.36		1.24	
Sample value	2.90U		3.80U	

ARGOS MODEL SA4 Version 1.29

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~~157~~ KAJ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-15	AS	MFQ343A	1.00x	01/14/93	22:40

	<-As->		<-Se->	
Burns (Conc)	-3.136	-29.387	-13.159	-33.035
Mean	-16.2615		-23.0970	
CV %	114.15	Se only	60.85	
Sample value	2.90U		3.80U	
Spike added	20.00	1/15/93	10.00	
Spike recovery, %	0.00 ***	KH	0.00 ***	

18	X	X	ZZZZZZ	1.00x	01/14/93	22:45

	<-As->		<-Se->	
Burns (Conc)	0.315	0.946	2.093	2.998
Mean	0.6305		2.5455	
CV %	70.77		25.14	
Sample value	2.90U		3.80U	

19	X	X	ZZZZZZ	1.00x	01/14/93	22:49

	<-As->		<-Se->	
Burns (Conc)	2.528	-1.571	0.894	-1.774
Mean	0.4785		-0.4400	
CV %	605.73		428.76	
Sample value	2.90U		3.80U	

20	50 PPB	CCV 2	CCV	1.00x	01/14/93	22:54

	<-As->		<-Se->	
Burns (Conc)	52.153	51.421	47.729	51.084
Mean	51.7870		49.4065	
CV %	1.00		4.80	
Sample value	51.79		49.41	

21	CAL BLK	CCB 2	CCB	1.00x	01/14/93	22:59

	<-As->		<-Se->	
Burns (Conc)	-1.258	0.315	-2.361	0.595
Mean	-0.4715		-0.8830	
CV %	235.90		236.72	
Sample value	2.90U		3.80U	

22	-16	S	MFQ344	1.00x	01/14/93	23:04

	<-As->		<-Se->	
Burns (Conc)	-1.571	-0.944	-2.946	-4.400
Mean	-1.2575		-3.6730	
CV %	35.26		27.99	
Sample value	2.90U		3.80U	

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KH 1/25/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-16	AS	MFQ344A	1.00x	01/14/93	23:08

	<-As->		<-Se->	
Burns (Conc)	13.797	10.218	-2.946	-5.267
Mean	12.0075		-4.1065	
CV %	21.08 ***		39.97	
Sample value	12.01		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	60.04 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-01	S	MFQ226	5.00x	01/14/93	23:13

	<-As->		<-Se->	
Burns (Conc)	0.315	1.262	0.297	-1.479
Mean	0.7885		-0.5910	
CV %	84.92		212.49	
Sample value	14.50U		19.00U	

Use only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-01	AS	MFQ226A	5.00x	01/14/93	23:18

	<-As->		<-Se->	
Burns (Conc)	17.744	18.406	7.911	4.823
Mean	18.0750		6.3670	
CV %	2.59		34.29 ***	
Sample value	90.38		31.84	
Spike added	20.00		10.00	
Spike recovery, %	90.38		63.67 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	-02	S	MFQ227	5.00x	01/14/93	23:23

	<-As->		<-Se->	
Burns (Conc)	0.315	-2.198	-0.593	0.595
Mean	-0.9415		0.0010	
CV %	188.74		>9999.99	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	-02	AS	MFQ227A	5.00x	01/14/93	23:27

	<-As->		<-Se->	
Burns (Conc)	18.737	18.074	6.979	7.289
Mean	18.4055		7.1340	
CV %	2.55		3.07	
Sample value	92.03		35.67	
Spike added	20.00		10.00	
Spike recovery, %	92.03		71.34 ***	

ARGOS MODEL SA4 Version 1.29

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KG 1/28/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-03	S	MFQ228	5.00x	01/14/93	23:32

	<-As->		<-Se->	
Burns (Conc)	1.578	0.315	-0.889	1.792
Mean	0.9465		0.4515	
CV %	94.36		419.88	
Sample value	14.50U		19.00U	

Se only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-03	AS	MFQ228A	5.00x	01/14/93	23:37

	<-As->		<-Se->	
Burns (Conc)	18.406	19.401	9.163	10.108
Mean	18.9035		9.6355	
CV %	3.72		6.93	
Sample value	94.51		48.18	
Spike added	20.00		10.00	
Spike recovery, %	94.51		96.35	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	1.00x	01/14/93	23:42

	<-As->		<-Se->	
Burns (Conc)	1.578	-0.944	1.792	0.595
Mean	0.3170		1.1935	
CV %	562.56		70.92	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	X	X	ZZZZZZ	1.00x	01/14/93	23:47

	<-As->		<-Se->	
Burns (Conc)	-2.198	1.578	-1.479	0.894
Mean	-0.3100		-0.2925	
CV %	861.30		573.66	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV 3	CCV	1.00x	01/14/93	23:51

	<-As->		<-Se->	
Burns (Conc)	51.421	49.236	46.494	49.394
Mean	50.3285		47.9440	
CV %	3.07		4.28	
Sample value	50.33		47.94	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB 3	CCB	1.00x	01/14/93	23:56

	<-As->		<-Se->	
Burns (Conc)	-0.315	0.630	0.297	-2.361
Mean	0.1575		-1.0320	
CV %	424.26		182.12	
Sample value	2.90U		3.80U	

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~~160~~ KG 1/28/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-04	S	MFQ229	5.00x	01/15/93	00:01

	<-As->		<-Se->	
Burns (Conc)	-0.629	-1.571	0.595	-0.593
Mean	-1.1000		0.0010	
CV %	60.55	Se only 1/15/93 KH	>9999.99	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-04	AS	MFQ229A	5.00x	01/15/93	00:06

	<-As->		<-Se->	
Burns (Conc)	20.066	19.733	10.424	2.093
Mean	19.8995		6.2585	
CV %	1.18		94.13 ***	
Sample value	99.50		31.29	
Spike added	20.00		10.00	
Spike recovery, %	99.50		62.59 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	-05	S	MFQ230	5.00x	01/15/93	00:10

	<-As->		<-Se->	
Burns (Conc)	-0.629	-1.885	-0.889	-3.529
Mean	-1.2570		-2.2090	
CV %	70.65	ignore data lines needed for both As+Se 1/15/93 KH	84.51	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	-05	AS	MFQ230A	5.00x	01/15/93	00:15

	<-As->		<-Se->	
Burns (Conc)	16.753	17.413	6.051	1.193
Mean	17.0830		3.6220	
CV %	2.73		94.84	
Sample value	85.42		19.00U	
Spike added	20.00		10.00	
Spike recovery, %	85.42		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	-07	S	MFQ232	5.00x	01/15/93	00:20

	<-As->		<-Se->	
Burns (Conc)	-0.629	-0.944	-3.238	1.492
Mean	-0.7865		-0.8730	
CV %	28.32		383.12	
Sample value	14.50U		19.00U	

ARGOS MODEL SA4 Version 1.29

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1/28/93

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-07	AS	MFQ232A	5.00x	01/15/93	00:25

	<-As->		<-Se->	
Burns (Conc)	17.083	15.108	9.163	6.979
Mean	16.0955		8.0710	
CV %	8.68		19.13	
Sample value	80.47	Se only	40.35	
Spike added	20.00		10.00	
Spike recovery, %	80.47 ***	1/15/93 KK	80.71 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-08	S	MFQ237	5.00x	01/15/93	00:29

	<-As->		<-Se->	
Burns (Conc)	1.894	0.000	-0.889	2.093
Mean	0.9470		0.6020	
CV %	141.42		350.26	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-08	AS	MFQ237A	5.00x	01/15/93	00:34

	<-As->		<-Se->	
Burns (Conc)	19.401	19.069	12.336	6.360
Mean	19.2350		9.3480	
CV %	1.22		45.20 ***	
Sample value	96.18		46.74	
Spike added	20.00		10.00	
Spike recovery, %	96.18		93.48	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	X	X	ZZZZZZ	1.00x	01/15/93	00:39

	<-As->		<-Se->	
Burns (Conc)	0.946	0.630	1.193	-2.361
Mean	0.7880		-0.5840	
CV %	28.36		430.32	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	X	X	ZZZZZZ	1.00x	01/15/93	00:44

	<-As->		<-Se->	
Burns (Conc)	-0.944	0.000	-0.297	1.792
Mean	-0.4720		0.7475	
CV %	141.42		197.61	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
44	50 PPB	CCV 4	CCV	1.00x	01/15/93	00:48

	<-As->		<-Se->	
Burns (Conc)	48.511	52.519	46.085	52.367
Mean	50.5150		49.2260	
CV %	5.61		9.02	
Sample value	50.51		49.23	

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KG 1/28/93

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	CAL BLK	CCB	CCB	1.00x	01/15/93	00:53

	<-As->		<-Se->	
Burns (Conc)	1.578	-0.944	1.492	-2.946
Mean	0.3170		-0.7270	
CV %	562.56		431.66	
Sample value	2.90U		3.80U	

46	-11	S	MFQ240	5.00x	01/15/93	00:58

	<-As->		<-Se->	
Burns (Conc)	0.946	0.630	2.394	1.792
Mean	0.7880		2.0930	
CV %	28.36		20.34	
Sample value	14.50U		19.00U	

47	-11	AS	MFQ240A	5.00x	01/15/93	01:03

	<-As->		<-Se->	
Burns (Conc)	21.400	20.399	4.213	3.908
Mean	20.8995		4.0605	
CV %	3.39		5.31	
Sample value	104.50		20.30	
Spike added	20.00		10.00	
Spike recovery, %	104.50		40.60 ***	

48	-14	S	MFQ342	5.00x	01/15/93	01:08

	<-As->		<-Se->	
Burns (Conc)	-2.824	-2.198	0.000	1.193
Mean	-2.5110		0.5965	
CV %	17.63		141.42	
Sample value	14.50U		19.00U	

49	-14	AS	MFQ342A	5.00x	01/15/93	01:12

	<-As->		<-Se->	
Burns (Conc)	18.406	18.406	6.360	5.129
Mean	18.4060		5.7445	
CV %	0.03		15.15	
Sample value	92.03		28.72	
Spike added	20.00		10.00	
Spike recovery, %	92.03		57.45 ***	

50	-15	S	MFQ343	5.00x	01/15/93	01:17

	<-As->		<-Se->	
Burns (Conc)	-2.198	-3.448	-2.654	-4.479
Mean	-2.8230		-2.0665	
CV %	31.31		40.21	
Sample value	14.50U		19.00U	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 10

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-15	AS	MFQ343A	5.00x	01/15/93	01:22

	<-As->		<-Se->	
Burns (Conc)	1.262	2.211	-0.889	0.894
Mean	1.7365		0.0025	
CV %	38.64		>9999.99	
Sample value	14.50U		19.00U	
Spike added	20.00		10.00	
Spike recovery, %	0.00 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-01	S2	MFQ226D	5.00x	01/15/93	01:27

	<-As->		<-Se->	
Burns (Conc)	-1.571	1.894	-2.946	-2.361
Mean	~~0.1615~~		-2.6535	
CV %	~~1517.11~~	Se only	15.59	
Sample value	14.50U	1/15/93 KU	19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-01	ASS2	MFQ226DA	5.00x	01/15/93	01:32

	<-As->		<-Se->	
Burns (Conc)	20.066	17.083	6.051	6.051
Mean	~~18.5745~~		6.0510	
CV %	~~11.36~~		0.00	
Sample value	~~92.87~~		30.26	
Spike added	20.00		10.00	
Spike recovery, %	92.87		60.51 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	X	X	ZZZZZZ	1.00x	01/15/93	01:37

	<-As->		<-Se->	
Burns (Conc)	0.000	0.946	-1.185	0.000
Mean	0.4730		-0.5925	
CV %	141.42		141.42	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	X	X	ZZZZZZ	1.00x	01/15/93	01:41

	<-As->		<-Se->	
Burns (Conc)	0.000	1.894	-2.361	0.297
Mean	0.9470		-1.0320	
CV %	141.42		182.12	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	50 PPB	CCV 5	CCV	1.00x	01/15/93	01:46

	<-As->		<-Se->	
Burns (Conc)	51.056	52.886	49.815	47.316
Mean	51.9710		48.5655	
CV %	2.49		3.64	
Sample value	51.97		48.56	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 11

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB	CCB	1.00x	01/15/93	01:51

	<-As->		<-Se->	
Burns (Conc)	2.211	0.946	-0.593	-2.068
Mean	1.5785		-1.3305	
CV %	56.67		78.39	
Sample value	2.90U		3.80U	

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~~165~~ 100/1/28/93

C L P M E T A L S 3.02e

ARSENIC

Run id: F4 9301501
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1257
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:57
2	10 PPB	WS1	F			S10	01/15/93	09:02
3	50 PPB	WS2	F			S50	01/15/93	09:07
4	100 PPB	WS3	F			S100	01/15/93	09:12
5	ICV-2	ICV	F			ICV	01/15/93	09:19
6	CAL BLK	ICB	F			ICB	01/15/93	09:24
7	CRA	CRA0	F			CRA	01/15/93	09:28
8	50 PPB	CCV	F			CCV	01/15/93	09:33
9	CAL BLK	CCB	F			CCB	01/15/93	09:38
10	X	X	F			ZZZZZZ	01/15/93	09:43
11	X	X	F			ZZZZZZ	01/15/93	09:48
12	X	X	F			ZZZZZZ	01/15/93	09:52
13	X	X	F			ZZZZZZ	01/15/93	09:57
14	X	X	F			ZZZZZZ	01/15/93	10:02
15	X	X	F			ZZZZZZ	01/15/93	10:07
16	X	X	F			ZZZZZZ	01/15/93	10:12
17	X	X	F			ZZZZZZ	01/15/93	10:20
18	X	X	F			ZZZZZZ	01/15/93	10:25
19	X	X	F			ZZZZZZ	01/15/93	10:30
20	50 PPB	CCV	F			CCV	01/15/93	10:35
21	CAL BLK	CCB	F			CCB	01/15/93	10:39
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/15/93	10:44
23	S212196-16	AS	F	1267		MFQ344A	01/15/93	10:49
24	X	X	F			ZZZZZZ	01/15/93	10:56
25	X	X	F			ZZZZZZ	01/15/93	11:01
26	X	X	F			ZZZZZZ	01/15/93	11:06
27	X	X	F			ZZZZZZ	01/15/93	11:10
28	50 PPB	CCV	F			CCV	01/15/93	11:15
29	CAL BLK	CCB	F			CCB	01/15/93	11:20

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C L P M E T A L S 3.02e

SELENIUM

Run id: F4 9301551
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1258
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:57
2	5 PPB	WS1	F			S5	01/15/93	09:02
3	50 PPB	WS2	F			S50	01/15/93	09:07
4	100 PPB	WS3	F			S100	01/15/93	09:12
5	ICV-2	ICV	F			ICV	01/15/93	09:19
6	CAL BLK	ICB	F			ICB	01/15/93	09:24
7	CRA	CRA0	F			CRA	01/15/93	09:28
8	50 PPB	CCV	F			CCV	01/15/93	09:33
9	CAL BLK	CCB	F			CCB	01/15/93	09:38
10	S212196-01	S	F	1267	01/11/93	MFQ226	01/15/93	09:43
11	S212196-01	AS	F	1267		MFQ226A	01/15/93	09:48
12	S212196-04	S	F	1267	01/11/93	MFQ229	01/15/93	09:52
13	S212196-04	AS	F	1267		MFQ229A	01/15/93	09:57
14	S212196-08	S	F	1267	01/11/93	MFQ237	01/15/93	10:02
15	S212196-08	AS	F	1267		MFQ237A	01/15/93	10:07
16	S212196-12	S	F	1267	01/11/93	MFQ241	01/15/93	10:12
17	S212196-12	AS	F	1267		MFQ241A	01/15/93	10:20
18	S212196-16	S	F	1267	01/11/93	MFQ344	01/15/93	10:25
19	S212196-16	AS	F	1267		MFQ344A	01/15/93	10:30
20	50 PPB	CCV	F			CCV	01/15/93	10:35
21	CAL BLK	CCB	F			CCB	01/15/93	10:39
22	X	X	F			ZZZZZZ	01/15/93	10:44
23	X	X	F			ZZZZZZ	01/15/93	10:49
24	S212196-12	S	F	1267	01/11/93	MFQ241	01/15/93	10:56
25	S212196-12	AS	F	1267		MFQ241A	01/15/93	11:01
26	X	X	F			ZZZZZZ	01/15/93	11:06
27	X	X	F			ZZZZZZ	01/15/93	11:10
28	50 PPB	CCV	F			CCV	01/15/93	11:15
29	CAL BLK	CCB	F			CCB	01/15/93	11:20

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2323 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/15/93 Reviewed By: 1/15/93 Standards Prepared: 8:00 1/15/93
Operator: JST

Disk # 170
Acq ____
SAMIN ✓ 5212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [4] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301501		RUN ID:	9301551	
Element:	[4] AS	[] PB	Element:	[4] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[4] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	01		
	11	01A		
	12	04		
	13	04A		
	14	08	1:4	
	15	08A		
	16	12		
	17	12A		RSD
	18	16		
	19	16A		
	20	✓CCV		
	21	CCB		
	22	16		
	23	16A		AS/only
se/only	24	12	1:4	
	25	12A		
	26	X		
	27	X		
	28	CCV		
	29	CCB		
	30			
	31			
	32			
	33			
	34			159
	35			
	36			~~125~~
	37			160 1/28/93
	38			
	39			

se only

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/15/93	08:57

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/15/93	09:02

	<-As->		<-Se->	
Burns (Abs)	0.031 A	0.032 A	0.025A	0.019A
Mean	0.0315		0.0220	
CV %	0.00		19.28	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/15/93	09:07

	<-As->		<-Se->	
Burns (Abs)	0.159 A	0.154 A	0.151A	0.154A
Mean	0.1565		0.1525	
CV %	2.26		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/15/93	09:12

	<-As->		<-Se->	
Burns (Abs)	0.293 A	0.285 A	0.256A	0.247A
Mean	0.2890		0.2515	
CV %	1.96		2.53	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003346986	0.003618674
Coef[2]:	-4.557742e-006	-1.105556e-005
Correl. coef.:	1.0000	0.9997

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/15/93	09:19

	<-As->		<-Se->	
Burns (Conc)	52.795	49.670	49.883	47.912
Mean	51.2325		48.8975	
CV %	4.31		2.85	
Sample value	51.23		48.90	

ARGOS MODEL SA4 Version 1.29

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~~126~~ Kaj 1/28/93

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/15/93	09:24

	<-As->		<-Se->	
Burns (Conc)	2.097	0.299	2.506	2.226
Mean	1.1980		2.3660	
CV %	106.13		8.37	
Sample value	3.70U		3.30U	

7	CRA	CRA	CRA	1.00x	01/15/93	09:28

	<-As->		<-Se->	
Burns (Conc)	9.996	10.610	5.910	7.640
Mean	10.3030		6.7750	
CV %	4.21		18.06	
Sample value	10.30		6.78	

8	50 PPB	CCV	CCV	1.00x	01/15/93	09:33

	<-As->		<-Se->	
Burns (Conc)	51.402	50.708	51.082	48.304
Mean	51.0550		49.6930	
CV %	0.96		3.95	
Sample value	51.06		49.69	

9	CAL BLK	CCB	CCB	1.00x	01/15/93	09:38

	<-As->		<-Se->	
Burns (Conc)	-1.193	0.000	1.388	-0.827
Mean	-0.5965		0.2805	
CV %	141.42		558.37	
Sample value	3.70U		3.30U	

10	S212196-01	S	MFQ226	5.00x	01/15/93	09:43

	<-As->		<-Se->	
Burns (Conc)	-0.299	1.497	0.277	0.554
Mean	0.5990		0.4155	
CV %	212.01		47.14	
Sample value	18.50U		16.50U	

Seally JS 1/19/93

11	-01	AS	MFQ226A	5.00x	01/15/93	09:48

	<-As->		<-Se->	
Burns (Conc)	17.445	15.256	5.052	5.623
Mean	16.3505		5.3375	
CV %	9.47		7.56	
Sample value	81.75		26.69	
Spike added	20.00		10.00	
Spike recovery, %	81.75 ***		53.38 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-04	S	MFQ229	5.00x	01/15/93	09:52

	<-As->		<-Se->	
Burns (Conc)	-2.679	1.797	-1.650	0.277
Mean	-0.4410		-0.6865	
CV %	717.69		198.48	
Sample value	18.50U		16.50U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-04	AS	MFQ229A	5.00x	01/15/93	09:57

	<-As->		<-Se->	
Burns (Conc)	16.505	14.322	3.916	5.910
Mean	15.4135		4.9130	
CV %	10.01		28.70	
Sample value	77.07		24.57	
Spike added	20.00		10.00	
Spike recovery, %	77.07 ***		49.13 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-08	S	MFQ237	5.00x	01/15/93	10:02

	<-As->		<-Se->	
Burns (Conc)	0.299	-0.895	3.069	-2.196
Mean	-0.2980		0.4365	
CV %	283.32		852.90	
Sample value	18.50U		16.50U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-08	AS	MFQ237A	5.00x	01/15/93	10:07

	<-As->		<-Se->	
Burns (Conc)	18.073	15.880	10.271	10.566
Mean	16.9765		10.4185	
CV %	9.13		2.00	
Sample value	84.88		52.09	
Spike added	20.00		10.00	
Spike recovery, %	84.88 ***		104.18	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-12	S	MFQ241	5.00x	01/15/93	10:12

	<-As->		<-Se->	
Burns (Conc)	-0.299	-2.086	-1.102	2.226
Mean	-1.1925		0.5620	
CV %	105.96		418.73	
Sample value	18.50U		16.50U	

ARGOS MODEL SA4 Version 1.29

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KJ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-12	AS	MFQ241A	5.00x	01/15/93	10:20

	<-As->		<-Se->	
Burns (Conc)	15.256	17.131	5.623	7.930
Mean	16.1935		6.7765	
CV %	8.19		24.07 ***	
Sample value	80.97		33.88	
Spike added	20.00		10.00	
Spike recovery, %	80.97 ***		67.77 ***	

Selenium 1/31/15/93

18	-16	S	MFQ344	5.00x	01/15/93	10:25

	<-As->		<-Se->	
Burns (Conc)	-0.299	-1.193	0.277	2.506
Mean	-0.7460		1.3915	
CV %	84.74		113.27	
Sample value	18.50U		16.50U	

19	-16	AS	MFQ344A	5.00x	01/15/93	10:30

	<-As->		<-Se->	
Burns (Conc)	17.131	16.818	5.052	2.226
Mean	16.9745		3.6390	
CV %	1.30		54.91	
Sample value	84.87		18.19	
Spike added	20.00		10.00	
Spike recovery, %	84.87 ***		36.39 ***	

20	50 PPB	CCV 2	CCV	1.00x	01/15/93	10:35

	<-As->		<-Se->	
Burns (Conc)	45.550	47.260	44.448	51.888
Mean	46.4050		48.1680	
CV %	2.61		10.92	
Sample value	46.40		48.17	

21	CAL BLK	CCB 2	CCB	1.00x	01/15/93	10:39

	<-As->		<-Se->	
Burns (Conc)	-1.788	-0.299	-0.827	0.000
Mean	-1.0435		-0.4135	
CV %	100.90		141.42	
Sample value	3.70U		3.30U	

22	-16	S	MFQ344	1.00x	01/15/93	10:44

	<-As->		<-Se->	
Burns (Conc)	-0.597	-4.750	-3.283	923
Mean	-2.6735		-2.6030	
CV %	109.84		36.94	
Sample value	3.70U		3.30U	

As not 1/31/15/93 ~~129~~ 1/28/93

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-16	AS	MFQ344A	1.00x	01/15/93	10:49

	<-As->		<-Se->	
Burns (Conc)	10.303	10.610	-2.740	-2.196
Mean	10.4565		-2.4680	
CV %	2.08		15.59	
Sample value	10.46		3.30U	
Spike added	20.00		10.00	
Spike recovery, %	52.28 ***		0.00 ***	

Asney 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-12	S	MFQ241	5.00x	01/15/93	10:56

	<-As->		<-Se->	
Burns (Conc)	-1.788	-0.299	-0.276	1.388
Mean	-1.0435		0.5560	
CV %	100.90		211.62	
Sample value	18.50U		16.50U	

Seney 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-12	AS	MFQ241A	5.00x	01/15/93	11:01

	<-As->		<-Se->	
Burns (Conc)	16.192	19.332	5.052	5.910
Mean	17.7620		5.4810	
CV %	12.50		11.07	
Sample value	88.81		27.40	
Spike added	20.00		10.00	
Spike recovery, %	88.81		54.81 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	X	X	ZZZZZZ	1.00x	01/15/93	11:06

	<-As->		<-Se->	
Burns (Conc)	-2.086	0.897	1.667	-0.276
Mean	-0.5945		0.6955	
CV %	354.80		197.54	
Sample value	3.70U		3.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	X	X	ZZZZZZ	1.00x	01/15/93	11:10

	<-As->		<-Se->	
Burns (Conc)	-1.491	1.497	1.946	2.787
Mean	0.0030		2.3665	
CV %	>9999.99		25.13	
Sample value	3.70U		3.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	50 PPB	CCV 3	CCV	1.00x	01/15/93	11:15

	<-As->		<-Se->	
Burns (Conc)	50.362	50.016	49.883	47.133
Mean	50.1890		48.5080	
CV %	0.49		4.01	
Sample value	50.19		48.51	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	CAL BLK	CCB 3	CCB	1.00x	01/15/93	11:20

	<-As->		<-Se->	
Burns (Conc)	0.897	-1.193	2.787	2.506
Mean	-0.1480		2.6465	
CV %	998.55		7.51	
Sample value	3.70U		3.30U	

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U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1878.0	1967.10	104.7	25000.0	25032.00	100.1	25075.00	100.3	P
Antimony	978.0	975.08	99.7	2500.0	2522.40	100.9	2515.40	100.6	P
Arsenic	50.4	52.47	104.1	50.0	51.43	102.9	52.13	104.3	F
Barium	1891.0	2031.60	107.4	2500.0	2499.20	100.0	2437.60	97.5	P
Beryllium	478.0	517.81	108.3	500.0	523.32	104.7	509.83	102.0	P
Cadmium	493.0	511.72	103.8	2500.0	2536.20	101.4	2536.80	101.5	P
Calcium	48810.0	51435.00	105.4	25000.0	25388.00	101.6	24892.00	99.6	P
Chromium	480.0	517.00	107.7	2500.0	2513.00	100.5	2488.10	99.5	P
Cobalt	487.0	506.69	104.0	2500.0	2492.20	99.7	2434.00	97.4	P
Copper	486.0	503.67	103.6	2500.0	2505.00	100.2	2497.80	99.9	P
Iron	1962.0	2078.00	105.9	10000.0	10160.00	101.6	10048.00	100.5	P
Lead	98.4	101.23	102.9	50.0	50.33	100.7	48.48	97.0	F
Magnesium	23859.0	25501.00	106.9	25000.0	25465.00	101.9	25706.00	102.8	P
Manganese	474.0	503.55	106.2	2500.0	2516.80	100.7	2483.60	99.3	P
Mercury	5.0	4.88	97.6	2.0	1.91	95.5	1.91	95.5	CV
Nickel	488.0	514.52	105.4	2500.0	2495.60	99.8	2474.10	99.0	P
Potassium	49182.0	50710.00	103.1	25000.0	25158.00	100.6	24975.00	99.9	P
Selenium	50.3	48.84	97.1	50.0	50.48	101.0	47.28	94.6	F
Silver	478.0	509.26	106.5	500.0	521.71	104.3	526.12	105.2	P
Sodium	46804.0	50969.00	108.9	25000.0	25086.00	100.3	25084.00	100.3	P
Thallium	100.7	102.25	101.5	50.0	49.23	98.5	49.44	98.9	F
Vanadium	482.0	517.08	107.3	2500.0	2515.70	100.6	2452.40	98.1	P
Zinc	2921.0	3063.10	104.9	2500.0	2503.80	100.2	2463.10	98.5	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

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U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	25807.00	103.2	24421.00	97.7	P
Antimony				2500.0	2572.50	102.9	2450.50	98.0	P
Arsenic				50.0	52.47	104.9	49.70	99.4	F
Barium				2500.0	2505.80	100.2	2493.60	99.7	P
Beryllium				500.0	525.98	105.2	511.29	102.3	P
Cadmium				2500.0	2629.40	105.2	2433.60	97.3	P
Calcium				25000.0	25520.00	102.1	24464.00	97.9	P
Chromium				2500.0	2585.20	103.4	2441.90	97.7	P
Cobalt				2500.0	2486.30	99.5	2430.10	97.2	P
Copper				2500.0	2569.60	102.8	2509.90	100.4	P
Iron				10000.0	10404.00	104.0	9819.30	98.2	P
Lead				50.0	47.06	94.1	47.77	95.5	F
Magnesium				25000.0	26668.00	106.7	23983.00	95.9	P
Manganese				2500.0	2573.20	102.9	2453.20	98.1	P
Mercury				2.0	1.84	92.0	1.71	85.5	CV
Nickel				2500.0	2552.00	102.1	2434.60	97.4	P
Potassium				25000.0	25475.00	101.9	24779.00	99.1	P
Selenium				50.0	49.46	98.9	46.41	92.8	F
Silver				500.0	523.06	104.6	490.49	98.1	P
Sodium				25000.0	25715.00	102.9	24537.00	98.1	P
Thallium				50.0	47.55	95.1	46.51	93.0	F
Vanadium				2500.0	2515.30	100.6	2472.00	98.9	P
Zinc				2500.0	2508.70	100.3	2449.80	98.0	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

019

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	24636.00	98.5			P
Antimony				2500.0	2429.20	97.2			P
Arsenic				50.0	47.46	94.9			F
Barium				2500.0	2536.00	101.4			P
Beryllium				500.0	518.51	103.7			P
Cadmium				2500.0	2441.70	97.7			P
Calcium				25000.0	24531.00	98.1			P
Chromium				2500.0	2473.10	98.9			P
Cobalt				2500.0	2445.50	97.8			P
Copper				2500.0	2508.40	100.3			P
Iron				10000.0	9971.00	99.7			P
Lead				50.0	49.33	98.7	50.05	100.1	F
Magnesium				25000.0	24013.00	96.1			P
Manganese				2500.0	2481.00	99.2			P
Mercury									NR
Nickel				2500.0	2435.30	97.4			P
Potassium				25000.0	24803.00	99.2			P
Selenium	50.3	48.56	96.5	50.0	47.11	94.2	49.41	98.8	F
Silver				500.0	490.96	98.2			P
Sodium				25000.0	24678.00	98.7			P
Thallium				50.0	47.97	95.9	50.49	101.0	F
Vanadium				2500.0	2503.30	100.1			P
Zinc				2500.0	2420.50	96.8			P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

020

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	50.4	51.42	102.0	50.0	51.60	103.2	51.79	103.6	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	48.48	97.0	46.21	92.4	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	47.94	95.9	49.23	98.5	F
Silver									NR
Sodium									NR
Thallium				50.0	49.44	98.9	45.46	90.9	F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

021

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	50.33	100.7	50.52	101.0	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	46.35	92.7			F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	48.57	97.1			F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

022

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	51.97	103.9			F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead	98.4	100.47	102.1	50.0	48.58	97.2	48.28	96.6	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium	50.3	48.90	97.2	50.0	49.69	99.4	48.17	96.3	F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

023

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	50.4	51.23	101.6	50.0	51.06	102.1	46.40	92.8	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	48.28	96.6	46.32	92.6	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	48.51	97.0			F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

024

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	50.19	100.4			F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	45.42	90.8	46.62	93.2	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

025

Method: CLP0LDP1 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 20:22:28
Comment: CCB#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04968	.00414	.01450	.00257	.00000	.00116	.03121
SDev	.02395	.01146	.00384	.00222	.00001	.00063	.00779
%RSD	48.210	276.88	26.507	86.603	113.09	54.051	24.957
#1	.07333	.01737	H.01893	.00000	.00001	.00164	.04020
#2	.05025	-.00247	.01223	.00385	.00001	.00045	.02637
#3	.02544	-.00248	.01232	.00385	-.00000	.00138	.02706
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00743	.00165	.01908	.01521	.01154	.04043	.00327
SDev	.00129	.00251	.00132	.00328	.00484	.01750	.00047
%RSD	17.306	152.75	6.9300	21.553	41.909	43.294	14.431
#1	.00891	.00110	.01984	.01825	.00732	.02022	.00354
#2	.00668	-.00055	.01984	.01565	.01049	.05053	.00354
#3	.00669	.00439	.01755	.01174	H.01682	.05053	.00272
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00271	.27230	.00321	-.13155	.00177	.00382
SDev	.00292	.24812	.00080	.01889	.00200	.00169
%RSD	107.85	91.119	24.737	14.362	113.09	44.110
#1	-.00039	.40845	.00275	-.11480	.00292	.00577
#2	.00310	-.01408	.00413	-.12783	.00291	.00285
#3	.00542	.42254	.00275	-.15203	-.00054	.00285
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source: SKINER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony				120.0	115.35	96.1	99.09	82.6
Arsenic	10.0	9.19	91.9					
Barium								
Beryllium				10.0	10.90	109.0	9.62	96.2
Cadmium				10.0	11.04	110.4	11.50	115.0
Calcium								
Chromium				20.0	23.02	115.1	22.14	110.7
Cobalt				100.0	98.85	98.8	97.13	97.1
Copper				50.0	59.47	118.9	83.96	167.9
Iron								
Lead	3.0	3.37	112.3					
Magnesium								
Manganese				30.0	29.96	99.9	35.14	117.1
Mercury								
Nickel				80.0	85.21	106.5	79.77	99.7
Potassium								
Selenium	5.0	3.62	72.4					
Silver				20.0	28.36	141.8	26.61	133.0
Sodium								
Thallium	10.0	8.34	83.4					
Vanadium				100.0	96.91	96.9	97.98	98.0
Zinc				40.0	47.21	118.0	48.17	120.4

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U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic	10.0	9.73	97.3					
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead	3.0	3.12	104.0					
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	3.92	78.4					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

027

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic	10.0	10.30	103.0					
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	6.78	135.6					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

028

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	21.4	U	48.8	B	30.7	B	42.5	B	31.540	B	P
Antimony	16.9	U	16.9	U	16.9	U	16.9	U	16.900	U	P
Arsenic	2.9	U	2.9	U	2.9	U	2.9	U	2.900	U	F
Barium	2.9	U	2.9	U	2.9	U	3.3	B	2.900	U	P
Beryllium	0.4	U	0.4	U	0.4	U	0.4	U	0.400	U	P
Cadmium	1.0	U	1.6	B	1.7	B	3.0	B	1.000	U	P
Calcium	25.9	U	36.7	B	25.9	U	25.9	U	25.900	U	P
Chromium	4.5	U	4.5	U	6.2	B	7.1	B	4.500	U	P
Cobalt	2.7	U	2.7	U	3.9	B	5.9	B	2.700	U	P
Copper	3.5	U	3.5	U	4.1	B	17.4	B	3.500	U	P
Iron	11.6	U	21.2	B	-17.0	B	11.6	U	11.600	U	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Magnesium	40.8	U	40.8	U	40.8	U	40.8	U	40.800	U	P
Manganese	-5.2	B	4.7	U	4.7	U	14.5	B	4.700	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.100	U	CV
Nickel	5.4	U	5.4	U	5.4	U	5.4	U	5.400	U	P
Potassium	241.8	U	241.8	U	241.8	U	241.8	U	241.800	U	P
Selenium	3.8	U	3.8	U	3.8	U	3.8	U	3.800	U	F
Silver	2.5	B	2.5	U	3.1	B	2.5	U	2.500	U	P
Sodium	53.4	B	94.7	B	215.2	B	314.1	B	117.900	B	P
Thallium	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	F
Vanadium	2.8	U	2.8	U	2.8	U	2.8	U	2.800	U	P
Zinc	4.1	B	3.2	B	4.0	B	8.1	B	2.200	U	P
Cyanide											NR

029

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			33.7	B	49.7	B					P
Antimony			16.9	U	16.9	U					P
Arsenic			2.9	U	2.9	U					F
Barium			2.9	U	2.9	U					P
Beryllium			0.4	U	0.4	U					P
Cadmium			1.0	U	1.2	B					P
Calcium			25.9	U	31.2	B					P
Chromium			4.5	U	7.4	B					P
Cobalt			3.3	B	2.7	U					P
Copper			21.4	B	19.1	B					P
Iron			11.6	U	15.2	B					P
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium			40.8	U	40.8	U					P
Manganese			7.1	B	4.7	U					P
Mercury			0.1	U							CV
Nickel			5.4	U	5.4	U					P
Potassium			342.7	B	272.3	B					P
Selenium			3.8	U							F
Silver			2.8	B	3.2	B					P
Sodium			-109.2	B	-131.6	B					P
Thallium			1.3	U	1.3	U	1.3	U			F
Vanadium			2.8	U	2.8	U					P
Zinc			3.5	B	3.8	B					P
Cyanide											NR

030

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	2.9	U	2.9	U	2.9	U	2.9	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium			1.3	U	1.3	U					F
Vanadium											NR
Zinc											NR
Cyanide											NR

031

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			2.9	U	2.9	U					F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	2.0	U	2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.8	U	3.8	U					F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

032

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	2.9	U	2.9	U	2.9	U	2.9	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

033

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: P1 ICS Source: ICF-0292

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	514927	507757	542180	544480.0	107.2	545770	547530.0	107.8
Antimony	0	0	5	-8.5		-16	1.8	
Arsenic								
Barium	0	499	13	507.5	101.7	14	508.5	101.9
Beryllium	0	488	0	516.7	105.9	0	506.3	103.8
Cadmium	0	928	-6	933.5	100.6	-1	901.5	97.1
Calcium	529351	525385	513400	513260.0	97.7	498400	498850.0	94.9
Chromium	14	464	15	490.0	105.6	15	479.1	103.3
Cobalt	0	475	-1	494.9	104.2	1	486.8	102.5
Copper	0	488	-2	500.1	102.5	5	512.0	104.9
Iron	190348	187957	197540	198340.0	105.5	192000	192910.0	102.6
Lead								
Magnesium	543610	533685	555770	556570.0	104.3	539930	540060.0	101.2
Manganese	36	502	31	507.5	101.1	50	514.4	102.5
Mercury								
Nickel	0	897	0	904.4	100.8	0	882.5	98.4
Potassium	0	0	171	152.1		352	375.6	
Selenium								
Silver	0	899	-8	887.1	98.7	-6	976.2	108.6
Sodium	0	0	985	972.5		781	798.0	
Thallium								
Vanadium	0	473	2	491.0	103.8	-3	475.6	100.5
Zinc	71	1001	92	1089.8	108.9	90	1070.4	106.9

034

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5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MFQ227S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		109590.0000		101300.0000		2000.00	414.5		P
Antimony	75-125	502.9700		16.9000	U	500.00	100.6		P
Arsenic	75-125	23.5510		2.9000	U	40.00	58.9	N	F
Barium	75-125	1930.1000		26.6200	B	2000.00	95.2		P
Beryllium	75-125	78.0200		28.3400		50.00	99.4		P
Cadmium	75-125	180.7600		122.7200		50.00	116.1		P
Calcium									NR
Chromium	75-125	213.6200		29.6000		200.00	92.0		P
Cobalt	75-125	2311.5000		1749.2000		500.00	112.5		P
Copper		196870.0000		185710.0000		250.00	4464.0		P
Iron		166370.0000		157030.0000		1000.00	934.0		P
Lead	75-125	18.4120		3.6310		20.00	73.9	N	F
Magnesium									NR
Manganese		30255.0000		28403.0000		500.00	370.4		P
Mercury	75-125	1.1055		0.2385		1.00	86.7		CV
Nickel	75-125	1054.2000		546.1300		500.00	101.6		P
Potassium									NR
Selenium	75-125	3.8000	U	19.0000	U	10.00	0.0	N	F
Silver	75-125	47.7800		2.5000	U	50.00	95.6		P
Sodium									NR
Thallium	75-125	46.0885		2.7030	B	50.00	86.8		F
Vanadium	75-125	509.0100		38.0200	B	500.00	94.2		P
Zinc		9846.7000		8750.0000		500.00	219.3		P
Cyanide									NR

Comments:

035

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6
DUPLICATES

EPA SAMPLE NO.

MFQ226D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		7828.5000		8603.0000		9.4		P
Antimony		16.9000	U	16.9000	U			P
Arsenic		2.9000	U	2.9000	U			F
Barium		14.9700	B	18.3000	B	20.0		P
Beryllium		27.7200		27.1900		1.9		P
Cadmium		158.9700		159.0300		0.0		P
Calcium		480770.0000		478920.0000		0.4		P
Chromium	10.0	9.9000	B	14.3600		36.8		P
Cobalt		1666.7000		1664.7000		0.1		P
Copper	25.0	6.5000	B	1127.9000		197.7	*	P
Iron		92530.0000		92781.0000		0.3		P
Lead	3.0	11.2000		8.8000		24.0		F
Magnesium		413540.0000		414450.0000		0.2		P
Manganese		118550.0000		116890.0000		1.4		P
Mercury		0.1000	U	0.1000	U			CV
Nickel		471.4500		476.9500		1.2		P
Potassium		4055.8000	B	4195.2000	B	3.4		P
Selenium		19.0000	U	19.0000	U			F
Silver		2.5000	U	2.5000	U			P
Sodium		58396.0000		58777.0000		0.7		P
Thallium		1.3000	U	1.3000	U			F
Vanadium		2.8000	U	3.5500	B	200.0		P
Zinc		68563.0000		68928.0000		0.5		P
Cyanide								NR

036

7

LABORATORY CONTROL SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Solid LCS Source:

Aqueous LCS Source: EPA-LV 0692

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	1878.0	1911.50	101.8						
Antimony	1024.0	986.79	96.4						
Arsenic	50.4	47.63	94.5						
Barium	1891.0	1911.80	101.1						
Beryllium	478.0	488.94	102.3						
Cadmium	493.0	486.16	98.6						
Calcium	48810.0	48567.00	99.5						
Chromium	480.0	485.86	101.2						
Cobalt	487.0	473.30	97.2						
Copper	486.0	499.55	102.8						
Iron	1962.0	1961.70	100.0						
Lead	49.2	49.19	100.0						
Magnesium	23859.0	24374.00	102.2						
Manganese	474.0	481.00	101.5						
Mercury									
Nickel	488.0	474.20	97.2						
Potassium	49182.0	48295.00	98.2						
Selenium	50.3	44.81	89.1						
Silver	478.0	422.29	88.3						
Sodium	46804.0	48268.00	103.1						
Thallium	50.4	47.13	93.5						
Vanadium	482.0	483.93	100.4						
Zinc	2921.0	2855.00	97.7						
Cyanide									

037

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STANDARD ADDITION RESULTS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q
MFQ226	PB	0.028	10.00	0.053	20.00	0.074	30.00	0.103	11.2	0.9982	
MFQ226D	PB	0.027	10.00	0.062	20.00	0.097	30.00	0.124	8.8	0.9982	
MFQ232	PB	0.028	10.00	0.050	20.00	0.083	30.00	0.127	6.8	0.9891	+
MFQ232	PB	0.026	10.00	0.063	20.00	0.069	30.00	0.082	19.5	0.9354	+
MFQ239	PB	0.025	10.00	0.049	20.00	0.085	30.00	0.120	6.7	0.9963	
MFQ240	PB	0.020	10.00	0.050	20.00	0.080	30.00	0.095	9.0	0.9898	+
MFQ240	PB	0.011	10.00	0.047	20.00	0.066	30.00	0.076	8.4	0.9644	+
MFQ242	PB	0.033	10.00	0.053	20.00	0.091	30.00	0.126	8.9	0.9923	+
MFQ242	PB	0.027	10.00	0.047	20.00	0.063	30.00	0.106	9.0	0.9730	+
MFQ344	PB	0.077	10.00	0.108	20.00	0.137	30.00	0.133	42.7	0.9196	+
MFQ344	PB	0.042	10.00	0.078	20.00	0.079	30.00	0.121	18.6	0.9512	+

038

9

ICP SERIAL DILUTIONS

EPA SAMPLE NO.

MFQ227L

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	101300.00		104480.00		3.1		P
Antimony	16.90	U	84.50	U			P
Arsenic							NR
Barium	26.62	B	49.90	B	87.5		P
Beryllium	28.34		24.05	B	15.1	E	P
Cadmium	122.72		132.90		8.3		P
Calcium	483470.00		514550.00		6.4		P
Chromium	29.60		22.85	B	22.8		P
Cobalt	1749.20		1888.60		8.0		P
Copper	185710.00		194305.00		4.6		P
Iron	157030.00		169835.00		8.2		P
Lead							NR
Magnesium	147560.00		155205.00		5.2		P
Manganese	28403.00		30299.00		6.7		P
Mercury							NR
Nickel	546.13		602.45		10.3		P
Potassium	25989.00		26869.50		3.4		P
Selenium							NR
Silver	2.50	U	12.50	U			P
Sodium	113070.00		116510.00		3.0		P
Thallium							NR
Vanadium	38.02	B	36.90	B	2.9		P
Zinc	8750.00		9341.50		6.8		P

039

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F3

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	283.30	BS	3	2.0	F
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium	276.80	BS	10	1.3	F
Vanadium			50		NR
Zinc			20		NR

Comments:

F3: THERMO JARRELL-ASH VIDEO 22E (#2913)

040

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F4

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	2.9	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	3.8	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F4: THERMO JARRELL-ASH VIDEO 22E (#2664)

041

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: Date: 10/15/92

Flame AA ID Number: M1

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

M1: TECHNICON MERCURY ANALYZER (#SS4199A-D)

042

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: P1 Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	21.4	P
Antimony	206.80		60	16.9	P
Arsenic			10		NR
Barium	493.40		200	2.9	P
Beryllium	313.00		5	0.4	P
Cadmium	226.50		5	1.0	P
Calcium	317.90		5000	25.9	P
Chromium	267.70		10	4.5	P
Cobalt	228.60		50	2.7	P
Copper	324.70		25	3.5	P
Iron	259.90		100	11.6	P
Lead			3		NR
Magnesium	279.00		5000	40.8	P
Manganese	257.60		15	4.7	P
Mercury			0.2		NR
Nickel	231.60		40	5.4	P
Potassium	766.40		5000	241.8	P
Selenium			5		NR
Silver	328.00		10	2.5	P
Sodium	588.90		5000	46.4	P
Thallium			10		NR
Vanadium	292.40		50	2.8	P
Zinc	213.80		20	2.2	P

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

043

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: P1 Date: 07/01/92

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	Cr
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0002100	0.0000000	0.0119500
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0001500	0.0000000	0.0000000
Calcium	317.90	0.0000000	0.0000000	-0.0003000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000300	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.70	0.0000000	0.0000000	-0.0001200	0.0000000	-0.0000800
Iron	259.90	0.0001400	0.0000000	0.0000000	0.0000000	0.0000000
Lead						
Magnesium	279.00	0.0000000	0.0000000	-0.0002400	0.0000000	0.0000000
Manganese	257.60	0.0000200	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0000000	-0.0001000	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000400	0.0000000	-0.0002000	0.0000000	-0.0051200
Zinc	213.80	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

044

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: P1 Date: 07/01/92

Analyte	Wave-length (nm)	Cu	Mn	Ni	V	----
Aluminum	308.20	0.0000000	0.0012800	0.0000000	0.0098400	
Antimony	206.80	0.0000000	0.0000000	-0.0023000	-0.0043600	
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.00	0.0000000	0.0000000	0.0000000	-0.0024900	
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.90	0.0000000	0.0000000	0.0000000	0.0000000	
Chromium	267.70	0.0000000	0.0000000	0.0000000	0.0015200	
Cobalt	228.60	0.0000000	0.0000000	-0.0000300	0.0000000	
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.90	-0.0001200	-0.0017500	0.0000000	0.0000000	
Lead						
Magnesium	279.00	0.0000000	-0.0004100	0.0000000	0.0000000	
Manganese	257.60	0.0000000	0.0000000	0.0000000	-0.0001000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	328.00	0.0000000	0.0000000	0.0000000	0.0000000	
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	
Zinc	213.80	0.0017400	0.0000000	0.0045900	0.0000000	

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

045

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ICP LINEAR RANGES (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

ICP ID Number: P1 Date: 10/15/92

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	P
Antimony	5.00	25000.0	P
Arsenic			NR
Barium	5.00	100000.0	P
Beryllium	5.00	25000.0	P
Cadmium	5.00	25000.0	P
Calcium	5.00	1200000.0	P
Chromium	5.00	200000.0	P
Cobalt	5.00	100000.0	P
Copper	5.00	250000.0	P
Iron	5.00	1000000.0	P
Lead			NR
Magnesium	5.00	1000000.0	P
Manganese	5.00	200000.0	P
Mercury			NR
Nickel	5.00	250000.0	P
Potassium	5.00	1100000.0	P
Selenium			NR
Silver	5.00	100000.0	P
Sodium	5.00	1000000.0	P
Thallium			NR
Vanadium	5.00	50000.0	P
Zinc	5.00	150000.0	P

Comments:
P1: THERMO JARRELL-ASH ICAP61 (#10782)

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
MFQ226	12/21/92		100
MFQ226D	12/21/92		100
MFQ227	12/21/92		100
MFQ227S	12/21/92		100
MFQ228	12/21/92		100
MFQ229	12/21/92		100
MFQ230	12/21/92		100
MFQ231	12/21/92		100
MFQ232	12/21/92		100
MFQ237	12/21/92		100
MFQ238	12/21/92		100
MFQ239	12/21/92		100
MFQ240	12/21/92		100
MFQ241	12/21/92		100
MFQ242	12/21/92		100
MFQ342	12/21/92		100
MFQ343	12/21/92		100
MFQ344	12/21/92		100
PBW	12/21/92		100

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSW	01/11/93		100
MFQ226	01/11/93		100
MFQ226D	01/11/93		100
MFQ227	01/11/93		100
MFQ227S	01/11/93		100
MFQ228	01/11/93		100
MFQ229	01/11/93		100
MFQ230	01/11/93		100
MFQ231	01/11/93		100
MFQ232	01/11/93		100
MFQ237	01/11/93		100
MFQ238	01/11/93		100
MFQ239	01/11/93		100
MFQ240	01/11/93		100
MFQ241	01/11/93		100
MFQ242	01/11/93		100
MFQ342	01/11/93		100
MFQ343	01/11/93		100
MFQ344	01/11/93		100
PBW	01/11/93		100

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSW	01/11/93		100
MFQ226	01/11/93		100
MFQ226D	01/11/93		100
MFQ227	01/11/93		100
MFQ227S	01/11/93		100
MFQ228	01/11/93		100
MFQ229	01/11/93		100
MFQ230	01/11/93		100
MFQ231	01/11/93		100
MFQ232	01/11/93		100
MFQ237	01/11/93		100
MFQ238	01/11/93		100
MFQ239	01/11/93		100
MFQ240	01/11/93		100
MFQ241	01/11/93		100
MFQ242	01/11/93		100
MFQ342	01/11/93		100
MFQ343	01/11/93		100
MFQ344	01/11/93		100
PBW	01/11/93		100

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: M1 Method: CV

Start date: 12/21/92 End date: 12/21/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1000																X									
S0.2	1.00	1003																X									
S0.5	1.00	1006																X									
S1.0	1.00	1009																X									
S2.0	1.00	1012																X									
S5.0	1.00	1015																X									
ICV	2.00	1021																X									
ICB	1.00	1024																X									
CCV	1.00	1027																X									
CCB	1.00	1030																X									
PBW	1.00	1033																X									
ZZZZZZ	1.00	1036																									
ZZZZZZ	1.00	1039																									
MFQ227	1.00	1042																X									
MFQ227S	1.00	1045																X									
MFQ228	1.00	1048																X									
MFQ229	1.00	1051																X									
MFQ230	1.00	1054																X									
MFQ231	1.00	1057																X									
MFQ232	1.00	1100																X									
CCV	1.00	1103																X									
CCB	1.00	1106																X									
MFQ237	1.00	1109																X									
MFQ238	1.00	1112																X									
MFQ239	1.00	1115																X									
MFQ240	1.00	1118																X									
MFQ241	1.00	1121																X									
MFQ242	1.00	1124																X									
MFQ342	1.00	1127																X									
MFQ343	1.00	1130																X									
MFQ344	1.00	1133																X									
CCV	1.00	1136																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: M1 Method: CV

Start date: 12/21/92 End date: 12/21/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	AN	TL	V	ZN	CN
CCB	1.00	1139																X									
MFQ226	1.00	1142																X									
MFQ226D	1.00	1145																X									
ZZZZZZ	1.00	1148																									
ZZZZZZ	1.00	1151																									
ZZZZZZ	1.00	1154																									
ZZZZZZ	1.00	1157																									
ZZZZZZ	1.00	1200																									
CCV	1.00	1203																X									
CCB	1.00	1206																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0859													X												
S3	1.00	0903													X												
S50	1.00	0907													X												
S100	1.00	0911													X												
ICV	2.00	0929													X												
ICB	1.00	0933													X												
CRA	1.00	0937													X												
CCV	1.00	0941													X												
CCB	1.00	0946													X												
ZZZZZZ	1.00	0950																									
ZZZZZZ	1.00	0954																									
ZZZZZZ	1.00	0958																									
ZZZZZZ	1.00	1003																									
ZZZZZZ	1.00	1007																									
ZZZZZZ	1.00	1011																									
ZZZZZZ	1.00	1015																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1024																									
ZZZZZZ	1.00	1028																									
CCV	1.00	1032													X												
CCB	1.00	1037													X												
ZZZZZZ	1.00	1041																									
ZZZZZZ	1.00	1045																									
ZZZZZZ	1.00	1049																									
ZZZZZZ	1.00	1054																									
ZZZZZZ	1.00	1058																									
ZZZZZZ	1.00	1102																									
ZZZZZZ	1.00	1107																									
ZZZZZZ	1.00	1111																									
CCV	1.00	1115													X												
CCB	1.00	1120													X												
PBW	1.00	1131													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BBE	CDA	CCA	CRO	COU	CUE	FEB	PBG	MGN	HGI	NIK	SEA	AGN	NAL	TLV	VZN	CCN
PBWA	1.00	1136	95.4										X										
LCSW	1.00	1140											X										
LCSWA	1.00	1144	81.1										X										
MFQ226	1.00	1148																					
MFQ226A	1.00	1153	67.8																				
MFQ226D	1.00	1157																					
MFQ226DA	1.00	1201	73.7																				
MFQ227	1.00	1205											X										
MFQ227A	1.00	1210	67.9										X										
CCV	1.00	1214											X										
CCB	1.00	1218											X										
MFQ227S	1.00	1222											X										
ZZZZZZ	1.00	1227																					
MFQ228	1.00	1231											X										
MFQ228A	1.00	1235	80.0										X										
MFQ229	1.00	1239																					
MFQ229A	1.00	1244	-9999.9																				
MFQ230	1.00	1248																					
MFQ230A	1.00	1252	34.5																				
MFQ231	1.00	1321											X										
MFQ231A	1.00	1325	71.8										X										
CCV	1.00	1329											X										
CCB	1.00	1334											X										
MFQ232	1.00	1338																					
MFQ232A	1.00	1342	59.2																				
MFQ237	1.00	1346																					
MFQ237A	1.00	1351	87.3																				
MFQ238	1.00	1355											X										
MFQ238A	1.00	1359	61.7										X										
MFQ239	1.00	1403																					
MFQ239A	1.00	1408	75.2																				
MFQ240	1.00	1412																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BBA	BBE	CCD	CCA	CCR	CCO	CCU	FEE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ240A	1.00	1416	57.6																								
CCV	1.00	1420													X												
CCB	1.00	1424													X												
ZZZZZZ	100.00	1443																									
ZZZZZZ	100.00	1445																									
ZZZZZZ	100.00	1447																									
ZZZZZZ	100.00	1450																									
CCV	1.00	1452													X												
CCB	1.00	1455													X												
MFQ241	1.00	1504													X												
MFQ241A	1.00	1508	62.1												X												
MFQ242	1.00	1513																									
MFQ242A	1.00	1517	75.3																								
MFQ342	1.00	1521																									
MFQ342A	1.00	1525	58.6																								
MFQ343	1.00	1530																									
MFQ343A	1.00	1534	21.4																								
MFQ344	1.00	1538																									
MFQ344A	1.00	1542	58.7																								
CCV	1.00	1547													X												
CCB	1.00	1551													X												
MFQ342	1.00	1604													X												
MFQ342A	1.00	1609	58.7												X												
MFQ343	1.00	1613																									
MFQ343A	1.00	1617	0.0																								
MFQ230	1.00	1621																									
MFQ230A	1.00	1626	28.6																								
MFQ237	1.00	1630													X												
MFQ237A	1.00	1634	90.7												X												
MFQ229	5.00	1638													X												
MFQ229A	5.00	1643	93.3												X												
CCV	1.00	1647													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1651													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0859																						X			
S10	1.00	0903																						X			
S50	1.00	0907																						X			
S100	1.00	0911																						X			
ICV	2.00	0929																						X			
ICB	1.00	0933																						X			
CRA	1.00	0937																						X			
CCV	1.00	0941																						X			
CCB	1.00	0946																						X			
ZZZZZZ	1.00	0950																									
ZZZZZZ	1.00	0954																									
ZZZZZZ	1.00	0958																									
ZZZZZZ	1.00	1003																									
ZZZZZZ	1.00	1007																									
ZZZZZZ	1.00	1011																									
ZZZZZZ	1.00	1015																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1024																									
ZZZZZZ	1.00	1028																									
CCV	1.00	1032																						X			
CCB	1.00	1037																						X			
ZZZZZZ	1.00	1041																									
ZZZZZZ	1.00	1045																									
ZZZZZZ	1.00	1049																									
ZZZZZZ	1.00	1054																									
ZZZZZZ	1.00	1058																									
ZZZZZZ	1.00	1102																									
ZZZZZZ	1.00	1107																									
ZZZZZZ	1.00	1111																									
CCV	1.00	1115																						X			
CCB	1.00	1120																						X			
PBW	1.00	1131																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
PBWA	1.00	1136	89.0																					X			
LCSW	1.00	1140																						X			
LCSWA	1.00	1144	101.2																					X			
MFQ226	1.00	1148																						X			
MFQ226A	1.00	1153	85.0																					X			
MFQ226D	1.00	1157																						X			
MFQ226DA	1.00	1201	87.0																					X			
MFQ227	1.00	1205																						X			
MFQ227A	1.00	1210	83.4																					X			
CCV	1.00	1214																						X			
CCB	1.00	1218																						X			
MFQ227S	1.00	1222																						X			
ZZZZZZ	1.00	1227																									
MFQ228	1.00	1231																						X			
MFQ228A	1.00	1235	70.2																					X			
MFQ229	1.00	1239																						X			
MFQ229A	1.00	1244	82.0																					X			
MFQ230	1.00	1248																						X			
MFQ230A	1.00	1252	78.1																					X			
MFQ231	1.00	1321																						X			
MFQ231A	1.00	1325	75.1																					X			
CCV	1.00	1329																						X			
CCB	1.00	1334																						X			
MFQ232	1.00	1338																						X			
MFQ232A	1.00	1342	93.0																					X			
MFQ237	1.00	1346																						X			
MFQ237A	1.00	1351	89.0																					X			
MFQ238	1.00	1355																						X			
MFQ238A	1.00	1359	72.1																					X			
MFQ239	1.00	1403																						X			
MFQ239A	1.00	1408	76.1																					X			
MFQ240	1.00	1412																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ240A	1.00	1416	76.1																					X			
CCV	1.00	1420																						X			
CCB	1.00	1424																						X			
ZZZZZZ	100.00	1443																									
ZZZZZZ	100.00	1445																									
ZZZZZZ	100.00	1447																									
ZZZZZZ	100.00	1450																									
CCV	1.00	1452																						X			
CCB	1.00	1455																						X			
MFQ241	1.00	1504																						X			
MFQ241A	1.00	1508	58.5																					X			
MFQ242	1.00	1513																						X			
MFQ242A	1.00	1517	66.2																					X			
MFQ342	1.00	1521																						X			
MFQ342A	1.00	1525	89.4																					X			
MFQ343	1.00	1530																						X			
MFQ343A	1.00	1534	87.0																					X			
MFQ344	1.00	1538																						X			
MFQ344A	1.00	1542	91.0																					X			
CCV	1.00	1547																						X			
CCB	1.00	1551																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	ASA	BAE	BCD	CAR	CCO	CUE	FEB	PBG	MNG	HGI	NIK	SEA	GAN	ALT	VZN	CN
S0	1.00	1518			X															
S10	1.00	1523			X															
S50	1.00	1527			X															
S100	1.00	1532			X															
ICV	1.00	1539			X															
ICB	1.00	1543			X															
CRA	1.00	1548			X															
CCV	1.00	1553			X															
CCB	1.00	1558			X															
PBW	1.00	1603			X															
PBWA	1.00	1607	95.4		X															
LCSW	1.00	1612			X															
LCSWA	1.00	1617	94.4		X															
MFQ226	1.00	1622			X															
MFQ226A	1.00	1627	69.3		X															
MFQ226D	1.00	1631			X															
MFQ226DA	1.00	1636	64.6		X															
MFQ227	1.00	1641			X															
MFQ227A	1.00	1646	42.9		X															
CCV	1.00	1651			X															
CCB	1.00	1655			X															
MFQ227S	1.00	1700			X															
ZZZZZZ	1.00	1705																		
MFQ228	1.00	1710			X															
MFQ228A	1.00	1714	66.2		X															
MFQ229	1.00	1719			X															
MFQ229A	1.00	1724	59.2		X															
MFQ230	1.00	1729																		
MFQ230A	1.00	1734	23.6																	
MFQ231	1.00	1738			X															
MFQ231A	1.00	1743	63.1		X															
CCV	1.00	1748			X															

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	ASA	BAE	BCD	CAR	COU	CFE	PBG	MGN	MGI	NIK	SEA	GAN	ALT	VZN	CN							
CCB	1.00	1753			X																					
MFQ232	1.00	1758			X																					
MFQ232A	1.00	1802	74.0		X																					
MFQ237	1.00	1807			X																					
MFQ237A	1.00	1812	96.2		X																					
MFQ238	1.00	1817			X																					
MFQ238A	1.00	1822	82.7		X																					
MFQ239	1.00	1826			X																					
MFQ239A	1.00	1831	76.4		X																					
MFQ240	1.00	1836			X																					
MFQ240A	1.00	1841	39.8		X																					
CCV	1.00	1846			X																					
CCB	1.00	1850			X																					
MFQ241	1.00	1855			X																					
MFQ241A	1.00	1900	44.4		X																					
MFQ242	1.00	1905			X																					
MFQ242A	1.00	1910	86.6		X																					
MFQ342	1.00	1914																								
MFQ342A	1.00	1919	37.5																							
MFQ343	1.00	1924																								
MFQ343A	1.00	1929	0.0																							
ZZZZZZ	1.00	1953																								
ZZZZZZ	1.00	1958																								
CCV	1.00	2003			X																					
CCB	1.00	2008			X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																					
				ALK	SBS	ABA	BBE	CDA	CAR	COU	CUE	FEB	PBG	MGN	MGI	NIK	SE	AGA	NAL	TLN	VCN	ZNC	CN		
S0	1.00	1518															X								
S5	1.00	1523															X								
S50	1.00	1527															X								
S100	1.00	1532															X								
ICV	1.00	1539															X								
ICB	1.00	1543															X								
CRA	1.00	1548															X								
CCV	1.00	1553															X								
CCB	1.00	1558															X								
PBW	1.00	1603															X								
PBWA	1.00	1607	86.8														X								
LCSW	1.00	1612															X								
LCSWA	1.00	1617	96.8														X								
MFQ226	1.00	1622																							
MFQ226A	1.00	1627	0.0																						
MFQ226D	1.00	1631																							
MFQ226DA	1.00	1636	0.0																						
MFQ227	1.00	1641																							
MFQ227A	1.00	1646	0.0																						
CCV	1.00	1651															X								
CCB	1.00	1655															X								
MFQ227S	1.00	1700															X								
ZZZZZZ	1.00	1705																							
MFQ228	1.00	1710																							
MFQ228A	1.00	1714	0.0																						
MFQ229	1.00	1719																							
MFQ229A	1.00	1724	0.0																						
MFQ230	1.00	1729																							
MFQ230A	1.00	1734	0.0																						
MFQ231	1.00	1738															X								
MFQ231A	1.00	1743	42.1														X								
CCV	1.00	1748															X								

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1753																			X						
MFQ232	1.00	1758																									
MFQ232A	1.00	1802	0.0																								
MFQ237	1.00	1807																									
MFQ237A	1.00	1812	0.0																								
MFQ238	1.00	1817																			X						
MFQ238A	1.00	1822	58.3																		X						
MFQ239	1.00	1826																			X						
MFQ239A	1.00	1831	52.3																		X						
MFQ240	1.00	1836																									
MFQ240A	1.00	1841	0.0																								
CCV	1.00	1846																			X						
CCB	1.00	1850																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BBA	BBE	CCD	CCA	CCR	CCO	CCU	CFE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1810													X												
S3	1.00	1814													X												
S50	1.00	1818													X												
S100	1.00	1823													X												
ICV	2.00	1945													X												
ICB	1.00	1949													X												
CRA	1.00	1953													X												
CCV	1.00	1957													X												
CCB	1.00	2002													X												
ZZZZZZ	5.00	2134																									
ZZZZZZ	5.00	2138																									
CCV	1.00	2142													X												
CCB	1.00	2147													X												
MFQ343	5.00	2156													X												
MFQ343A	5.00	2201	63.6												X												
MFQ230	5.00	2205													X												
MFQ230A	5.00	2209	82.2												X												
CCV	1.00	2213													X												
CCB	1.00	2218													X												
MFQ2260	1.00	2235													X												
MFQ2261	1.00	2237													X												
MFQ2262	1.00	2240													X												
MFQ2263	1.00	2242													X												
MFQ2320	1.00	2244													X												
MFQ2321	1.00	2247													X												
MFQ2322	1.00	2249													X												
MFQ2323	1.00	2251													X												
MFQ2390	1.00	2254													X												
MFQ2391	1.00	2256													X												
MFQ2392	1.00	2259													X												
MFQ2393	1.00	2301													X												
MFQ2400	1.00	2309													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ2401	1.00	2311													X												
MFQ2402	1.00	2313													X												
MFQ2403	1.00	2316													X												
ZZZZZZ	1.00	2318																									
ZZZZZZ	1.00	2321																									
CCV	1.00	2323													X												
CCB	1.00	2325													X												
MFQ2420	1.00	2328													X												
MFQ2421	1.00	2330													X												
MFQ2422	1.00	2332													X												
MFQ2423	1.00	2335													X												
MFQ3440	2.00	2337													X												
MFQ3441	2.00	2340													X												
MFQ3442	2.00	2342													X												
MFQ3443	2.00	2344													X												
MFQ226D0	1.00	2347													X												
MFQ226D1	1.00	2349													X												
MFQ226D2	1.00	2352													X												
MFQ226D3	1.00	2354													X												
ZZZZZZ	1.00	2356																									
ZZZZZZ	1.00	2359																									
CCV	1.00	0001													X												
CCB	1.00	0003													X												
MFQ2320	1.00	0006													X												
MFQ2321	1.00	0008													X												
MFQ2322	1.00	0011													X												
MFQ2323	1.00	0013													X												
MFQ2400	1.00	0015													X												
MFQ2401	1.00	0018													X												
MFQ2402	1.00	0020													X												
MFQ2403	1.00	0023													X												
MFQ2420	1.00	0025													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F3 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BBA	BBE	CCD	CCA	CCR	CCO	CCU	FEE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ2421	1.00	0027													X												
MFQ2422	1.00	0030													X												
MFQ2423	1.00	0032													X												
MFQ3440	2.00	0034													X												
MFQ3441	2.00	0037													X												
MFQ3442	2.00	0039													X												
MFQ3443	2.00	0042													X												
ZZZZZZ	1.00	0044																									
ZZZZZZ	1.00	0046																									
CCV	1.00	0049													X												
CCB	1.00	0051													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2120				X																					
S10	1.00	2125				X																					
S50	1.00	2130				X																					
S100	1.00	2134				X																					
ICV	1.00	2142				X																					
ICB	1.00	2147				X																					
CRA	1.00	2152				X																					
CCV	1.00	2157				X																					
CCB	1.00	2202				X																					
ZZZZZZ	1.00	2206																									
ZZZZZZ	1.00	2211																									
ZZZZZZ	1.00	2216																									
ZZZZZZ	1.00	2221																									
ZZZZZZ	1.00	2225																									
ZZZZZZ	1.00	2230																									
ZZZZZZ	1.00	2235																									
ZZZZZZ	1.00	2240																									
ZZZZZZ	1.00	2245																									
ZZZZZZ	1.00	2249																									
CCV	1.00	2254				X																					
CCB	1.00	2259				X																					
MFQ344	1.00	2304																									
MFQ344A	1.00	2308	60.0																								
ZZZZZZ	5.00	2313																									
ZZZZZZ	5.00	2318																									
ZZZZZZ	5.00	2323																									
ZZZZZZ	5.00	2327																									
ZZZZZZ	5.00	2332																									
ZZZZZZ	5.00	2337																									
ZZZZZZ	1.00	2342																									
ZZZZZZ	1.00	2347																									
CCV	1.00	2351				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	2356				X																					
ZZZZZZ	5.00	0001																									
ZZZZZZ	5.00	0006																									
MFQ230	5.00	0010				X																					
MFQ230A	5.00	0015	85.4			X																					
ZZZZZZ	5.00	0020																									
ZZZZZZ	5.00	0025																									
ZZZZZZ	5.00	0029																									
ZZZZZZ	5.00	0034																									
ZZZZZZ	1.00	0039																									
ZZZZZZ	1.00	0044																									
CCV	1.00	0048				X																					
CCB	1.00	0053				X																					
MFQ240	5.00	0058																									
MFQ240A	5.00	0103	104.5																								
MFQ342	5.00	0108				X																					
MFQ342A	5.00	0112	92.0			X																					
MFQ343	5.00	0117				X																					
MFQ343A	5.00	0122	0.0			X																					
ZZZZZZ	5.00	0127																									
ZZZZZZ	5.00	0132																									
ZZZZZZ	1.00	0137																									
ZZZZZZ	1.00	0141																									
CCV	1.00	0146				X																					
CCB	1.00	0151				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ABA	BEB	CDC	CAC	CRC	COC	CUC	FEF	PBP	MGM	MNM	HGH	NIN	K	SES	AGA	NAN	TLT	V	ZNZ	CNC
S0	1.00	2120																		X						
S5	1.00	2125																		X						
S50	1.00	2130																		X						
S100	1.00	2134																		X						
ICV	1.00	2142																		X						
ICB	1.00	2147																		X						
CRA	1.00	2152																		X						
CCV	1.00	2157																		X						
CCB	1.00	2202																		X						
MFQ241	1.00	2206																								
MFQ241A	1.00	2211	0.0																							
MFQ242	1.00	2216																		X						
MFQ242A	1.00	2221	82.2																	X						
MFQ342	1.00	2225																								
MFQ342A	1.00	2230	0.0																							
MFQ343	1.00	2235																								
MFQ343A	1.00	2240	0.0																							
ZZZZZZ	1.00	2245																								
ZZZZZZ	1.00	2249																								
CCV	1.00	2254																		X						
CCB	1.00	2259																		X						
MFQ344	1.00	2304																								
MFQ344A	1.00	2308	0.0																							
MFQ226	5.00	2313																								
MFQ226A	5.00	2318	63.7																							
MFQ227	5.00	2323																		X						
MFQ227A	5.00	2327	71.3																	X						
MFQ228	5.00	2332																		X						
MFQ228A	5.00	2337	96.4																	X						
ZZZZZZ	1.00	2342																								
ZZZZZZ	1.00	2347																								
CCV	1.00	2351																		X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BEB	CDC	CAC	CRC	COC	CUC	FEF	PBP	MGM	MNM	HGH	NIN	KK	SES	AGA	NAN	TLT	VV	ZNZ	CNC
CCB	1.00	2356																		X						
MFQ229	5.00	0001																								
MFQ229A	5.00	0006	62.6																							
MFQ230	5.00	0010																		X						
MFQ230A	5.00	0015	0.0																	X						
MFQ232	5.00	0020																		X						
MFQ232A	5.00	0025	80.7																	X						
MFQ237	5.00	0029																								
MFQ237A	5.00	0034	93.5																							
ZZZZZZ	1.00	0039																								
ZZZZZZ	1.00	0044																								
CCV	1.00	0048																		X						
CCB	1.00	0053																		X						
MFQ240	5.00	0058																		X						
MFQ240A	5.00	0103	40.6																	X						
MFQ342	5.00	0108																		X						
MFQ342A	5.00	0112	57.4																	X						
MFQ343	5.00	0117																		X						
MFQ343A	5.00	0122	0.0																	X						
MFQ226D	5.00	0127																		X						
MFQ226DA	5.00	0132	60.5																	X						
ZZZZZZ	1.00	0137																								
ZZZZZZ	1.00	0141																								
CCV	1.00	0146																		X						
CCB	1.00	0151																		X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	ASA	BAE	BCD	CAR	COU	CUE	FEB	PBG	MNG	HGI	NIK	SEA	AGN	NAL	TLV	ZNC	CN					
S0	1.00	0857			X																					
S10	1.00	0902			X																					
S50	1.00	0907			X																					
S100	1.00	0912			X																					
ICV	1.00	0919			X																					
ICB	1.00	0924			X																					
CRA	1.00	0928			X																					
CCV	1.00	0933			X																					
CCB	1.00	0938			X																					
ZZZZZZ	5.00	0943																								
ZZZZZZ	5.00	0948																								
ZZZZZZ	5.00	0952																								
ZZZZZZ	5.00	0957																								
ZZZZZZ	5.00	1002																								
ZZZZZZ	5.00	1007																								
ZZZZZZ	5.00	1012																								
ZZZZZZ	5.00	1020																								
ZZZZZZ	5.00	1025																								
ZZZZZZ	5.00	1030																								
CCV	1.00	1035			X																					
CCB	1.00	1039			X																					
MFQ344	1.00	1044			X																					
MFQ344A	1.00	1049	52.3		X																					
ZZZZZZ	5.00	1056																								
ZZZZZZ	5.00	1101																								
ZZZZZZ	1.00	1106																								
ZZZZZZ	1.00	1110																								
CCV	1.00	1115			X																					
CCB	1.00	1120			X																					

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U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: F4 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0857																			X						
S5	1.00	0902																			X						
S50	1.00	0907																			X						
S100	1.00	0912																			X						
ICV	1.00	0919																			X						
ICB	1.00	0924																			X						
CRA	1.00	0928																			X						
CCV	1.00	0933																			X						
CCB	1.00	0938																			X						
MFQ226	5.00	0943																			X						
MFQ226A	5.00	0948	53.4																		X						
MFQ229	5.00	0952																			X						
MFQ229A	5.00	0957	49.1																		X						
MFQ237	5.00	1002																			X						
MFQ237A	5.00	1007	104.2																		X						
MFQ241	5.00	1012																									
MFQ241A	5.00	1020	67.8																								
MFQ344	5.00	1025																			X						
MFQ344A	5.00	1030	0.0																		X						
CCV	1.00	1035																			X						
CCB	1.00	1039																			X						
ZZZZZZ	1.00	1044																									
ZZZZZZ	1.00	1049																									
MFQ241	5.00	1056																			X						
MFQ241A	5.00	1101	54.8																		X						
ZZZZZZ	1.00	1106																									
ZZZZZZ	1.00	1110																									
CCV	1.00	1115																			X						
CCB	1.00	1120																			X						

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U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: P1 Method: P

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				ALK	SB	ABS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1739		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
S	1.00	1742		X						X				X		X				X			X				
S	1.00	1744			X		X	X	X		X	X	X				X		X						X	X	
S	1.00	1746																				X					
ICV	1.00	1749		X			X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICV	1.00	1752																									
ICV	1.00	1755			X																						
ICB	1.00	1757		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1800		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1802		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1805			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1807		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1810		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
PBW	1.00	1812		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
LCSW	1.00	1817		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ226	1.00	1820		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ226D	1.00	1822		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ227	1.00	1825		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ227S	1.00	1827		X	X		X	X	X		X	X	X	X			X		X			X			X	X	
MFQ227L	5.00	1833		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ228	1.00	1836		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ229	1.00	1838		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ZZZZZZ	1.00	1846																									
CCV	1.00	1848		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1851		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ230	1.00	1854		X	X		X	X	X	X	X	X		X					X	X		X	X		X	X	
ZZZZZZ	1.00	1856																									
MFQ232	1.00	1859		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ237	1.00	1901		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ238	1.00	1904		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ239	1.00	1906		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ240	1.00	1909		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

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FORM XIV - IN ILM02.1

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Instrument ID Number: P1 Method: P

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALS	SBS	ABA	BBE	CDA	CAR	COU	CUE	FEB	PBG	MGN	MGI	NIK	SEG	AGA	NAL	TLN	VCN	ZCN	CN				
MFQ241	1.00	1911		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ242	1.00	1914		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ZZZZZZ	1.00	1917																									
CCV	1.00	1919		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1922		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ342	1.00	1924		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ343	1.00	1927		X	X		X	X	X	X	X	X		X					X	X		X	X		X	X	
MFQ344	1.00	1929		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ230	5.00	1933											X			X	X										
MFQ343	5.00	1935											X			X	X										
ZZZZZZ	1.00	1943																									
ZZZZZZ	1.00	1945																									
MFQ231	1.00	2004		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCV	1.00	2006		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	2009		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	2012		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	2014		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	2017			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	2019		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	2022		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

~~072~~

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FORM XIV - IN ILM02.1

C L P M E T A L S 3.02e

CASE 19220

Run id: P1 9301403
THERMO JARRELL-ASH ICAP61 (#10782)
Analytical method: P
Element: Multi-Element

Acquired: 01/14/93 by SRP
Crunched: 01/15/93 by SRP
Time: 1408
Processing protocol: 3/90

Al Sb Ba Be Cd Ca Cr Co Cu
Fe Mg Mn Ni K Ag Na V Zn

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	ICV1	ICV	P			ICV	01/14/93	17:49
2	ICV2	ICV	P			ICV	01/14/93	17:52
3	ICV3	ICV	P			ICV	01/14/93	17:55
4	STDB	ICB	P			ICB	01/14/93	17:57
5	ICSAA	ICSA0	P			ICSA	01/14/93	18:00
6	ICSABB	ICSAB0	P			ICSAB	01/14/93	18:02
7	2XCRDL192Q4	CRI0	P		10/15/92	CRI	01/14/93	18:05
8	HALFSTD	CCV	P			CCV	01/14/93	18:07
9	STDB	CCB	P			CCB	01/14/93	18:10
10	PB	PBW	P	1267	01/11/93	PBW	01/14/93	18:12
11	LCSPW	LCSW	P	1267	01/11/93	LCSW	01/14/93	18:17
12	S212196-01	S	P	1267	01/11/93	MFQ226	01/14/93	18:20
13	S212196-01	S2	P	1267	01/11/93	MFQ226D	01/14/93	18:22
14	S212196-02	S	P	1267	01/11/93	MFQ227	01/14/93	18:25
15	S212196-02	DS	P	1267	01/11/93	MFQ227S	01/14/93	18:27
16	S212196-02	ISD	P	1267		MFQ227L	01/14/93	18:33
17	S212196-03	S	P	1267	01/11/93	MFQ228	01/14/93	18:36
18	S212196-04	S	P	1267	01/11/93	MFQ229	01/14/93	18:38
19	X	X	P			ZZZZZZ	01/14/93	18:46
20	HALFSTD	CCV	P			CCV	01/14/93	18:48
21	STDB	CCB	P			CCB	01/14/93	18:51
22	S212196-05	S	P	1267	01/11/93	MFQ230	01/14/93	18:54
23	X	X	P			ZZZZZZ	01/14/93	18:56
24	S212196-07	S	P	1267	01/11/93	MFQ232	01/14/93	18:59
25	S212196-08	S	P	1267	01/11/93	MFQ237	01/14/93	19:01
26	S212196-09	S	P	1267	01/11/93	MFQ238	01/14/93	19:04
27	S212196-10	S	P	1267	01/11/93	MFQ239	01/14/93	19:06
28	S212196-11	S	P	1267	01/11/93	MFQ240	01/14/93	19:09
29	S212196-12	S	P	1267	01/11/93	MFQ241	01/14/93	19:11
30	S212196-13	S	P	1267	01/11/93	MFQ242	01/14/93	19:14
31	X	X	P			ZZZZZZ	01/14/93	19:17
32	HALFSTD	CCV	P			CCV	01/14/93	19:19
33	STDB	CCB	P			CCB	01/14/93	19:22
34	S212196-14	S	P	1267	01/11/93	MFQ342	01/14/93	19:24
35	S212196-15	S	P	1267	01/11/93	MFQ343	01/14/93	19:27
36	S212196-16	S	P	1267	01/11/93	MFQ344	01/14/93	19:29
37	S212196-05	S	P	1267	01/11/93	MFQ230	01/14/93	19:33
38	S212196-15	S	P	1267	01/11/93	MFQ343	01/14/93	19:35
39	X	X	P			ZZZZZZ	01/14/93	19:43
40	X	X	P			ZZZZZZ	01/14/93	19:45
41	S212196-06	S	P	1267	01/11/93	MFQ231	01/14/93	20:04
42	HALFSTD	CCV	P			CCV	01/14/93	20:06
43	STDB	CCB	P			CCB	01/14/93	20:09

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CASE 19220

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	ICSAA	ICSA1	P			ICSA	01/14/93	20:12
45	ICSABB	ICSAB1	P			ICSAB	01/14/93	20:14
46	2XCRDL192Q4	CRI1	P		10/15/92	CRI	01/14/93	20:17
47	HALFSTD	CCV	P			CCV	01/14/93	20:19
48	STDB	CCB	P			CCB	01/14/93	20:22
49	STDB	WS0	P			S0	01/14/93	17:39
50	STD3	WS1	P			S	01/14/93	17:42
51	STD1	WS2	P			S	01/14/93	17:44
52	STD2	WS3	P			S	01/14/93	17:46

075

Method: CLP0LDP1 Standard: STDB

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Avge	.00153	.00027	-.00153	.00000	.00000	-.00027	.00449
SDev	.00081	.00110	.00023	.00000	.00000	.00181	.00096
%RSD	52.715	413.07	15.061	.00000	.00000	680.53	21.405
#1	.00240	.00100	-.00140	.00000	.00000	-.00100	.00524
#2	.00080	-.00100	-.00140	.00000	.00000	.00180	.00341
#3	.00140	.00080	-.00180	.00000	.00000	-.00160	.00484

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Avge	.00000	-.00013	.00027	.00240	-.00107	.00027	.00133
SDev	.00040	.00023	.00023	.00020	.00147	.00012	.00012
%RSD	.00000	173.21	86.603	8.3333	138.21	43.301	8.6602
#1	.00000	.00000	.00040	.00260	-.00160	.00020	.00140
#2	-.00040	-.00040	.00000	.00240	-.00220	.00040	.00140
#3	.00040	.00000	.00040	.00220	.00060	.00020	.00120

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Avge	.00007	-.00200	.00120	.08533	.00007	.00060
SDev	.00012	.00144	.00035	.00076	.00023	.00000
%RSD	173.21	72.111	28.868	.88733	346.41	.00000
#1	.00020	-.00360	.00100	.08620	.00020	.00060
#2	.00000	-.00080	.00100	.08480	-.00020	.00060
#3	.00000	-.00160	.00160	.08500	.00020	.00060

076

Method: CLP0LDP1 Standard: STD3

Elem	Al3082	Ca3179	Fe2599	Mg2790	K_7664	Na5889
Avge	4.2307	6.9167	2.5146	.26367	.52400	3.9585
SDev	.0151	.0318	.0085	.00081	.00040	.0120
%RSD	.35729	.46044	.33978	.30656	.07634	.30198
#1	4.2348	6.9456	2.5236	.26380	.52440	3.9666
#2	4.2434	6.9218	2.5136	.26440	.52360	3.9642
#3	4.2140	6.8825	2.5066	.26280	.52400	3.9448

077

Method: CLP0LDP1 Standard: STD1

Elem	Sb2068	As1936	Ba4934	Be3130	Cd2265	Cr2677	Co2286
Avge	.43200	.24240	.20033	.12507	10.270	.37407	.50907
SDev	.00111	.00269	.00031	.00042	.015	.00151	.00117
%RSD	.25777	1.1100	.15250	.33289	.15077	.40484	.23020
#1	.43320	.23940	.20060	.12520	10.288	.37580	.51040
#2	.43180	.24320	.20000	.12460	10.262	.37300	.50820
#3	.43100	.24460	.20040	.12540	10.261	.37340	.50860

Elem	Cu3247	Pb2203	Mn2576	Ni2316	V_2924	Zn2138
Avge	.32547	1.0697	1.0360	.72760	.47533	.81807
SDev	.00012	.0021	.0018	.00164	.00103	.00042
%RSD	.03548	.19816	.17158	.22500	.21592	.05089
#1	.32540	1.0720	1.0380	.72900	.47620	.81840
#2	.32540	1.0678	1.0346	.72800	.47420	.81820
#3	.32560	1.0694	1.0354	.72580	.47560	.81760

078

Method: CLP0LDP1 Standard: STD2

Elem	Ag3280
Avge	.10700
SDev	.00072
%RSD	.67394
#1	.10780
#2	.10680
#3	.10640

079

Analysis Report QC Standard Thu 01-14-93 05:52:20 PM page 1

Method: CLP0LDP1 Sample Name: ICV1;ICV Operator: LP
Run Time: 01/14/93 17:49:42
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.9671	.00763	.00823	2.0316	.51781	.51172	51.435
SDev	.0188	.01516	.00634	.0180	.00556	.00245	.431
%RSD	.95336	198.67	77.081	.88589	1.0730	.47964	.83858
#1	1.9601	.00539	.01378	2.0116	.51140	.50890	50.944
#2	1.9528	.02379	.00959	2.0366	.52102	.51289	51.609
#3	1.9883	-.00628	.00132	2.0466	.52102	.51338	51.752
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.8780			1.8910	.47800	.49300	48.810
Range	10.000			10.000	10.000	10.000	10.000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.51701	.50669	.50367	2.0780	5.0435	25.501	.50356
SDev	.00858	.00567	.00814	.0175	.0418	.197	.00726
%RSD	1.6603	1.1189	1.6160	.84115	.82971	.77363	1.4407
#1	.50722	.50015	.49445	2.0578	4.9953	25.273	.49518
#2	.52324	.50997	.50675	2.0881	5.0653	25.614	.50774
#3	.52057	.50997	.50983	2.0881	5.0700	25.614	.50774
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48000	.48700	.48600	1.9620	4.7390	23.859	.47400
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.51452	50.710	.50926	50.969	.51708	3.0631
SDev	.00620	.371	.00578	.403	.00681	.0210
%RSD	1.2046	.73115	1.1342	.79107	1.3172	.68613
#1	.50811	50.285	.50296	50.509	.50931	3.0391
#2	.51498	50.970	.51052	51.134	.52203	3.0721
#3	.52048	50.875	.51430	51.263	.51991	3.0782
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48800	49.182	.47800	46.804	.48200	2.9210
Range	10.000	10.000	10.000	10.000	10.000	10.000

080

Analysis Report QC Standard Thu 01-14-93 05:54:54 PM page 1

Method: CLP0LDP1 Sample Name: ICV2;ICV Operator: LP
Run Time: 01/14/93 17:52:27
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00944	-.00236	.20630	.00000	.00001	.00097	.02349
SDev	.01117	.01278	.01034	.00000	.00001	.00081	.00604
%RSD	118.25	542.30	5.0142	.00000	114.11	83.205	25.735
#1	.00076	.00382	.21587	.00000	.00001	.00188	.03045
#2	.00553	-.01705	.20769	.00000	-.00000	.00071	.01963
#3	.02204	.00616	.19533	.00000	.00001	.00033	.02038
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			.20200				
Range			10.000				

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00445	.00262	.00102	-.00532	.01587	.02531	-.00451
SDev	.00154	.00113	.00470	.00092	.01028	.03796	.00097
%RSD	34.708	43.300	458.51	17.282	64.802	150.02	21.430
#1	.00534	.00131	-.00410	-.00638	.02086	-.01266	-.00451
#2	.00535	.00327	.00205	-.00479	.00404	.06327	-.00548
#3	.00267	.00327	.00512	-.00479	.02271	.02531	-.00354
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00137	.08238	.03844	.09467	.00213	.01141
SDev	.00159	.21199	.00970	.01938	.00243	.00071
%RSD	115.47	257.32	25.237	20.470	114.11	6.2261
#1	.00229	-.00000	.04915	.09381	.00353	.01223
#2	.00229	-.07605	.03592	.07573	-.00068	.01100
#3	-.00046	.32319	.03025	.11446	.00352	.01100
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

081

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Method: CLP0LDP1 Sample Name: ICV3;ICV Operator: LP
Run Time: 01/14/93 17:55:00
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01734	.97509	.01771	.00000	.00000	.00023	.01911
SDev	.01554	.03278	.01252	.00000	.00001	.00049	.00112
%RSD	89.603	3.3616	70.669	.00000	444.03	213.50	5.8423
#1	.01497	.93726	.00678	.00000	.00000	.00023	.01813
#2	.03393	.99518	.03136	.00000	-.00001	-.00026	.01888
#3	.00312	.99283	.01499	.00000	.00001	.00072	.02032
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value		.97800					
Range		10.000					

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00535	.00262	-.00410	-.00532	.01555	.03796	-.00548
SDev	.00267	.00300	.00000	.00092	.00285	.05799	.00000
%RSD	49.921	114.56	.00272	17.247	18.357	152.77	.01152
#1	.00534	.00327	-.00410	-.00479	.01244	.10124	-.00548
#2	.00268	.00524	-.00410	-.00479	.01617	.02531	-.00548
#3	.00801	-.00065	-.00410	-.00638	.01805	-.01266	-.00548
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00458	.43093	.00126	.09553	.00073	.00529
SDev	.00210	.07683	.00218	.01325	.00323	.00070
%RSD	45.826	17.830	173.25	13.869	444.03	13.221
#1	.00641	.34221	.00378	.09897	.00143	.00609
#2	.00229	.47529	-.00000	.08090	-.00279	.00489
#3	.00504	.47529	-.00000	.10672	.00355	.00488
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

082

Method: CLP0LDP1 Sample Name: STDB;ICB Operator: LP
Run Time: 01/14/93 17:57:33
Comment: ICB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00474	.01309	-.00821	.00000	-.00000	.00013	-.01483
SDev	.00760	.00613	.01706	.00000	.00000	.00000	.00123
%RSD	160.26	46.842	207.77	.00000	.04412	.00013	8.2808
#1	-.00393	.00846	L-.02185	.00000	-.00000	.00013	-.01349
#2	.00790	.02005	.01091	.00000	-.00000	.00013	-.01590
#3	.01026	.01077	-.01369	.00000	-.00000	.00013	-.01509
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00267	.00065	-.00000	-.00638	.00467	-.00000	-.00515
SDev	.00000	.00113	.00178	.00000	.01451	.02192	.00056
%RSD	.00002	173.20	203930.	.01548	310.86	601020.	10.823
#1	.00267	.00131	-.00103	-.00638	.00031	-.01266	-.00548
#2	.00267	-.00065	-.00103	-.00638	-.00716	-.01266	-.00548
#3	.00267	.00131	.00205	-.00638	H.02085	.02531	-.00451
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00000	.08872	.00252	.05336	-.00069	.00408
SDev	.00210	.06111	.00394	.02196	.00000	.00071
%RSD	22e9	68.883	156.15	41.153	.04412	17.404
#1	-.00046	.01901	.00567	.03701	-.00069	.00490
#2	.00229	.11407	-.00189	.04475	-.00069	.00366
#3	-.00183	.13308	.00378	.07832	-.00069	.00367
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

083

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Method: CLP0LDP1 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/14/93 18:00:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	542.18	.00467	.04914	.01331	.00000	-.00570	513.40
SDev	2.31	.01456	.00672	.00288	.00000	.00084	2.75
%RSD	.42687	311.68	13.683	21.651	72.950	14.679	.53547
#1	543.16	.01310	.04250	.00998	.00001	-.00667	515.10
#2	543.85	.01306	.04897	.01498	.00001	-.00521	514.88
#3	539.54	-.01214	.05594	.01498	.00000	-.00523	510.23
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01483	-.00131	-.00229	197.54	.00588	555.77	.03072
SDev	.00406	.00113	.00170	.92	.01147	2.71	.00276
%RSD	27.364	86.607	74.259	.46520	194.98	.48687	8.9904
#1	.01128	-.00065	-.00118	198.07	.00307	557.10	.02909
#2	.01396	-.00262	-.00425	198.07	-.00392	557.55	.03390
#3	.01926	-.00065	-.00145	196.48	.01849	552.65	.02916
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00046	.17110	-.00768	.98454	.00176	.09175
SDev	.00364	.10060	.00106	.02295	.00129	.00124
%RSD	793.73	58.794	13.863	2.3308	72.950	1.3468
#1	-.00183	.20913	-.00702	1.0104	.00252	.09298
#2	-.00321	.05703	-.00891	.97680	.00250	.09177
#3	.00367	.24715	-.00712	.96647	.00028	.09051
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

084

Method: CLP0LDP1 Sample Name: ICSABB;ICSAB Operator: LP
Run Time: 01/14/93 18:02:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	544.48	-.00854	.02966	.50749	.51668	.93348	513.26
SDev	2.05	.01285	.00374	.00288	.00369	.00253	2.08
%RSD	.37621	150.50	12.599	.56790	.71482	.27079	.40434
#1	542.21	.00479	.03277	.50416	.51455	.93057	511.38
#2	546.18	-.00954	.03069	.50915	.52095	.93514	515.49
#3	545.05	-.02087	.02551	.50915	.51455	.93472	512.91
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.48997	.49492	.50014	198.34	4.7438	556.57	.50752
SDev	.00411	.00113	.00314	.87	.0336	1.80	.00286
%RSD	.83869	.22912	.62851	.43872	.70790	.32411	.56347
#1	.48638	.49427	.49692	197.50	4.7058	554.93	.50467
#2	.49445	.49623	.50029	199.24	4.7564	558.50	.51039
#3	.48907	.49427	.50320	198.27	4.7693	556.26	.50751
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.90443	.15209	.88714	.97249	.49101	1.0898
SDev	.00650	.03802	.00868	.00650	.00012	.0024
%RSD	.71821	25.000	.97806	.66813	.02444	.22163
#1	.89710	.19011	.87952	.96647	.49092	1.0874
#2	.90947	.15209	.88530	.97163	.49115	1.0922
#3	.90672	.11407	.89658	.97938	.49097	1.0898
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

085

Method: CLP0LDP1 Sample Name: 2XCRDL192Q4;CRI Operator: LP
Run Time: 01/14/93 18:05:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.33398	.11536	.04628	.00000	.01090	.01105	.32323
SDev	.12005	.01227	.00791	.00000	.00092	.00136	.12165
%RSD	35.945	10.636	17.095	.00000	8.4405	12.354	37.635
#1	.46798	.11999	.05414	.00000	.01143	.01061	.46088
#2	.29773	.12464	.04638	.00000	.01143	.01257	.27863
#3	.23623	.10145	.03832	.00000	.00984	.00995	.23018

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02303	.09885	.05947	.12951	.04025	.24049	.02996
SDev	.00308	.00300	.00178	.05212	.01307	.10961	.00056
%RSD	13.394	3.0346	2.9951	40.245	32.459	45.577	1.8603
#1	.02125	.09950	.06051	.18788	.04577	.36705	.03028
#2	.02124	.10147	.06050	.11307	.02533	.17721	.02932
#3	.02659	.09558	.05742	.08760	.04965	.17720	.03029

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.08522	.19011	.02836	.10586	.09692	.04721
SDev	.00556	.18136	.00189	.00537	.00123	.00124
%RSD	6.5185	95.394	6.6728	5.0772	1.2657	2.6321
#1	.08201	-.00000	.03026	.10413	.09621	.04845
#2	.08201	.36122	.02647	.11188	.09621	.04723
#3	.09163	.20913	.02836	.10155	.09833	.04596

086

Method: CLP0LDP1 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 18:07:43
Comment: CCV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	25.032	2.5224	2.5453	2.4992	.52332	2.5362	25.388
SDev	.114	.0162	.0332	.0104	.00247	.0114	.108
%RSD	.45573	.64241	1.3044	.41578	.47226	.44891	.42344
#1	24.926	2.5061	2.5169	2.4908	.52279	2.5360	25.371
#2	25.152	2.5385	2.5818	2.5108	.52602	2.5477	25.503
#3	25.018	2.5225	2.5372	2.4958	.52116	2.5249	25.290
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.5130	2.4922	2.5050	10.160	2.5413	25.465	2.5168
SDev	.0108	.0101	.0108	.046	.0086	.174	.0108
%RSD	.42930	.40437	.43136	.45678	.33867	.68325	.42757
#1	2.5147	2.4896	2.4948	10.145	2.5355	25.427	2.5149
#2	2.5228	2.5033	2.5163	10.212	2.5512	25.655	2.5284
#3	2.5014	2.4837	2.5040	10.123	2.5373	25.314	2.5072
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4956	25.158	.52172	25.086	2.5157	2.5038
SDev	.0077	.143	.00289	.092	.0116	.0086
%RSD	.30665	.56717	.55370	.36836	.46305	.34456
#1	2.4888	25.019	.52424	25.022	2.5150	2.4944
#2	2.5039	25.304	.52235	25.192	2.5276	2.5114
#3	2.4943	25.152	.51857	25.045	2.5044	2.5054
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

087

Method: CLP0LDP1 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 18:10:16
Comment: CCB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04886	-.00543	H.01626	.00000	.00000	.00162	.03675
SDev	.03084	.01064	.00937	.00000	.00001	.00049	.01030
%RSD	63.114	196.06	57.611	.00000	343.05	30.252	28.018
#1	.08351	-.01473	H.02708	.00000	.00001	.00168	.04863
#2	.02444	.00617	.01087	.00000	-.00000	.00110	.03121
#3	.03863	-.00772	.01084	.00000	-.00000	.00207	.03040
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00178	.00196	.00308	.02122	.00993	-.01265	.00097
SDev	.00308	.00300	.00355	.00511	.00934	.03797	.00148
%RSD	173.05	152.75	115.34	24.095	94.017	300.14	152.90
#1	.00534	.00524	.00513	.02706	H.01893	.02532	.00129
#2	.00000	-.00065	.00513	.01752	.00030	-.01265	.00225
#3	.00000	.00131	-.00102	.01910	.01056	-.05062	-.00065
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00046	.06337	.00063	.09467	.00071	.00325
SDev	.00346	.10810	.00109	.02165	.00245	.00071
%RSD	754.98	170.59	172.90	22.872	343.05	21.904
#1	-.00321	.15209	.00189	.11963	.00354	.00368
#2	.00092	.09506	.00000	.08090	-.00070	.00366
#3	.00367	-.05703	.00000	.08348	-.00070	.00243
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

088

Method: CLP0LDP1 Sample Name: PB;PBW Operator: LP
Run Time: 01/14/93 18:12:54
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03154	.00226	.00949	.00000	-.00000	.00000	.01523
SDev	.02166	.01357	.01256	.00000	.00000	.00031	.00070
%RSD	68.677	599.85	132.37	.00000	88.397	28885.	4.6131
#1	.05518	.01770	.00669	.00000	-.00000	.00013	.01588
#2	.01264	-.00313	H.02321	.00000	-.00001	.00023	.01448
#3	.02681	-.00779	-.00144	.00000	-.00000	-.00036	.01534
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00446	.00262	.00102	-.00637	.01025	-.01266	-.00032
SDev	.00154	.00113	.00178	.00000	.00674	.00000	.00056
%RSD	34.584	43.303	173.32	.03673	65.764	.00180	172.68
#1	.00535	.00327	-.00103	-.00638	H.01802	-.01266	.00032
#2	.00268	.00327	.00205	-.00637	.00591	-.01266	-.00064
#3	.00535	.00131	.00205	-.00637	.00683	-.01266	-.00064
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00183	.15209	.00126	.11790	-.00138	.00081
SDev	.00210	.05030	.00476	.01220	.00122	.00141
%RSD	114.56	33.072	377.61	10.349	88.397	174.88
#1	.00367	.19011	.00567	.12221	-.00068	.00243
#2	.00229	.09506	-.00378	.12737	-.00279	-.00001
#3	-.00046	.17110	.00189	.10413	-.00068	-.00000
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

089

Method: CLP0LDP1 Sample Name: LCSPW;LCSW Operator: LP
Run Time: 01/14/93 18:17:48
Comment: LCS
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.9115	.98679	.00866	1.9118	.48894	.48617	48.567
SDev	.0137	.00134	.00470	.0086	.00160	.00339	.134
%RSD	.71410	.13603	54.242	.45223	.32707	.69778	.27638
#1	1.9272	.98755	.01408	1.9168	.48894	.48925	48.702
#2	1.9036	.98759	.00595	1.9018	.48735	.48253	48.434
#3	1.9036	.98524	.00594	1.9168	.49054	.48672	48.566
Errors	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	2.2540	1.1760		2.2690	.57360	.59160	58.573
Low	1.5020	.78400		1.5130	.38240	.39440	39.049

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.48587	.47331	.49955	1.9617	4.7936	24.374	.48100
SDev	.00267	.00300	.00355	.0064	.0171	.079	.00148
%RSD	.55023	.63384	.71079	.32805	.35745	.32425	.30688
#1	.48854	.47658	.50365	1.9607	4.8132	24.400	.48261
#2	.48319	.47265	.49750	1.9559	4.7815	24.286	.47971
#3	.48587	.47069	.49750	1.9686	4.7861	24.438	.48068
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.57600	.58440	.58320	2.3540	5.6870	28.631	.56880
Low	.38400	.38960	.38880	1.5670	3.7910	19.087	.37920

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47421	48.295	.42230	48.268	.48394	2.8550
SDev	.00572	.022	.00109	.132	.00001	.0007
%RSD	1.2068	.04545	.25853	.27308	.00285	.02363
#1	.48062	48.308	.42167	48.261	.48395	2.8557
#2	.46962	48.308	.42167	48.139	.48392	2.8546
#3	.47237	48.270	.42356	48.403	.48394	2.8546
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.58560	59.018	.57360	56.165	.57840	3.5050
Low	.39040	39.346	.38240	37.443	.38560	2.3370

090

Method: CLP0LDP1 Sample Name: S212196-01;S Operator: LP
Run Time: 01/14/93 18:20:21
Comment: MFQ226
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.8285	-.00533	.02154	.01498	.02772	.15898	480.77
SDev	.0536	.00600	.01059	.00000	.00093	.00179	3.71
%RSD	.68488	112.55	49.160	.00000	3.3534	1.1245	.77245
#1	7.7666	-.01215	.00952	.01498	.02719	.15735	476.98
#2	7.8577	-.00296	.02559	.01498	.02719	.15869	480.93
#3	7.8611	-.00088	.02951	.01498	.02880	.16089	484.40

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00990	1.6667	.00651	92.530	.05530	413.54	118.55
SDev	.00409	.0137	.00366	.754	.01405	3.52	.92
%RSD	41.300	.82483	56.234	.81438	25.401	.85236	.77553
#1	.01077	1.6529	.00228	91.803	.06904	409.85	117.64
#2	.00545	1.6667	.00855	92.481	.04096	413.88	118.52
#3	.01348	1.6804	.00869	93.307	.05590	416.88	119.48

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47146	4.0558	-.00201	58.396	.00211	68.563
SDev	.00420	.1807	.00376	.512	.00258	.609
%RSD	.89068	4.4552	186.91	.87651	122.12	.88796
#1	.46687	3.8783	-.00205	57.824	.00057	67.916
#2	.47237	4.2395	.00177	58.555	.00068	68.649
#3	.47512	4.0494	-.00574	58.810	.00509	69.125

091

Method: CLP0LDP1 Sample Name: S212196-01;S2 Operator: LP
Run Time: 01/14/93 18:22:53
Comment: MFQ226D
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	8.6030	.01080	.02637	.01830	.02719	.15903	478.92
SDev	.0878	.00465	.02034	.00288	.00001	.00121	4.00
%RSD	1.0211	43.102	77.128	15.746	.03045	.76224	.83584
#1	8.5019	.01096	.03635	.01997	.02719	.15791	474.34
#2	8.6605	.01536	.03980	.01498	.02720	.16032	481.76
#3	8.6466	.00606	.00297	.01997	.02719	.15886	480.65

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01436	1.6647	1.1279	92.781	.05169	414.45	116.89
SDev	.00155	.0156	.0063	.744	.00423	3.91	.90
%RSD	10.827	.93636	.55512	.80195	8.1912	.94419	.76586
#1	.01345	1.6470	1.1216	91.922	.04802	410.04	115.86
#2	.01348	1.6765	1.1341	93.227	.05632	417.52	117.48
#3	.01616	1.6706	1.1280	93.194	.05072	415.78	117.33

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47695	4.1952	-.00325	58.777	.00356	68.928
SDev	.00420	.0478	.00112	.602	.00333	.659
%RSD	.88042	1.1405	34.264	1.0241	93.503	.95552
#1	.47237	4.1445	-.00394	58.103	.00058	68.202
#2	.47787	4.2395	-.00197	59.259	.00715	69.486
#3	.48062	4.2015	-.00386	58.970	.00295	69.097

092

Method: CLP0LDP1 Sample Name: S212196-02;S Operator: LP
Run Time: 01/14/93 18:25:24
Comment: MFQ227
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	101.30	.00824	.02505	.02662	.02835	.12273	483.47
SDev	.83	.01797	.01464	.00288	.00093	.00234	1.91
%RSD	.81605	218.14	58.455	10.825	3.2630	1.9107	.39525
#1	102.25	.02277	.04033	.02995	.02888	.12543	485.66
#2	100.87	-.01186	.01113	.02496	.02888	.12148	482.18
#3	100.77	.01381	.02369	.02496	.02728	.12127	482.56

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02960	1.7492	185.71	157.03	.05058	147.56	28.403
SDev	.01012	.0142	.90	.45	.01966	.94	.133
%RSD	34.195	.80963	.48351	.28403	38.871	.63471	.46875
#1	.03407	1.7649	186.74	157.54	.06926	148.63	28.556
#2	.03672	1.7374	185.16	156.71	.05241	147.11	28.317
#3	.01802	1.7452	185.21	156.85	.03007	146.92	28.336

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.54614	25.989	-.00192	113.07	.03803	8.7500
SDev	.00397	.347	.00503	.90	.00129	.1132
%RSD	.72654	1.3349	261.79	.79683	3.3923	1.2935
#1	.55072	26.388	.00378	114.11	.03952	8.8790
#2	.54385	25.760	-.00383	112.52	.03731	8.7032
#3	.54385	25.817	-.00571	112.58	.03725	8.6676

093

Method: CLP0LDP1 Sample Name: S212196-02;DS Operator: LP
Run Time: 01/14/93 18:27:56
Comment: MFQ227S
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	109.59	.50298	2.1105	1.9301	.07803	.18076	510.46
SDev	1.60	.03524	.0525	.0144	.00161	.00440	2.89
%RSD	1.4565	7.0061	2.4870	.74657	2.0664	2.4344	.56626
#1	107.76	.46448	2.0550	1.9218	.07964	.17624	507.51
#2	110.30	.51083	2.1594	1.9218	.07642	.18503	510.57
#3	110.71	.53363	2.1171	1.9468	.07802	.18100	513.28

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.21363	2.3115	196.87	166.37	.54700	158.03	30.255
SDev	.00816	.0194	2.16	.93	.03795	1.53	.186
%RSD	3.8192	.83820	1.0961	.56066	6.9373	.97022	.61568
#1	.22072	2.2892	194.54	165.64	.57838	156.34	30.085
#2	.20471	2.3207	197.28	166.05	.50482	158.39	30.226
#3	.21544	2.3246	198.80	167.42	.55779	159.34	30.454

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.0542	27.560	.04779	119.79	.50901	9.8467
SDev	.0092	.768	.00497	1.68	.00557	.1683
%RSD	.86810	2.7878	10.404	1.4014	1.0938	1.7092
#1	1.0565	26.673	.05342	117.85	.51529	9.6534
#2	1.0442	28.004	.04399	120.62	.50467	9.9606
#3	1.0620	28.004	.04596	120.89	.50708	9.9261

034

Method: CLP0LDP1 Sample Name: S212196-02;ISD/5 Operator: LP
Run Time: 01/14/93 18:33:42
Comment: MFQ227L
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.896	.00084	.00628	.00998	.00482	.02658	102.91
SDev	.304	.01576	.02345	.00000	.00001	.00030	1.43
%RSD	1.4534	1870.6	373.13	.00000	.10646	1.1291	1.3916
#1	20.545	.00628	.02772	.00998	.00482	.02677	101.27
#2	21.077	.01317	.00990	.00998	.00481	.02624	103.89
#3	21.065	-.01692	-.01876	.00998	.00482	.02675	103.58

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00457	.37772	38.861	33.967	.01132	31.041	6.0598
SDev	.00616	.00409	.581	.448	.01467	.418	.0885
%RSD	134.68	1.0823	1.4942	1.3195	129.61	1.3477	1.4598
#1	.01168	.37445	38.190	33.454	.02805	30.560	5.9584
#2	.00102	.38230	39.202	34.286	.00062	31.319	6.1207
#3	.00101	.37641	39.190	34.160	.00530	31.243	6.1004

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.12050	5.3739	-.00237	23.302	.00738	1.8683
SDev	.00137	.1452	.00287	.306	.00206	.0309
%RSD	1.1407	2.7020	120.95	1.3117	27.885	1.6523
#1	.12050	5.5323	.00012	22.951	.00944	1.8328
#2	.12187	5.2471	-.00172	23.509	.00532	1.8836
#3	.11912	5.3422	-.00551	23.447	.00740	1.8885

095

Method: CLP0LDP1 Sample Name: S212196-03;S Operator: LP
Run Time: 01/14/93 18:36:14
Comment: MFQ228
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.14098	.00844	.03100	.04326	.00055	.00061	798.04
SDev	.01167	.00836	.01228	.00288	.00093	.00115	19.92
%RSD	8.2814	99.036	39.622	6.6617	169.55	190.39	2.4959
#1	.13546	.00616	.03101	.04493	.00161	-.00001	775.05
#2	.15440	.01770	.04327	.03993	.00001	-.00011	809.17
#3	.13310	.00145	.01871	.04493	.00001	.00193	809.92

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00267	.00327	.19480	.25908	.01423	91.698	.03962
SDev	.00267	.00000	.00355	.01237	.00247	2.885	.00056
%RSD	100.01	.00192	1.8237	4.7735	17.335	3.1467	1.4078
#1	-.00000	.00327	.19274	.24528	.01143	88.370	.03995
#2	.00268	.00327	.19275	.26279	.01609	93.230	.03995
#3	.00535	.00327	.19890	.26916	.01517	93.495	.03898

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00458	6.3435	-.00377	73.344	.00497	3.2601
SDev	.00210	.1294	.00189	2.016	.00121	.1180
%RSD	45.826	2.0400	50.212	2.7480	24.444	3.6182
#1	.00641	6.1977	-.00377	71.017	.00565	3.1239
#2	.00504	6.4449	-.00566	74.479	.00357	3.3294
#3	.00229	6.3878	-.00187	74.536	.00569	3.3270

096

Method: CLP0LDP1 Sample Name: S212196-04;S Operator: LP
Run Time: 01/14/93 18:38:47
Comment: MFQ229
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	55.740	.00903	.04088	.07987	.01496	.08760	467.20
SDev	1.068	.00614	.01608	.00000	.00091	.00210	8.73
%RSD	1.9162	67.951	39.337	.00000	6.0753	2.4010	1.8694
#1	55.240	.00219	.02445	.07987	.01444	.08875	464.62
#2	55.014	.01404	.04162	.07987	.01601	.08517	460.06
#3	56.967	.01087	.05659	.07987	.01444	.08888	476.94

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02166	.45235	8.1318	99.061	.67383	550.91	59.623
SDev	.00968	.01247	.1545	1.783	.02089	11.24	1.075
%RSD	44.668	2.7573	1.8999	1.8000	3.0998	2.0395	1.8027
#1	.02431	.44515	8.0569	98.422	.67229	547.42	59.273
#2	.01094	.44515	8.0291	97.686	.65376	541.83	58.767
#3	.02974	.46675	8.3095	101.08	.69545	563.48	60.829

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.30102	20.868	-.00792	121.85	.01489	37.746
SDev	.01169	.429	.00404	2.30	.00578	.730
%RSD	3.8835	2.0540	51.042	1.8852	38.849	1.9329
#1	.29231	20.837	-.00922	120.77	.01900	37.448
#2	.29644	20.456	-.01115	120.29	.00827	37.213
#3	.31430	21.312	-.00339	124.49	.01739	38.578

097

Method: CLP0LDP1 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 18:48:59
Comment: CCV#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	25.075	2.5154	2.5730	2.4376	.50984	2.5368	24.892
SDev	.091	.0046	.0021	.0029	.00162	.0055	.061
%RSD	.36452	.18389	.08133	.11823	.31725	.21844	.24589
#1	25.101	2.5108	2.5743	2.4359	.50985	2.5398	24.929
#2	25.151	2.5155	2.5741	2.4409	.51145	2.5402	24.926
#3	24.974	2.5200	2.5706	2.4359	.50822	2.5304	24.822
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4881	2.4340	2.4978	10.048	2.5453	25.706	2.4836
SDev	.0027	.0030	.0092	.016	.0203	.110	.0040
%RSD	.10753	.12326	.36931	.15637	.79843	.42636	.16197
#1	2.4908	2.4346	2.4978	10.066	2.5494	25.769	2.4869
#2	2.4854	2.4366	2.5070	10.037	2.5633	25.769	2.4849
#3	2.4881	2.4307	2.4886	10.040	2.5233	25.579	2.4791
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4741	24.975	.52612	25.084	2.4524	2.4631
SDev	.0092	.096	.00500	.093	.0080	.0120
%RSD	.36991	.38314	.95045	.37173	.32464	.48849
#1	2.4682	24.962	.52045	25.034	2.4559	2.4688
#2	2.4847	25.076	.52990	25.192	2.4580	2.4712
#3	2.4695	24.886	.52801	25.027	2.4433	2.4493
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

098

Method: CLP0LDP1 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 18:51:31
Comment: CCB#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03072	.00535	H.01767	.00000	.00000	.00169	.00921
SDev	.00135	.01276	.01251	.00000	.00001	.00160	.00533
%RSD	4.3898	238.63	70.784	.00000	147.13	94.816	57.832
#1	.02916	.02002	.00676	.00000	-.00000	.00354	.01523
#2	.03149	-.00081	H.03132	.00000	.00001	.00072	.00730
#3	.03151	-.00317	.01493	.00000	.00000	.00081	.00510
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00624	.00393	.00410	-.01698	.00963	-.01266	.00387
SDev	.00154	.00113	.00178	.00092	.00975	.00000	.00112
%RSD	24.755	28.867	43.320	5.4059	101.24	.00314	28.867
#1	.00535	.00327	.00512	-.01751	.00496	-.01266	.00515
#2	.00534	.00327	.00512	-.01751	.00309	-.01266	.00322
#3	.00802	.00524	.00205	-.01592	H.02084	-.01266	.00322
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00367	.14575	.00315	.21515	.00143	.00405
SDev	.00137	.16610	.00289	.01125	.00210	.00071
%RSD	37.500	113.96	91.682	5.2307	147.13	17.520
#1	.00504	.19011	-.00000	.22290	-.00068	.00364
#2	.00229	-.03802	.00378	.20224	.00353	.00487
#3	.00367	.28517	.00567	.22032	.00144	.00365
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP0LDP1 Sample Name: S212196-05;S Operator: LP
Run Time: 01/14/93 18:54:10
Comment: MFQ230
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	767.23	.02477	.14388	.02163	.11066	.60342	415.83
SDev	6.35	.02947	.02392	.00288	.00092	.00569	4.47
%RSD	.82793	118.99	16.628	13.323	.83458	.94363	1.0759
#1	774.19	-.00915	.12499	.02496	.11015	.60954	420.67
#2	761.74	.04409	.13588	.01997	.11012	.59827	411.84
#3	765.77	.03937	.17079	.01997	.11173	.60244	414.98

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05202	10.498	251.69	6.8058	.09774	1336.8	511.31
SDev	.01012	.114	2.07	.0954	.04160	16.3	6.17
%RSD	19.446	1.0855	.82376	1.4020	42.564	1.2204	1.2060
#1	.05914	10.614	253.79	6.8962	.13586	1354.9	518.14
#2	.04044	10.386	249.64	6.7060	.05337	1323.4	506.17
#3	.05647	10.494	251.62	6.8153	.10398	1332.1	509.61

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.4289	8.9797	.02687	93.256	-.08447	101.88
SDev	.0524	.2323	.00501	.667	.00613	1.06
%RSD	1.5296	2.5872	18.631	.71540	7.2578	1.0421
#1	3.4839	9.0304	.03255	93.944	-.07838	103.06
#2	3.3795	9.1825	.02309	92.612	-.09064	101.01
#3	3.4234	8.7262	.02498	93.213	-.08439	101.55

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Method: CLP0LDP1 Sample Name: S212196-07;S Operator: LP
Run Time: 01/14/93 18:59:15
Comment: MFQ232
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.0995	.01693	.04432	.01498	.02774	.15145	465.89
SDev	.0701	.00923	.02178	.00000	.00091	.00184	3.33
%RSD	.98668	54.519	49.153	.00000	3.2953	1.2178	.71579
#1	7.1688	.02523	.02762	.01498	.02722	.15308	469.57
#2	7.1011	.01856	.06896	.01498	.02880	.15181	465.01
#3	7.0287	.00699	.03637	.01498	.02721	.14945	463.08

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00891	1.5809	.07159	89.474	.05484	397.88	112.85
SDev	.00939	.0147	.00948	.479	.01551	3.95	.69
%RSD	105.41	.93237	13.237	.53528	28.279	.99155	.60738
#1	.01872	1.5960	.08192	89.969	.07223	402.14	113.52
#2	.00000	1.5803	.06953	89.441	.04986	397.13	112.89
#3	.00800	1.5665	.06331	89.013	.04244	394.36	112.15

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.45359	3.9607	-.00282	56.485	.00854	63.729
SDev	.00442	.2481	.00766	.448	.00431	.691
%RSD	.97410	6.2646	271.30	.79242	50.455	1.0843
#1	.45863	4.2205	.00540	56.801	.01289	64.454
#2	.45175	3.9354	-.00976	56.680	.00428	63.655
#3	.45038	3.7262	-.00411	55.973	.00844	63.078

Method: CLP0LDP1 Sample Name: S212196-08;S Operator: LP
Run Time: 01/14/93 19:01:47
Comment: MFQ237
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.20706	-.01479	.00898	.03494	.00001	-.00029	18.962
SDev	.02920	.00618	.00466	.00000	.00001	.00074	.255
%RSD	14.102	41.782	51.866	.00000	59.761	253.10	1.3455
#1	.18259	-.02178	.00629	.03494	.00001	-.00097	18.670
#2	.23938	-.01253	.01436	.03494	.00001	.00049	19.072
#3	.19922	-.01006	.00629	.03494	.00000	-.00039	19.144

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00891	.00131	.07691	.18123	.02197	6.9097	.15045
SDev	.00771	.00393	.00470	.00514	.00973	.0790	.01448
%RSD	86.573	299.97	6.1057	2.8351	44.295	1.1437	9.6223
#1	.01336	-.00262	.07281	.18497	.03288	6.8212	.16656
#2	.01337	.00131	.07588	.18334	.01883	6.9730	.14626
#3	.00000	.00524	.08203	.17537	.01419	6.9351	.13853

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00412	2.2497	.00253	11.464	.00358	.09649
SDev	.00079	.1047	.00218	.306	.00214	.01167
%RSD	19.245	4.6543	86.243	2.6694	59.761	12.099
#1	.00504	2.1293	.00379	11.116	.00571	.10872
#2	.00367	2.3194	.00379	11.588	.00360	.09527
#3	.00367	2.3004	.00001	11.689	.00143	.08547

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Method: CLP0LDP1 Sample Name: S212196-09;S Operator: LP
Run Time: 01/14/93 19:04:20
Comment: MFQ238
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.23783	.00067	.00480	.03993	.00001	.00084	441.53
SDev	.01922	.03145	.00848	.00000	.00001	.00205	7.54
%RSD	8.0810	4699.0	176.59	.00000	102.51	244.38	1.7079
#1	.25120	.03389	.01432	.03993	.00001	.00321	438.97
#2	.21581	-.02865	-.00194	.03993	-.00000	-.00029	435.60
#3	.24649	-.00323	.00202	.03993	.00001	-.00040	450.01

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00624	.00327	.08921	.21833	.01634	178.79	.12371
SDev	.00408	.00786	.00470	.01663	.01500	3.80	.00643
%RSD	65.391	240.00	5.2677	7.6145	91.762	2.1277	5.2020
#1	.00534	.01113	.09434	.22949	.02723	178.27	.13079
#2	.00268	-.00458	.08511	.19922	-.00076	175.27	.12210
#3	.01069	.00327	.08819	.22628	.02256	182.83	.11823

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00092	6.3371	-.00440	85.285	.00357	.10667
SDev	.00496	.3160	.00893	1.693	.00366	.00602
%RSD	540.83	4.9870	203.15	1.9855	102.51	5.6469
#1	.00229	6.6730	-.00755	84.574	.00567	.11359
#2	-.00458	6.0456	-.01133	84.063	-.00066	.10385
#3	.00504	6.2928	.00568	87.218	.00570	.10258

Method: CLP0LDP1 Sample Name: S212196-10;S Operator: LP
Run Time: 01/14/93 19:06:51
Comment: MFQ239
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.56500	-.01019	.02577	.02662	.00000	.00696	331.78
SDev	.02140	.03332	.00701	.00288	.00002	.00037	9.69
%RSD	3.7877	326.94	27.198	10.825	4581.0	5.2611	2.9214
#1	.55632	.01756	.02988	.02496	.00000	.00670	320.63
#2	.58938	-.00098	.02976	.02995	.00001	.00679	336.60
#3	.54931	-.04715	.01768	.02496	-.00002	.00738	338.13

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00265	.00262	.09753	.88855	-.00068	96.824	.08858
SDev	.01164	.00300	.00308	.02762	.03939	3.090	.00056
%RSD	439.87	114.57	3.1574	3.1088	5805.5	3.1909	.62952
#1	.00270	.00524	.09445	.85671	.01209	93.268	.08826
#2	.00537	.00327	.10061	.90606	.03075	98.355	.08826
#3	-.01600	-.00065	.09753	.90289	-.04487	98.849	.08923

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00046	4.5881	-.00940	97.330	.00014	2.1679
SDev	.00991	.1537	.00866	3.911	.00649	.0711
%RSD	2163.3	3.3493	92.169	4.0179	4581.0	3.2774
#1	.00229	4.5627	-.00751	93.169	.00157	2.0868
#2	.00779	4.7529	-.00184	97.889	.00580	2.1980
#3	-.01145	4.4487	-.01885	100.93	-.00694	2.2189

Method: CLP0LDP1 Sample Name: S212196-11;S Operator: LP
Run Time: 01/14/93 19:09:23
Comment: MFQ240
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	85.611	-.02534	.02417	.00998	.01972	.05595	504.47
SDev	3.038	.01005	.02162	.00000	.00093	.00199	15.93
%RSD	3.5490	39.663	89.427	.00000	4.6932	3.5633	3.1578
#1	82.123	-.01382	.00971	.00998	.01918	.05485	486.11
#2	87.022	-.02994	.01378	.00998	.02078	.05475	512.81
#3	87.686	-.03228	.04902	.00998	.01919	.05825	514.51

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00983	1.4061	6.3121	.58518	.03836	216.00	43.552
SDev	.00155	.0467	.1998	.02374	.00867	7.94	1.253
%RSD	15.733	3.3178	3.1651	4.0576	22.598	3.6745	2.8763
#1	.01072	1.3525	6.0815	.55817	.03098	206.88	42.108
#2	.00804	1.4291	6.4228	.59463	.03620	219.82	44.204
#3	.01072	1.4369	6.4320	.60274	.04791	221.30	44.344

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.50582	1.7110	-.00312	66.795	-.00396	16.823
SDev	.01508	.1187	.00109	2.225	.00200	.699
%RSD	2.9809	6.9389	35.047	3.3318	50.625	4.1562
#1	.48887	1.7490	-.00375	64.232	-.00592	16.039
#2	.51086	1.5779	-.00185	67.914	-.00192	17.047
#3	.51773	1.8061	-.00374	68.239	-.00403	17.383

Method: CLP0LDP1 Sample Name: S212196-12;S Operator: LP
Run Time: 01/14/93 19:11:56
Comment: MFQ241
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	85.782	.01180	.01833	.01165	.02024	.05749	506.67
SDev	1.461	.01893	.01319	.00288	.00094	.00146	10.67
%RSD	1.7031	160.46	71.947	24.744	4.6653	2.5477	2.1059
#1	84.577	.00718	.00367	.00998	.01915	.05597	496.86
#2	85.363	-.00440	.02209	.00998	.02078	.05762	505.12
#3	87.407	.03262	.02922	.01498	.02079	.05889	518.03

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00803	1.4120	6.3582	.30220	.03545	217.15	43.811
SDev	.00800	.0346	.1127	.00061	.03327	4.24	.856
%RSD	99.624	2.4501	1.7730	.20183	93.856	1.9546	1.9540
#1	.00003	1.3800	6.2598	.30150	-.00237	213.56	43.017
#2	.00803	1.4075	6.3336	.30259	.04849	216.06	43.699
#3	.01604	1.4487	6.4812	.30251	.06023	221.84	44.718

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.50903	1.7934	-.00439	67.008	-.00473	16.899
SDev	.01657	.0768	.00764	1.021	.00875	.320
%RSD	3.2553	4.2842	173.92	1.5237	184.88	1.8930
#1	.49162	1.7110	-.01321	66.290	-.01454	16.643
#2	.51086	1.8631	.00002	66.558	-.00191	16.797
#3	.52460	1.8061	.00002	68.177	.00226	17.258

Method: CLP0LDP1 Sample Name: S212196-13;S Operator: LP
Run Time: 01/14/93 19:14:28
Comment: MFQ242
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	7.5579	-.00392	.00518	.01664	.00160	.02390	392.61
SDev	.1111	.01627	.01649	.00288	.00000	.00189	8.55
%RSD	1.4700	414.58	318.56	17.321	.20551	7.9253	2.1769
#1	7.4492	-.01925	-.00955	.01498	.00160	.02171	387.37
#2	7.6712	-.00567	.00208	.01997	.00161	.02495	402.48
#3	7.5532	.01315	.02299	.01498	.00160	.02502	388.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00657	.03011	.93672	11.216	.02248	103.95	5.4383
SDev	.01319	.00227	.01521	.229	.02437	2.57	.0882
%RSD	200.75	7.5300	1.6236	2.0445	108.38	2.4710	1.6215
#1	-.00234	.02880	.92645	11.095	.01135	102.00	5.3893
#2	.02173	.02880	.95419	11.481	.05042	106.86	5.5401
#3	.00033	.03273	.92952	11.073	.00567	102.99	5.3855

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01970	3.8910	-.01193	75.506	.00197	10.868
SDev	.00994	.3097	.00788	1.213	.00132	.235
%RSD	50.471	7.9588	66.086	1.6070	67.046	2.1610
#1	.01466	3.5361	-.01446	74.371	.00121	10.636
#2	.03116	4.0304	-.00309	76.785	.00350	11.106
#3	.01329	4.1065	-.01824	75.362	.00121	10.862

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Method: CLP0LDP1 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 19:19:37
Comment: CCV#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	25.807	2.5725	2.6799	2.5058	.52599	2.6294	25.520
SDev	.071	.0367	.0263	.0050	.00161	.0063	.057
%RSD	.27423	1.4254	.98085	.19920	.30553	.23904	.22357
#1	25.758	2.5448	2.6499	2.5108	.52759	2.6264	25.543
#2	25.774	2.5587	2.6991	2.5008	.52438	2.6253	25.455
#3	25.888	2.6141	2.6905	2.5058	.52599	2.6367	25.562
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.5852	2.4863	2.5696	10.404	2.6382	26.668	2.5732
SDev	.0111	.0011	.0047	.031	.0118	.110	.0068
%RSD	.43041	.04561	.18303	.30042	.44656	.41100	.26379
#1	2.5816	2.4857	2.5686	10.386	2.6339	26.604	2.5738
#2	2.5762	2.4857	2.5655	10.386	2.6292	26.604	2.5661
#3	2.5976	2.4876	2.5748	10.440	2.6516	26.794	2.5796
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.5520	25.475	.52307	25.715	2.5153	2.5087
SDev	.0090	.251	.00647	.044	.0037	.0120
%RSD	.35318	.98722	1.2379	.17226	.14655	.47835
#1	2.5438	25.190	.51768	25.708	2.5174	2.4989
#2	2.5506	25.665	.52127	25.675	2.5111	2.5050
#3	2.5616	25.570	.53025	25.763	2.5175	2.5221
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

Method: CLP0LDP1 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 19:22:11
Comment: CCB#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04253	.00842	H.02174	.00333	.00000	.00302	.02102
SDev	.00494	.01158	.01707	.00288	.00001	.00138	.01253
%RSD	11.620	137.60	78.520	86.603	147.15	45.771	59.598
#1	.04095	.02002	H.03541	.00000	.00000	.00451	.03549
#2	.04807	-.00315	.00261	.00499	-.00000	.00178	.01379
#3	.03857	.00839	H.02719	.00499	.00001	.00276	.01379
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00713	.00589	.01743	.00904	.00900	.01266	.01450
SDev	.00308	.00113	.00308	.00460	.00868	.02192	.00056
%RSD	43.273	19.244	17.646	50.828	96.442	173.10	3.8475
#1	.00534	.00720	.01743	.01435	.00495	.02532	.01482
#2	.00535	.00524	.01435	.00639	.00308	-.01265	.01482
#3	H.01069	.00524	.02050	.00639	H.01896	.02532	.01385
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00321	.11407	.00120	.31412	.00144	.00811
SDev	.00159	.18136	.00104	.01513	.00212	.00142
%RSD	49.487	158.99	86.575	4.8160	147.15	17.462
#1	.00229	.28517	.00180	.33134	.00143	.00975
#2	.00229	.13308	.00180	.30294	-.00067	.00730
#3	.00504	-.07605	.00000	.30810	.00356	.00728
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

Method: CLP0LDP1 Sample Name: S212196-14;S Operator: LP
Run Time: 01/14/93 19:24:52
Comment: MFQ342
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	112.86	.00673	.04206	.02496	.02836	.13965	545.12
SDev	4.86	.01001	.02802	.00000	.00093	.00807	22.46
%RSD	4.3072	148.76	66.616	.00000	3.2618	5.7792	4.1196
#1	107.26	.00219	.06698	.02496	.02889	.13044	519.23
#2	115.87	.01821	.04748	.02496	.02889	.14551	559.32
#3	115.46	-.00021	.01173	.02496	.02729	.14299	556.80

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01860	1.9253	203.52	176.63	.06983	169.44	31.955
SDev	.00286	.0794	8.36	6.85	.02101	7.80	1.270
%RSD	15.352	4.1238	4.1082	3.8791	30.086	4.6060	3.9737
#1	.01569	1.8336	193.87	168.73	.07254	160.44	30.491
#2	.02140	1.9730	208.43	180.89	.08936	174.34	32.755
#3	.01871	1.9691	208.26	180.28	.04760	173.54	32.619

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.60753	28.726	-.00736	128.16	.04213	9.6084
SDev	.02222	1.432	.00294	5.58	.00125	.4585
%RSD	3.6574	4.9865	40.009	4.3556	2.9769	4.7723
#1	.58371	27.072	-.00603	121.72	.04146	9.0793
#2	.62769	29.563	-.00530	131.61	.04358	9.8905
#3	.61120	29.544	-.01073	131.15	.04135	9.8554

Method: CLP0LDP1 Sample Name: S212196-15;S Operator: LP
Run Time: 01/14/93 19:27:25
Comment: MFQ343
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	748.16	-.00851	.05508	.02496	.11119	.57308	414.02
SDev	23.96	.03660	.10598	.00499	.00245	.01985	13.07
%RSD	3.2026	430.12	192.42	20.000	2.2040	3.4643	3.1573
#1	721.16	.02303	.16392	.01997	.10852	.55082	398.95
#2	756.46	-.04864	-.04779	.02995	.11334	.57948	420.87
#3	766.88	.00009	.04910	.02496	.11172	.58894	422.24

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03866	10.229	250.59	7.1334	.06998	1305.7	502.93
SDev	.01080	.326	6.56	.1664	.05822	49.2	14.36
%RSD	27.944	3.1852	2.6181	2.3325	83.202	3.7645	2.8555
#1	.02708	9.8541	243.02	6.9469	.00504	1250.0	486.35
#2	.04846	10.384	254.17	7.2666	.11751	1324.3	510.90
#3	.04045	10.447	254.59	7.1866	.08738	1342.8	511.53

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.3588	8.4157	.01659	92.878	-.08651	94.805
SDev	.1071	.0938	.00784	2.711	.00404	4.095
%RSD	3.1898	1.1144	47.242	2.9191	4.6649	4.3198
#1	3.2351	8.3080	.00760	89.813	-.08904	90.327
#2	3.4193	8.4791	.02198	93.861	-.08186	95.728
#3	3.4221	8.4601	.02018	94.961	-.08865	98.360

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Method: CLP0LDP1 Sample Name: S212196-16;S Operator: LP
Run Time: 01/14/93 19:29:58
Comment: MFQ344
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	48.781	.00684	.04551	.01165	.01711	.06069	412.20
SDev	.954	.00210	.02498	.00288	.00092	.00199	7.27
%RSD	1.9566	30.665	54.900	24.744	5.3815	3.2738	1.7644
#1	47.969	.00470	.01763	.01498	.01604	.06038	405.85
#2	48.543	.00691	.05300	.00998	.01763	.05888	410.62
#3	49.832	.00890	.06589	.00998	.01764	.06281	420.14

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01207	.40849	6.7361	76.748	.07600	472.57	53.109
SDev	.00407	.00631	.0938	1.159	.02302	10.14	.796
%RSD	33.743	1.5454	1.3923	1.5100	30.292	2.1467	1.4982
#1	.01561	.40391	6.6631	75.712	.07840	463.35	52.402
#2	.00762	.40587	6.7033	76.531	.05187	470.91	52.954
#3	.01300	.41569	6.8419	77.999	.09773	483.44	53.970

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.27032	16.489	-.01095	106.06	.01977	30.309
SDev	.00496	.390	.00209	2.16	.00248	.756
%RSD	1.8333	2.3638	19.037	2.0334	12.570	2.4938
#1	.27169	16.255	-.00982	104.05	.02102	29.608
#2	.26482	16.274	-.01336	105.80	.01691	30.210
#3	.27444	16.939	-.00968	108.34	.02139	31.110

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Method: CLP0LDP1 Sample Name: S212196-05;S /5 Operator: LP
Run Time: 01/14/93 19:33:05
Comment: MFQ230
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	145.68	.01273	.04554	.00000	.02501	.12809	85.741
SDev	1.42	.00479	.00589	.00000	.00093	.00209	.580
%RSD	.97519	37.624	12.939	.00000	3.6975	1.6341	.67681
#1	145.18	.01652	.04815	.00000	.02394	.12812	85.505
#2	144.57	.01432	.04968	.00000	.02554	.12598	85.317
#3	147.28	.00735	.03880	.00000	.02554	.13016	86.402

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00987	2.1884	50.042	1.4214	.02111	253.78	102.58
SDev	.00557	.0112	.387	.0049	.00515	2.81	.65
%RSD	56.383	.51028	.77259	.34752	24.418	1.1062	.63714
#1	.01611	2.1793	49.870	1.4263	.01708	252.61	102.32
#2	.00541	2.1851	49.772	1.4164	.01934	251.74	102.09
#3	.00809	2.2009	50.485	1.4214	.02692	256.98	103.32

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.71566	1.8251	-.00111	17.904	-.01812	19.744
SDev	.00496	.1485	.00274	.125	.00123	.240
%RSD	.69249	8.1357	246.69	.69776	6.8118	1.2166
#1	.71978	1.7300	-.00171	17.859	-.01877	19.653
#2	.71016	1.9962	.00188	17.808	-.01669	19.562
#3	.71703	1.7490	-.00351	18.045	-.01889	20.016

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Method: CLP0LDP1 Sample Name: S212196-15;S /5 Operator: LP
Run Time: 01/14/93 19:35:56
Comment: MFQ343
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	160.70	-.00570	.03652	.00666	.02554	.13419	94.713
SDev	2.62	.00360	.01898	.00288	.00000	.00228	1.191
%RSD	1.6285	63.205	51.968	43.301	.01114	1.7001	1.2576
#1	157.68	-.00179	.05776	.00499	.02554	.13238	93.354
#2	161.99	-.00642	.03053	.00499	.02554	.13344	95.205
#3	162.41	-.00888	.02125	.00998	.02554	.13675	95.579

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01166	2.3828	55.075	1.5860	.03065	282.76	110.73
SDev	.00859	.0301	.852	.0242	.01565	4.57	1.36
%RSD	73.699	1.2616	1.5473	1.5277	51.069	1.6168	1.2318
#1	.00542	2.3482	54.092	1.5580	.01735	277.60	109.16
#2	.00809	2.3992	55.605	1.6014	.02669	284.39	111.40
#3	.02146	2.4012	55.528	1.5985	.04790	286.29	111.63

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.78439	1.9265	-.00050	20.238	-.01797	21.754
SDev	.01125	.0549	.00104	.316	.00114	.439
%RSD	1.4343	2.8488	206.24	1.5614	6.3605	2.0202
#1	.77202	1.9582	-.00170	19.876	-.01929	21.262
#2	.78713	1.8631	.00010	20.382	-.01734	21.891
#3	.79401	1.9582	.00010	20.457	-.01729	22.109

Method: CLP0LDP1 Sample Name: S212196-06;S Operator: LP
Run Time: 01/14/93 20:04:19
Comment: MFQ227A
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.3983	-.00643	.01327	.04574	.00050	.00105	826.52
SDev	.0532	.01213	.02149	.00255	.00081	.00169	2.49
%RSD	3.8027	188.79	161.91	5.5873	162.74	161.13	.30068
#1	1.3469	-.01953	-.01091	.04869	.00003	-.00077	823.66
#2	1.3948	-.00416	.03019	.04426	.00144	.00258	828.14
#3	1.4531	.00442	.02054	.04426	.00003	.00133	827.76

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01719	.00534	.12157	.08208	.02751	92.441	.20710
SDev	.00129	.00092	.01240	.01157	.00366	.872	.00314
%RSD	7.5260	17.320	10.203	14.090	13.302	.94338	1.5160
#1	.01793	.00587	.11007	.07687	.02965	91.456	.20350
#2	.01794	.00587	.11992	.07403	.02328	92.756	.20848
#3	.01570	.00427	.13471	.09533	.02958	93.113	.20931

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00743	6.9065	.00422	75.533	.01153	2.7634
SDev	.00223	.2056	.00241	.687	.00210	.0523
%RSD	30.000	2.9764	57.220	.90949	18.192	1.8930
#1	.00966	6.6789	.00632	74.764	.01395	2.7035
#2	.00520	6.9620	.00158	75.752	.01033	2.7861
#3	.00743	7.0786	.00475	76.085	.01032	2.8004

Method: CLP0LDP1 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 20:06:56
Comment: CCV#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.421	2.4505	2.4483	2.4936	.51129	2.4336	24.464
SDev	.096	.0091	.0075	.0124	.00271	.0106	.082
%RSD	.39357	.36997	.30431	.49659	.52963	.43647	.33420
#1	24.530	2.4601	2.4569	2.5077	.51401	2.4452	24.554
#2	24.349	2.4493	2.4441	2.4884	.51126	2.4312	24.446
#3	24.383	2.4421	2.4440	2.4846	.50860	2.4243	24.394
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4419	2.4301	2.5099	9.8193	2.4151	23.983	2.4532
SDev	.0080	.0107	.0100	.0338	.0085	.046	.0107
%RSD	.32835	.44081	.39779	.34455	.35189	.19313	.43482
#1	2.4508	2.4411	2.5213	9.8571	2.4187	24.033	2.4652
#2	2.4397	2.4296	2.5053	9.8089	2.4212	23.942	2.4496
#3	2.4352	2.4197	2.5030	9.7919	2.4054	23.973	2.4447
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4346	24.779	.49050	24.537	2.4720	2.4498
SDev	.0092	.081	.00238	.071	.0154	.0103
%RSD	.37875	.32817	.48624	.28821	.62245	.42031
#1	2.4415	24.873	.49188	24.617	2.4894	2.4617
#2	2.4380	24.732	.49187	24.483	2.4599	2.4443
#3	2.4241	24.732	.48774	24.511	2.4668	2.4434
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP0LDP1 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 20:09:34
Comment: CCB#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03370	.00479	H.01680	.00128	.00000	.00099	.01200
SDev	.00674	.01782	.00517	.00222	.00000	.00069	.00164
%RSD	19.989	371.80	30.740	173.21	148.13	69.855	13.670
#1	.02895	-.00966	H.02243	.00385	.00001	.00147	.01268
#2	.03074	.02470	.01569	.00000	.00000	.00130	.01319
#3	.04141	-.00066	.01229	.00000	-.00000	.00020	.01013
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01590	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01590	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00297	.00329	.02137	.00479	.00813	-.02021	.00708
SDev	.00257	.00095	.00132	.00076	.00970	.01750	.00094
%RSD	86.649	28.864	6.1857	15.769	119.28	86.623	13.328
#1	.00445	.00274	.02213	.00523	H.01918	-.01010	.00763
#2	-.00000	.00274	.02213	.00523	.00419	-.01010	.00763
#3	.00446	.00439	.01984	.00392	.00103	-.04042	.00599
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01300	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01300	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00232	.34272	.00275	-.10922	.00117	.00350
SDev	.00484	.08606	.00000	.00186	.00173	.00054
%RSD	208.17	25.110	.00166	1.7045	148.13	15.462
#1	.00774	.32394	.00275	-.10735	.00290	.00380
#2	.00077	.26761	.00275	-.11108	.00115	.00383
#3	-.00155	.43662	.00275	-.10921	-.00055	.00287
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

Method: CLP0LDP1 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/14/93 20:12:15
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	545.77	-.01641	.02347	.01412	-.00001	-.00051	498.40
SDev	3.04	.01618	.01159	.00222	.00001	.00108	2.82
%RSD	.55646	98.591	49.398	15.746	99.826	211.92	.56511
#1	543.71	-.02833	.03662	.01541	-.00000	.00064	496.86
#2	549.25	.00201	.01907	.01156	-.00002	-.00067	501.65
#3	544.34	-.02292	.01472	.01541	-.00000	-.00151	496.69
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01468	.00110	.00517	192.00	-.02885	539.93	.04957
SDev	.00003	.00000	.00248	.95	.00997	3.20	.00206
%RSD	.22433	.01202	47.993	.49498	34.573	.59218	4.1502
#1	.01466	.00110	.00659	191.36	-.03040	537.95	.05152
#2	.01472	.00110	.00231	193.09	-.03796	543.62	.04977
#3	.01466	.00110	.00662	191.54	-.01819	538.22	.04742
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00039	.35211	-.00637	.78126	-.00293	.08995
SDev	.00440	.09859	.00359	.01730	.00292	.00169
%RSD	1135.8	28.000	56.299	2.2140	99.826	1.8761
#1	-.00271	.30986	-.00503	.76202	-.00125	.08899
#2	-.00155	.46479	-.01043	.79553	-.00630	.09190
#3	.00542	.28169	-.00364	.78622	-.00123	.08896
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

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Method: CLP0LDP1 Sample Name: ICSABB;ICSAB Operator: LP
Run Time: 01/14/93 20:14:49
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	547.53	.00184	.04878	.50847	.50632	.90152	498.85
SDev	3.55	.00940	.05950	.00385	.00355	.00331	2.70
%RSD	.64768	511.32	121.97	.75757	.70067	.36724	.54033
#1	543.46	.00992	-.01742	.50462	.50230	.89770	495.94
#2	549.95	.00406	.09779	.51233	.50900	.90342	501.25
#3	549.17	-.00847	.06597	.50847	.50766	.90344	499.36
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47913	.48680	.51200	192.91	4.5970	540.06	.51438
SDev	.00466	.00436	.00274	.97	.0429	3.26	.00362
%RSD	.97277	.89483	.53497	.50185	.93274	.60358	.70432
#1	.47538	.48351	.51029	191.79	4.5536	536.31	.51092
#2	.48435	.48515	.51516	193.54	4.6394	542.23	.51815
#3	.47766	.49174	.51056	193.40	4.5981	541.65	.51408
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.88251	.37559	.97625	.79801	.47562	1.0704
SDev	.00813	.02932	.00556	.00752	.00107	.0081
%RSD	.92146	7.8062	.56920	.94280	.22411	.75420
#1	.87322	.40845	.97068	.79367	.47439	1.0611
#2	.88600	.35211	.98180	.79367	.47625	1.0745
#3	.88832	.36620	.97628	.80670	.47622	1.0755
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

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Method: CLP0LDP1 Sample Name: 2XCRDL192Q4;CRI Operator: LP
Run Time: 01/14/93 20:17:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.39656	.09910	.04448	-.00128	.00962	.01150	.37868
SDev	.06856	.00650	.01156	.00222	.00000	.00055	.06110
%RSD	17.290	6.5576	25.992	173.21	.00037	4.7661	16.137
#1	.46815	.10630	.05105	-.00385	.00962	.01203	.43981
#2	.39005	.09367	.05126	.00000	.00962	.01094	.37861
#3	.33148	.09733	.03113	.00000	.00962	.01153	.31760

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02215	.09714	.08396	.16039	.03078	.34363	.03515
SDev	.00223	.00095	.00229	.02912	.00785	.06311	.00047
%RSD	10.069	.97860	2.7322	18.154	25.492	18.367	1.3394
#1	.02438	.09824	.08625	.19298	.03862	.41437	.03542
#2	.02215	.09659	.08396	.15127	.03078	.32341	.03542
#3	.01992	.09659	.08167	.13693	.02293	.29309	.03460

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07977	.21127	.02662	-.11418	.09799	.04818
SDev	.00402	.11529	.00421	.01347	.00001	.00436
%RSD	5.0448	54.569	15.802	11.795	.01465	9.0434
#1	.08209	.23944	.03029	-.10735	.09800	.05267
#2	.07512	.08451	.02753	-.12969	.09799	.04787
#3	.08209	.30986	.02203	-.10549	.09797	.04398

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Method: CLP0LDP1 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 20:19:55
Comment: CCV#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.636	2.4292	2.4182	2.5360	.51852	2.4417	24.531
SDev	.122	.0369	.0226	.0022	.00207	.0150	.107
%RSD	.49698	1.5173	.93570	.08769	.39855	.61553	.43781
#1	24.495	2.3877	2.3928	2.5347	.51670	2.4245	24.411
#2	24.711	2.4417	2.4360	2.5347	.51808	2.4483	24.566
#3	24.702	2.4581	2.4259	2.5385	.52077	2.4523	24.617
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4731	2.4455	2.5084	9.9710	2.4042	24.013	2.4810
SDev	.0102	.0124	.0106	.0365	.0153	.093	.0098
%RSD	.41261	.50531	.42176	.36647	.63716	.38572	.39575
#1	2.4620	2.4328	2.4962	9.9302	2.3887	23.912	2.4709
#2	2.4820	2.4460	2.5145	9.9823	2.4194	24.094	2.4815
#3	2.4753	2.4575	2.5145	10.001	2.4044	24.033	2.4905
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4353	24.803	.49097	24.678	2.5033	2.4205
SDev	.0127	.232	.00693	.105	.0092	.0217
%RSD	.52327	.93481	1.4112	.42476	.36694	.89616
#1	2.4206	24.535	.48362	24.561	2.4929	2.3960
#2	2.4427	24.930	.49188	24.708	2.5068	2.4375
#3	2.4427	24.944	.49739	24.764	2.5102	2.4278
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

C L P M E T A L S 3.02e

ARSENIC

Run id: F4 9301501
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1257
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:57
2	10 PPB	WS1	F			S10	01/15/93	09:02
3	50 PPB	WS2	F			S50	01/15/93	09:07
4	100 PPB	WS3	F			S100	01/15/93	09:12
5	ICV-2	ICV	F			ICV	01/15/93	09:19
6	CAL BLK	ICB	F			ICB	01/15/93	09:24
7	CRA	CRA0	F			CRA	01/15/93	09:28
8	50 PPB	CCV	F			CCV	01/15/93	09:33
9	CAL BLK	CCB	F			CCB	01/15/93	09:38
10	X	X	F			ZZZZZZ	01/15/93	09:43
11	X	X	F			ZZZZZZ	01/15/93	09:48
12	X	X	F			ZZZZZZ	01/15/93	09:52
13	X	X	F			ZZZZZZ	01/15/93	09:57
14	X	X	F			ZZZZZZ	01/15/93	10:02
15	X	X	F			ZZZZZZ	01/15/93	10:07
16	X	X	F			ZZZZZZ	01/15/93	10:12
17	X	X	F			ZZZZZZ	01/15/93	10:20
18	X	X	F			ZZZZZZ	01/15/93	10:25
19	X	X	F			ZZZZZZ	01/15/93	10:30
20	50 PPB	CCV	F			CCV	01/15/93	10:35
21	CAL BLK	CCB	F			CCB	01/15/93	10:39
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/15/93	10:44
23	S212196-16	AS	F	1267		MFQ344A	01/15/93	10:49
24	X	X	F			ZZZZZZ	01/15/93	10:56
25	X	X	F			ZZZZZZ	01/15/93	11:01
26	X	X	F			ZZZZZZ	01/15/93	11:06
27	X	X	F			ZZZZZZ	01/15/93	11:10
28	50 PPB	CCV	F			CCV	01/15/93	11:15
29	CAL BLK	CCB	F			CCB	01/15/93	11:20

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Sample Delivery Group (SDG)
Traffic Report (TR) Cover Sheet

Lab Name: Hines Sherman Contract No.: 68-D00108

Lab Code: Hines Case No.: 19220 SAS No.: NA -

Full Sample Analysis Price in Contract: $ 106.00

SDG No./First Sample in SDG: MFQ226 Sample Receipt Date: 12-14-92
(Lowest EPA Sample Number in first shipment of samples received under SDG) (MM / DD / YY)

Last Sample in SDG: MFQ344 Sample Receipt Date: 12-14-92
(Highest EPA Sample Number in last shipment of samples received under SDG) (MM / DD / YY)

EPA Sample Numbers in the SDG (listed in alphanumeric order):

1	MFQ226	11	MFQ240
2	227	12	241
3	228	13	242
4	229	14	342
5	230	15	343
6	231	16	344
7	232	17	
8	237	18	
9	238	19	
10	239	20	

Note: There are a maximum of 20 field samples in an SDG.

Attach Traffic Reports to this form in alphanumeric order
(i.e., the order listed on this form)

Sample Custodian [signature] Date 12-14-92

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C L P M E T A L S 3.02e

SELENIUM

Run id: F4 9301551
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1258
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:57
2	5 PPB	WS1	F			S5	01/15/93	09:02
3	50 PPB	WS2	F			S50	01/15/93	09:07
4	100 PPB	WS3	F			S100	01/15/93	09:12
5	ICV-2	ICV	F			ICV	01/15/93	09:19
6	CAL BLK	ICB	F			ICB	01/15/93	09:24
7	CRA	CRA0	F			CRA	01/15/93	09:28
8	50 PPB	CCV	F			CCV	01/15/93	09:33
9	CAL BLK	CCB	F			CCB	01/15/93	09:38
10	S212196-01	S	F	1267	01/11/93	MFQ226	01/15/93	09:43
11	S212196-01	AS	F	1267		MFQ226A	01/15/93	09:48
12	S212196-04	S	F	1267	01/11/93	MFQ229	01/15/93	09:52
13	S212196-04	AS	F	1267		MFQ229A	01/15/93	09:57
14	S212196-08	S	F	1267	01/11/93	MFQ237	01/15/93	10:02
15	S212196-08	AS	F	1267		MFQ237A	01/15/93	10:07
16	S212196-12	S	F	1267	01/11/93	MFQ241	01/15/93	10:12
17	S212196-12	AS	F	1267		MFQ241A	01/15/93	10:20
18	S212196-16	S	F	1267	01/11/93	MFQ344	01/15/93	10:25
19	S212196-16	AS	F	1267		MFQ344A	01/15/93	10:30
20	50 PPB	CCV	F			CCV	01/15/93	10:35
21	CAL BLK	CCB	F			CCB	01/15/93	10:39
22	X	X	F			ZZZZZZ	01/15/93	10:44
23	X	X	F			ZZZZZZ	01/15/93	10:49
24	S212196-12	S	F	1267	01/11/93	MFQ241	01/15/93	10:56
25	S212196-12	AS	F	1267		MFQ241A	01/15/93	11:01
26	X	X	F			ZZZZZZ	01/15/93	11:06
27	X	X	F			ZZZZZZ	01/15/93	11:10
28	50 PPB	CCV	F			CCV	01/15/93	11:15
29	CAL BLK	CCB	F			CCB	01/15/93	11:20

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2323 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/15/93 Reviewed By: 1/15/93 Standards Prepared: 8:00 1/15/93
Operator: JST

Disk # 170
Acq ____
SAMIN ✓ 5212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [X] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301501		RUN ID:	9301551	
Element:	[X] AS	[] PB	Element:	[X] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[X] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	01		
	11	01A		
	12	04		
	13	04A		
	14	08	1:4	
	15	08A		
	16	12		RSD
	17	12A		
	18	16		
	19	16A		
	20	✓CCV		
	21	CCB		
	22	16		
	23	16A		AS/only
se/only	24	12	1:4	
	25	12A		
	26	X		
	27	X		
	28	CCV		
	29	CCB		
	30			
	31			
	32			
	33			
	34			
	35			
	36			
	37			
	38			
	39			

se/only

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/15/93	08:57

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

2	STD2(10,5)	WS1	S	1.00x	01/15/93	09:02

	<-As->		<-Se->	
Burns (Abs)	0.031 A	0.032 A	0.025A	0.019A
Mean	0.0315		0.0220	
CV %	0.00		19.28	

3	STD3(50)	WS2	S	1.00x	01/15/93	09:07

	<-As->		<-Se->	
Burns (Abs)	0.159 A	0.154 A	0.151A	0.154A
Mean	0.1565		0.1525	
CV %	2.26		0.00	

4	STD4(100)	WS3	S	1.00x	01/15/93	09:12

	<-As->		<-Se->	
Burns (Abs)	0.293 A	0.285 A	0.256A	0.247A
Mean	0.2890		0.2515	
CV %	1.96		2.53	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003346986	0.003618674
Coef[2]:	-4.557742e-006	-1.105556e-005
Correl. coef.:	1.0000	0.9997

5	ICV-2	ICV	ICV	1.00x	01/15/93	09:19

	<-As->		<-Se->	
Burns (Conc)	52.795	49.670	49.883	47.912
Mean	51.2325		48.8975	
CV %	4.31		2.85	
Sample value	51.23		48.90	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/15/93	09:24

	<-As->		<-Se->	
Burns (Conc)	2.097	0.299	2.506	2.226
Mean	1.1980		2.3660	
CV %	106.13		8.37	
Sample value	3.70U		3.30U	

7	CRA	CRA	CRA	1.00x	01/15/93	09:28

	<-As->		<-Se->	
Burns (Conc)	9.996	10.610	5.910	7.640
Mean	10.3030		6.7750	
CV %	4.21		18.06	
Sample value	10.30		6.78	

8	50 PPB	CCV	CCV	1.00x	01/15/93	09:33

	<-As->		<-Se->	
Burns (Conc)	51.402	50.708	51.082	48.304
Mean	51.0550		49.6930	
CV %	0.96		3.95	
Sample value	51.06		49.69	

9	CAL BLK	CCB	CCB	1.00x	01/15/93	09:38

	<-As->		<-Se->	
Burns (Conc)	-1.193	0.000	1.388	-0.827
Mean	-0.5965		0.2805	
CV %	141.42		558.37	
Sample value	3.70U		3.30U	

10	S212196-01	S	MFQ226	5.00x	01/15/93	09:43

	<-As->		<-Se->	
Burns (Conc)	-0.299	1.497	0.277	0.554
Mean	0.5990		0.4155	
CV %	212.01		47.14	
Sample value	18.50U		16.50U	

Scanned JS 1/19/93

11	-01	AS	MFQ226A	5.00x	01/15/93	09:48

	<-As->		<-Se->	
Burns (Conc)	17.445	15.256	5.052	5.623
Mean	16.3505		5.3375	
CV %	9.47		7.56	
Sample value	81.75		26.69	
Spike added	20.00		10.00	
Spike recovery, %	81.75 ***		53.38 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-04	S	MFQ229	5.00x	01/15/93	09:52

	<-As->		<-Se->	
Burns (Conc)	-2.679	1.797	-1.650	0.277
Mean	-0.4410		-0.6865	
CV %	717.69		198.48	
Sample value	18.50U		16.50U	

Segely 5/19/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-04	AS	MFQ229A	5.00x	01/15/93	09:57

	<-As->		<-Se->	
Burns (Conc)	16.505	14.322	3.916	5.910
Mean	15.4135		4.9130	
CV %	10.01		28.70	
Sample value	77.07		24.57	
Spike added	20.00		10.00	
Spike recovery, %	77.07 ***		49.13 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-08	S	MFQ237	5.00x	01/15/93	10:02

	<-As->		<-Se->	
Burns (Conc)	0.299	-0.895	3.069	-2.196
Mean	-0.2980		0.4365	
CV %	283.32		852.90	
Sample value	18.50U		16.50U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-08	AS	MFQ237A	5.00x	01/15/93	10:07

	<-As->		<-Se->	
Burns (Conc)	18.073	15.880	10.271	10.566
Mean	16.9765		10.4185	
CV %	9.13		2.00	
Sample value	84.88		52.09	
Spike added	20.00		10.00	
Spike recovery, %	84.88 ***		104.18	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-12	S	MFQ241	5.00x	01/15/93	10:12

	<-As->		<-Se->	
Burns (Conc)	-0.299	-2.086	-1.102	2.226
Mean	-1.1925		0.5620	
CV %	105.96		418.73	
Sample value	18.50U		16.50U	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-12	AS	MFQ241A	5.00x	01/15/93	10:20

	<-As->		<-Se->	
Burns (Conc)	15.256	17.131	5.623	7.930
Mean	16.1935		6.7765	
CV %	8.19		24.07 ***	
Sample value	80.97		33.88	
Spike added	20.00		10.00	
Spike recovery, %	80.97 ***		67.77 ***	

Serally 1/21/93

18	-16	S	MFQ344	5.00x	01/15/93	10:25

	<-As->		<-Se->	
Burns (Conc)	-0.299	-1.193	0.277	2.506
Mean	-0.7460		1.3915	
CV %	84.74		113.27	
Sample value	18.50U		16.50U	

19	-16	AS	MFQ344A	5.00x	01/15/93	10:30

	<-As->		<-Se->	
Burns (Conc)	17.131	16.818	5.052	2.226
Mean	16.9745		3.6390	
CV %	1.30		54.91	
Sample value	84.87		18.19	
Spike added	20.00		10.00	
Spike recovery, %	84.87 ***		36.39 ***	

20	50 PPB	CCV	CCV	1.00x	01/15/93	10:35

	<-As->		<-Se->	
Burns (Conc)	45.550	47.260	44.448	51.888
Mean	46.4050		48.1680	
CV %	2.61		10.92	
Sample value	46.40		48.17	

21	CAL BLK	CCB	CCB	1.00x	01/15/93	10:39

	<-As->		<-Se->	
Burns (Conc)	-1.788	-0.299	-0.827	0.000
Mean	-1.0435		-0.4135	
CV %	100.90		141.42	
Sample value	3.70U		3.30U	

22	-16	S	MFQ344	1.00x	01/15/93	10:44

	<-As->		<-Se->	
Burns (Conc)	-0.597	-4.750	-3.283	923
Mean	-2.6735		-2.6030	
CV %	109.84		36.94	
Sample value	3.70U		3.30U	

Asmt 1/21/93

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Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-16	AS	MFQ344A	1.00x	01/15/93	10:49

	<-As->		<-Se->	
Burns (Conc)	10.303	10.610	-2.740	-2.196
Mean	10.4565		-2.4680	
CV %	2.08		15.59	
Sample value	10.46		3.30U	
Spike added	20.00		10.00	
Spike recovery, %	52.28 ***		0.00 ***	

Asmy 1/15/93

24	-12	S	MFQ241	5.00x	01/15/93	10:56

	<-As->		<-Se->	
Burns (Conc)	-1.788	-0.299	-0.276	1.388
Mean	-1.0435		0.5560	
CV %	100.90		211.62	
Sample value	18.50U		16.50U	

Semly 1/15/93

25	-12	AS	MFQ241A	5.00x	01/15/93	11:01

	<-As->		<-Se->	
Burns (Conc)	16.192	19.332	5.052	5.910
Mean	17.7620		5.4810	
CV %	12.50		11.07	
Sample value	88.81		27.40	
Spike added	20.00		10.00	
Spike recovery, %	88.81		54.81 ***	

26	X	X	ZZZZZZ	1.00x	01/15/93	11:06

	<-As->		<-Se->	
Burns (Conc)	-2.086	0.897	1.667	-0.276
Mean	-0.5945		0.6955	
CV %	354.80		197.54	
Sample value	3.70U		3.30U	

27	X	X	ZZZZZZ	1.00x	01/15/93	11:10

	<-As->		<-Se->	
Burns (Conc)	-1.491	1.497	1.946	2.787
Mean	0.0030		2.3665	
CV %	>9999.99		25.13	
Sample value	3.70U		3.30U	

28	50 PPB	CCV 3	CCV	1.00x	01/15/93	11:15

	<-As->		<-Se->	
Burns (Conc)	50.362	50.016	49.883	47.133
Mean	50.1890		48.5080	
CV %	0.49		4.01	
Sample value	50.19		48.51	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301501 Analyst: JST Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	CAL BLK	CCB 3	CCB	1.00x	01/15/93	11:20

	<-As->		<-Se->	
Burns (Conc)	0.897	-1.193	2.787	2.506
Mean	-0.1480		2.6465	
CV %	998.55		7.51	
Sample value	3.70U		3.30U	

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C L P M E T A L S 3.02e

S212196--ARSENIC

Run id: F4 9301404
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1019
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	15:18
2	10 PPB	WS1	F			S10	01/14/93	15:23
3	50 PPB	WS2	F			S50	01/14/93	15:27
4	100 PPB	WS3	F			S100	01/14/93	15:32
5	ICV-2	ICV	F			ICV	01/14/93	15:39
6	CAL BLK	ICB	F			ICB	01/14/93	15:43
7	CRA	CRA0	F			CRA	01/14/93	15:48
8	50 PPB	CCV	F			CCV	01/14/93	15:53
9	CAL BLK	CCB	F			CCB	01/14/93	15:58
10	PB	PBW	F	1267	01/11/93	PBW	01/14/93	16:03
11	PB	ASPBW	F	1267		PBWA	01/14/93	16:07
12	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	16:12
13	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	16:17
14	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	16:22
15	S212196-01	AS	F	1267		MFQ226A	01/14/93	16:27
16	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	16:31
17	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	16:36
18	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	16:41
19	S212196-02	AS	F	1267		MFQ227A	01/14/93	16:46
20	50 PPB	CCV	F			CCV	01/14/93	16:51
21	CAL BLK	CCB	F			CCB	01/14/93	16:55
22	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	17:00
23	X	X	F			ZZZZZZ	01/14/93	17:05
24	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	17:10
25	S212196-03	AS	F	1267		MFQ228A	01/14/93	17:14
26	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	17:19
27	S212196-04	AS	F	1267		MFQ229A	01/14/93	17:24
28	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	17:29
29	S212196-05	AS	F	1267		MFQ230A	01/14/93	17:34
30	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	17:38
31	S212196-06	AS	F	1267		MFQ231A	01/14/93	17:43
32	50 PPB	CCV	F			CCV	01/14/93	17:48
33	CAL BLK	CCB	F			CCB	01/14/93	17:53
34	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	17:58
35	S212196-07	AS	F	1267		MFQ232A	01/14/93	18:02
36	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	18:07
37	S212196-08	AS	F	1267		MFQ237A	01/14/93	18:12
38	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	18:17
39	S212196-09	AS	F	1267		MFQ238A	01/14/93	18:22
40	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	18:26
41	S212196-10	AS	F	1267		MFQ239A	01/14/93	18:31
42	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	18:36
43	S212196-11	AS	F	1267		MFQ240A	01/14/93	18:41

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S212196--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	18:46
45	CAL BLK	CCB	F			CCB	01/14/93	18:50
46	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	18:55
47	S212196-12	AS	F	1267		MFQ241A	01/14/93	19:00
48	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	19:05
49	S212196-13	AS	F	1267		MFQ242A	01/14/93	19:10
50	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	19:14
51	S212196-14	AS	F	1267		MFQ342A	01/14/93	19:19
52	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	19:24
53	S212196-15	AS	F	1267		MFQ343A	01/14/93	19:29
54	X	X	F			ZZZZZZ	01/14/93	19:53
55	X	X	F			ZZZZZZ	01/14/93	19:58
56	50 PPB	CCV	F			CCV	01/14/93	20:03
57	CAL BLK	CCB	F			CCB	01/14/93	20:08

C L P M E T A L S 3.02e

S212196--SELENIUM

Run id: F4 9301454
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1021
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	15:18
2	5 PPB	WS1	F			S5	01/14/93	15:23
3	50 PPB	WS2	F			S50	01/14/93	15:27
4	100 PPB	WS3	F			S100	01/14/93	15:32
5	ICV-2	ICV	F			ICV	01/14/93	15:39
6	CAL BLK	ICB	F			ICB	01/14/93	15:43
7	CRA	CRA0	F			CRA	01/14/93	15:48
8	50 PPB	CCV	F			CCV	01/14/93	15:53
9	CAL BLK	CCB	F			CCB	01/14/93	15:58
10	PB	PBW	F	1267	01/11/93	PBW	01/14/93	16:03
11	PB	ASPBW	F	1267		PBWA	01/14/93	16:07
12	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	16:12
13	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	16:17
14	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	16:22
15	S212196-01	AS	F	1267		MFQ226A	01/14/93	16:27
16	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	16:31
17	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	16:36
18	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	16:41
19	S212196-02	AS	F	1267		MFQ227A	01/14/93	16:46
20	50 PPB	CCV	F			CCV	01/14/93	16:51
21	CAL BLK	CCB	F			CCB	01/14/93	16:55
22	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	17:00
23	X	X	F			ZZZZZZ	01/14/93	17:05
24	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	17:10
25	S212196-03	AS	F	1267		MFQ228A	01/14/93	17:14
26	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	17:19
27	S212196-04	AS	F	1267		MFQ229A	01/14/93	17:24
28	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	17:29
29	S212196-05	AS	F	1267		MFQ230A	01/14/93	17:34
30	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	17:38
31	S212196-06	AS	F	1267		MFQ231A	01/14/93	17:43
32	50 PPB	CCV	F			CCV	01/14/93	17:48
33	CAL BLK	CCB	F			CCB	01/14/93	17:53
34	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	17:58
35	S212196-07	AS	F	1267		MFQ232A	01/14/93	18:02
36	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	18:07
37	S212196-08	AS	F	1267		MFQ237A	01/14/93	18:12
38	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	18:17
39	S212196-09	AS	F	1267		MFQ238A	01/14/93	18:22
40	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	18:26
41	S212196-10	AS	F	1267		MFQ239A	01/14/93	18:31
42	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	18:36
43	S212196-11	AS	F	1267		MFQ240A	01/14/93	18:41

S212196--SELENIUM

Pos	Sample	Code	Preparation Meth Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F		CCV	01/14/93	18:46
45	CAL BLK	CCB	F		CCB	01/14/93	18:50

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2321 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8:00 1/14/93
Operator: [illegible]

Disk # 33
Acq
SAMIN ✓ 5212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	93014 04		RUN ID:	93014 54	
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments			Sample ID	Dilution	Comments
	STD1	1	0 PPB		
	STD2	2	[✓] 10,5 [] 3,10		
	STD3	3	50 PPB		
	STD4	4	100 PPB		
		5	ICV		
		6	ICB		
		7	CRA		
		8	CCV		
		9	CCB		
		10	PBW		
		11	PBWA		
		12	LCSW		
		13	LCSWA		
		14	01		<40
		15	01A		
		16	01D		<40
		17	01DA		
		18	02		<40
		19	02A		
		20	CCV		
		21	CCB		
		22	02S		
		23	X		
		24	03		<40
		25	03A		
		26	04		<40
		27	04A		
	<40%	28	05		<40
		29	05A		
		30	06		
		31	06A		
		32	CCV		
		33	CCB		
		34	07		<40
		35	07A		
		36	08		<40
		37	08A		
		38	09		
		39	09A195		

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2321
Page 2 of 2

	40	10		Mg
	41	10A		
<40	42	11		<40
	43	11A		
	44	CCV		
	45	CCB		
	46	12		
	47	12A		
	48	13		Se CCV
	49	13A		
<40	50	14		pwr
	51	14A		
<40	52	15		
	53	15A		
	54	X ~~16~~	SG 1/14/93	
	55	X ~~16A~~		
	56	CCV		
	57	CCB		
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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	15:18

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/14/93	15:23

	<-As->		<-Se->	
Burns (Abs)	0.028 A	0.031 A	0.019A	0.019A
Mean	0.0295		0.0190	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	15:27

	<-As->		<-Se->	
Burns (Abs)	0.155 A	0.157 A	0.144A	0.151A
Mean	0.1560		0.1475	
CV %	0.00		3.36	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	15:32

	<-As->		<-Se->	
Burns (Abs)	0.287 A	0.291 A	0.244A	0.240A
Mean	0.2890		0.2420	
CV %	0.00		0.00	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003302634	0.003494462
Coef[2]:	-4.101406e-006	-1.07527e-005
Correl. coef.:	0.9998	0.9999

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/14/93	15:39

	<-As->		<-Se->	
Burns (Conc)	52.123	52.819	47.611	50.066
Mean	52.4710		48.8385	
CV %	0.94		3.55	
Sample value	52.47		48.84	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	15:43

	<-As->		<-Se->	
Burns (Conc)	1.213	-0.605	-0.856	-1.708
Mean	0.3040		-1.2820	
CV %	422.87		46.99	
Sample value	2.90U		3.80U	

7	CRA	CRA	CRA	1.00x	01/14/93	15:48

	<-As->		<-Se->	
Burns (Conc)	9.498	8.879	4.645	2.596
Mean	9.1885		3.6205	
CV %	4.76		40.02	
Sample value	9.19		3.80U	

8	50 PPB	CCV	CCV	1.00x	01/14/93	15:53

	<-As->		<-Se->	
Burns (Conc)	52.123	50.734	50.896	50.066
Mean	51.4285		50.4810	
CV %	1.91		1.16	
Sample value	51.43		50.48	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	15:58

	<-As->		<-Se->	
Burns (Conc)	0.909	0.606	-0.286	-0.571
Mean	0.7575		-0.4285	
CV %	28.28		47.03	
Sample value	2.90U		3.80U	

10	PB	PBW	PBW	1.00x	01/14/93	16:03

	<-As->		<-Se->	
Burns (Conc)	0.303	-1.209	-2.555	-1.141
Mean	-0.4530		-1.8480	
CV %	236.01		54.10	
Sample value	2.90U		3.80U	

11	PB	ASPBW	PBWA	1.00x	01/14/93	16:07

	<-As->		<-Se->	
Burns (Conc)	18.914	19.232	7.920	9.431
Mean	19.0730		8.6755	
CV %	1.18		12.32	
Sample value	19.07		8.68	
Spike added	20.00		10.00	
Spike recovery, %	95.36		86.75	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	LCSFW	LCSW	LCSW	1.00x	01/14/93	16:12

	<-As->		<-Se->	
Burns (Conc)	48.662	46.601	44.417	45.207
Mean	47.6315		44.8120	
CV %	3.06		1.25	
Sample value	47.63		44.81	

13	LCSFW	ASLCSW	LCSWA	1.00x	01/14/93	16:17

	<-As->		<-Se->	
Burns (Conc)	67.412	65.599	54.281	54.711
Mean	66.5055		54.4960	
CV %	1.93		0.56	
Sample value	66.51		54.50	
Spike added	20.00		10.00	
Spike recovery, %	94.37		96.84	

14	S212196-01	S	MFQ226	1.00x	01/14/93	16:22

	<-As->		<-Se->	
Burns (Conc)	-0.907	0.303	-2.555	-1.708
Mean	-0.3020		-2.1315	
CV %	283.31		28.10	
Sample value	2.90U		3.80U	

15	-01	AS	MFQ226A	1.00x	01/14/93	16:27

	<-As->		<-Se->	
Burns (Conc)	14.806	12.925	2.016	-1.425
Mean	13.8655		0.2955	
CV %	9.59		823.40	
Sample value	13.86		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	69.32 ***		0.00 ***	

16	-01	S2	MFQ226D	1.00x	01/14/93	16:31

	<-As->		<-Se->	
Burns (Conc)	-3.617	-3.017	-3.958	-1.991
Mean	-3.3170		-2.9745	
CV %	12.79		46.76	
Sample value	2.90U		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-01	ASS2	MFQ226DA	1.00x	01/14/93	16:36

	<-As->		<-Se->	
Burns (Conc)	11.675	14.178	0.573	0.861
Mean	12.9265		0.7170	
CV %	13.69		28.40	
Sample value	12.93		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	64.64 ***		0.00 ***	

18	-02	S	MFQ227	1.00x	01/14/93	16:41

	<-As->		<-Se->	
Burns (Conc)	-6.011	-7.797	-6.729	-4.237
Mean	-6.9040		-5.4830	
CV %	18.29		32.14	
Sample value	2.90U		3.80U	

19	-02	AS	MFQ227A	1.00x	01/14/93	16:46

	<-As->		<-Se->	
Burns (Conc)	7.025	10.119	-6.454	-4.516
Mean	8.5720		-5.4850	
CV %	25.52		24.98	
Sample value	8.57		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	42.86 ***		0.00 ***	

20	50 PPB	CCV	2 CCV	1.00x	01/14/93	16:51

	<-As->		<-Se->	
Burns (Conc)	50.388	53.866	43.241	51.313
Mean	52.1270		47.2770	
CV %	4.72		12.07	
Sample value	52.13		47.28	

21	CAL BLK	CCB	2 CCB	1.00x	01/14/93	16:55

	<-As->		<-Se->	
Burns (Conc)	-0.303	0.303	-2.555	-2.837
Mean	-0.0000		-2.6960	
CV %	>9999.99		7.40	
Sample value	2.90U		3.80U	

22	-02	DS	MFQ227S	1.00x	01/14/93	17:00

	<-As->		<-Se->	
Burns (Conc)	24.677	22.425	-3.398	-1.708
Mean	23.5510		-2.5530	
CV %	6.76		46.81	
Sample value	23.55		3.80U	

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	X	X	ZZZZZZ	1.00x	01/14/93	17:05

	<-As->		<-Se->	
Burns (Conc)	17.329	14.806	3.764	4.645
Mean	16.0675		4.2045	
CV %	11.10		14.82	
Sample value	16.07		4.20	

24	-03	S	MFQ228	1.00x	01/14/93	17:10

	<-As->		<-Se->	
Burns (Conc)	-5.414	-6.607	-1.425	-1.991
Mean	-6.0105		-1.7080	
CV %	14.04		23.43	
Sample value	2.90U		3.80U	

25	-03	AS	MFQ228A	1.00x	01/14/93	17:14

	<-As->		<-Se->	
Burns (Conc)	12.612	13.864	0.286	1.726
Mean	13.2380		1.0060	
CV %	6.69		101.22	
Sample value	13.24		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	66.19 ***		0.00 ***	

26	-04	S	MFQ229	1.00x	01/14/93	17:19

	<-As->		<-Se->	
Burns (Conc)	-3.617	-1.813	-5.349	-5.902
Mean	-2.7150		-5.6255	
CV %	46.98		6.95	
Sample value	2.90U		3.80U	

27	-04	AS	MFQ229A	1.00x	01/14/93	17:24

	<-As->		<-Se->	
Burns (Conc)	11.052	12.612	-3.679	-3.118
Mean	11.8320		-3.3985	
CV %	9.32		11.67	
Sample value	11.83		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	59.16 ***		0.00 ***	

28	-05	S	MFQ230	1.00x	01/14/93	17:29

	<-As->		<-Se->	
Burns (Conc)	-10.462	-9.871	-8.913	-15.043
Mean	-10.1665		-11.9780	
CV %	4.11		36.19	
Sample value	2.90U		3.80U	

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-05	AS	MFQ230A	1.00x	01/14/93	17:34

	<-As->		<-Se->	
Burns (Conc)	4.262	5.181	-8.641	-9.184
Mean	4.7215		-8.9125	
CV %	13.76		4.31	
Sample value	4.72		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	23.61 ***		0.00 ***	

30	-06	S	MFQ231	1.00x	01/14/93	17:38

	<-As->		<-Se->	
Burns (Conc)	-27.521	-1.511	-21.221	-2.837
Mean	-14.5160		-12.0290	
CV %	126.70		108.07	
Sample value	2.90U		3.80U	

31	-06	AS	MFQ231A	1.00x	01/14/93	17:43

	<-As->		<-Se->	
Burns (Conc)	12.925	12.299	5.828	2.596
Mean	12.6120		4.2120	
CV %	3.51		54.26	
Sample value	12.61		4.21	
Spike added	20.00		10.00	
Spike recovery, %	63.06 ***		42.12 ***	

32	50 PPB	CCV 3	CCV	1.00x	01/14/93	17:48

	<-As->		<-Se->	
Burns (Conc)	51.775	53.168	50.896	48.016
Mean	52.4715		49.4560	
CV %	1.88		4.12	
Sample value	52.47		49.46	

33	CAL BLK	CCB 3	CCB	1.00x	01/14/93	17:53

	<-As->		<-Se->	
Burns (Conc)	-0.303	0.909	-2.273	-1.141
Mean	0.3030		-1.7070	
CV %	282.84		46.89	
Sample value	2.90U		3.80U	

34	-07	S	MFQ232	1.00x	01/14/93	17:58

	<-As->		<-Se->	
Burns (Conc)	-2.716	-2.415	-1.425	-3.398
Mean	-2.5655		-2.4115	
CV %	8.30		57.85	
Sample value	2.90U		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-07	AS	MFQ232A	1.00x	01/14/93	18:02

	<-As->		<-Se->	
Burns (Conc)	13.551	16.066	0.861	0.861
Mean	14.8085		0.8610	
CV %	12.01		0.00	
Sample value	14.81		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	74.04 ***		0.00 ***	

36	-08	S	MFQ237	1.00x	01/14/93	18:07

	<-As->		<-Se->	
Burns (Conc)	-0.605	-1.209	-2.273	3.179
Mean	-0.9070		0.4530	
CV %	47.09		851.03	
Sample value	2.90U		3.80U	

37	-08	AS	MFQ237A	1.00x	01/14/93	18:12

	<-As->		<-Se->	
Burns (Conc)	19.232	19.232	2.306	4.645
Mean	19.2320		3.4755	
CV %	0.02		47.59	
Sample value	19.23		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	96.16		0.00 ***	

38	-09	S	MFQ238	1.00x	01/14/93	18:17

	<-As->		<-Se->	
Burns (Conc)	-1.813	-3.017	1.726	-3.118
Mean	-2.4150		-0.6960	
CV %	35.25		492.13	
Sample value	2.90U		3.80U	

39	-09	AS	MFQ238A	1.00x	01/14/93	18:22

	<-As->		<-Se->	
Burns (Conc)	15.750	17.329	6.125	5.531
Mean	16.5395		5.8280	
CV %	6.75		7.21	
Sample value	16.54		5.83	
Spike added	20.00		10.00	
Spike recovery, %	82.70 ***		58.28 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-10	S	MFQ239	1.00x	01/14/93	18:26

	<-As->		<-Se->	
Burns (Conc)	-1.209	-1.209	9.735	7.920
Mean	-1.2090		8.8275	
CV %	0.00		14.54	
Sample value	2.90U		8.83	

41	-10	AS	MFQ239A	1.00x	01/14/93	18:31

	<-As->		<-Se->	
Burns (Conc)	15.435	15.121	14.686	13.433
Mean	15.2780		14.0595	
CV %	1.45		6.30	
Sample value	15.28		14.06	
Spike added	20.00		10.00	
Spike recovery, %	76.39 ***		52.32 ***	

42	-11	S	MFQ240	1.00x	01/14/93	18:36

	<-As->		<-Se->	
Burns (Conc)	-7.203	-7.500	-5.349	-4.516
Mean	-7.3515		-4.9325	
CV %	2.86		11.94	
Sample value	2.90U		3.80U	

43	-11	AS	MFQ240A	1.00x	01/14/93	18:41

	<-As->		<-Se->	
Burns (Conc)	4.874	11.052	-1.141	-2.837
Mean	7.9630		-1.9890	
CV %	54.86		60.29	
Sample value	7.96		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	39.81 ***		0.00 ***	

44	50 PPB	CCV 4	CCV	1.00x	01/14/93	18:46

	<-As->		<-Se->	
Burns (Conc)	50.388	49.006	45.604	47.207
Mean	49.6970		46.4055	
CV %	1.97		2.44	
Sample value	49.70		46.41	

45	CAL BLK	CCB 4	CCB	1.00x	01/14/93	18:50

	<-As->		<-Se->	
Burns (Conc)	-0.907	0.606	-0.571	-1.991
Mean	-0.1505		-1.2810	
CV %	710.87		78.38	
Sample value	2.90U		3.80U	

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
46	-12	S	MFQ241	1.00x	01/14/93	18:55

	<-As->		<-Se->	
Burns (Conc)	-3.017	-3.317	-2.555	-8.097
Mean	-3.1670		-5.3260	
CV %	6.70		73.58	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-12	AS	MFQ241A	1.00x	01/14/93	19:00

	<-As->		<-Se->	
Burns (Conc)	11.052	6.717	-4.516	-5.902
Mean	8.8845		-5.2090	
CV %	34.50		18.81	
Sample value	8.89		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	44.43 ***		0.00 ***	

Selenium out 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	-13	S	MFQ242	1.00x	01/14/93	19:05

	<-As->		<-Se->	
Burns (Conc)	-2.114	-2.415	4.057	-0.286
Mean	-2.2645		1.8855	
CV %	9.40		162.87	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
49	-13	AS	MFQ242A	1.00x	01/14/93	19:10

	<-As->		<-Se->	
Burns (Conc)	18.279	16.381	5.828	6.721
Mean	17.3300		6.2745	
CV %	7.74		10.06	
Sample value	17.33		6.27	
Spike added	20.00		10.00	
Spike recovery, %	86.65		62.74 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	-14	S	MFQ342	1.00x	01/14/93	19:14

	<-As->		<-Se->	
Burns (Conc)	-11.051	-7.797	-8.369	-6.454
Mean	-9.4240		-7.4115	
CV %	24.42		18.27	
Sample value	2.90U		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-14	AS	MFQ342A	1.00x	01/14/93	19:19

	<-As->		<-Se->	
Burns (Conc)	4.874	10.119	-2.273	-7.824
Mean	7.4965		-5.0485	
CV %	49.47		77.75	
Sample value	7.50		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	37.49 ***		0.00 ***	

52	-15	S	MFQ343	1.00x	01/14/93	19:24

	<-As->		<-Se->	
Burns (Conc)	-5.712	-23.535	-6.729	-21.221
Mean	-14.6235		-13.9750	
CV %	86.18		73.33	
Sample value	2.90U		3.80U	

53	-15	AS	MFQ343A	1.00x	01/14/93	19:29

	<-As->		<-Se->	
Burns (Conc)	5.181	-8.391	-6.729	-12.670
Mean	-1.6050		-9.6995	
CV %	597.93		43.31	
Sample value	2.90U		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	0.00 ***		0.00 ***	

Dew out 11/4/93 SG

54	X	X	ZZZZZZ	1.00x	01/14/93	19:53

	<-As->		<-Se->	
Burns (Conc)	-0.605	0.303	-1.708	-2.273
Mean	-0.1510		-1.9905	
CV %	425.20		20.07	
Sample value	2.90U		3.80U	

55	X	X	ZZZZZZ	1.00x	01/14/93	19:58

	<-As->		<-Se->	
Burns (Conc)	1.213	0.909	-1.141	0.000
Mean	1.0610		-0.5705	
CV %	20.26		141.42	
Sample value	2.90U		3.80U	

56	50 PPB	CCV 5	CCV	1.00x	01/14/93	20:03

	<-As->		<-Se->	
Burns (Conc)	46.601	48.318	43.632	41.307
Mean	47.4595		42.4695	
CV %	2.56		3.87	
Sample value	47.46		42.47 ***	

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Jarrell-Ash Video 22
Run: F4 9301404 Analyst: LL Page 11

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB 5	CCB	1.00x	01/14/93	20:08

	<-As->		<-Se->	
Burns (Conc)	0.303	-0.907	-0.856	0.000
Mean	-0.3020		-0.4280	
CV %	283.31		141.42	
Sample value	2.90U		3.80U	

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C L P M E T A L S 3.02e

S212196--ARSENIC

Run id: F4 9301405
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1023
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:20
2	10 PPB	WS1	F			S10	01/14/93	21:25
3	50 PPB	WS2	F			S50	01/14/93	21:30
4	100 PPB	WS3	F			S100	01/14/93	21:34
5	ICV-2	ICV	F			ICV	01/14/93	21:42
6	CAL BLK	ICB	F			ICB	01/14/93	21:47
7	CRA	CRA0	F			CRA	01/14/93	21:52
8	50 PPB	CCV	F			CCV	01/14/93	21:57
9	CAL BLK	CCB	F			CCB	01/14/93	22:02
10	X	X	F			ZZZZZZ	01/14/93	22:06
11	X	X	F			ZZZZZZ	01/14/93	22:11
12	X	X	F			ZZZZZZ	01/14/93	22:16
13	X	X	F			ZZZZZZ	01/14/93	22:21
14	X	X	F			ZZZZZZ	01/14/93	22:25
15	X	X	F			ZZZZZZ	01/14/93	22:30
16	X	X	F			ZZZZZZ	01/14/93	22:35
17	X	X	F			ZZZZZZ	01/14/93	22:40
18	X	X	F			ZZZZZZ	01/14/93	22:45
19	X	X	F			ZZZZZZ	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:54
21	CAL BLK	CCB	F			CCB	01/14/93	22:59
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	23:04
23	S212196-16	AS	F	1267		MFQ344A	01/14/93	23:08
24	X	X	F			ZZZZZZ	01/14/93	23:13
25	X	X	F			ZZZZZZ	01/14/93	23:18
26	X	X	F			ZZZZZZ	01/14/93	23:23
27	X	X	F			ZZZZZZ	01/14/93	23:27
28	X	X	F			ZZZZZZ	01/14/93	23:32
29	X	X	F			ZZZZZZ	01/14/93	23:37
30	X	X	F			ZZZZZZ	01/14/93	23:42
31	X	X	F			ZZZZZZ	01/14/93	23:47
32	50 PPB	CCV	F			CCV	01/14/93	23:51
33	CAL BLK	CCB	F			CCB	01/14/93	23:56
34	X	X	F			ZZZZZZ	01/15/93	00:01
35	X	X	F			ZZZZZZ	01/15/93	00:06
36	S212196-05	S	F	1267	01/11/93	MFQ230	01/15/93	00:10
37	S212196-05	AS	F	1267		MFQ230A	01/15/93	00:15
38	X	X	F			ZZZZZZ	01/15/93	00:20
39	X	X	F			ZZZZZZ	01/15/93	00:25
40	X	X	F			ZZZZZZ	01/15/93	00:29
41	X	X	F			ZZZZZZ	01/15/93	00:34
42	X	X	F			ZZZZZZ	01/15/93	00:39
43	X	X	F			ZZZZZZ	01/15/93	00:44

S212196--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/15/93	00:48
45	CAL BLK	CCB	F			CCB	01/15/93	00:53
46	S212196-11	S	F	1267	01/11/93	MFQ240	01/15/93	00:58
47	S212196-11	AS	F	1267		MFQ240A	01/15/93	01:03
48	S212196-14	S	F	1267	01/11/93	MFQ342	01/15/93	01:08
49	S212196-14	AS	F	1267		MFQ342A	01/15/93	01:12
50	S212196-15	S	F	1267	01/11/93	MFQ343	01/15/93	01:17
51	S212196-15	AS	F	1267		MFQ343A	01/15/93	01:22
52	X	X	F			ZZZZZZ	01/15/93	01:27
53	X	X	F			ZZZZZZ	01/15/93	01:32
54	X	X	F			ZZZZZZ	01/15/93	01:37
55	X	X	F			ZZZZZZ	01/15/93	01:41
56	50 PPB	CCV	F			CCV	01/15/93	01:46
57	CAL BLK	CCB	F			CCB	01/15/93	01:51

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C L P M E T A L S 3.02e

S212196--SELENIUM

Run id: F4 9301455
THERMO JARRELL-ASH VIDEO 22E (#2664)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1026
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:20
2	5 PPB	WS1	F			S5	01/14/93	21:25
3	50 PPB	WS2	F			S50	01/14/93	21:30
4	100 PPB	WS3	F			S100	01/14/93	21:34
5	ICV-2	ICV	F			ICV	01/14/93	21:42
6	CAL BLK	ICB	F			ICB	01/14/93	21:47
7	CRA	CRA0	F			CRA	01/14/93	21:52
8	50 PPB	CCV	F			CCV	01/14/93	21:57
9	CAL BLK	CCB	F			CCB	01/14/93	22:02
10	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	22:06
11	S212196-12	AS	F	1267		MFQ241A	01/14/93	22:11
12	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	22:16
13	S212196-13	AS	F	1267		MFQ242A	01/14/93	22:21
14	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	22:25
15	S212196-14	AS	F	1267		MFQ342A	01/14/93	22:30
16	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	22:35
17	S212196-15	AS	F	1267		MFQ343A	01/14/93	22:40
18	X	X	F			ZZZZZZ	01/14/93	22:45
19	X	X	F			ZZZZZZ	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:54
21	CAL BLK	CCB	F			CCB	01/14/93	22:59
22	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	23:04
23	S212196-16	AS	F	1267		MFQ344A	01/14/93	23:08
24	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	23:13
25	S212196-01	AS	F	1267		MFQ226A	01/14/93	23:18
26	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	23:23
27	S212196-02	AS	F	1267		MFQ227A	01/14/93	23:27
28	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	23:32
29	S212196-03	AS	F	1267		MFQ228A	01/14/93	23:37
30	X	X	F			ZZZZZZ	01/14/93	23:42
31	X	X	F			ZZZZZZ	01/14/93	23:47
32	50 PPB	CCV	F			CCV	01/14/93	23:51
33	CAL BLK	CCB	F			CCB	01/14/93	23:56
34	S212196-04	S	F	1267	01/11/93	MFQ229	01/15/93	00:01
35	S212196-04	AS	F	1267		MFQ229A	01/15/93	00:06
36	S212196-05	S	F	1267	01/11/93	MFQ230	01/15/93	00:10
37	S212196-05	AS	F	1267		MFQ230A	01/15/93	00:15
38	S212196-07	S	F	1267	01/11/93	MFQ232	01/15/93	00:20
39	S212196-07	AS	F	1267		MFQ232A	01/15/93	00:25
40	S212196-08	S	F	1267	01/11/93	MFQ237	01/15/93	00:29
41	S212196-08	AS	F	1267		MFQ237A	01/15/93	00:34
42	X	X	F			ZZZZZZ	01/15/93	00:39
43	X	X	F			ZZZZZZ	01/15/93	00:44

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S212196--SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/15/93	00:48
45	CAL BLK	CCB	F			CCB	01/15/93	00:53
46	S212196-11	S	F	1267	01/11/93	MFQ240	01/15/93	00:58
47	S212196-11	AS	F	1267		MFQ240A	01/15/93	01:03
48	S212196-14	S	F	1267	01/11/93	MFQ342	01/15/93	01:08
49	S212196-14	AS	F	1267		MFQ342A	01/15/93	01:12
50	S212196-15	S	F	1267	01/11/93	MFQ343	01/15/93	01:17
51	S212196-15	AS	F	1267		MFQ343A	01/15/93	01:22
52	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/15/93	01:27
53	S212196-01	ASS2	F	1267		MFQ226DA	01/15/93	01:32
54	X	X	F			ZZZZZZ	01/15/93	01:37
55	X	X	F			ZZZZZZ	01/15/93	01:41
56	50 PPB	CCV	F			CCV	01/15/93	01:46
57	CAL BLK	CCB	F			CCB	01/15/93	01:51

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2322 GFAA ID: F1 F2 F3 (F4) F5 F6 Method: 150

Date: 1/14/93 Reviewed By: MS Standards Prepared: 800 1/14/93
Operator: SG

Disk # 52
Acq
SAMIN ✓ 5212196

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:	9301405		Channel B:	9301455	
RUN ID:			RUN ID:		
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[✓] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	12		<40%
	11	12A		
	12	13		
Se/only	13	13A		
	14	14		<40%
	15	14A		
	16	15		<40%
	17	15A		
	18	X		
	19	X		
	20	CCV		
	21	CCB		
≠ RSD	22	16		<40%
	23	16A		
	24	01	J1:4	RSD
Se/only	25	01A		
	26	02	J1:4	
	27	02A		
	28	03	J1:4	
	29	03A		
	30	X		
	31	X		
	32	CCV		
	33	CCB		
	34	04	J1:4	RSD
Se/only	35	04A		
	36	05	J1:4	
	37	05A		
	38	07	J1:4	
Se/only	39	07A		

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2322
Page 2 of 2

Se/only	40	08	J1:4	KSD
	41	08A		
	42	X		
	43	X		
	44	CCV		
	45	CCB		
	46	11	J1:4	
	47	11A		
	48	14	J1:4	
	49	14A		
	50	15	J1:4	
	51	15A		
Se/only	52	01D	J1:4	
	53	01DA		
	54	X		
	55	X		
	56	CCV		
	57	CCB		
	58			
	59			
	60			
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	94			
	95			

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	21:20

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/14/93	21:25

	<-As->		<-Se->	
Burns (Abs)	0.034 A	0.007 A	0.024A	-0.002A
Mean	0.0205		0.0110	
CV %	93.13		167.13	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	21:30

	<-As->		<-Se->	
Burns (Abs)	0.154 A	0.150 A	0.140A	0.149A
Mean	0.1520		0.1445	
CV %	0.00		4.40	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	21:34

	<-As->		<-Se->	
Burns (Abs)	0.276 A	0.272 A	0.243A	0.231A
Mean	0.2740		0.2370	
CV %	0.00		3.58	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003175423	0.003365102
Coef[2]:	-4.267605e-006	-9.925924e-006
Correl. coef.:	0.9978	0.9993

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/14/93	21:42

	<-As->		<-Se->	
Burns (Conc)	52.886	49.963	48.143	48.976
Mean	51.4245		48.5595	
CV %	4.02		1.21	
Sample value	51.42		48.56	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	21:47

	<-As->		<-Se->	
Burns (Conc)	2.211	0.630	0.000	-0.593
Mean	1.4205		-0.2965	
CV %	78.70		141.42	
Sample value	2.90U		3.80U	

7	CRA	CRA	CRA	1.00x	01/14/93	21:52

	<-As->		<-Se->	
Burns (Conc)	9.248	10.218	2.394	5.436
Mean	9.7330		3.9150	
CV %	7.05		54.94	
Sample value	9.73		3.91	

8	50 PPB	CCV	CCV	1.00x	01/14/93	21:57

	<-As->		<-Se->	
Burns (Conc)	52.519	50.691	47.729	46.494
Mean	51.6050		47.1115	
CV %	2.51		1.85	
Sample value	51.60		47.11	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	22:02

	<-As->		<-Se->	
Burns (Conc)	0.630	-0.315	2.093	1.492
Mean	0.1575		1.7925	
CV %	424.26		23.71	
Sample value	2.90U		3.80U	

10	S212196-12	S	MFQ241	1.00x	01/14/93	22:06

	<-As->		<-Se->	
Burns (Conc)	-7.174	-5.005	-1.479	-0.593
Mean	~~-6.0895~~		-1.0360	
CV %	~~25.19~~	Se only	60.47	
Sample value	2.90U	1/15/93 KN	3.80U	

11	-12	AS	MFQ241A	1.00x	01/14/93	22:11

	<-As->		<-Se->	
Burns (Conc)	15.108	9.894	0.000	-4.979
Mean	12.5010		-2.4895	
CV %	~~29.49 ***~~		141.42	
Sample value	~~12.50~~		3.80U	
Spike added	~~20.00~~		10.00	
Spike recovery, %	~~62.51 ***~~		0.00 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-13	S	MFQ242	1.00x	01/14/93	22:16

	<-As->		<-Se->	
Burns (Conc)	0.000	-0.315	0.000	3.301
Mean	-0.1875		1.6505	
CV %	141.42		141.42	
Sample value	2.90U		3.80U	

Se only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-13	AS	MFQ242A	1.00x	01/14/93	22:21

	<-As->		<-Se->	
Burns (Conc)	17.083	20.399	8.849	7.600
Mean	18.7410		8.2245	
CV %	12.51		10.74	
Sample value	18.74		8.22	
Spike added	20.00		10.00	
Spike recovery, %	93.70		82.24 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-14	S	MFQ342	1.00x	01/14/93	22:25

	<-As->		<-Se->	
Burns (Conc)	-5.005	-7.174	-8.409	-11.497
Mean	-6.0895		-9.9530	
CV %	28.19		21.94	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-14	AS	MFQ342A	1.00x	01/14/93	22:30

	<-As->		<-Se->	
Burns (Conc)	8.280	6.032	-8.692	-8.692
Mean	7.1560		-8.6920	
CV %	22.21		0.00	
Sample value	7.16		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	35.78 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-15	S	MFQ343	1.00x	01/14/93	22:35

	<-As->		<-Se->	
Burns (Conc)	-15.124	-24.098	-15.352	-15.624
Mean	-19.6110		-15.4880	
CV %	32.36		1.24	
Sample value	2.90U		3.80U	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-15	AS	MFQ343A	1.00x	01/14/93	22:40

	<-As->		<-Se->	
Burns (Conc)	-3.136	-29.387	-13.159	-33.035
Mean	-16.2615		-23.0970	
CV %	114.15	Se only	60.85	
Sample value	2.90U		3.80U	
Spike added	20.00	1/15/93	10.00	
Spike recovery, %	0.00 ***	KH	0.00 ***	

18	X	X	ZZZZZZ	1.00x	01/14/93	22:45

	<-As->		<-Se->	
Burns (Conc)	0.315	0.946	2.093	2.998
Mean	0.6305		2.5455	
CV %	70.77		25.14	
Sample value	2.90U		3.80U	

19	X	X	ZZZZZZ	1.00x	01/14/93	22:49

	<-As->		<-Se->	
Burns (Conc)	2.528	-1.571	0.894	-1.774
Mean	0.4785		-0.4400	
CV %	605.73		428.76	
Sample value	2.90U		3.80U	

20	50 PPB	CCV 2	CCV	1.00x	01/14/93	22:54

	<-As->		<-Se->	
Burns (Conc)	52.153	51.421	47.729	51.084
Mean	51.7870		49.4065	
CV %	1.00		4.80	
Sample value	51.79		49.41	

21	CAL BLK	CCB 2	CCB	1.00x	01/14/93	22:59

	<-As->		<-Se->	
Burns (Conc)	-1.258	0.315	-2.361	0.595
Mean	-0.4715		-0.8830	
CV %	235.90		236.72	
Sample value	2.90U		3.80U	

22	-16	S	MFQ344	1.00x	01/14/93	23:04

	<-As->		<-Se->	
Burns (Conc)	-1.571	-0.944	-2.946	-4.400
Mean	-1.2575		-3.6730	
CV %	35.26		27.99	
Sample value	2.90U		3.80U	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-16	AS	MFQ344A	1.00x	01/14/93	23:08

	<-As->		<-Se->	
Burns (Conc)	13.797	10.218	-2.946	-5.267
Mean	12.0075		-4.1065	
CV %	21.08 ***		39.97	
Sample value	12.01		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	60.04 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-01	S	MFQ226	5.00x	01/14/93	23:13

	<-As->		<-Se->	
Burns (Conc)	0.315	1.262	0.297	-1.479
Mean	0.7885		-0.5910	
CV %	84.92		212.49	
Sample value	14.50U		19.00U	

Use only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-01	AS	MFQ226A	5.00x	01/14/93	23:18

	<-As->		<-Se->	
Burns (Conc)	17.744	18.406	7.911	4.823
Mean	18.0750		6.3670	
CV %	2.59		34.29 ***	
Sample value	90.38		31.84	
Spike added	20.00		10.00	
Spike recovery, %	90.38		63.67 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	-02	S	MFQ227	5.00x	01/14/93	23:23

	<-As->		<-Se->	
Burns (Conc)	0.315	-2.198	-0.593	0.595
Mean	-0.9415		0.0010	
CV %	188.74		>9999.99	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	-02	AS	MFQ227A	5.00x	01/14/93	23:27

	<-As->		<-Se->	
Burns (Conc)	18.737	18.074	6.979	7.289
Mean	18.4055		7.1340	
CV %	2.55		3.07	
Sample value	92.03		35.67	
Spike added	20.00		10.00	
Spike recovery, %	92.03		71.34 ***	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-03	S	MFQ228	5.00x	01/14/93	23:32

	<-As->		<-Se->	
Burns (Conc)	1.578	0.315	-0.889	1.792
Mean	0.9465		0.4515	
CV %	94.36		419.88	
Sample value	14.50U		19.00U	

Se only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-03	AS	MFQ228A	5.00x	01/14/93	23:37

	<-As->		<-Se->	
Burns (Conc)	18.406	19.401	9.163	10.108
Mean	18.9035		9.6355	
CV %	3.72		6.93	
Sample value	94.51		48.18	
Spike added	20.00		10.00	
Spike recovery, %	94.51		96.35	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	1.00x	01/14/93	23:42

	<-As->		<-Se->	
Burns (Conc)	1.578	-0.944	1.792	0.595
Mean	0.3170		1.1935	
CV %	562.56		70.92	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	X	X	ZZZZZZ	1.00x	01/14/93	23:47

	<-As->		<-Se->	
Burns (Conc)	-2.198	1.578	-1.479	0.894
Mean	-0.3100		-0.2925	
CV %	861.30		573.66	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV 3	CCV	1.00x	01/14/93	23:51

	<-As->		<-Se->	
Burns (Conc)	51.421	49.236	46.494	49.394
Mean	50.3285		47.9440	
CV %	3.07		4.28	
Sample value	50.33		47.94	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB 3	CCB	1.00x	01/14/93	23:56

	<-As->		<-Se->	
Burns (Conc)	-0.315	0.630	0.297	-2.361
Mean	0.1575		-1.0320	
CV %	424.26		182.12	
Sample value	2.90U		3.80U	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F4 9301405 Analyst: LL Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-04	S	MFQ229	5.00x	01/15/93	00:01

	<-As->		<-Se->	
Burns (Conc)	-0.629	-1.571	0.595	-0.593
Mean	-1.1000		0.0010	
CV %	60.55		>9999.99	
Sample value	14.50U		19.00U	

Se only 1/15/93 KK

35	-04	AS	MFQ229A	5.00x	01/15/93	00:06

	<-As->		<-Se->	
Burns (Conc)	20.066	19.733	10.424	2.093
Mean	19.8995		6.2585	
CV %	1.18		94.13 ***	
Sample value	99.50		31.29	
Spike added	20.00		10.00	
Spike recovery, %	99.50		62.59 ***	

36	-05	S	MFQ230	5.00x	01/15/93	00:10

	<-As->		<-Se->	
Burns (Conc)	-0.629	-1.885	-0.889	-3.529
Mean	-1.2570		-2.2090	
CV %	70.65		84.51	
Sample value	14.50U		19.00U	

ignore data lines needed for both As+Se 1/15/93 KK

37	-05	AS	MFQ230A	5.00x	01/15/93	00:15

	<-As->		<-Se->	
Burns (Conc)	16.753	17.413	6.051	1.193
Mean	17.0830		3.6220	
CV %	2.78		94.84	
Sample value	85.42		19.00U	
Spike added	20.00		10.00	
Spike recovery, %	85.42		0.00 ***	

38	-07	S	MFQ232	5.00x	01/15/93	00:20

	<-As->		<-Se->	
Burns (Conc)	-0.629	-0.944	-3.238	1.492
Mean	-0.7865		-0.8730	
CV %	28.32		383.12	
Sample value	14.50U		19.00U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-07	AS	MFQ232A	5.00x	01/15/93	00:25

	<-As->		<-Se->	
Burns (Conc)	17.083	15.108	9.163	6.979
Mean	16.0955		8.0710	
CV %	8.68		19.13	
Sample value	80.47	Se only	40.35	
Spike added	20.00	1/15/93 KK	10.00	
Spike recovery, %	80.47 ***		80.71 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-08	S	MFQ237	5.00x	01/15/93	00:29

	<-As->		<-Se->	
Burns (Conc)	1.894	0.000	-0.889	2.093
Mean	0.9470		0.6020	
CV %	141.42		350.26	
Sample value	14.50U		19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-08	AS	MFQ237A	5.00x	01/15/93	00:34

	<-As->		<-Se->	
Burns (Conc)	19.401	19.069	12.336	6.360
Mean	19.2350		9.3480	
CV %	1.22		45.20 ***	
Sample value	96.18		46.74	
Spike added	20.00		10.00	
Spike recovery, %	96.18		93.48	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	X	X	ZZZZZZ	1.00x	01/15/93	00:39

	<-As->		<-Se->	
Burns (Conc)	0.946	0.630	1.193	-2.361
Mean	0.7880		-0.5840	
CV %	28.36		430.32	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	X	X	ZZZZZZ	1.00x	01/15/93	00:44

	<-As->		<-Se->	
Burns (Conc)	-0.944	0.000	-0.297	1.792
Mean	-0.4720		0.7475	
CV %	141.42		197.61	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
44	50 PPB	CCV	CCV	1.00x	01/15/93	00:48

	<-As->		<-Se->	
Burns (Conc)	48.511	52.519	46.085	52.367
Mean	50.5150		49.2260	
CV %	5.61		9.02	
Sample value	50.51		49.23	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	CAL BLK	CCB	CCB	1.00x	01/15/93	00:53

	<-As->		<-Se->	
Burns (Conc)	1.578	-0.944	1.492	-2.946
Mean	0.3170		-0.7270	
CV %	562.56		431.66	
Sample value	2.90U		3.80U	

46	-11	S	MFQ240	5.00x	01/15/93	00:58

	<-As->		<-Se->	
Burns (Conc)	0.946	0.630	2.394	1.792
Mean	0.7880		2.0930	
CV %	28.36		20.34	
Sample value	14.50U		19.00U	

47	-11	AS	MFQ240A	5.00x	01/15/93	01:03

	<-As->		<-Se->	
Burns (Conc)	21.400	20.399	4.213	3.908
Mean	20.8995		4.0605	
CV %	3.39		5.31	
Sample value	104.50		20.30	
Spike added	20.00		10.00	
Spike recovery, %	104.50		40.60 ***	

48	-14	S	MFQ342	5.00x	01/15/93	01:08

	<-As->		<-Se->	
Burns (Conc)	-2.824	-2.198	0.000	1.193
Mean	-2.5110		0.5965	
CV %	17.63		141.42	
Sample value	14.50U		19.00U	

49	-14	AS	MFQ342A	5.00x	01/15/93	01:12

	<-As->		<-Se->	
Burns (Conc)	18.406	18.406	6.360	5.129
Mean	18.4060		5.7445	
CV %	0.03		15.15	
Sample value	92.03		28.72	
Spike added	20.00		10.00	
Spike recovery, %	92.03		57.45 ***	

50	-15	S	MFQ343	5.00x	01/15/93	01:17

	<-As->		<-Se->	
Burns (Conc)	-2.198	-3.448	-2.654	-1.479
Mean	-2.8230		-2.0665	
CV %	31.31		40.21	
Sample value	14.50U		19.00U	

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-15	AS	MFQ343A	5.00x	01/15/93	01:22

	<-As->		<-Se->	
Burns (Conc)	1.262	2.211	-0.889	0.894
Mean	1.7365		0.0025	
CV %	38.64		>9999.99	
Sample value	14.50U		19.00U	
Spike added	20.00		10.00	
Spike recovery, %	0.00 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-01	S2	MFQ226D	5.00x	01/15/93	01:27

	<-As->		<-Se->	
Burns (Conc)	-1.571	1.894	-2.946	-2.361
Mean	~~0.1615~~		-2.6535	
CV %	~~1517.11~~	Se only	15.59	
Sample value	14.50U	1/15/93 KLL	19.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-01	ASS2	MFQ226DA	5.00x	01/15/93	01:32

	<-As->		<-Se->	
Burns (Conc)	20.066	17.083	6.051	6.051
Mean	18.5745		6.0510	
CV %	~~11.36~~		0.00	
Sample value	~~92.87~~		30.26	
Spike added	20.00		10.00	
Spike recovery, %	92.87		60.51 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	X	X	ZZZZZZ	1.00x	01/15/93	01:37

	<-As->		<-Se->	
Burns (Conc)	0.000	0.946	-1.185	0.000
Mean	0.4730		-0.5925	
CV %	141.42		141.42	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	X	X	ZZZZZZ	1.00x	01/15/93	01:41

	<-As->		<-Se->	
Burns (Conc)	0.000	1.894	-2.361	0.297
Mean	0.9470		-1.0320	
CV %	141.42		182.12	
Sample value	2.90U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	50 PPB	CCV 5	CCV	1.00x	01/15/93	01:46

	<-As->		<-Se->	
Burns (Conc)	51.056	52.886	49.815	47.316
Mean	51.9710		48.5655	
CV %	2.49		3.64	
Sample value	51.97		48.56	

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Run: F4 9301405 Analyst: LL Page 11

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB S	CCB	1.00x	01/15/93	01:51

	<-As->		<-Se->	
Burns (Conc)	2.211	0.946	-0.593	-2.068
Mean	1.5785		-1.3305	
CV %	56.67		78.39	
Sample value	2.90U		3.80U	

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C L P M E T A L S 3.02e

S212196--LEAD

Run id: F3 9301402
THERMO JARRELL-ASH VIDEO 22E (#2913)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1028
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	08:59
2	3 PPB	WS1	F			S3	01/14/93	09:03
3	50 PPB	WS2	F			S50	01/14/93	09:07
4	100 PPB	WS3	F			S100	01/14/93	09:11
5	ICV-4	ICV	F			ICV	01/14/93	09:29
6	CAL BLK	ICB	F			ICB	01/14/93	09:33
7	CRA	CRA0	F			CRA	01/14/93	09:37
8	50 PPB	CCV	F			CCV	01/14/93	09:41
9	CAL BLK	CCB	F			CCB	01/14/93	09:46
10	X	X	F			ZZZZZZ	01/14/93	09:50
11	X	X	F			ZZZZZZ	01/14/93	09:54
12	X	X	F			ZZZZZZ	01/14/93	09:58
13	X	X	F			ZZZZZZ	01/14/93	10:03
14	X	X	F			ZZZZZZ	01/14/93	10:07
15	X	X	F			ZZZZZZ	01/14/93	10:11
16	X	X	F			ZZZZZZ	01/14/93	10:15
17	X	X	F			ZZZZZZ	01/14/93	10:20
18	X	X	F			ZZZZZZ	01/14/93	10:24
19	X	X	F			ZZZZZZ	01/14/93	10:28
20	50 PPB	CCV	F			CCV	01/14/93	10:32
21	CAL BLK	CCB	F			CCB	01/14/93	10:37
22	X	X	F			ZZZZZZ	01/14/93	10:41
23	X	X	F			ZZZZZZ	01/14/93	10:45
24	X	X	F			ZZZZZZ	01/14/93	10:49
25	X	X	F			ZZZZZZ	01/14/93	10:54
26	X	X	F			ZZZZZZ	01/14/93	10:58
27	X	X	F			ZZZZZZ	01/14/93	11:02
28	X	X	F			ZZZZZZ	01/14/93	11:07
29	X	X	F			ZZZZZZ	01/14/93	11:11
30	50 PPB	CCV	F			CCV	01/14/93	11:15
31	CAL BLK	CCB	F			CCB	01/14/93	11:20
32	PB	PBW	F	1267	01/11/93	PBW	01/14/93	11:31
33	PB	ASPBW	F	1267		PBWA	01/14/93	11:36
34	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	11:40
35	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	11:44
36	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	11:48
37	S212196-01	AS	F	1267		MFQ226A	01/14/93	11:53
38	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	11:57
39	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	12:01
40	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	12:05
41	S212196-02	AS	F	1267		MFQ227A	01/14/93	12:10
42	50 PPB	CCV	F			CCV	01/14/93	12:14
43	CAL BLK	CCB	F			CCB	01/14/93	12:18

S212196--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	12:22
45	X	X	F			ZZZZZZ	01/14/93	12:27
46	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	12:31
47	S212196-03	AS	F	1267		MFQ228A	01/14/93	12:35
48	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	12:39
49	S212196-04	AS	F	1267		MFQ229A	01/14/93	12:44
50	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	12:48
51	S212196-05	AS	F	1267		MFQ230A	01/14/93	12:52
52	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	13:21
53	S212196-06	AS	F	1267		MFQ231A	01/14/93	13:25
54	50 PPB	CCV	F			CCV	01/14/93	13:29
55	CAL BLK	CCB	F			CCB	01/14/93	13:34
56	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	13:38
57	S212196-07	AS	F	1267		MFQ232A	01/14/93	13:42
58	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	13:46
59	S212196-08	AS	F	1267		MFQ237A	01/14/93	13:51
60	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	13:55
61	S212196-09	AS	F	1267		MFQ238A	01/14/93	13:59
62	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	14:03
63	S212196-10	AS	F	1267		MFQ239A	01/14/93	14:08
64	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	14:12
65	S212196-11	AS	F	1267		MFQ240A	01/14/93	14:16
66	50 PPB	CCV	F			CCV	01/14/93	14:20
67	CAL BLK	CCB	F			CCB	01/14/93	14:24
68	X	X	F			ZZZZZZ	01/14/93	14:43
69	X	X	F			ZZZZZZ	01/14/93	14:45
70	X	X	F			ZZZZZZ	01/14/93	14:47
71	X	X	F			ZZZZZZ	01/14/93	14:50
72	50 PPB	CCV	F			CCV	01/14/93	14:52
73	CAL BLK	CCB	F			CCB	01/14/93	14:55
74	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	15:04
75	S212196-12	AS	F	1267		MFQ241A	01/14/93	15:08
76	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	15:13
77	S212196-13	AS	F	1267		MFQ242A	01/14/93	15:17
78	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	15:21
79	S212196-14	AS	F	1267		MFQ342A	01/14/93	15:25
80	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	15:30
81	S212196-15	AS	F	1267		MFQ343A	01/14/93	15:34
82	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	15:38
83	S212196-16	AS	F	1267		MFQ344A	01/14/93	15:42
84	50 PPB	CCV	F			CCV	01/14/93	15:47
85	CAL BLK	CCB	F			CCB	01/14/93	15:51
86	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	16:04
87	S212196-14	AS	F	1267		MFQ342A	01/14/93	16:09
88	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	16:13
89	S212196-15	AS	F	1267		MFQ343A	01/14/93	16:17
90	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	16:21
91	S212196-05	AS	F	1267		MFQ230A	01/14/93	16:26
92	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	16:30
93	S212196-08	AS	F	1267		MFQ237A	01/14/93	16:34
94	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	16:38
95	S212196-04	AS	F	1267		MFQ229A	01/14/93	16:43

S212196--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
96	50 PPB	CCV	F			CCV	01/14/93	16:47
97	CAL BLK	CCB	F			CCB	01/14/93	16:51

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C L P M E T A L S 3.02e

S212196--THALLIUM

Run id: F3 9301452
THERMO JARRELL-ASH VIDEO 22E (#2913)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1032
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	08:59
2	10 PPB	WS1	F			S10	01/14/93	09:03
3	50 PPB	WS2	F			S50	01/14/93	09:07
4	100 PPB	WS3	F			S100	01/14/93	09:11
5	ICV-4	ICV	F			ICV	01/14/93	09:29
6	CAL BLK	ICB	F			ICB	01/14/93	09:33
7	CRA	CRA0	F			CRA	01/14/93	09:37
8	50 PPB	CCV	F			CCV	01/14/93	09:41
9	CAL BLK	CCB	F			CCB	01/14/93	09:46
10	X	X	F			ZZZZZZ	01/14/93	09:50
11	X	X	F			ZZZZZZ	01/14/93	09:54
12	X	X	F			ZZZZZZ	01/14/93	09:58
13	X	X	F			ZZZZZZ	01/14/93	10:03
14	X	X	F			ZZZZZZ	01/14/93	10:07
15	X	X	F			ZZZZZZ	01/14/93	10:11
16	X	X	F			ZZZZZZ	01/14/93	10:15
17	X	X	F			ZZZZZZ	01/14/93	10:20
18	X	X	F			ZZZZZZ	01/14/93	10:24
19	X	X	F			ZZZZZZ	01/14/93	10:28
20	50 PPB	CCV	F			CCV	01/14/93	10:32
21	CAL BLK	CCB	F			CCB	01/14/93	10:37
22	X	X	F			ZZZZZZ	01/14/93	10:41
23	X	X	F			ZZZZZZ	01/14/93	10:45
24	X	X	F			ZZZZZZ	01/14/93	10:49
25	X	X	F			ZZZZZZ	01/14/93	10:54
26	X	X	F			ZZZZZZ	01/14/93	10:58
27	X	X	F			ZZZZZZ	01/14/93	11:02
28	X	X	F			ZZZZZZ	01/14/93	11:07
29	X	X	F			ZZZZZZ	01/14/93	11:11
30	50 PPB	CCV	F			CCV	01/14/93	11:15
31	CAL BLK	CCB	F			CCB	01/14/93	11:20
32	PB	PBW	F	1267	01/11/93	PBW	01/14/93	11:31
33	PB	ASPBW	F	1267		PBWA	01/14/93	11:36
34	LCSFW	LCSW	F	1267	01/11/93	LCSW	01/14/93	11:40
35	LCSFW	ASLCSW	F	1267		LCSWA	01/14/93	11:44
36	S212196-01	S	F	1267	01/11/93	MFQ226	01/14/93	11:48
37	S212196-01	AS	F	1267		MFQ226A	01/14/93	11:53
38	S212196-01	S2	F	1267	01/11/93	MFQ226D	01/14/93	11:57
39	S212196-01	ASS2	F	1267		MFQ226DA	01/14/93	12:01
40	S212196-02	S	F	1267	01/11/93	MFQ227	01/14/93	12:05
41	S212196-02	AS	F	1267		MFQ227A	01/14/93	12:10
42	50 PPB	CCV	F			CCV	01/14/93	12:14
43	CAL BLK	CCB	F			CCB	01/14/93	12:18

S212196--THALLIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212196-02	DS	F	1267	01/11/93	MFQ227S	01/14/93	12:22
45	X	X	F			ZZZZZZ	01/14/93	12:27
46	S212196-03	S	F	1267	01/11/93	MFQ228	01/14/93	12:31
47	S212196-03	AS	F	1267		MFQ228A	01/14/93	12:35
48	S212196-04	S	F	1267	01/11/93	MFQ229	01/14/93	12:39
49	S212196-04	AS	F	1267		MFQ229A	01/14/93	12:44
50	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	12:48
51	S212196-05	AS	F	1267		MFQ230A	01/14/93	12:52
52	S212196-06	S	F	1267	01/11/93	MFQ231	01/14/93	13:21
53	S212196-06	AS	F	1267		MFQ231A	01/14/93	13:25
54	50 PPB	CCV	F			CCV	01/14/93	13:29
55	CAL BLK	CCB	F			CCB	01/14/93	13:34
56	S212196-07	S	F	1267	01/11/93	MFQ232	01/14/93	13:38
57	S212196-07	AS	F	1267		MFQ232A	01/14/93	13:42
58	S212196-08	S	F	1267	01/11/93	MFQ237	01/14/93	13:46
59	S212196-08	AS	F	1267		MFQ237A	01/14/93	13:51
60	S212196-09	S	F	1267	01/11/93	MFQ238	01/14/93	13:55
61	S212196-09	AS	F	1267		MFQ238A	01/14/93	13:59
62	S212196-10	S	F	1267	01/11/93	MFQ239	01/14/93	14:03
63	S212196-10	AS	F	1267		MFQ239A	01/14/93	14:08
64	S212196-11	S	F	1267	01/11/93	MFQ240	01/14/93	14:12
65	S212196-11	AS	F	1267		MFQ240A	01/14/93	14:16
66	50 PPB	CCV	F			CCV	01/14/93	14:20
67	CAL BLK	CCB	F			CCB	01/14/93	14:24
68	X	X	F			ZZZZZZ	01/14/93	14:43
69	X	X	F			ZZZZZZ	01/14/93	14:45
70	X	X	F			ZZZZZZ	01/14/93	14:47
71	X	X	F			ZZZZZZ	01/14/93	14:50
72	50 PPB	CCV	F			CCV	01/14/93	14:52
73	CAL BLK	CCB	F			CCB	01/14/93	14:55
74	S212196-12	S	F	1267	01/11/93	MFQ241	01/14/93	15:04
75	S212196-12	AS	F	1267		MFQ241A	01/14/93	15:08
76	S212196-13	S	F	1267	01/11/93	MFQ242	01/14/93	15:13
77	S212196-13	AS	F	1267		MFQ242A	01/14/93	15:17
78	S212196-14	S	F	1267	01/11/93	MFQ342	01/14/93	15:21
79	S212196-14	AS	F	1267		MFQ342A	01/14/93	15:25
80	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	15:30
81	S212196-15	AS	F	1267		MFQ343A	01/14/93	15:34
82	S212196-16	S	F	1267	01/11/93	MFQ344	01/14/93	15:38
83	S212196-16	AS	F	1267		MFQ344A	01/14/93	15:42
84	50 PPB	CCV	F			CCV	01/14/93	15:47
85	CAL BLK	CCB	F			CCB	01/14/93	15:51

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

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AA Sequence # 2093 GFAA ID: F1 F2 (F3) F4 F5 F6 Method: 160

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8:00 1/14/93

Operator: BI

Disk # 3 5212196

Acq ~~5212189~~

SAMIN

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	93014001		RUN ID:	93014052	
Element:	[] AS	[] PB	Element:	[] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[] 10,5 [] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
Tl/only	10	8		
	11	8A		
	12	9		
	13	9A		
	14	9D		
	15	9DA		Pb/only
	16	9S		
	17	7		
RSD	18	10		
	19	10A		
	20	CCV		
	21	CCB		
Another case 1/14/93	22	11		
	23	11A		Pb/only
	24	12		
	25	12A		
	26	13		
	27	13A		Pb/only
	28	6		
	29	6A		
	30	CCV		
	31	CCB		
	32	PBW		
	33	PBWA		
	34	LCSW		
	35	LCSWA		171
M(7)	36	01		
	37	01A		
M(7)	38	01D		170
	39	01DA30		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2093
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	40	02		
	41	02A		
	42	CW		
	43	CCB		
	44	02S		
	45	X		
	46	03		
	47	03A		
< d.l.(1:4)	48	04		
	49	04A		
	50	05		
RSD	51	05A		
	52	06		
	53	06A		
	54	CW		
	55	CCB		
m(9)	56	07		
	57	07A		
PSD	58	08		
	59	08A		
	60	09		
	61	09A		
m(8)	62	10		
	63	10A		
m(7)	64	11		
	65	11A		
	66	CW		
	67	CCB		
	68	X		
	69	X		
	70	X		
	71	X		
	72	CW		
	73	CCB		
	74	12		
	75	12A		
m(9)	76	13		
	77	13A		
PSD	78	14		
	79	14A		
PSD	80	15		
	81	15A		
m(28)	82	16		
	83	16A		
	84	CW		
	85	CCB		
	86	14		
	87	14A		
<40	88	15		
	89	15A		
	90	05		
<40	91	05A		
	92	08		
	93	08A		
	94	04	1:4	
	95	04A		
	96	CCV		
	97	CCB		

Pb only

Jarrell-Ash Video 22
Run: F3 9301402 Analyst: JST Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	08:59

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(3.10)	WS1	S	1.00x	01/14/93	09:03

	<-Pb->		<-Tl->	
Burns (Abs)	0.012 A	0.017 A	0.022A	0.023A
Mean	0.0145		0.0225	
CV %	24.38 ***		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	09:07

	<-Pb->		<-Tl->	
Burns (Abs)	0.186 A	0.182 A	0.128A	0.123A
Mean	0.1840		0.1255	
CV %	0.00		2.82	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	09:11

	<-Pb->		<-Tl->	
Burns (Abs)	0.348 A	0.353 A	0.238A	0.237A
Mean	0.3505		0.2375	
CV %	1.01		0.00	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003869442	0.002595761
Coef[2]:	-3.652665e-006	-2.181696e-006
Correl. coef.:	0.9999	0.9997

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-4	ICV	ICV	2.00x	01/14/93	09:29

	<-Pb->		<-Tl->	
Burns (Conc)	50.760	50.474	51.966	50.280
Mean	50.6170		51.1230	
CV %	0.40		2.33	
Sample value	101.23		102.25	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F3 9301402 Analyst: JST Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	09:33

	<-Pb->		<-Tl->	
Burns (Conc)	1.553	0.000	-0.385	0.000
Mean	0.7765		-0.1925	
CV %	141.42		141.42	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
7	CRA	CRA	CRA	1.00x	01/14/93	09:37

	<-Pb->		<-Tl->	
Burns (Conc)	3.891	2.850	7.755	8.928
Mean	3.3705		8.3415	
CV %	21.84 ***		9.94	
Sample value	3.37		8.34	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
8	50 PPB	CCV	CCV	1.00x	01/14/93	09:41

	<-Pb->		<-Tl->	
Burns (Conc)	49.903	50.760	49.439	49.019
Mean	50.3315		49.2290	
CV %	1.20		0.60	
Sample value	50.33		49.23	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
9	CAL BLK	CCB	CCB	1.00x	01/14/93	09:46

	<-Pb->		<-Tl->	
Burns (Conc)	0.258	0.776	0.000	0.000
Mean	0.5170		0.0000	
CV %	70.85		---	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
10	X	X	ZZZZZZ	1.00x	01/14/93	09:50

	<-Pb->		<-Tl->	
Burns (Conc)	4.151	4.412	0.000	-0.385
Mean	4.2815		-0.1925	
CV %	4.31		141.42	
Sample value	4.28		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
11	X	X	ZZZZZZ	1.00x	01/14/93	09:54

	<-Pb->		<-Tl->	
Burns (Conc)	20.288	21.095	17.199	17.993
Mean	20.6915		17.5960	
CV %	2.76		3.19	
Sample value	20.69		17.60	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	X	X	ZZZZZZ	1.00x	01/14/93	09:58

	<-Pb->		<-Tl->	
Burns (Conc)	3.370	2.591	0.000	-0.770
Mean	2.9805		-0.3850	
CV %	18.48		141.42	
Sample value	2.98		1.30U	

13	X	X	ZZZZZZ	1.00x	01/14/93	10:03

	<-Pb->		<-Tl->	
Burns (Conc)	23.253	20.826	20.382	17.993
Mean	22.0395		19.1875	
CV %	7.79		8.80	
Sample value	22.04		19.19	

14	X	X	ZZZZZZ	1.00x	01/14/93	10:07

	<-Pb->		<-Tl->	
Burns (Conc)	4.151	3.370	-0.385	-0.770
Mean	3.7605		-0.5775	
CV %	14.69		47.14	
Sample value	3.76		1.30U	

15	X	X	ZZZZZZ	1.00x	01/14/93	10:11

	<-Pb->		<-Tl->	
Burns (Conc)	25.963	21.095	22.780	16.010
Mean	23.5290		19.3950	
CV %	14.63		24.68 ***	
Sample value	23.53		19.40	

16	X	X	ZZZZZZ	1.00x	01/14/93	10:15

	<-Pb->		<-Tl->	
Burns (Conc)	23.253	23.253	44.837	45.254
Mean	23.2530		45.0455	
CV %	0.01		0.65	
Sample value	23.25		45.04	

17	X	X	ZZZZZZ	1.00x	01/14/93	10:20

	<-Pb->		<-Tl->	
Burns (Conc)	44.512	39.181	69.122	60.904
Mean	41.8465		65.0130	
CV %	9.01		8.94	
Sample value	41.85		65.01	

ARGOS MODEL SA4 Version 1.29

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	X	X	ZZZZZZ	1.00x	01/14/93	10:24

	<-Pb->		<-Tl->	
Burns (Conc)	3.891	2.850	-0.385	-0.770
Mean	3.3705		-0.5775	
CV %	21.84 ***		47.14	
Sample value	3.37		1.30U	

19	X	X	ZZZZZZ	1.00x	01/14/93	10:28

	<-Pb->		<-Tl->	
Burns (Conc)	22.712	20.019	19.585	17.199
Mean	21.3655		18.3920	
CV %	8.91		9.17	
Sample value	21.37		18.39	

20	50 PPB	CCV	2 CCV	1.00x	01/14/93	10:32

	<-Pb->		<-Tl->	
Burns (Conc)	48.478	48.478	49.439	49.439
Mean	48.4780		49.4390	
CV %	0.00		0.00	
Sample value	48.48		49.44	

21	CAL BLK	CCB	2 CCB	1.00x	01/14/93	10:37

	<-Pb->		<-Tl->	
Burns (Conc)	0.258	1.294	0.000	0.000
Mean	0.7760		0.0000	
CV %	94.40		---	
Sample value	2.00U		1.30U	

22	X	X	ZZZZZZ	1.00x	01/14/93	10:41

	<-Pb->		<-Tl->	
Burns (Conc)	4.412	3.891	0.385	-1.155
Mean	4.1515		-0.3850	
CV %	8.87		282.84	
Sample value	4.15		1.30U	

23	X	X	ZZZZZZ	1.00x	01/14/93	10:45

	<-Pb->		<-Tl->	
Burns (Conc)	28.142	21.364	24.787	16.010
Mean	24.7530		20.3985	
CV %	19.36		30.43 ***	
Sample value	24.75		20.40	

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Jarrell-Ash Video 22
Run: F3 9301402 Analyst: JST Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	X	X	ZZZZZZ	1.00x	01/14/93	10:49

	<-Pb->		<-Tl->	
Burns (Conc)	3.631	3.891	0.000	0.771
Mean	3.7610		0.3855	
CV %	4.89		141.42	
Sample value	3.76		1.30U	

25	X	X	ZZZZZZ	1.00x	01/14/93	10:54

	<-Pb->		<-Tl->	
Burns (Conc)	22.982	21.903	16.803	15.615
Mean	22.4425		16.2090	
CV %	3.40		5.18	
Sample value	22.44		16.21	

26	X	X	ZZZZZZ	1.00x	01/14/93	10:58

	<-Pb->		<-Tl->	
Burns (Conc)	2.591	1.812	0.771	-0.770
Mean	2.2015		0.0005	
CV %	25.02		>9999.99	
Sample value	2.20		1.30U	

27	X	X	ZZZZZZ	1.00x	01/14/93	11:02

	<-Pb->		<-Tl->	
Burns (Conc)	21.364	20.557	17.199	17.199
Mean	20.9605		17.1990	
CV %	2.72		0.00	
Sample value	20.96		17.20	

28	X	X	ZZZZZZ	1.00x	01/14/93	11:07

	<-Pb->		<-Tl->	
Burns (Conc)	2.591	2.850	-0.385	0.385
Mean	2.7205		0.0000	
CV %	6.73		>9999.99	
Sample value	2.72		1.30U	

29	X	X	ZZZZZZ	1.00x	01/14/93	11:11

	<-Pb->		<-Tl->	
Burns (Conc)	21.364	21.364	18.788	19.186
Mean	21.3640		18.9870	
CV %	0.00		1.48	
Sample value	21.36		18.99	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	50 PPB	CCV 3	CCV	1.00x	01/14/93	11:15

	<-Pb->		<-Tl->	
Burns (Conc)	47.342	46.775	48.180	46.924
Mean	47.0585		47.5520	
CV %	0.85		1.87	
Sample value	47.06		47.55	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	CAL BLK	CCB 3	CCB	1.00x	01/14/93	11:20

	<-Pb->		<-Tl->	
Burns (Conc)	1.035	1.553	0.771	0.771
Mean	1.2940		0.7710	
CV %	28.31		0.00	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	PB	PBW	PBW	1.00x	01/14/93	11:31

	<-Pb->		<-Tl->	
Burns (Conc)	0.517	1.294	-0.385	0.000
Mean	0.9055		-0.1925	
CV %	60.68		141.42	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	PB	ASPBW	PBWA	1.00x	01/14/93	11:36

	<-Pb->		<-Tl->	
Burns (Conc)	19.214	18.946	17.596	17.993
Mean	19.0800		17.7945	
CV %	0.99		1.58	
Sample value	19.08		17.80	
Spike added	20.00		20.00	
Spike recovery, %	95.40		88.97	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	LCSFW	LCSW	LCSW	1.00x	01/14/93	11:40

	<-Pb->		<-Tl->	
Burns (Conc)	49.333	49.048	46.924	47.343
Mean	49.1905		47.1335	
CV %	0.41		0.63	
Sample value	49.19		47.13	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	LCSFW	ASLCSW	LCSWA	1.00x	01/14/93	11:44

	<-Pb->		<-Tl->	
Burns (Conc)	65.861	64.976	67.381	67.381
Mean	65.4185		67.3810	
CV %	0.96		0.01	
Sample value	65.42		67.38	
Spike added	20.00		20.00	
Spike recovery, %	81.14 ***		101.24	

Jarrell-Ash Video 22
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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	S212196-01	S	MFQ226	1.00x	01/14/93	11:48

	<-Pb->		<-Tl->	
Burns (Conc)	8.336	7.286	1.157	0.000
Mean	7.8110		0.5785	
CV %	9.51		141.42	
Sample value	7.81		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	-01	AS	MFQ226A	1.00x	01/14/93	11:53

	<-Pb->		<-Tl->	
Burns (Conc)	22.173	20.557	17.596	16.406
Mean	21.3650		17.0010	
CV %	5.35		4.95	
Sample value	21.36		17.00	
Spike added	20.00		20.00	
Spike recovery, %	67.77 ***		85.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	-01	S2	MFQ226D	1.00x	01/14/93	11:57

	<-Pb->		<-Tl->	
Burns (Conc)	6.501	7.548	0.000	-0.385
Mean	7.0245		-0.1925	
CV %	10.54		141.42	
Sample value	7.03		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-01	ASS2	MFQ226DA	1.00x	01/14/93	12:01

	<-Pb->		<-Tl->	
Burns (Conc)	21.903	21.633	17.993	16.803
Mean	21.7680		17.3980	
CV %	0.88		4.84	
Sample value	21.77		17.40	
Spike added	20.00		20.00	
Spike recovery, %	73.71 ***		86.99	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-02	S	MFQ227	1.00x	01/14/93	12:05

	<-Pb->		<-Tl->	
Burns (Conc)	3.631	3.631	3.477	1.929
Mean	3.6310		2.7030	
CV %	0.00		40.50	
Sample value	3.63		2.70	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-02	AS	MFQ227A	1.00x	01/14/93	12:10

	<-Pb->		<-Tl->	
Burns (Conc)	17.341	17.073	19.186	19.585
Mean	17.2070		19.3855	
CV %	1.10		1.46	
Sample value	17.21		19.39	
Spike added	20.00		20.00	
Spike recovery, %	67.88 ***		83.41 ***	

42	50 PPB	CCV 4	CCV	1.00x	01/14/93	12:14

	<-Pb->		<-Tl->	
Burns (Conc)	47.342	48.194	46.088	46.924
Mean	47.7680		46.5060	
CV %	1.26		1.27	
Sample value	47.77		46.51	

43	CAL BLK	CCB 4	CCB	1.00x	01/14/93	12:18

	<-Pb->		<-Tl->	
Burns (Conc)	0.517	-0.258	-0.385	-1.155
Mean	0.1295		-0.7700	
CV %	423.17		70.71	
Sample value	2.00U		1.30U	

44	-02	DS	MFQ227S	1.00x	01/14/93	12:22

	<-Pb->		<-Tl->	
Burns (Conc)	19.483	17.341	45.671	46.506
Mean	18.4120		46.0885	
CV %	8.23		1.28	
Sample value	18.41		46.09	

45	X	X	ZZZZZZ	1.00x	01/14/93	12:27

	<-Pb->		<-Tl->	
Burns (Conc)	0.517	1.035	0.771	-1.155
Mean	0.7760		-0.1920	
CV %	47.20		709.32	
Sample value	2.00U		1.30U	

46	-03	S	MFQ228	1.00x	01/14/93	12:31

	<-Pb->		<-Tl->	
Burns (Conc)	1.812	1.553	-0.385	-0.385
Mean	1.6825		-0.3850	
CV %	10.88		0.00	
Sample value	2.00U		1.30U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-03	AS	MFQ228A	1.00x	01/14/93	12:35

	<-Pb->		<-Tl->	
Burns (Conc)	17.073	14.942	14.429	13.640
Mean	16.0075		14.0345	
CV %	9.41		3.98	
Sample value	16.01		14.03	
Spike added	20.00		20.00	
Spike recovery, %	80.04 ***		70.17 ***	

48	-04	S	MFQ229	1.00x	01/14/93	12:39

	<-Pb->		<-Tl->	
Burns (Conc)	197.196	223.338	0.000	-0.385
Mean	210.2670		-0.1925	
CV %	8.79		141.42	
Sample value	210.27		1.30U	

49	-04	AS	MFQ229A	1.00x	01/14/93	12:44

	<-Pb->		<-Tl->	
Burns (Conc)	209.358	221.556	16.406	16.406
Mean	215.4570		16.4060	
CV %	4.00		0.00	
Sample value	215.46		16.41	
Spike added	20.00		20.00	
Spike recovery, %	25.95 ***		82.03 ***	

50	-05	S	MFQ230	1.00x	01/14/93	12:48

	<-Pb->		<-Tl->	
Burns (Conc)	-5.655	-2.835	-1.539	-0.385
Mean	-4.2450		-0.9620	
CV %	46.97		84.82	
Sample value	2.00U		1.30U	

51	-05	AS	MFQ230A	1.00x	01/14/93	12:52

	<-Pb->		<-Tl->	
Burns (Conc)	8.336	5.455	16.010	15.219
Mean	6.8955		15.6145	
CV %	29.54 ***		3.58	
Sample value	6.89		15.61	
Spike added	20.00		20.00	
Spike recovery, %	34.47 ***		78.07 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-06	S	MFQ231	1.00x	01/14/93	13:21

	<-Pb->		<-Tl->	
Burns (Conc)	2.331	2.850	1.157	0.000
Mean	2.5905		0.5785	
CV %	14.17		141.42	
Sample value	2.59		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-06	AS	MFQ231A	1.00x	01/14/93	13:25

	<-Pb->		<-Tl->	
Burns (Conc)	16.540	17.341	15.615	14.429
Mean	16.9405		15.0220	
CV %	3.34		5.58	
Sample value	16.94		15.02	
Spike added	20.00		20.00	
Spike recovery, %	71.75 ***		75.11 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	50 PPB	CCV	5 CCV	1.00x	01/14/93	13:29

	<-Pb->		<-Tl->	
Burns (Conc)	49.903	48.763	46.088	49.860
Mean	49.3330		47.9740	
CV %	1.63		5.56	
Sample value	49.33		47.97	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	CAL BLK	CCB	5 CCB	1.00x	01/14/93	13:34

	<-Pb->		<-Tl->	
Burns (Conc)	0.517	1.035	-0.385	-0.385
Mean	0.7760		-0.3850	
CV %	47.20		0.00	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	-07	S	MFQ232	1.00x	01/14/93	13:38

	<-Pb->		<-Tl->	
Burns (Conc)	10.440	8.598	0.771	1.543
Mean	9.5190		1.1570	
CV %	13.68		47.18	
Sample value	9.52		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	-07	AS	MFQ232A	1.00x	01/14/93	13:42

	<-Pb->		<-Tl->	
Burns (Conc)	21.903	20.826	19.585	17.596
Mean	21.3645		18.5905	
CV %	3.56		7.57	
Sample value	21.36		18.59	
Spike added	20.00		20.00	
Spike recovery, %	59.23 ***		92.95	

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
58	-08	S	MFQ237	1.00x	01/14/93	13:46

	<-Pb->		<-Tl->	
Burns (Conc)	4.412	2.591	0.771	0.771
Mean	3.5015		0.7710	
CV %	36.77 ***		0.00	
Sample value	3.50		1.30U	

59	-08	AS	MFQ237A	1.00x	01/14/93	13:51

	<-Pb->		<-Tl->	
Burns (Conc)	20.557	21.364	17.993	17.596
Mean	20.9605		17.7945	
CV %	2.72		1.58	
Sample value	20.96		17.80	
Spike added	20.00		20.00	
Spike recovery, %	87.29		88.97	

60	-09	S	MFQ238	1.00x	01/14/93	13:55

	<-Pb->		<-Tl->	
Burns (Conc)	2.331	2.591	0.385	0.771
Mean	2.4610		0.5780	
CV %	7.47		47.22	
Sample value	2.46		1.30U	

61	-09	AS	MFQ238A	1.00x	01/14/93	13:59

	<-Pb->		<-Tl->	
Burns (Conc)	15.474	14.144	14.429	14.429
Mean	14.8090		14.4290	
CV %	6.35		0.03	
Sample value	14.81		14.43	
Spike added	20.00		20.00	
Spike recovery, %	61.74 ***		72.14 ***	

62	-10	S	MFQ239	1.00x	01/14/93	14:03

	<-Pb->		<-Tl->	
Burns (Conc)	7.811	7.811	0.771	0.771
Mean	7.8110		0.7710	
CV %	0.00		0.00	
Sample value	7.81		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
63	-10	AS	MFQ239A	1.00x	01/14/93	14:08

	<-Pb->		<-Tl->	
Burns (Conc)	22.442	23.253	14.824	15.615
Mean	22.8475		15.2195	
CV %	2.51		3.67	
Sample value	22.85		15.22	
Spike added	20.00		20.00	
Spike recovery, %	75.18 ***		76.10 ***	

64	-11	S	MFQ240	1.00x	01/14/93	14:12

	<-Pb->		<-Tl->	
Burns (Conc)	6.762	6.762	0.385	-1.155
Mean	6.7620		-0.3850	
CV %	0.00		282.84	
Sample value	6.76		1.30U	

65	-11	AS	MFQ240A	1.00x	01/14/93	14:16

	<-Pb->		<-Tl->	
Burns (Conc)	18.946	17.608	16.406	14.034
Mean	18.2770		15.2200	
CV %	5.18		11.02	
Sample value	18.28		15.22	
Spike added	20.00		20.00	
Spike recovery, %	57.58 ***		76.10 ***	

66	50 PPB	CCV	CCV	1.00x	01/14/93	14:20

	<-Pb->		<-Tl->	
Burns (Conc)	48.763	51.332	50.280	50.701
Mean	50.0475		50.4905	
CV %	3.63		0.59	
Sample value	50.05		50.49	

67	CAL BLK	CCB	CCB	1.00x	01/14/93	14:24

	<-Pb->		<-Tl->	
Burns (Conc)	0.776	0.517	1.157	0.771
Mean	0.6465		0.9640	
CV %	28.33		28.31	
Sample value	2.00U		1.30U	

68	X	X	ZZZZZZ	100.00x	01/14/93	14:43

	<-Pb->	<-Tl->
Burns (Conc)	25.420	0.385
Mean	25.4200	0.3850
CV %	---	---
Sample value	2542.00	130.00U

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
69	X	X	ZZZZZZ	100.00x	01/14/93	14:45

	<-Pb->		<-Tl->	
Burns (Conc)	33.079		8.928	
Mean	33.0790		8.9280	
CV %	---		---	
Sample value	3307.90		892.80	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
70	X	X	ZZZZZZ	100.00x	01/14/93	14:47

	<-Pb->		<-Tl->	
Burns (Conc)	42.822		18.391	
Mean	42.8220		18.3910	
CV %	---		---	
Sample value	4282.20		1839.10	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
71	X	X	ZZZZZZ	100.00x	01/14/93	14:50

	<-Pb->		<-Tl->	
Burns (Conc)	51.332		28.821	
Mean	51.3320		28.8210	
CV %	---		---	
Sample value	5133.20		2882.10	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
72	50 PPB	CCV 7	CCV	1.00x	01/14/93	14:52

	<-Pb->		<-Tl->	
Burns (Conc)	48.478		49.439	
Mean	48.4780		49.4390	
CV %	---		---	
Sample value	48.48		49.44	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
73	CAL BLK	CCB 7	CCB	1.00x	01/14/93	14:55

	<-Pb->		<-Tl->	
Burns (Conc)	1.553		0.385	
Mean	1.5530		0.3850	
CV %	---		---	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
74	-12	S	MFQ241	1.00x	01/14/93	15:04

	<-Pb->		<-Tl->	
Burns (Conc)	5.716	5.194	1.157	2.316
Mean	5.4550		1.7365	
CV %	6.77		47.19	
Sample value	5.45		1.74	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
75	-12	AS	MFQ241A	1.00x	01/14/93	15:08

	<-Pb->		<-Tl->	
Burns (Conc)	17.875	17.875	13.246	13.640
Mean	17.8750		13.4430	
CV %	0.00		2.07	
Sample value	17.88		13.44	
Spike added	20.00		20.00	
Spike recovery, %	62.10 ***		58.53 ***	

76	-13	S	MFQ242	1.00x	01/14/93	15:13

	<-Pb->		<-Tl->	
Burns (Conc)	8.336	9.124	1.157	0.771
Mean	8.7300		0.9640	
CV %	6.38		28.31	
Sample value	8.73		1.30U	

77	-13	AS	MFQ242A	1.00x	01/14/93	15:17

	<-Pb->		<-Tl->	
Burns (Conc)	22.982	24.606	13.640	12.852
Mean	23.7940		13.2460	
CV %	4.83		4.21	
Sample value	23.79		13.25	
Spike added	20.00		20.00	
Spike recovery, %	75.32 ***		66.23 ***	

78	-14	S	MFQ342	1.00x	01/14/93	15:21

	<-Pb->		<-Tl->	
Burns (Conc)	4.151	3.110	2.316	3.477
Mean	3.6305		2.8965	
CV %	20.28 ***		28.34	
Sample value	3.63		2.90	

79	-14	AS	MFQ342A	1.00x	01/14/93	15:25

	<-Pb->		<-Tl->	
Burns (Conc)	14.676	16.006	21.180	20.382
Mean	15.3410		20.7810	
CV %	6.13		2.72	
Sample value	15.34		20.78	
Spike added	20.00		20.00	
Spike recovery, %	58.55 ***		89.42	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
80	-15	S	MFQ343	1.00x	01/14/93	15:30

	<-Pb->		<-Tl->	
Burns (Conc)	-2.578	-8.969	-1.539	-1.923
Mean	-5.7735		-1.7310	
CV %	78.27		15.69	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
81	-15	AS	MFQ343A	1.00x	01/14/93	15:34

	<-Pb->		<-Tl->	
Burns (Conc)	2.331	6.239	16.803	17.993
Mean	4.2850		17.3980	
CV %	64.49 ***		4.84	
Sample value	4.28		17.40	
Spike added	20.00		20.00	
Spike recovery, %	21.42 ***		86.99	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
82	-16	S	MFQ344	1.00x	01/14/93	15:38

	<-Pb->		<-Tl->	
Burns (Conc)	27.596	28.688	0.385	0.771
Mean	28.1420		0.5780	
CV %	2.74		47.22	
Sample value	28.14		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
83	-16	AS	MFQ344A	1.00x	01/14/93	15:42

	<-Pb->		<-Tl->	
Burns (Conc)	40.298	39.460	17.596	18.788
Mean	39.8790		18.1920	
CV %	1.49		4.63	
Sample value	39.88		18.19	
Spike added	20.00		20.00	
Spike recovery, %	58.69 ***		90.96	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
84	50 PPB	CCV	CCV	1.00x	01/14/93	15:47

	<-Pb->		<-Tl->	
Burns (Conc)	46.208	46.208	45.671	45.254
Mean	46.2080		45.4625	
CV %	0.00		0.65	
Sample value	46.21		45.46	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
85	CAL BLK	CCB	CCB	1.00x	01/14/93	15:51

	<-Pb->		<-Tl->	
Burns (Conc)	1.812	0.776	0.771	0.000
Mean	1.2940		0.3855	
CV %	56.61		141.42	
Sample value	2.00U		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
86	-14	S	MFQ342	1.00x	01/14/93	16:04

	<-Pb->		<-Tl->	
Burns (Conc)	4.151	5.194	3.090	1.543
Mean	4.6725		2.3165	
CV %	15.78		47.22	
Sample value	4.67		2.32	

Pb only 1-14-93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
87	-14	AS	MFQ342A	1.00x	01/14/93	16:09

	<-Pb->		<-Tl->	
Burns (Conc)	15.208	17.608	19.186	19.186
Mean	16.4080		19.1860	
CV %	10.34		0.00	
Sample value	16.41		19.19	
Spike added	20.00		20.00	
Spike recovery, %	58.68 ***		84.35 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
88	-15	S	MFQ343	1.00x	01/14/93	16:13

	<-Pb->		<-Tl->	
Burns (Conc)	-8.715	-9.731	-2.307	-2.307
Mean	-9.2230		-2.3070	
CV %	7.79		0.00	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
89	-15	AS	MFQ343A	1.00x	01/14/93	16:17

	<-Pb->		<-Tl->	
Burns (Conc)	2.591	-3.606	13.640	14.034
Mean	-0.5075		13.8370	
CV %	863.44		2.01	
Sample value	2.00U		13.84	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		69.18 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
90	-05	S	MFQ230	1.00x	01/14/93	16:21

	<-Pb->		<-Tl->	
Burns (Conc)	-5.144	-3.092	0.000	-1.155
Mean	-4.1180		-0.5775	
CV %	35.24		141.42	
Sample value	2.00U		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
91	-05	AS	MFQ230A	1.00x	01/14/93	16:26

	<-Pb->		<-Tl->	
Burns (Conc)	5.716	5.716	19.186	15.219
Mean	5.7160		17.2025	
CV %	0.00		16.31	
Sample value	5.72		17.20	
Spike added	20.00		20.00	
Spike recovery, %	28.58 ***		86.01	

Pb only 1/14/93 JJ

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
92	-08	S	MFQ237	1.00x	01/14/93	16:30

	<-Pb->		<-Tl->	
Burns (Conc)	3.110	4.412	-0.385	0.385
Mean	3.7610		0.0000	
CV %	24.48 ***		>9999.99	
Sample value	3.76		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
93	-08	AS	MFQ237A	1.00x	01/14/93	16:34

	<-Pb->		<-Tl->	
Burns (Conc)	24.606	19.214	21.180	17.199
Mean	21.9100		19.1895	
CV %	17.40		14.67	
Sample value	21.91		19.19	
Spike added	20.00		20.00	
Spike recovery, %	90.75		95.95	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
94	-04	S	MFQ229	5.00x	01/14/93	16:38

	<-Pb->		<-Tl->	
Burns (Conc)	47.910	46.208	1.543	0.385
Mean	47.0590		0.9640	
CV %	2.56		84.94	
Sample value	235.29		6.50U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
95	-04	AS	MFQ229A	5.00x	01/14/93	16:43

	<-Pb->		<-Tl->	
Burns (Conc)	68.821	62.625	15.615	14.824
Mean	65.7230		15.2195	
CV %	6.67		3.68	
Sample value	328.61		76.10	
Spike added	20.00		20.00	
Spike recovery, %	93.32		76.10 ***	

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
96	50 PPB	CCV	CCV	1.00x	01/14/93	16:47

	<-Pb->		<-Tl->	
Burns (Conc)	45.642	47.058	46.506	46.506
Mean	46.3500		46.5060	
CV %	2.16		0.01	
Sample value	46.35		46.51	

Pb only

97	CAL BLK	CCB	CCB	1.00x	01/14/93	16:51

1/13/93

	<-Pb->		<-Tl->	
Burns (Conc)	0.258	0.776	-0.385	0.771
Mean	0.5170		0.1930	
CV %	70.85		423.53	
Sample value	2.00U		1.80U	

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C L P M E T A L S 3.02e

S212196--LEAD

Run id: F3 9301405
THERMO JARRELL-ASH VIDEO 22E (#2913)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1036
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	18:10
2	3 PPB	WS1	F			S3	01/14/93	18:14
3	50 PPB	WS2	F			S50	01/14/93	18:18
4	100 PPB	WS3	F			S100	01/14/93	18:23
5	ICV-4	ICV	F			ICV	01/14/93	19:45
6	CAL BLK	ICB	F			ICB	01/14/93	19:49
7	CRA	CRA0	F			CRA	01/14/93	19:53
8	50 PPB	CCV	F			CCV	01/14/93	19:57
9	CAL BLK	CCB	F			CCB	01/14/93	20:02
10	X	X	F			ZZZZZZ	01/14/93	21:34
11	X	X	F			ZZZZZZ	01/14/93	21:38
12	50 PPB	CCV	F			CCV	01/14/93	21:42
13	CAL BLK	CCB	F			CCB	01/14/93	21:47
14	S212196-15	S	F	1267	01/11/93	MFQ343	01/14/93	21:56
15	S212196-15	AS	F	1267		MFQ343A	01/14/93	22:01
16	S212196-05	S	F	1267	01/11/93	MFQ230	01/14/93	22:05
17	S212196-05	AS	F	1267		MFQ230A	01/14/93	22:09
18	50 PPB	CCV	F			CCV	01/14/93	22:13
19	CAL BLK	CCB	F			CCB	01/14/93	22:18
20	S212196-01	M0S	F	1267		MFQ2260	01/14/93	22:35
21	S212196-01	M1S	F	1267		MFQ2261	01/14/93	22:37
22	S212196-01	M2S	F	1267		MFQ2262	01/14/93	22:40
23	S212196-01	M3S	F	1267		MFQ2263	01/14/93	22:42
24	S212196-07	M0S	F	1267		MFQ2320	01/14/93	22:44
25	S212196-07	M1S	F	1267		MFQ2321	01/14/93	22:47
26	S212196-07	M2S	F	1267		MFQ2322	01/14/93	22:49
27	S212196-07	M3S	F	1267		MFQ2323	01/14/93	22:51
28	S212196-10	M0S	F	1267		MFQ2390	01/14/93	22:54
29	S212196-10	M1S	F	1267		MFQ2391	01/14/93	22:56
30	S212196-10	M2S	F	1267		MFQ2392	01/14/93	22:59
31	S212196-10	M3S	F	1267		MFQ2393	01/14/93	23:01
32	S212196-11	M0S	F	1267		MFQ2400	01/14/93	23:09
33	S212196-11	M1S	F	1267		MFQ2401	01/14/93	23:11
34	S212196-11	M2S	F	1267		MFQ2402	01/14/93	23:13
35	S212196-11	M3S	F	1267		MFQ2403	01/14/93	23:16
36	X	X	F			ZZZZZZ	01/14/93	23:18
37	X	X	F			ZZZZZZ	01/14/93	23:21
38	50 PPB	CCV	F			CCV	01/14/93	23:23
39	CAL BLK	CCB	F			CCB	01/14/93	23:25
40	S212196-13	M0S	F	1267		MFQ2420	01/14/93	23:28
41	S212196-13	M1S	F	1267		MFQ2421	01/14/93	23:30
42	S212196-13	M2S	F	1267		MFQ2422	01/14/93	23:32
43	S212196-13	M3S	F	1267		MFQ2423	01/14/93	23:35

S212196--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212196-16	M0S	F	1267		MFQ3440	01/14/93	23:37
45	S212196-16	M1S	F	1267		MFQ3441	01/14/93	23:40
46	S212196-16	M2S	F	1267		MFQ3442	01/14/93	23:42
47	S212196-16	M3S	F	1267		MFQ3443	01/14/93	23:44
48	S212196-01	M0S2	F	1267		MFQ226D0	01/14/93	23:47
49	S212196-01	M1S2	F	1267		MFQ226D1	01/14/93	23:49
50	S212196-01	M2S2	F	1267		MFQ226D2	01/14/93	23:52
51	S212196-01	M3S2	F	1267		MFQ226D3	01/14/93	23:54
52	X	X	F			ZZZZZZ	01/14/93	23:56
53	X	X	F			ZZZZZZ	01/14/93	23:59
54	50 PPB	CCV	F			CCV	01/15/93	00:01
55	CAL BLK	CCB	F			CCB	01/15/93	00:03
56	S212196-07	M0S	F	1267		MFQ2320	01/15/93	00:06
57	S212196-07	M1S	F	1267		MFQ2321	01/15/93	00:08
58	S212196-07	M2S	F	1267		MFQ2322	01/15/93	00:11
59	S212196-07	M3S	F	1267		MFQ2323	01/15/93	00:13
60	S212196-11	M0S	F	1267		MFQ2400	01/15/93	00:15
61	S212196-11	M1S	F	1267		MFQ2401	01/15/93	00:18
62	S212196-11	M2S	F	1267		MFQ2402	01/15/93	00:20
63	S212196-11	M3S	F	1267		MFQ2403	01/15/93	00:23
64	S212196-13	M0S	F	1267		MFQ2420	01/15/93	00:25
65	S212196-13	M1S	F	1267		MFQ2421	01/15/93	00:27
66	S212196-13	M2S	F	1267		MFQ2422	01/15/93	00:30
67	S212196-13	M3S	F	1267		MFQ2423	01/15/93	00:32
68	S212196-16	M0S	F	1267		MFQ3440	01/15/93	00:34
69	S212196-16	M1S	F	1267		MFQ3441	01/15/93	00:37
70	S212196-16	M2S	F	1267		MFQ3442	01/15/93	00:39
71	S212196-16	M3S	F	1267		MFQ3443	01/15/93	00:42
72	X	X	F			ZZZZZZ	01/15/93	00:44
73	X	X	F			ZZZZZZ	01/15/93	00:46
74	50 PPB	CCV	F			CCV	01/15/93	00:49
75	CAL BLK	CCB	F			CCB	01/15/93	00:51

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2094 GFAA ID: F1 F2 F3 F4 F5 F6 Method: 1160

Date: 1/14/93 Reviewed By: [illegible] Standards Prepared: 8:00 1/14/93
Operator: [illegible]

Disk # 17 S212196
Acq ____ S212127 1/14/93
SAMIN ✓

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [X] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	93014~~04~~05		RUN ID:	93014~~54~~55	
Element:	[] AS	[X] PB	Element:	[] SE	[X] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[] 10,5 [X] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	~~S212127-4~~	1:4	pb only
A new case	11	4A		
	12	CCV		
	13	CCB		
	14	15	1:4	pb only
	15	15A		
	16	05		
	17	05A		
	18	CCV		
	19	CCB		
✓	20	01		
	21	+10		
	22	+20		
	23	+30		
Rerun	24	07		
	25	+10		
	26	+20		
	27	+30		
	28	10		
	29	+10		
	30	+20		
	31	+30		
RERUN	32	11		
	33	+10		
	34	+20		
	35	+30		
	36	X		
	37	X		
	38	CCV		
	39	CCB		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 294
Page 2 of 2

rerun	40	B		Pb
	41	+10		
	42	+20		
	43	+30		
rerun	44	16		only
	45	+10	1:1	
	46	+20		
	47	+30		
	48	OD		
	49	+10		
	50	+20		
	51	+30		
	52	X		
	53	X		
	54	CCV		
	55	CCB		
	56	07		
	57	+10		
	58	+20		
	59	+30		
	60	11		
	61	+10		
	62	+20		
	63	+30		
	64	13		
	65	+10		
	66	+20		
	67	+30		
	68	16		
	69	+10	1:1	
	70	+20		
	71	+30		
	72	X		
	73	X		
	74	CCV		
	75	CCB		
	76	~~OD~~		
	77	+10		
	78	+20		
	79	+30		
	80	X		
	81	X		
	82	CCV		
	83	CCB		
	84			
	85			
	86			
	87			
	88			
	89			
	90			
	91			
	92			
	93			
	94			
	95			

CCV X 1:5 1:3
CCB

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Jarrell-Ash Video 25
Run: F3 9301405 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	18:10

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(3,10)	WS1	S	1.00x	01/14/93	18:14

	<-Pb->		<-Tl->	
Burns (Abs)	0.014 A	0.011 A	0.024A	0.022A
Mean	0.0125		0.0230	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	18:18

	<-Pb->		<-Tl->	
Burns (Abs)	0.171 A	0.171 A	0.115A	0.116A
Mean	0.1710		0.1155	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	18:23

	<-Pb->		<-Tl->	
Burns (Abs)	0.333 A	0.330 A	0.226A	0.222A
Mean	0.3315		0.2240	
CV %	0.00		0.00	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003534463	0.002371169
Coef[2]:	-2.200039e-006	-1.307648e-006
Correl. coef.:	1.0000	1.0000

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-4	ICV	ICV	2.00x	01/14/93	19:45

	<-Pb->		<-Tl->	
Burns (Conc)	49.330	51.140	51.657	50.317
Mean	50.2350		50.9870	
CV %	2.55		1.86	
Sample value	100.47		101.97	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	19:49

	<-Pb->		<-Tl->	
Burns (Conc)	0.283	1.133	1.266	0.844
Mean	0.7080		1.0550	
CV %	84.89		28.28	
Sample value	2.00U		1.30U	

Pb only 1/15/93 ICK

7	CRA	CRA	CRA	1.00x	01/14/93	19:53

	<-Pb->		<-Tl->	
Burns (Conc)	3.118	3.118	8.049	9.326
Mean	3.1180		8.6875	
CV %	0.00		10.39	
Sample value	3.12		8.69	

8	50 PPB	CCV	CCV	1.00x	01/14/93	19:57

	<-Pb->		<-Tl->	
Burns (Conc)	48.125	49.028	48.087	48.532
Mean	48.5765		48.3095	
CV %	1.31		0.65	
Sample value	48.58		48.31	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	20:02

	<-Pb->		<-Tl->	
Burns (Conc)	0.566	0.566	0.422	-1.264
Mean	0.5660		-0.4210	
CV %	0.00		288.18	
Sample value	2.00U		1.30U	

10	X	X	ZZZZZZ	5.00x	01/14/93	21:34

	<-Pb->		<-Tl->	
Burns (Conc)	5.394	4.824	0.000	0.422
Mean	5.1090		0.2110	
CV %	7.89		141.42	
Sample value	25.55		6.50U	

11	X	X	ZZZZZZ	5.00x	01/14/93	21:38

	<-Pb->		<-Tl->	
Burns (Conc)	23.254	23.254	18.320	20.474
Mean	23.2540		19.3970	
CV %	0.00		7.85	
Sample value	116.27		96.99	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	50 PPB	CCV	CCV	1.00x	01/14/93	21:42

	<-Pb->		<-Tl->	
Burns (Conc)	47.824	48.727	49.424	48.978
Mean	48.2755		49.2010	
CV %	1.32		0.64	
Sample value	48.28		49.20	

Pb only 1/15/93 ISH

13	CAL BLK	CCB	CCB	1.00x	01/14/93	21:47

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	0.566	0.000	0.844
Mean	0.2830		0.4220	
CV %	141.42		141.42	
Sample value	2.00U		1.30U	

14	S212196-15	S	MFQ343	5.00x	01/14/93	21:56

	<-Pb->		<-Tl->	
Burns (Conc)	2.834	1.983	0.844	0.000
Mean	2.4085		0.4220	
CV %	24.98		141.42	
Sample value	12.05		6.50U	

15	-15	AS	MFQ343A	5.00x	01/14/93	22:01

	<-Pb->		<-Tl->	
Burns (Conc)	15.426	14.850	19.612	20.043
Mean	15.1380		19.8275	
CV %	2.69		1.54	
Sample value	75.69		99.13	
Spike added	20.00		20.00	
Spike recovery, %	63.64 ***		99.13	

16	-05	S	MFQ230	5.00x	01/14/93	22:05

	<-Pb->		<-Tl->	
Burns (Conc)	1.416	1.699	0.000	-0.422
Mean	1.5575		-0.2110	
CV %	12.85		141.42	
Sample value	10.00U		6.50U	

17	-05	AS	MFQ230A	5.00x	01/14/93	22:09

	<-Pb->		<-Tl->	
Burns (Conc)	15.426	17.448	19.181	21.338
Mean	16.4370		20.2595	
CV %	8.70		7.53	
Sample value	82.18		101.30	
Spike added	20.00		20.00	
Spike recovery, %	82.18 ***		101.30	

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	50 PPB	CCV 3	CCV	1.00x	01/14/93	22:13

	<-Pb->		<-Tl->	
Burns (Conc)	47.222	49.330	46.752	47.642
Mean	48.2760		~~47.1770~~	
CV %	3.09		1.33	
Sample value	48.28		47.20	

Pb only 1/15/93 KH

19	CAL BLK	CCB 3	CCB	1.00x	01/14/93	22:18

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	-0.566	-0.422	-0.422
Mean	-0.2830		~~-0.4220~~	
CV %	141.42		0.00	
Sample value	2.00U		1.30U	

20	-01	MOS	MFQ2260	1.00x	01/14/93	22:35

	<-Pb->	<-Tl->
Burns (Abs)	0.028 A	0.005A
Mean	0.0280	~~0.0050~~
CV %	---	---
Spike added:	0.00	0.00

21	-01	M1S	MFQ2261	1.00x	01/14/93	22:37

	<-Pb->	<-Tl->
Burns (Abs)	0.053 A	0.023A
Mean	0.0530	~~0.0230~~
CV %	---	---
Spike added:	10.00	10.00

22	-01	M2S	MFQ2262	1.00x	01/14/93	22:40

	<-Pb->	<-Tl->
Burns (Abs)	0.074 A	0.047A
Mean	0.0740	~~0.0470~~
CV %	---	---
Spike added:	20.00	20.00

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-01	M3S	MFQ2263	1.00x	01/14/93	22:42

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.103 A	0.066A
Mean	0.1030	0.0660
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02760	0.00420
Slope:	0.00246	0.00207
Correlation:	0.9982	0.9985
X intercept:	-11.220	-2.029
Sample value:	11.220	2.029

Pb curve 1/15/93 KU

24	-07	MOS	MFQ2320	1.00x	01/14/93	22:44

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.028 A	0.003A
Mean	0.0280	0.0030
CV %	---	---
Spike added:	0.00	0.00

25	-07	M1S	MFQ2321	1.00x	01/14/93	22:47

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.050 A	0.022A
Mean	0.0500	0.0220
CV %	---	---
Spike added:	10.00	10.00

26	-07	M2S	MFQ2322	1.00x	01/14/93	22:49

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.083 A	0.048A
Mean	0.0830	0.0480
CV %	---	---
Spike added:	20.00	20.00

27	-07	M3S	MFQ2323	1.00x	01/14/93	22:51

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.127 A	0.075A
Mean	0.1270	0.0750
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02250	0.00070
Slope:	0.00330	0.00242
Correlation:	0.9891	0.9970
X intercept:	-6.818	-0.289
Sample value:	6.818	0.289

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-10	MOS	MFQ2390	1.00x	01/14/93	22:54

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.025 A	-0.001A
Mean	0.0250	-0.0010
CV %	---	---
Spike added:	0.00	0.00

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-10	M1S	MFQ2391	1.00x	01/14/93	22:56

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.049 A	0.016A
Mean	0.0490	0.0160
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	-10	M2S	MFQ2392	1.00x	01/14/93	22:59

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.085 A	0.043A
Mean	0.0850	0.0430
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	-10	M3S	MFQ2393	1.00x	01/14/93	23:01

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.120 A	0.064A
Mean	0.1200	0.0640
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02160	-0.00280
Slope:	0.00321	0.00222
Correlation:	0.9963	0.9966
X intercept:	-6.729	1.261
Sample value:	6.729	-1.261

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	-11	MOS	MFQ2400	1.00x	01/14/93	23:09

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.020 A	0.000A
Mean	0.0200	0.0000
CV %	---	---
Spike added:	0.00	0.00

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	-11	M1S	MFQ2401	1.00x	01/14/93	23:11

	<-Pb->	<-Tl->
Burns (Abs)	0.050 A	0.017A
Mean	0.0500	0.0170
CV %	---	---
Spike added:	10.00	10.00

Pb only
1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-11	M2S	MFQ2402	1.00x	01/14/93	23:13

	<-Pb->	<-Tl->
Burns (Abs)	0.080 A	0.038A
Mean	0.0800	0.0380
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-11	M3S	MFQ2403	1.00x	01/14/93	23:16

	<-Pb->	<-Tl->
Burns (Abs)	0.095 A	0.056A
Mean	0.0950	0.0560
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02300	-0.00060
Slope:	0.00255	0.00189
Correlation:	0.9898	0.9992
X intercept:	-9.020	0.317
Sample value:	9.020	-0.317

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	X	X	ZZZZZZ	1.00x	01/14/93	23:18

	<-Pb->	<-Tl->
Burns (Conc)	-0.566	0.422
Mean	-0.5660	0.4220
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	X	X	ZZZZZZ	1.00x	01/14/93	23:21

	<-Pb->	<-Tl->
Burns (Conc)	0.849	-0.422
Mean	0.8490	-0.4220
CV %	---	---
Sample value	2.00U	1.30U

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	50 PPB	CCV	CCV	1.00x	01/14/93	23:23

	<-Pb---------->	<-Tl---------->
Burns (Conc)	46.321	48.087
Mean	46.3210	~~48.0870~~
CV %	---	---
Sample value	46.32	48.09

Pb only 1/15/93 EH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	CAL BLK	CCB	CCB	1.00x	01/14/93	23:25

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.283	0.422
Mean	-0.2830	~~0.4220~~
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-13	MOS	MFQ2420	1.00x	01/14/93	23:28

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.033 A	-0.003A
Mean	0.0330	~~-0.0030~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-13	MIS	MFQ2421	1.00x	01/14/93	23:30

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.053 A	0.010A
Mean	0.0530	~~0.0100~~
CV %	---	---
Spike added:	10.00	~~10.00~~

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	-13	MPS	MFQ2422	1.00x	01/14/93	23:32

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.091 A	0.036A
Mean	0.0910	~~0.0360~~
CV %	---	---
Spike added:	20.00	~~20.00~~

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	-13	M3S	MFQ2423	1.00x	01/14/93	23:35

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.126 A	0.052A
Mean	0.1260	0.0520
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02820	-0.00490
Slope:	0.00317	0.00191
Correlation:	0.9923	0.9922
X intercept:	-8.896	2.565
Sample value:	8.896	-2.565

44	-16	MOS	MFQ3440	2.00x	01/14/93	23:37

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.077 A	0.002A
Mean	0.0770	0.0020
CV %	---	---
Spike added:	0.00	0.00

45	-16	M1S	MFQ3441	2.00x	01/14/93	23:40

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.108 A	0.025A
Mean	0.1080	0.0250
CV %	---	---
Spike added:	10.00	10.00

46	-16	M2S	MFQ3442	2.00x	01/14/93	23:42

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.137 A	0.045A
Mean	0.1370	0.0450
CV %	---	---
Spike added:	20.00	20.00

47	-16	M3S	MFQ3443	2.00x	01/14/93	23:44

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.133 A	0.060A
Mean	0.1330	0.0600
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.08420	0.00390
Slope:	0.00197	0.00194
Correlation:	0.9196	0.9957
X intercept:	-42.741	-2.010
Sample value:	85.482	4.021

203

Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 10

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	-01	MOS2	MFQ226DO	1.00x	01/14/93	23:47

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.027 A	-0.001A
Mean	0.0270	-0.0010
CV %	---	---
Spike added:	0.00	0.00

Pb only 1/15/93 KH

49	-01	M1S2	MFQ226D1	1.00x	01/14/93	23:49

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.062 A	0.020A
Mean	0.0620	0.0200
CV %	---	---
Spike added:	10.00	10.00

50	-01	M2S2	MFQ226D2	1.00x	01/14/93	23:52

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.097 A	0.052A
Mean	0.0970	0.0520
CV %	---	---
Spike added:	20.00	20.00

51	-01	M3S2	MFQ226D3	1.00x	01/14/93	23:54

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.124 A	0.077A
Mean	0.1240	0.0770
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02860	-0.00290
Slope:	0.00326	0.00266
Correlation:	0.9982	0.9972
X intercept:	-8.773	1.090
Sample value:	8.773	-1.090

52	X	X	ZZZZZZ	1.00x	01/14/93	23:56

	<-Pb---------->	<-Tl---------->
Burns (Conc)	0.283	0.000
Mean	0.2830	0.0000
CV %	---	---
Sample value	2.00U	1.30U

ARGOS MODEL SA4 Version 1.29

204

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	X	X	ZZZZZZ	1.00x	01/14/93	23:59

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.566	0.000
Mean	-0.5660	0.0000
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	50 PPB	CCV 5	CCV	1.00x	01/15/93	00:01

	<-Pb---------->	<-Tl---------->
Burns (Conc)	45.421	46.752
Mean	45.4210	46.7520
CV %	---	---
Sample value	45.42	46.75

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	CAL BLK	CCB 5	CCB	1.00x	01/15/93	00:03

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.283	-1.264
Mean	-0.2830	-1.2640
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	-07	MOS	MFQ2320	1.00x	01/15/93	00:06

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.026 A	0.016A
Mean	0.0260	0.0160
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	-07	M1S	MFQ2321	1.00x	01/15/93	00:08

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.063 A	0.032A
Mean	0.0630	0.0320
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
58	-07	M2S	MFQ2322	1.00x	01/15/93	00:11

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.069 A	0.032A
Mean	0.0690	0.0320
CV %	---	---
Spike added:	20.00	20.00

ARGOS MODEL SA4 Version 1.29

205

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
59	-07	M3S	MFQ2323	1.00x	01/15/93	00:13

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.082 A	0.068A
Mean	0.0820	0.0680
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.03390	0.01360
Slope:	0.00174	0.00156
Correlation:	0.9354	0.9154
X intercept:	-19.483	-8.718
Sample value:	19.483	8.718

Pb only
1/15/93
KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
60	-11	M0S	MFQ2400	1.00x	01/15/93	00:15

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.011 A	0.004A
Mean	0.0110	0.0040
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
61	-11	M1S	MFQ2401	1.00x	01/15/93	00:18

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.047 A	0.012A
Mean	0.0470	0.0120
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
62	-11	M2S	MFQ2402	1.00x	01/15/93	00:20

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.066 A	0.036A
Mean	0.0660	0.0360
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
63	-11	M3S	MFQ2403	1.00x	01/15/93	00:23

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.076 A	0.067A
Mean	0.0760	0.0670
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.01790	-0.00220
Slope:	0.00214	0.00213
Correlation:	0.9644	0.9712
X intercept:	-8.364	1.033
Sample value:	8.364	-1.033

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Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 13

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
64	-13	MOS	MFQ2420	1.00x	01/15/93	00:25

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.027 A	0.000A
Mean	0.0270	0.0000
CV %	---	---
Spike added:	0.00	0.00

Pb only
1/15/93 KU

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
65	-13	M1S	MFQ2421	1.00x	01/15/93	00:27

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.047 A	0.012A
Mean	0.0470	0.0120
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
66	-13	M2S	MFQ2422	1.00x	01/15/93	00:30

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.063 A	0.029A
Mean	0.0630	0.0290
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
67	-13	M3S	MFQ2423	1.00x	01/15/93	00:32

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.106 A	0.037A
Mean	0.1060	0.0370
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.02280	0.00030
Slope:	0.00253	0.00128
Correlation:	0.9730	0.9917
X intercept:	-9.012	-0.234
Sample value:	9.012	0.234

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
68	-16	MOS	MFQ3440	2.00x	01/15/93	00:34

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.042 A	0.010A
Mean	0.0420	0.0100
CV %	---	---
Spike added:	0.00	0.00

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
69	-16	M1S	MFQ3441	2.00x	01/15/93	00:37

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.078 A	0.012A
Mean	0.0780	~~0.0120~~
CV %	---	---
Spike added:	10.00	10.00

Pb only
1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
70	-16	M2S	MFQ3442	2.00x	01/15/93	00:39

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.079 A	0.054A
Mean	0.0790	~~0.0540~~
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
71	-16	M3S	MFQ3443	2.00x	01/15/93	00:42

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.121 A	0.055A
Mean	0.1210	0.0550
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.04430	~~0.00620~~
Slope:	0.00238	~~0.00177~~
Correlation:	0.9512	0.9092
X intercept:	-18.613	-3.503
Sample value:	37.227	7.006

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
72	X	X	ZZZZZZ	1.00x	01/15/93	00:44

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.566	0.000
Mean	-0.5660	0.0000
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
73	X	X	ZZZZZZ	1.00x	01/15/93	00:46

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.283	-7.978
Mean	-0.2830	-7.9780
CV %	---	---
Sample value	2.00U	1.30U

ARGOS MODEL SA4 Version 1.29

208

Jarrell-Ash Video 22
Run: F3 9301405 Analyst: LL Page 15

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
74	50 PPB	CCV 6	CCV	1.00x	01/15/93	00:49

	<-Pb->	<-Tl->
Burns (Conc)	46.621	46.752
Mean	46.6210	~~46.7520~~
CV %	---	---
Sample value	46.62	46.75

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
75	CAL BLK	CCB 6	CCB	1.00x	01/15/93	00:51

	<-Pb->	<-Tl->
Burns (Conc)	0.849	-0.843
Mean	0.8490	~~-0.8430~~
CV %	---	---
Sample value	2.00U	1.30U

209

C L P M E T A L S 3.02e

S212196--MERCURY

Run id: M1 9235601
TECHNICON MERCURY ANALYZER (#SS4199A-D)
Analytical method: CV
Element: Hg

Acquired: 12/21/92 by MAS
Crunched: 01/13/93 by MAS
Time: 1813
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	CV			S0	12/21/92	10:00
2	0.2 PPB	WS1	CV			S0.2	12/21/92	10:03
3	0.5 PPB	WS2	CV			S0.5	12/21/92	10:06
4	1.0 PPB	WS3	CV			S1.0	12/21/92	10:09
5	2.0 PPB	WS4	CV			S2.0	12/21/92	10:12
6	5.0 PPB	WS5	CV			S5.0	12/21/92	10:15
7	ICV-5	ICV	CV			ICV	12/21/92	10:21
8	CAL BLK	ICB	CV			ICB	12/21/92	10:24
9	2 PPB	CCV	CV			CCV	12/21/92	10:27
10	CAL BLK	CCB	CV			CCB	12/21/92	10:30
11	PB	PBW	CV	1267	12/21/92	PBW	12/21/92	10:33
12	X	X	CV			ZZZZZZ	12/21/92	10:36
13	X	X	CV			ZZZZZZ	12/21/92	10:39
14	S212196-02	S	CV	1267	12/21/92	MFQ227	12/21/92	10:42
15	S212196-02	DS	CV	1267	12/21/92	MFQ227S	12/21/92	10:45
16	S212196-03	S	CV	1267	12/21/92	MFQ228	12/21/92	10:48
17	S212196-04	S	CV	1267	12/21/92	MFQ229	12/21/92	10:51
18	S212196-05	S	CV	1267	12/21/92	MFQ230	12/21/92	10:54
19	S212196-06	S	CV	1267	12/21/92	MFQ231	12/21/92	10:57
20	S212196-07	S	CV	1267	12/21/92	MFQ232	12/21/92	11:00
21	2 PPB	CCV	CV			CCV	12/21/92	11:03
22	CAL BLK	CCB	CV			CCB	12/21/92	11:06
23	S212196-08	S	CV	1267	12/21/92	MFQ237	12/21/92	11:09
24	S212196-09	S	CV	1267	12/21/92	MFQ238	12/21/92	11:12
25	S212196-10	S	CV	1267	12/21/92	MFQ239	12/21/92	11:15
26	S212196-11	S	CV	1267	12/21/92	MFQ240	12/21/92	11:18
27	S212196-12	S	CV	1267	12/21/92	MFQ241	12/21/92	11:21
28	S212196-13	S	CV	1267	12/21/92	MFQ242	12/21/92	11:24
29	S212196-14	S	CV	1267	12/21/92	MFQ342	12/21/92	11:27
30	S212196-15	S	CV	1267	12/21/92	MFQ343	12/21/92	11:30
31	S212196-16	S	CV	1267	12/21/92	MFQ344	12/21/92	11:33
32	2 PPB	CCV	CV			CCV	12/21/92	11:36
33	CAL BLK	CCB	CV			CCB	12/21/92	11:39
34	S212196-01	S	CV	1267	12/21/92	MFQ226	12/21/92	11:42
35	S212196-01	S2	CV	1267	12/21/92	MFQ226D	12/21/92	11:45
36	X	X	CV			ZZZZZZ	12/21/92	11:48
37	X	X	CV			ZZZZZZ	12/21/92	11:51
38	X	X	CV			ZZZZZZ	12/21/92	11:54
39	X	X	CV			ZZZZZZ	12/21/92	11:57
40	X	X	CV			ZZZZZZ	12/21/92	12:00
41	2 PPB	CCV	CV			CCV	12/21/92	12:03
42	CAL BLK	CCB	CV			CCB	12/21/92	12:06

210

TMA/Skinner & Sherman Labs
MERCURY BENCH SHEET

SEQ NO: 497
RUN IDS: 9235601 02 ~~03~~ MG 12/21/92
Reviewed MG

Pg 1 of 2

Copy MAZ 687/ 19194
~~Original is filed in CSF~~

ANALYST MG
INSTR: M1(water)
METHOD: HG
WAVELENGTH 253.7 mm

CALIBRATION TIME 10:00

RUN DATE 12/21/92
STANDARDS PREPPED
DATE: 12/21/92
STANDARD SOURCE MG 12/21/92
CALIB: 10 ppm Hg 92 290930
ICV: ICV-5-24 CCV: 2 ppb

		PK HT(mm)
01	BLANK	0
02	0.2 PPB	3
03	0.5 PPB	8
04	1.0 PPB	19
05	2.0 PPB	34
06	5.0 PPB	75

r=0.9975

	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
07	ICV-5	ICV	38	2.44	
08	CAL BLK	ICB	0	-0.09	
09	2 PPB	CCV	30	1.91	
10	CAL BLK	CCB	0	-0.09	
11	PR				
12	SB12196 ~~-01~~ MG 12/21/92	x			
13	~~01D~~ MG 12/21/92	x			
14	02	MFG ~~226~~ 227	5	0.24	
15	02S	~~226S~~ 227S	18	1.11	8790
16	03	~~227~~ 228 MG 12/21/92	2	0.04	
17	04	~~228~~ 229	0	-0.09	
18	05	~~229~~ 230	2	0.04	
19	06	230 231	0	-0.09	
20	07	~~231~~ 232			
21	CCV	MG 12/21/92	30	1.91	
22	CCB		0	-0.09	
23	08	MFG ~~232~~ 237			
24	09	~~237~~ 238	2	0.04	
25	10	~~238~~ 239	2	0.04	
26	11	MG ~~239~~ 240	0	-0.09	
27	12	12/21/92 ~~240~~ 241			
28	13	~~241~~ 242			
29	14	~~242~~ 342	2	0.04	
30	15	343	0	-0.09	
31	16	344			
32	CCV		29	1.84	
33	CCB		0	-0.09	
34	01	MFG226	1	-0.03	
35	01D	226D	0	-0.09	
36	x				
37	x				
38	x				
39	x				

Revised 07/92

211

TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: -497

Copy
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	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
40	X		0	-0.09	
41	CCV		27	1.71	
42	CCB		0	-0.09	
43	S212236-01		↓	↓	
44	01D		↓	↓	
45	01S		14	0.84	
46	02		0	-0.09	
47	03		↓	↓	
48	04		↓	↓	
49	PB		↓	↓	
50	CCV		28	1.77	
51	CCB		0	-0.09	
52	PB		↓	-0.09 ~~1.77~~	NS 12/21/92
53	S212192-01	MAZ687	2	0.04	
54	02	688	0	-0.09	
55	03	689	↓	↓	
56	04	890	2	0.04	
57	05	691	0	-0.09	
58	06	692	↓	↓	
59	07	693	↓	↓	
60	08	694	↓	↓	
61	09	695	↓	↓	
62	CCV		27	↓	
63	CCB		0	-0.09	
64	10				
65	11				
66	11D				
67	11S				
68	12				
69	13				
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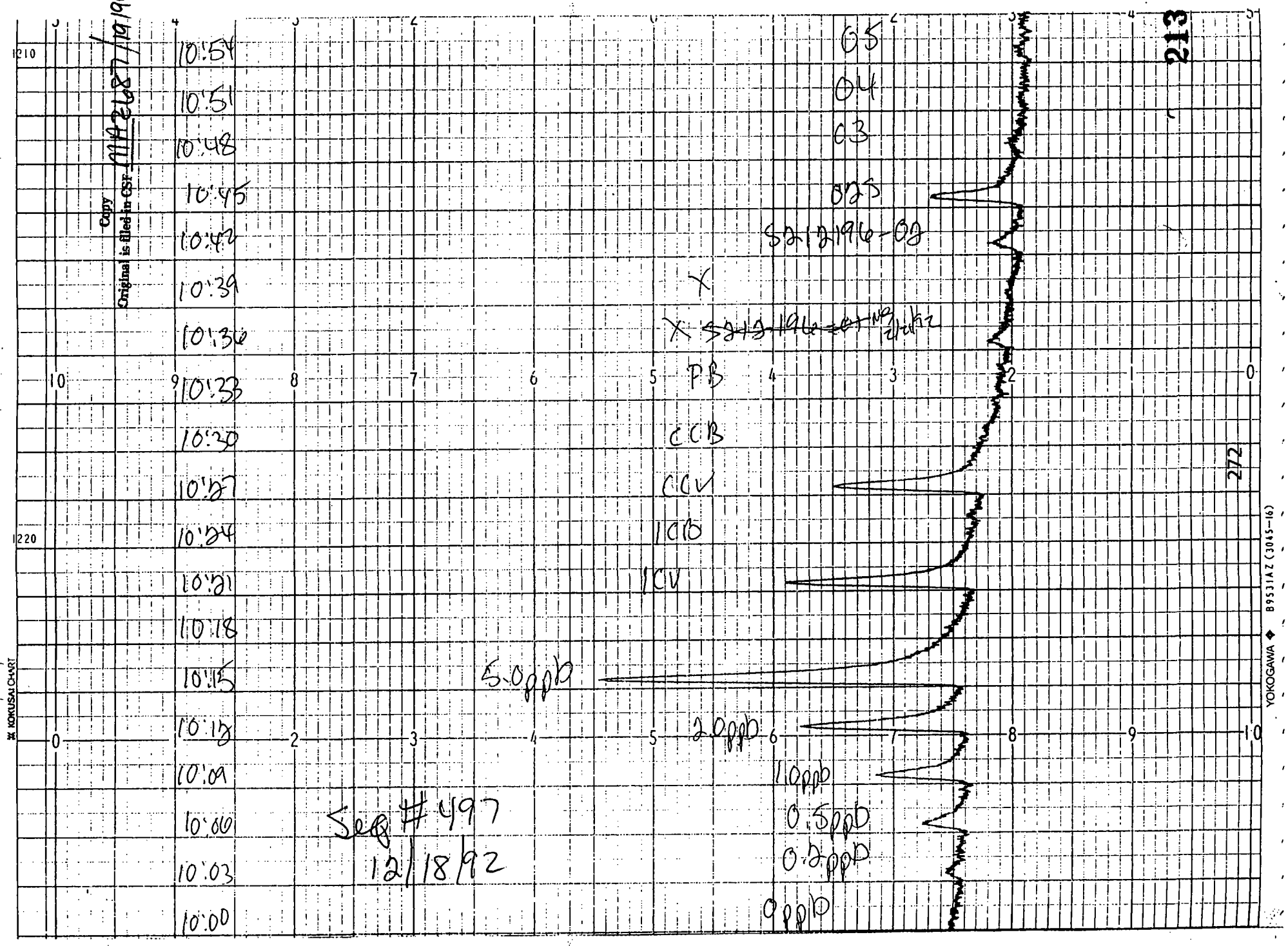
212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Original is filed in CSF 114 2687/19/94
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G5
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G2S
S2121196-03
X
X S2121196-01 NO 12/14/92
PB
CCB
CCV
ICB
ICV
5.0ppb
2.0ppb
1.0ppb
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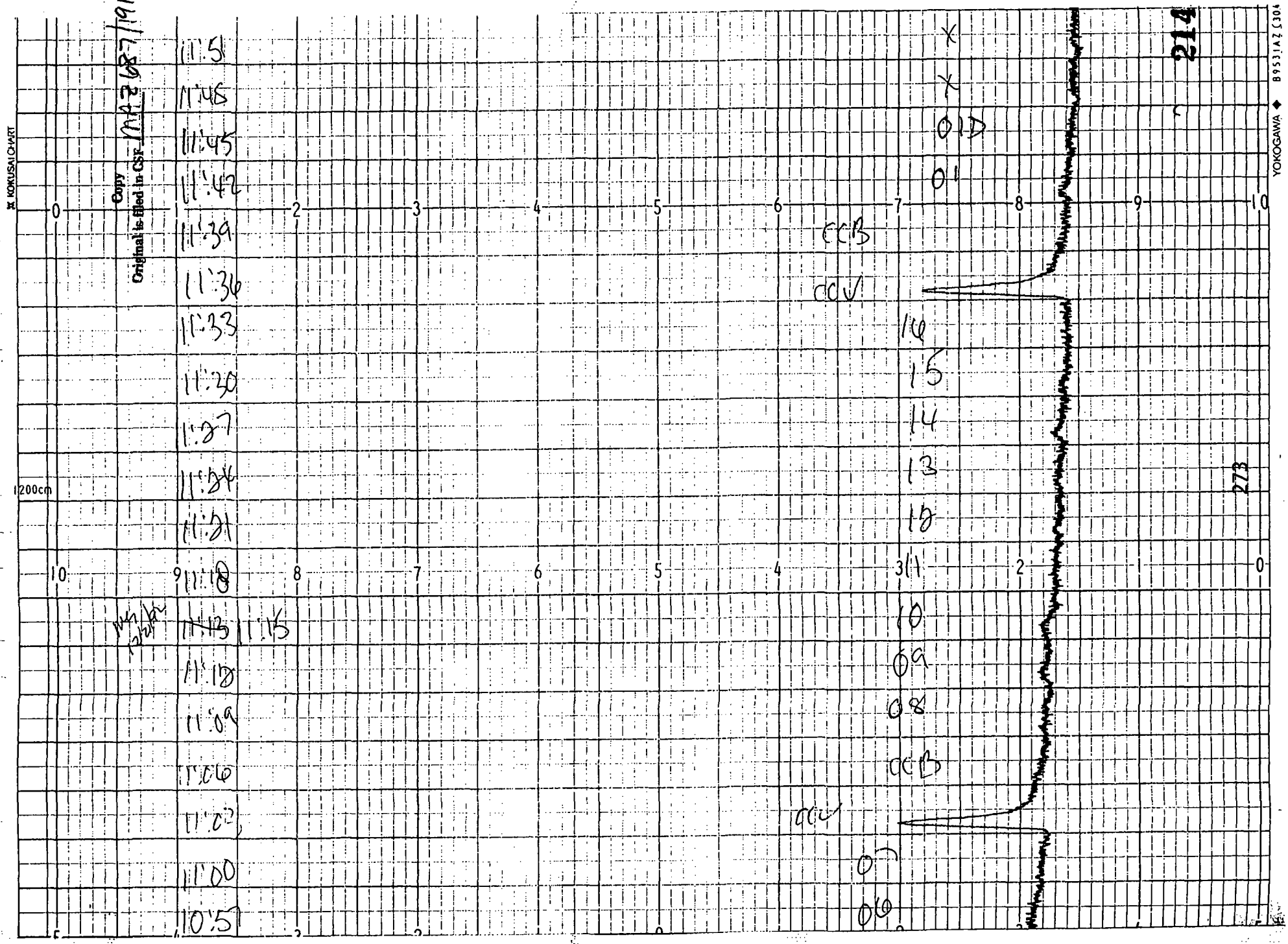
Seq # 497
12/18/92
272
213
YOKOGAWA ◆ B9531AZ (3045-16)
KOKUSAI CHART


KOKUSAI CHART
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11:00
10:57
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CCV
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YOKOGAWA ◆ B9531AZ 5304

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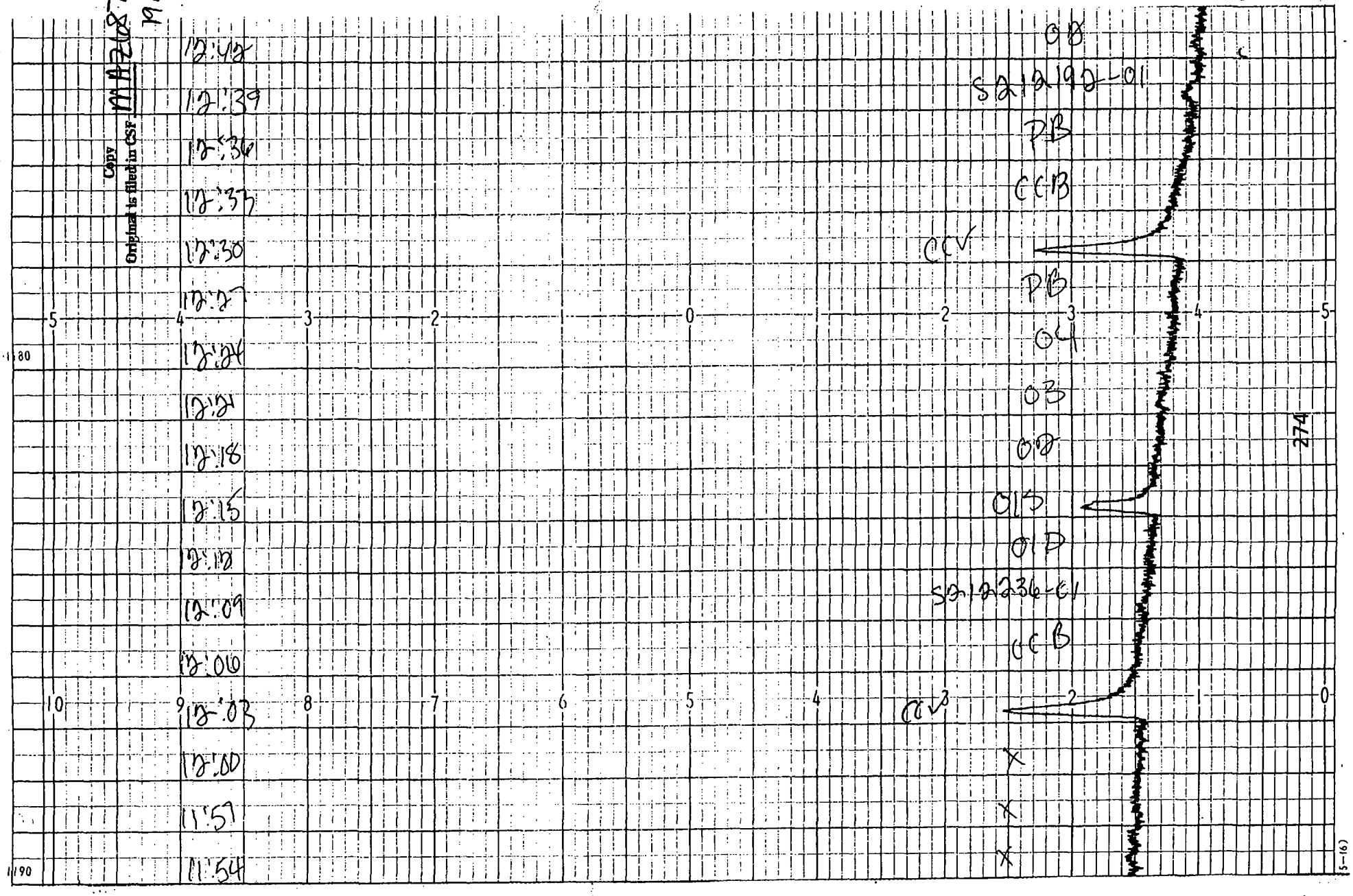
1994



(5-16)

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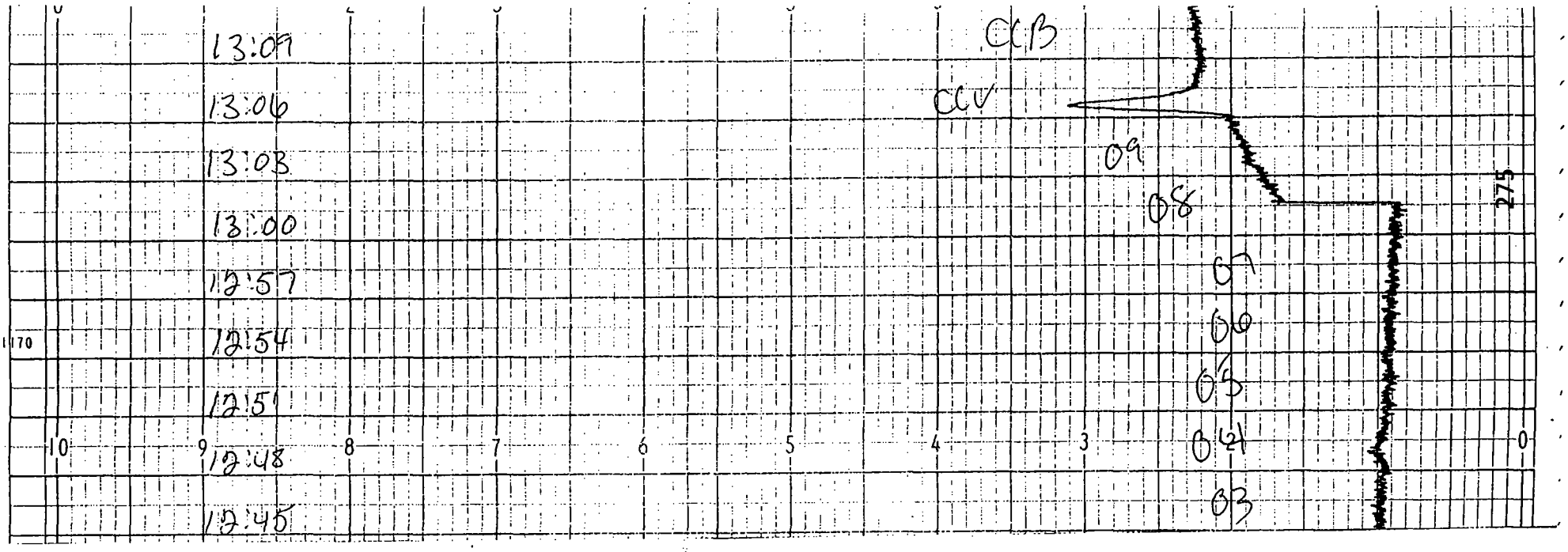

SAMPLE PREPARATION REPORT: AQUEOUS

Prep batch: 1267
Printed by MAS

Date: 01/12/93
Approved: MS

pH AS RECEIVED

Sample ID	Lab code	pH	pH(CN)
S212196-01	S	2.0	
S212196-01	S2	2.0	
S212196-02	S	2.0	
S212196-03	S	2.0	
S212196-04	S	2.0	
S212196-05	S	2.0	
S212196-06	S	2.0	
S212196-07	S	2.0	
S212196-08	S	2.0	
S212196-09	S	2.0	
S212196-10	S	2.0	
S212196-11	S	1.5	
S212196-12	S	2.0	
S212196-13	S	1.5	
S212196-14	S	2.5	
S212196-15	S	2.0	
S212196-16	S	2.0	

Prep code CV (Mercury)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	PB	PBW	100	100	12/21/92 0800	MAS	1.00
MFQ226	S212196-01	S	100	100	12/21/92 0800	MAS	1.00
MFQ226D	S212196-01	S2	100	100	12/21/92 0800	MAS	1.00
MFQ227S	S212196-02	DS	100	100	12/21/92 0800	MAS	1.00
MFQ227	S212196-02	S	100	100	12/21/92 0800	MAS	1.00
MFQ228	S212196-03	S	100	100	12/21/92 0800	MAS	1.00
MFQ229	S212196-04	S	100	100	12/21/92 0800	MAS	1.00
MFQ230	S212196-05	S	100	100	12/21/92 0800	MAS	1.00
MFQ231	S212196-06	S	100	100	12/21/92 0800	MAS	1.00
MFQ232	S212196-07	S	100	100	12/21/92 0800	MAS	1.00
MFQ237	S212196-08	S	100	100	12/21/92 0800	MAS	1.00
MFQ238	S212196-09	S	100	100	12/21/92 0800	MAS	1.00
MFQ239	S212196-10	S	100	100	12/21/92 0800	MAS	1.00
MFQ240	S212196-11	S	100	100	12/21/92 0800	MAS	1.00
MFQ241	S212196-12	S	100	100	12/21/92 0800	MAS	1.00
MFQ242	S212196-13	S	100	100	12/21/92 0800	MAS	1.00
MFQ342	S212196-14	S	100	100	12/21/92 0800	MAS	1.00
MFQ343	S212196-15	S	100	100	12/21/92 0800	MAS	1.00
MFQ344	S212196-16	S	100	100	12/21/92 0800	MAS	1.00

SAMPLE PREPARATION REPORT: AQUEOUS

Prep batch: 1267

Date: 01/12/93

Printed by MAS

Approved: MS

Prep code F (Furnace)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSFW	LCSW	100	100	01/11/93 0800	MAS	1.00
	PB	PBW	100	100	01/11/93 0800	MAS	1.00
MFQ226	S212196-01	S	100	100	01/11/93 0800	MAS	1.00
MFQ226D	S212196-01	S2	100	100	01/11/93 0800	MAS	1.00
MFQ227S	S212196-02	DS	100	100	01/11/93 0800	MAS	1.00
MFQ227	S212196-02	S	100	100	01/11/93 0800	MAS	1.00
MFQ228	S212196-03	S	100	100	01/11/93 0800	MAS	1.00
MFQ229	S212196-04	S	100	100	01/11/93 0800	MAS	1.00
MFQ230	S212196-05	S	100	100	01/11/93 0800	MAS	1.00
MFQ231	S212196-06	S	100	100	01/11/93 0800	MAS	1.00
MFQ232	S212196-07	S	100	100	01/11/93 0800	MAS	1.00
MFQ237	S212196-08	S	100	100	01/11/93 0800	MAS	1.00
MFQ238	S212196-09	S	100	100	01/11/93 0800	MAS	1.00
MFQ239	S212196-10	S	100	100	01/11/93 0800	MAS	1.00
MFQ240	S212196-11	S	100	100	01/11/93 0800	MAS	1.00
MFQ241	S212196-12	S	100	100	01/11/93 0800	MAS	1.00
MFQ242	S212196-13	S	100	100	01/11/93 0800	MAS	1.00
MFQ342	S212196-14	S	100	100	01/11/93 0800	MAS	1.00
MFQ343	S212196-15	S	100	100	01/11/93 0800	MAS	1.00
MFQ344	S212196-16	S	100	100	01/11/93 0800	MAS	1.00

Prep code P (ICP)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSPW	LCSW	100	100	01/11/93 0800	MAS	1.00
	PB	PBW	100	100	01/11/93 0800	MAS	1.00
MFQ226	S212196-01	S	100	100	01/11/93 0800	MAS	1.00
MFQ226D	S212196-01	S2	100	100	01/11/93 0800	MAS	1.00
MFQ227S	S212196-02	DS	100	100	01/11/93 0800	MAS	1.00
MFQ227	S212196-02	S	100	100	01/11/93 0800	MAS	1.00
MFQ228	S212196-03	S	100	100	01/11/93 0800	MAS	1.00
MFQ229	S212196-04	S	100	100	01/11/93 0800	MAS	1.00
MFQ230	S212196-05	S	100	100	01/11/93 0800	MAS	1.00
MFQ231	S212196-06	S	100	100	01/11/93 0800	MAS	1.00
MFQ232	S212196-07	S	100	100	01/11/93 0800	MAS	1.00
MFQ237	S212196-08	S	100	100	01/11/93 0800	MAS	1.00
MFQ238	S212196-09	S	100	100	01/11/93 0800	MAS	1.00
MFQ239	S212196-10	S	100	100	01/11/93 0800	MAS	1.00
MFQ240	S212196-11	S	100	100	01/11/93 0800	MAS	1.00
MFQ241	S212196-12	S	100	100	01/11/93 0800	MAS	1.00
MFQ242	S212196-13	S	100	100	01/11/93 0800	MAS	1.00
MFQ342	S212196-14	S	100	100	01/11/93 0800	MAS	1.00
MFQ343	S212196-15	S	100	100	01/11/93 0800	MAS	1.00
MFQ344	S212196-16	S	100	100	01/11/93 0800	MAS	1.00

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DATE 1-11-93 ANALYST HE FOR GFAA/ICP WATERS PREP LOG

DATE _____ ANALYST _____ FOR MERCURY PREP BATCH # 267 REVIEWED BY 1/11/93

Thermo Analytical/ SKINNER & SHERMAN

LCS SOURCE		Digest 1 (GFAA)		Digest 2 (ICP)			Digest 3 (Hg)	Description Color Clarity
Client ID	Lab ID	Initial Vol(ml)	Final Vol(ml)	Initial Vol(ml)	Final Vol(ml)	pH	Initial Vol(ml)	
MFQ226	S212196 01	100	100	100	100	2.0		Colorless Clear
D	01.S2							"
227	02							Cloudy
S	02.DS							"
228	03							sl. cloudy
229	04							Grey Cloudy
230	05							Colorless Clear
231	06							
232	07							
237	08							
238	09							Cloudy
239	10							"
240	11					1.5		
241	12					2.0		Clear
242	13					1.5		
MFQ 342	14					2.5		
343	15					2.0		
344	16							
	LCSW							
	PB							

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TMA/SKINNER & SHERMAN LABORATORIES
MERCURY PREPARATION LOG

DATE 12/21/92

PREPARED BY RC

S212196

WORK ORDER

SKINNER & SHERMAN ID	CLIENT ID	INITIAL VOL (ML)	INITIAL WT (GM)	FINAL VOL (ML)	COMMENTS
PB				100	
LCSHG	LCSS	XXXX			
S212196-01	MFG226	100		100	
01D	226D				
02	227				
02S	227S				
03	228				
04	229				
05	230				
06	231				
07	232				
08	237				
09	238				
10	239				
11	240				
12	241				
13	242				
14	342				
15	343				
16	344				

REVIEWED BY: [illegible] 12/22/92

PAGE: 066

(1)

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD B

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: 10 HNO3
50 HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
=======	======	====	==========	======	==========

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

221

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(2)

STANDARD PREPARATION LOG
++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 1

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 ppm	5 ml	5 ppm
As	HPAs-2		1000 ppm	5 ml	5 ppm
Ba	HPBa-1		1000 ppm	5 ml	5 ppm
Be	HPBe-1		1000 ppm	1 ml	1 ppm
Cd	HPCd-1		1000 ppm	5 ml	5 ppm
Cr	HPCr-1		1000 ppm	5 ml	5 ppm
Co	HPCo-1		1000 ppm	5 ml	5 ppm
Cu	HPCu-1		1000 ppm	5 ml	5 ppm
Pb	HPPb-1		1000 ppm	5 ml	5 ppm
Mn	MVMn-3		1000 ppm	5 ml	5 ppm
Ni	MVNi-3		1000 ppm	5 ml	5 ppm
Se	HPSe-1		1000 ppm	5 ml	5 ppm
Tl	HPTl-1		1000 ppm	5 ml	5 ppm
V	HPV-1		1000 ppm	5 ml	5 ppm
Zn	HPZn-1		1000 ppm	5 ml	5 ppm
Ti	HPTi-1		1000 ppm	5 ml	5 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

222

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(3)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 2

DATE PREPARED: 12/23/92
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 20 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Ag	APAg-1		1000 ppm	1 ml	1.0 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

223

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(4)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 3

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
AL	HPAL-1		10,000ppm	5 ml	50 ppm
Ca	HPCa-1		10,000ppm	5 ml	50 ppm
Fe	HPFe-1		10,000ppm	2 ml	20 ppm
Mg	HPMg-1		10,000ppm	5 ml	50 ppm
K	HPK-1		10000ppm	5.0 ml	50 ppm
Na	HPNa-1		10000ppm	5.0 ml	50 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

224

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(5)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Initial Calibration Verification Solutions

DATE PREPARED: 12/31/92
PREPARED BY: SRP

FINAL VOLUME:

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4/2 HNO3 ← ICV 2
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICV-1	QCICV1	-200		20ml → 200ml	
b) ICV-2	QCICV2	-152		20ml → 100ml	
c) ICV-3	QCICV3	-179		20ml → 200ml	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

225

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(6)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Interference Check Sample Solutions

DATE PREPARED: 1/7/93
PREPARED BY: LJ

FINAL VOLUME: 200 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICSAA	QCICSA	-84		20 ml →	200 ml
b) ICSABB	QCICSA	-84		20 ml →	200 ml
	QCICSB	-47		20 ml →	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

226

7A

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: 2X CONTRACT REQUIRED DETECTION LIMIT SOLUTION P2

DATE PREPARED: 1/5/93
PREPARED BY: Zp

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 PPm	120 ul	120 PPb
As	HPAs-2		1000 PPm	30 ul	30 PPb
Be	HPBe-1		1000 PPm	10 ul	10 PPb
Cd	HPCd-1		1000 PPm	10 ul	10 ppb
Cr	HPCr-1		1000 PPm	20 ul	20 ppb
Co	HPCo-1		1000 PPm	100 ul	100 ppb
Cu	HPCu-1		1000 PPm	50 ul	50 ppb
Pb	HPPb-1		1000 PPm	30 ul	30 PPb
Mn	MVMn-3		1000 PPm	30 ul	30 ppb
Ni	MVNi-3		1000 PPm	80 ul	80 ppb
Se	HPSe-1		1000 PPm	100 ul	100 ppb
V	HPV-1		1000 PPm	100 ul	100 ppb
Tl	HPTl-1		1000 PPm	500 ul	500 ppb
Ag	HPAg-1		1000 PPm	20 ul	20 ppb
Zn	HPZn-1		1000 PPm	40 ul	40 ppb
Ti	HPTi-1		1000 PPm	100 ul	100 ppb
Sr	MVSr-3		1000 PPm	400 ul	400 ppb
Mo	MVMo-3		1000 PPm	400 ul	400 ppb
Sn	MVSn-2		1000 PPm	400 ul	400 ppb
Li	MVLi-3		1000 PPm	200 ul	200 ppb

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(8)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Continuing Calibration Verification Solution (HalfSTD)

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 500 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: ___ HNO3
___ HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
STD1	In House			250 ml	500 ml
STD3	In House			250 ml	
Ag	HP Ag-1		1000 ppm	250 ul	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

228

TMA/SKINNER & SHERMAN LABORATORIES, INC.
STANDARDS TRACKING LOG BOOK -- SECTION 2
STANDARD PREPARATION LOG

STANDARD IDENTITY Hg Working Standard

DATE PREPARED: PREPARED BY:

FINAL VOLUME: 100 ml

MATRIX: 2 %HNO3 ___ %HCL ___ Other

MLS ADDED: 2 HNO3 ___ HCl ___ Other

ELEMENT	SOURCE/LOT#	STOCK CONC	VOLUME ADDED	FINAL CONC
MS 12/18/92	Hp Lot #290930	10ppm	1 ml	100ppb
	Cr	5%	25 ml	—
12/21/92	Hp Lot #290930	10ppm	1 ml	100ppb
	Cr	5%	25 ml	—

229

SOURCE: QC=USEPA ICV=USEPA MV=METAL VENTURES S=SPEX OTHER=IDENTIFY
ver 1.1 04/17/91

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO_3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (SAS) (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: Fed Ex

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92 J. Nebreda

Laboratory Contract Number: 68D00108

Unit Price: 100.00

Sampler (Name): STEPHEN WUST

Airbill Number: 6159041571

Sampler Signature: Stephen Wust

6. Ship To: SKINNER + SHERMAN, 300 SECOND AVENUE, WALTHAM, MA 02254

8. Transfer to:

Date Received:

Received by:

Contract Number:

Price:

4. Type of Activity

Lead	Pre-Remedial	Remedial	Removal
SF	PA	RIFS	CLEM
PRP	SSI	RD	REMA
ST	O&M	RA	REM
FED	LSI ✓	NPLD	OIL
			UST

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MS Liq.	Non Water - Ms Liq.
												Samples M, Info Affects								
MFQ342	2	LOW	Grab	2/6	X							039944	CH92W-16S	12/9/92 11:36	SDW					
MFQ343	2	LOW	Grab	2/6	X							039953	CH92W-WD4	12/9/92 16:45	SDW					
MFQ344	2	LOW	Grab	2/6	X							039954	CH92W-WD10	12/9/92 15:20	SDW					
MFQ226	2	LOW	Grab	2/6	X							039943	CH92W-CB6D	12/9/92 16:05	SDW					
MFQ227	2	LOW	Grab	2/6	X							039940	CH92W-16S	12/9/92 11:36	SDW					
MFQ228	2	LOW	Grab	2/6	X							039957	CH92W-7GS	12/9/92 13:40	SDW					
MFQ229	2	LOW	Grab	2/6	X							039955	CH92W-WD10	12/9/92 15:20	SDW					
MFQ230	2	LOW	Grab	2/6	X							039945	CH92W-WD4	12/9/92 16:45	SDW					
MFQ231	2	LOW	Grab	2/6	X							039942	CH92W-7GS	12/9/92 13:40	SDW					
MFQ232	2	LOW	Grab	2/6	X							039952	CH92W-CB6D	12/9/92 16:05	SDW					

Shipment for Case complete? (Y/N) SDW Y

Page 1 of 1

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature) J. Nebreda	Date / Time 12/14/92 9:30	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 2110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy Yellow - Lab Copy for Return to SMO

Copy Original is filed in CSF MFQ226

Inorg-2

I 015633

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (SAS) (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: Fed Ex

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92 [signature]

Sampler (Name): STEPHEN WUST

Airbill Number: 6159041571

Laboratory Contract Number: 68D00108

Unit Price: 106.00

Sampler Signature: [signature]

6. Ship To: Skinner : Sherman
300 Second Ave.
Waltham, MA
02254

8. Transfer to:

Date Received:

Received by:

Contract Number:

Price:

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF		PA		RIFS		CLEM	
PRP		SSI		RD		REMA	
ST		LSI	✓	RA		REM	
FED				O&M		OIL	
				NPLD		UST	

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/ Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - Mis Liq.	Non Water - Mis Liq.
												Samples [illegible] Traffic Report Agrees								
✓ MFQ233	5	Low	Comp	6	X							6-039459	CH92S-BF	12/10/92 10:20	SLW					
✓ MFQ234	5	Low	Comp	6	X							6-039960	CH92S-BH	12/10/92 12:15	SLW					
✓ MFQ236	5	Low	Comp	6	X							6-039961	CH92S-LB	12/10/92 15:45	SLW					
✓ MFQ030	5	Low	Comp	6	X							6-039588	CH92S-BH1	12/10/92 13:38	SLW					
✓ MFQ031	5	Low	Comp	6	X							6-039589	CH92S-BH2	12/10/92 14:05	SLW					
✓ MFQ242	1	Low	grab	2/6	X							6-039600	CH92W-HCWD	12/10/92 11:20	SLW					
✓ MFQ238	1	Low	grab	2/6	X							6-039587	CH92W-HCBU	12/10/92 12:18	SLW					
✓ MFQ237	1	Low	grab	2/6	X							6-039963	CH92N-LB	12/10/92 15:35	SLW					
✓ MFQ-239	1	Low	grab	2/6	X							6-005385	CH92W-HCBH	12/10/92 11:50	SLW					
✓ MFQ-240	2	Low	grab	2/6	X							6-005383	CH92W-SW	12/10/92 15:10	SLW					

Shipment for Case complete? (Y/N)

Page 1 of ___ Page 3 of 4

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	
		[signature]	12/14/92 9:30		

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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Original is filed in CSF MPN6649

Inorg-2

I 015646

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: Fed Ex

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92 [illegible]

Sampler (Name): STEPHEN WUST

Airbill Number: 6159041571

Laboratory Contract Number: 68D00108

Unit Price: 106.00

Sampler Signature: [illegible]

6. Ship To: Skinner & Sherman, 300 Second Ave., Waltham, MA 02254

ATTN:

8. Transfer to

Date Received

Received by

Contract Number

Price

4. Type of Activity

	Lead	Pre-Remedial	Remedial	Removal
SF			RIFS	CLEM
PRP		PA	RD	REMA
ST		SSI	RA	REM
FED		LSI	O&M	OIL
			NPLD	UST

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MIS Liq.	Non Water - Mis Liq.
MFQ241	2	LOW	grab	2/6	X							Samples Off. Tube Areas 6-03/1947	CH-2W-SW	12/10/92 15:10	SLW					

Shipment for Case complete? (Y/N)

Page 1 of ___ Page 4 of 4

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) [illegible]	Date / Time 12/14/92 9:30	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION: Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Copy Original is filed in CSF MFQ 226

291

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I 340102

Copy
Original is filed in CSF MFN 649

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER 6159041571

2311M 6159041571

RECIPIENT'S COPY

1 Date 12-11-92

From (Your Name) Please Print: STEPHEN WEST
Your Phone Number (Very Important): 505-827-2917
Company: NEW MEXICO ENVIRONMENT DEPARTMENT
Department/Floor No.
Street Address: 1190 ST FRANCIS DR
City: SANTA FE State: NM ZIP Required: 87501

2 To (Recipient's Name) Please Print: JEFF DEPIOLO
Recipient's Phone Number (Very Important): (617) 890-2200
Company: SKINNER + SHERMAN
Department/Floor No.
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 SECOND AVENUE
City: WALTHAM State: MA ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 5657 1149 1173

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City State ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [X] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 [ ] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOVT LETTER
41 [ ] GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**
† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill in Box H) { 1 [ ] WEEKDAY or 31 [ ] SATURDAY
DELIVER { 2 [ ] WEEKDAY or 3 [X] SATURDAY (Extra charge) (Not available to all locations)
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845 ..... x ..... kg. III
7 [ ] OTHER SPECIAL SERVICE
9 [ ] SATURDAY PICK-UP (Extra charge)
[ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	70	0
Total	Total 70	Total 0

DIM SHIPMENT (Chargeable Weight)
[ ] lbs.
L x W x H

Received At
1 [ ] Regular Stop 3 [ ] Drop Box
2 [ ] Call Stop 4 [ ] B.S.C. 5 [ ] Station

7 Release Signature:

Emp. No. Date
[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold
Street Address
City State Zip
Received By: x 12-14-92 9:30
Date/Time Received FedEx Employee Number

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #136
136
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Copy

SAMPLE LOG-IN SHEET

Lab Name: Chemes Alem	Page 1 of 2
Received By (Print Name): J. DePAOLO	Log-in Date: 12-14-92
Received By (Signature): J. DePaolo	Copy. Original is filed in CSF MFN649
Case Number: 19220	Sample Delivery Group No. MFN649 MFQ026, 226 / SAS Number: NA

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* — Intact ☑ Broken ☐
2. Custody Seal Nos. NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* — Present ☑ Absent ☐
6. Airbill No. 6159041571
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* — Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-14-92
11. Time Received: 9:30

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFQ026	6039654	SQ121903	OK
027	6039686	04	
028	6039964	05	
029	6039965	06	
030	6039588	07	
031	6039589	08	
221	6005446	02	
222	6039951	18	
223	6039937	17	
224	6039924	15	
225	6039946	SQ121926 12/14/92	
226	6039943	SQ121896 09	
227	6039940	02	
228	6039957	03	
229	6039955	04	
230	6039945	05	
231	6039942	06	
232	6039952	07	
233	6039959	SQ121917 17	

Sample Transfer

Fraction	Fraction
Area #	Area #
By	By
On	On

*Contact SMO and attach record of resolution

Received By: 100 1/15/93	Logbook No.
Date	Logbook Page No.

FORM DC-1 ILM02.0

SAMPLE LOG-IN SHEET

Lab Name: Skinner & Sherman	Page 2 of 2
Received By (Print Name): J. DeRado	Log-in Date: 12-14-92
Received By (Signature): J. DeRado	Copy. Original is filed in CSF MFN649
Case Number: 19220	Sample Delivery Group No. MFN649 MFQ02 226 / SAS Number: NA

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* — Intact ☑ Broken ☐
2. Custody Seal Nos. NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* — Present ☑ Absent ☐
6. Airbill No. (6159041571)
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* — Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-14-92
11. Time Received: 9:30

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFQ234	6039960	SQ12197 18	OK
235	6039921	19	
236	6039961	20	
237	6039963	SQ12196 08	
238	6039587	09	
239	6005385	10	
240	6005383	11	
241	6039947	12	
242	6039600	13	
342	6039944	14	
343	6039953	15	
344	6039954	16	

Sample Transfer

Fraction	Fraction
Area #	Area #
By	By
On	On

*Contact SMO and attach record of resolution

Received By: [illegible] 1/15/93	Logbook No.
Date	Logbook Page No.

FORM DC-1 ILM02.0

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER 5212196 CLIENT USEPA No. SAMPLES:

PROTCL CLP TURNARND 35DAYS (Soil) 16 (Water) (Specify Other)

COOLER TEMP: 4 oC, or NA SDG/BATCH MFQ226

CUSTODIAN J. DeRado CLIENT CASE 19220

CUSTODY SEAL: ~~PRESENT~~/ABSENT/INTACT/NOT PO/CONTRACT# 68D00108

SHIPER & # Fedex#6159041571 CONTACT Nina Smith

TAGS: ~~PRESENT~~/ABSENT/NA/SEE COC

CHAIN OF CUSTODY: (PRESENT)/ABSENT/NA, # NA COMMENTS:

SAMPLE CONTAINERS (INTACT)/BROKEN COMMENTS

CLIENT COMMENT? YES/(NO)

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? (YES)/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? (YES) /NO (COMMENT)

SHIPMENT DATES 12-14-92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	MFQ226	WATER	12/14/92	2.09	Total Metals D S	
2	227			2.12		
3	228			2.22		
4	229			1.93		
5	230			2.21		
6	231			2.06		
7	232			2.19		
8	237			1.97		
9	238			2.15		
10	239			2.21		
11	240			1.66		
12	241			1.99		
13	242			1.61		
14	342			2.40		
15	343			2.17		
16	344			2.19		
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						

Complete
12-14-92

Samples are from site known to have Rad-Contamination: YES ___ NO N/A

Samples have detectable amounts of Radioactive Material: YES ___ NO N/A

SUBCONTRACT: YES/(NO) TO: DATE: 12-14-92

REVIEWED KP 1/15/93

* EPA/CLP required 285 Rev 1.6 PAGE: 0085

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2/2/93

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

FEB 1993 RECEIVED

Site Name Whitewater

Case # 19220

SDG# MFN-651

Date : 1-27-1993

Subject: **CLP Data Review**

From: Dr Melvin Ritter , Chemist , Region VI M.C. Ritter

To : K. Hill , 6H-MA , Region VI

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section. Samples were:

INORGANIC:	MFN-651	MFQ-212 TO		
	MFQ-201 TO	MFQ-220		
	MFQ-204			
	MFQ-206 TO			
	MFQ-209			
ORGANIC:				

The data was found:

( ) Acceptable

(X) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HO
Mike Hiatt, EMSL/Las Vegas
Regional TPO
Mitzie Dovel,Mantech ENV, VA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: 1-27-1993

Subject: CLP Data Review

From: Mahmoud El-Feky, Data Coordinator , Region VI

To: Dr. Melvin Ritter , Chemist , Region VI

Attached is the data review summary for Site Whitewater
Case # 19220
SDG # MFN-651

Data was found: ( ) Acceptable

(X) Provisional

( ) Unacceptable

Action required by TPO: ( ) Yes

(X) No

COMMENTS:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19220
LABORATORY Skinner/Sherman (MA)
CONTRACT # 68-D0-0108
SDG # MFN651
SOW# ILM02.1
ACCT # 3TGBDN77 SF # TGBUZZ

SITE Whitewater
NO. OF SAMPLES/
MATRIX 18/water
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Victor Chapman
COMPLETION DATE Jan. 27, 1993

SAMPLE NO.: MFN651, MFQ201, MFQ202, MFQ203, MFQ204, MFQ206, MFQ207, MFQ208, MFQ209, MFQ212, MFQ213, MFQ214, MFQ215, MFQ216, MFQ217, MFQ218, MFQ219, MFQ220

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	NA
2. CALIBRATIONS	O	O	O	NA
3. BLANKS	X	X	O	NA
4. ICS	O			
5. LCS	O	O		
6. DUPLICATE ANALYSIS	O	O	O	NA
7. MATRIX SPIKE	O	O	X	NA
8. MSA		X		
9. SERIAL DILUTION	O			
10. SAMPLE VERIFICATION	O	O	O	NA
11. OTHER QC	X	M	O	NA
12. OVERALL ASSESSMENT	X	X	X	NA

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
N/A= Not applicable

ACTION ITEMS: Blank concentrations were above the instrument detection limits; a matrix spike recovery was below the lower quality control limit; method of standard addition correlation coefficients were below 0.995; furnace atomic absorption analytical spike recoveries were below 10% for both the initial and the repeated determination; and furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 48 of 76 determinations.

AREAS OF CONCERN:

NOTABLE PERFORMANCE:

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

COMMENTS:

Eighteen water samples were analyzed at low concentrations for total metals. The data package is provisional because: blank concentrations were above the instrument detection limits; a matrix spike recovery was below the lower quality control limit; method of standard addition correlation coefficients were below 0.995; furnace atomic absorption analytical spike recoveries were below 10% for both the initial and the repeated determination; and furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 48 of 76 determinations.

1. Holding Times

All holding time criteria were met.

2. Calibrations

All calibrations were acceptable.

3. Blanks

A. Calibration Blanks

The concentrations of aluminum, barium, beryllium, cadmium, calcium, cobalt, copper, magnesium, manganese, nickel, and vanadium in the calibration blanks were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). Sample results greater than the IDL but less than five times the amount in any blank are qualified as undetected (U) in the following samples.

1) The aluminum sample results for MFQ218 and MFQ220 are qualified as undetected (U). The aluminum result for MFQ219 is biased high by the presence of 20.6 ug/L in the calibration blank.

2) The barium results for samples MFQ202, MFQ203, and MFQ208 are qualified as undetected (U). All other barium results are biased high by the presence of 0.8 ug/L to 2.2 ug/L in the calibration blanks.

3) All beryllium sample results above the instrument detection limit are qualified as undetected (U).

4) All cadmium sample results above the instrument detection limits are qualified as undetected (U).

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

3. Blanks, calibration, continued

5) All calcium sample results are biased high by the 23.8 ug/L to 81.8 ug/L calcium found in the calibration blanks.

6) The cobalt sample results for MFQ209, MFQ216, and MFQ217 are qualified as undetected (U). The cobalt result for sample MFQ204 is biased high by the presence of 1.8 ug/L cobalt in a calibration blank.

7) All copper sample results are qualified as undetected (U), except sample MFQ212 which is biased high by the presence of 7.5 ug/L copper in a calibration blank.

8) The magnesium sample result for samples MFQ201 and MFQ202 are qualified as undetected (U). All other magnesium sample results are biased by the presence of 27.3 ug/L to 130.6 ug/L in the calibration blanks.

9) The manganese sample results for MFQ213, MFQ218 and MFQ220 are qualified as undetected (U). The manganese sample results for MFQ209, MFQ212, MFQ214, MFQ215, MFQ216, MFQ217, and MFQ219 are biased high by the presence of 1.3 ug/L manganese in a calibration blank.

10) The nickel sample result for MFQ204 is qualified as undetected (U).

11) The vanadium sample results for MFN651, MFQ218, and MFQ220 are qualified as undetected (U).

B. Preparation Blank

The concentrations of cadmium, copper, iron, and lead in the preparation blank were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). Sample results greater than the IDL but less than five times the amount in any blank are qualified as undetected (U) in the following samples:

1) All cadmium sample results above the instrument detection limit are qualified as undetected (U).

2) All copper sample results are qualified as undetected (U), except MFQ212, which is biased high by the presence of 7.5 ug/L in the calibration blank (5.65 ug/L in the preparation blank).

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

3. Blanks, Preparation, continued

3) The iron results for samples MFQ202, MFQ203, MFQ208, and MFQ220 are qualified as undetected (U). All other iron sample results are biased high by the presence of 5.13 ug/L in the preparation blank.

4) All lead sample results are qualified as undetected (U), except MFQ206 and MFQ209 which are biased high by the presence of 2.4 ug/L in the preparation blank.

C. All other calibration and preparation blank results were acceptable.

4. ICS

Interference check sample criteria were met.

5. LCS

All laboratory control sample results were acceptable.

6. Duplicate Analysis

All laboratory duplicate results met technical quality control criteria.

7. Matrix Spike

A. All mercury sample results are qualified as estimated (J and UJ) due to a 71.1% pre-digestion matrix spike recovery. Physical or chemical interferences are suspected in the sample matrix.

B. All other analytes had acceptable pre-digestion matrix spike recoveries.

8. MSA

A. The selenium result for sample MFQ212 is qualified as estimated (J) due to method of standard addition correlation coefficients of 0.9657 and 0.8924. Physical or chemical interferences are suspected in the sample matrix.

B. The other method of standard addition results were acceptable.

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

9. Serial Dilutions

All serial dilution results met quality control criteria.

10. Sample Verification

All sample results were reported correctly.

11. Other QC

A. Furnace Atomic Absorption Quality Control

The following sample results are qualified due to physical or chemical interferences suspected in the samples:

1) The arsenic results for samples MFN651, MFQ201, MFQ202, MFQ207, MFQ208, MFQ209, MFQ213, MFQ214, MFQ215, MFQ216, MFQ217, MFQ219, and MFQ220 are qualified as estimated (UJ) due to FAA analytical spike recoveries of 48.4% to 78.2%.

2) The lead results for samples MFQ203, MFQ204, MFQ207, MFQ212, MFQ213, MFQ219, and MFQ220 are qualified as estimated (J and UJ) due to FAA analytical spike recoveries of 74%, 73.3%, 231.4%, 69.9%, 66.7%, 48.1%, and 56.0%, respectively.

3) The selenium result for samples MFN651, MFQ201, MFQ202, MFQ206, MFQ207, MFQ214, MFQ215, MFQ216, MFQ217, MFQ218, MFQ219, and MFQ220 are qualified as estimated (UJ) due to FAA analytical spike recoveries of 40.0% to 83.7%.

4) The selenium result for sample MFQ208 is qualified as unusable (R) because the FAA analytical spike recovery was 0% for the initial determination and for a determination of the diluted sample. A false negative is possible for selenium in sample MFQ208.

5) The thallium result for samples MFN651, MFQ201, MFQ202, MFQ203, MFQ204, MFQ206, MFQ207, MFQ208, MFQ212, MFQ213, MFQ214, MFQ215, MFQ216, and MFQ217 are qualified as estimated (UJ) due to FAA analytical spike recoveries of 53.9% to 81.9%.

6) The thallium result for sample MFQ209 is qualified as estimated (UJ) due to a FAA analytical spike recovery of 116.2%.

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

11. Other QC, continued

B. Field Blank

The samplers identified sample MFQ202 as a field blank. The sample results for barium, beryllium, copper, iron, lead, and magnesium in the field blank have been qualified as undetected (U) due to their presence in the calibration and preparation blanks. The field blank concentrations for aluminum, calcium, potassium, and sodium were above the instrument detection limits. Aluminum, potassium, and sodium sample results above the instrument detection limit but less than five times the amount in the field blank are qualified as undetected (U) in the following samples:

1) The aluminum sample results for MFQ203, MFQ204, MFQ207, MFQ208, MFQ213, MFQ214, MFQ215, MFQ218, MFQ177, and MFQ220 are qualified as undetected (U). All other aluminum sample results are biased high by the presence of 53.2 ug/L in the field blank.

2) The calcium sample results are biased high by the presence of 670 ug/L in the field blank.

3) The potassium result for sample MFQ218 are qualified as undetected (U). All other potassium sample results are biased high by the presence of 241 ug/L in the field blank.

4) The sodium results for samples MFQ206, MFQ207, MFQ208, MFQ209, MFQ214, MFQ215, MFQ216, MFQ217, and MFQ218 are qualified as undetected (U). All other sodium sample results are biased high by the presence of 8710 ug/L in the field blank.

C. All other Section 11 QC criteria were met.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFN651 Site Whitewater Lab Skinner (MA)

12. Overall Assessment

The data package is provisional for the following reasons:

A. Laboratory calibration and/or preparation blank concentrations were above the instrument detection limits for aluminum, barium, beryllium, cadmium, calcium, cobalt, copper, magnesium, manganese, nickel, and vanadium. Numerous sample results were qualified as undetected.

B. The field blank concentrations for aluminum, calcium, potassium, and sodium were above the instrument detection limits. Some aluminum, potassium, and sodium sample results were qualified as undetected.

C. The mercury matrix spike recovery was below the lower quality control limit.

D. The method of standard addition correlation coefficients were below 0.995 for one sample result.

E. A false negative is possible for selenium in sample MFQ208 due to FAA analytical spike recoveries less than 10%.

F. Furnace atomic absorption analytical spike recoveries exceeded the quality control limits for 48 of 76 determinations.

All other technical requirements were met.

980

DATA SUMMARY

THE VALUES IN THE CIRCLES ARE THE FAA SPIKE RECOVERY

Case No. 19220 SDG MFN 651

Laboratory SKINER

Matrix WATER

Units ug/L

EPA TR #	MFN651	MFQ201	MFQ202 (FIELD BLANK)	MFQ203	MFQ204	MFQ206	MFQ207	MFQ208	MFQ209	MFQ212	MFQ213	MFQ214	MFQ215	COMMENTS
Lab I.D. 12134	-01S	-02S	-03S	-04S	-05S	-06S	-07S	-08S	-09S	-10S	-11S	-12S	-13S	
Aluminum	8440	90.6 B	53.2 B	25.1 B	35.0 B	763	62.0 B	15.8 B	5970	414	24.8 B	30.8 B	21.1 B	
Antimony														
Arsenic	76.0 W	78.2 W	70.6 W	S	3.3 B		63.4 W	49.0 W	78.0 W		78.6 W	78.6 W	48.4 W	
Barium	60.9 B	17.5 B	2.6 B	5.5 B	28.7 B	81.5 B	74.4 B	2.0 B	42.0 B	26.3 B	32.4 B	58.1 B	51.8 B	
Beryllium	1.4 B		0.38 B						0.49 B			0.38 B		
Cadmium	2.1 B							1.7 B			1.5 B			
Calcium	15100	4520 B	670 B	495,000	495000	92700	69800	54200	11900	360000	308000	190000	171000	
Chromium									3.1 B		8.9 B			
Cobalt					17.4 B				2.1 B					
Copper	24.8 B	6.0 B	7.9 B	26.0	9.0 B	15.5 B	5.7 B	3.4 B	24.8 B	40.4	27.6	4.2 B		
Iron	1690	33.9 B	22.8 B	23.1 B	2230	1320	33.5 B	17.7 B	5980	506	219	52.6 B	30.1 B	
Lead	8.8	4.1	2.9 B	74.9 W	233 W	18.4	6.5 237.4 W	2.0 B	17.4 S	4.2 68.9 W	2.7 B 66.7 W			
Magnesium	2640 B	126 B	125 B	147000	135000	121,000	108000	22900	4570 B	136000	134000	79200	71000	
Manganese	43.5			59.5	6520	321	158		87.9	48.7	3.9 B	529	472	
Mercury	N	N	N	N	N	N	N	N	N	0.12 B N	N	N	N	
Nickel					11.0 B						6.6 B	4.1 B		
Potassium	24600	24400	241 B	3550 B	11400	4840 B	4760 B	2320 B	1460 B	5760	4310 B	7300	6490	
Selenium	59.2 W	40.0 W	49.2 W			74.5 W	71.3 W	TWICE 0% E		10.1 +		82.7 W	78.8 W	
Silver														
Sodium	71000	70300	8710	83000	135000	5220	5090	19200	1720 B	76100	60100	36900	32700	
Thallium	1.5 B 66.4 W	66.6 W	78.3 W	57.5 W	53.9 W	68.1 W	1.4 B 66.9 W	80.4 W	76.2 W	55.7 W	69.2 W	72.3 W	66.5 W	
Tin														
Vanadium	5.6 B								7.7 B	3.0 B				
Zinc	26.6			10.5	41.4	45.5	15.5 B	8.1 B	46.6	95.5	68.0		10.6 B	
Cyanide														
% Solids														

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 19220	SDG No. MFN651	SDG Nos. To Follow	SAS No.	Date Rec 1-14-93

EPA Lab ID: SKINER

Lab Location: WALTHAM, MA

Region: 6 Audit No.: 19920/SDG MFN651

Re_Submitted CSF? Yes ____ No X

Box No(s): ONE

COMMENTS:

1980

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: V. A. Chapman, Jr. — V. A. Chapman, Jr./ESAT Data Reviewer — Date 1-25-93

Audited by: ____ ____ Date ____

Audited by: ____ ____ Date ____

Signature — Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature — Printed Name/Title

DC-2___

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code: 51571149
Account Code:
2. Region No.: 6
Sampling Co.: NMED
4. Date Shipped: 12-9-92
Carrier: Fed. Ex

Regional Information:
Sampler (Name): Stephen Wust
Airbill Number: 6159041556

Non-Superfund Program:
Sampler Signature: [signature]
5. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254
ATTN: Jeff Depaolo

Site Name: Whitewater and Hanover Creeks
City, State: Bayard, NM
Site Spill ID:

3. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI (X); Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals: Total	Metals: Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Low Conc. only: Fluoride	High only: pH	High only: Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MFR216	2	Low	Grab	2/6	X							6-039913 6-005396	C092W-MW3	12/8/92 12:35	SDW		S
MFQ217	2	Low	Grab	2/6	X							6-039914	C092W-MW3	12/8/92 12:35	SDW		D
MFQ214	2	Low	Grab	2/6	X							6-005393 6-005395	C092W-MW3	12/8/92 12:35	SDW		S
MFQ215	2	Low	Grab	2/6	X							6-005394	C092W-MW3	12/8/92 12:35	SDW		D
MFQ219	2	Low	Grab	2/6	X							6-039918	C092W-MW2	12/8/92 1600	SDW		—
MFQ220	2	Low	Grab	2/6	X							6-039919	C092W-MW2	12/8/92 1600	SDW		—
MFQ212	1	Low	Grab	2/6	X							6-005391	C092W-HCUH	12/8/92 1010	SDW		—
MFQ209	1	Low	Grab	2/6	X							6-005448	C092W-HCB6	12/8/92 0950	SDW		—
MFQ213	2	Low	Grab	2/6	X							6-005389	C092W-ESC	12/8/92 0950	SDW		—
MFQ208	1	Low	Grab	2/6	X							6-005442	C092W-SPR	12/8/92 0940	SDW		—

Shipment for Case complete? (Y/N): N
Page 1 of 3
Sample used for a spike and/or duplicate: MFQ216, MFQ217, MFQ214, MFQ215
Additional Sampler Signatures: [signature]
Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received
[signature]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/no	

SKINER
Inorg.

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION: Green - Region Copy Pink - SMO Copy White - Lab Copy for return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Inorg-1

340103

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code:
Account Code:
2. Region No.: 6
Sampling Co.: NMED
4. Date Shipped: 12-9-92
Carrier: Fed Ex

Regional Information:
Sampler (Name): Stephen West
Airbill Number: 6159041556

Non-Superfund Program:
Sampler Signature: [signature]
5. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254
ATTN: Jeff Depaolo

Site Name: Whitewater and Hanover Creeks
City, State: Bayard, NM
Site Spill ID:

3. Type of Activity:
Lead: SF, PRP, ST, FED
Pre-Remedial: PA, SSI, LSI ☑
Remedial: RIFS, RD, RA, O&M, NPLD
Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals: Total	Metals: Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MFQ218	4	Low	Grab	2/6	X							6-039915	C092W-EQB	12/8/92 12:50	SDW		—
MFQ201	2	Low	Grab	2/6	X							6-005199	C092W-MW1	12/7/92 1325	SDW		—
MFN651	2	Low	Grab	2/6	X							6-005447	C092W-MW1	12/7/92 1325	SDW		—
MFQ206	2	Low	Grab	2/6	X							6-005439	C092W-MW4	12/7/92 1700	SDW		—
MFQ207	2	Low	Grab	2/6	X							6-005440	C092W-MW4	12/7/92 1700	SDW		—
MFQ202	2	Low	Grab	2/6	X							6-005297	C092W-B	12/7/92 1325	SDW		B
MFQ203	1	Low	Grab	2/6	X							6-005178	C092W-MT1	12/7/92 1530	SDW		—
MFQ204	1	Low	Grab	2/6	X							6-005198	C092W-MT2	12/7/92 1535	SDW		—
MFN649	5	Low	Comp	6	X							6-005377	C092S-MT	12/7/92 1110	SDW		—
MFQ211	5	Low	Comp	6	X							6-005450	C092S-FCC	12/8/92 1020	SDW		—

Shipment for Case complete? (Y/N): N
Page 1 of 3 (2)
Sample used for a spike and/or duplicate:
Additional Sampler Signatures: [signature]
Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Inorg-1

I 340104

TMA
Thermo Analytical Inc.

Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

Federal Express Airbill #6836314685

January 13, 1993

USEPA Contract Laboratory Program (CLP)
Sample Management Office (SMO)
300 North Lee Street, Suite 200
Alexandria, VA 22314

Attention: Data Receiver

Dear Sir:

Enclosed is the Sample Data Package for the Inorganic Analyses of Case 19220 and SDG MFN651. The samples were analyzed under Skinner and Sherman Work Order #S212134.

Please feel free to call if there are any questions concerning the enclosed.

Sincerely,

TMA/SKINNER & SHERMAN LABORATORIES, INC.

Kirk Johnson
Contract Laboratory Program
EPA Data Manager

KDJ

Encl.
Data Audit Staff, EMSL-LV, Federal #6836314694
Meg Jou, USEPA Region VI, Federal #6836314721

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

SOW No.: ILM02.1

EPA Sample No.	Lab Sample ID.
MFN651	12134-01S
MFQ201	12134-02S
MFQ202	12134-03S
MFQ203	12134-04S
MFQ204	12134-05S
MFQ206	12134-06S
MFQ207	12134-07S
MFQ208	12134-08S
MFQ209	12134-09S
MFQ212	12134-10S
MFQ213	12134-11S
MFQ214	12134-12S
MFQ214D	12134-12S2
MFQ215	12134-13S
MFQ216	12134-14S
MFQ216S	12134-14DS
MFQ217	12134-15S
MFQ218	12134-16S
MFQ219	12134-17S
MFQ220	12134-18S

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name: Kirk D. Johnson 001

Date: 11/13/93 Title: USEPA Data Manager

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFN651

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-01S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8440			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	60.9	B		P
7440-41-7	Beryllium	1.4	B		P
7440-43-9	Cadmium	2.1	B		P
7440-70-2	Calcium	15100			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	24.8	B		P
7439-89-6	Iron	1690			P
7439-92-1	Lead	8.8			F
7439-95-4	Magnesium	2640	B		P
7439-96-5	Manganese	43.5			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	24600			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	71000			P
7440-28-0	Thallium	1.5	B	W	F
7440-62-2	Vanadium	5.6	B		P
7440-66-6	Zinc	26.6			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

002

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ201

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-02S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	90.6	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	16.0	U	W	F
7440-39-3	Barium	17.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	4520	B		P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	6.0	B		P
7439-89-6	Iron	33.9	B		P
7439-92-1	Lead	4.1			F
7439-95-4	Magnesium	126	B		P
7439-96-5	Manganese	0.90	U		P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	24400			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	70300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	5.7	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

003

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ202

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-03S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	53.2	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	16.0	U	W	F
7440-39-3	Barium	2.6	B		P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	670	B		P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	7.9	B		P
7439-89-6	Iron	22.8	B		P
7439-92-1	Lead	2.9	B		F
7439-95-4	Magnesium	125	B		P
7439-96-5	Manganese	0.90	U		P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	241	B		P
7782-49-2	Selenium	19.5	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	8710			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	5.7	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

004

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ203

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-04S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	25.1	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	S	F
7440-39-3	Barium	5.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	495000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	26.0			P
7439-89-6	Iron	23.1	B		P
7439-92-1	Lead	2.0	U	W	F
7439-95-4	Magnesium	147000			P
7439-96-5	Manganese	59.5			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	3550	B		P
7782-49-2	Selenium	3.9	U		F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	83000			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	105			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

005

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ204

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-05S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	35.0	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.3	B		F
7440-39-3	Barium	28.7	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	495000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	17.4	B		P
7440-50-8	Copper	9.0	B		P
7439-89-6	Iron	2230			P
7439-92-1	Lead	2.0	U	W	F
7439-95-4	Magnesium	135000			P
7439-96-5	Manganese	6520			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	11.0	B		P
7440-09-7	Potassium	11400			P
7782-49-2	Selenium	3.9	U		F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	138000			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	41.4			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

006

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ206

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-06S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	763			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U		F
7440-39-3	Barium	81.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	92700			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	15.3	B		P
7439-89-6	Iron	1320			P
7439-92-1	Lead	18.4			F
7439-95-4	Magnesium	121000			P
7439-96-5	Manganese	321			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	4840	B		P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	5220			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	45.5			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

007

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ207

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-07S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	62.0	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	74.4	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	69800			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	5.7	B		P
7439-89-6	Iron	33.5	B		P
7439-92-1	Lead	6.5		W	F
7439-95-4	Magnesium	108000			P
7439-96-5	Manganese	158			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	4760	B		P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	5090			P
7440-28-0	Thallium	1.4	B	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	15.5	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

008

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ208

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-08S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15.8	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	2.0	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.7	B		P
7440-70-2	Calcium	54200			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	3.4	B		P
7439-89-6	Iron	17.7	B		P
7439-92-1	Lead	2.0	B		F
7439-95-4	Magnesium	22900			P
7439-96-5	Manganese	0.90	U		P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	2320	B		P
7782-49-2	Selenium	19.5	U	E	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	19200			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	8.1	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

009

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ209

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-09S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5970			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	42.0	B		P
7440-41-7	Beryllium	0.49	B		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	11900			P
7440-47-3	Chromium	3.1	B		P
7440-48-4	Cobalt	2.1	B		P
7440-50-8	Copper	24.8	B		P
7439-89-6	Iron	5980			P
7439-92-1	Lead	17.4		S	F
7439-95-4	Magnesium	4570	B		P
7439-96-5	Manganese	87.9			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	1460	B		P
7782-49-2	Selenium	3.9	U		F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	1720	B		P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	7.7	B		P
7440-66-6	Zinc	46.6			P
	Cyanide				NR

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: BROWN Clarity After: CLOUDY Artifacts:

Comments:

010

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ212

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-10S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	414			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U		F
7440-39-3	Barium	26.3	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	360000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	40.4			P
7439-89-6	Iron	506			P
7439-92-1	Lead	4.2		W	F
7439-95-4	Magnesium	136000			P
7439-96-5	Manganese	48.7			P
7439-97-6	Mercury	0.12	B	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	5760			P
7782-49-2	Selenium	10.1		+	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	76100			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	3.0	B		P
7440-66-6	Zinc	95.5			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

011

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ213

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-11S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24.8	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	32.4	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	B		P
7440-70-2	Calcium	308000			P
7440-47-3	Chromium	8.9	B		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	27.6			P
7439-89-6	Iron	219			P
7439-92-1	Lead	2.7	B	W	F
7439-95-4	Magnesium	134000			P
7439-96-5	Manganese	3.9	B		P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	6.6	B		P
7440-09-7	Potassium	4310	B		P
7782-49-2	Selenium	3.9	U		F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	60100			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	68.0			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

012

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ214

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-12S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	30.8	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	58.1	B		P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	190000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	4.2	B		P
7439-89-6	Iron	52.6	B		P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	79200			P
7439-96-5	Manganese	529			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	4.1	B		P
7440-09-7	Potassium	7300			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	36900			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	5.7	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

013

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ215

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-13S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	21.1	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	51.8	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	171000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	1.9	U		P
7439-89-6	Iron	30.1	B		P
7439-92-1	Lead	2.0	U		F
7439-95-4	Magnesium	71000			P
7439-96-5	Manganese	472			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	6490			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	32700			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	10.6	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

014

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ216

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-14S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	466			P
7440-36-0	Antimony	15.8	B		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	54.0	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.8	B		P
7440-70-2	Calcium	169000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	2.8	B		P
7440-50-8	Copper	2.7	B		P
7439-89-6	Iron	635			P
7439-92-1	Lead	2.7	B		F
7439-95-4	Magnesium	69100			P
7439-96-5	Manganese	516			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	6590			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	32000			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	11.9	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

015

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ217

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-15S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	654			P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	53.0	B		P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	167000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	3.5	B		P
7440-50-8	Copper	6.9	B		P
7439-89-6	Iron	820			P
7439-92-1	Lead	2.9	B		F
7439-95-4	Magnesium	69000			P
7439-96-5	Manganese	520			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	6330			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	31700			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	16.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

016

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ218

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-16S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	41.8	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U		F
7440-39-3	Barium	15.1	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	5970			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	17.0	B		P
7439-89-6	Iron	47.9	B		P
7439-92-1	Lead	5.7			F
7439-95-4	Magnesium	312	B		P
7439-96-5	Manganese	3.4	B		P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	322	B		P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	9720			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.6	B		P
7440-66-6	Zinc	32.1			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

017

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ219

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-17S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	177	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	91.1	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.8	B		P
7440-70-2	Calcium	181000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	3.1	B		P
7439-89-6	Iron	267			P
7439-92-1	Lead	2.0	U	W	F
7439-95-4	Magnesium	56500			P
7439-96-5	Manganese	28.8			P
7439-97-6	Mercury	0.10	U	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	13400			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	60200			P
7440-28-0	Thallium	1.7	B		F
7440-62-2	Vanadium	2.5	U		P
7440-66-6	Zinc	12.0	B		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

018

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ220

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Lab Sample ID: 12134-18S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	34.6	B		P
7440-36-0	Antimony	14.8	U		P
7440-38-2	Arsenic	3.2	U	W	F
7440-39-3	Barium	50.1	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.5	U		P
7440-70-2	Calcium	172000			P
7440-47-3	Chromium	2.6	U		P
7440-48-4	Cobalt	1.3	U		P
7440-50-8	Copper	2.3	B		P
7439-89-6	Iron	20.3	B		P
7439-92-1	Lead	2.0	U	W	F
7439-95-4	Magnesium	52000			P
7439-96-5	Manganese	3.9	B		P
7439-97-6	Mercury	0.18	B	N	CV
7440-02-0	Nickel	2.6	U		P
7440-09-7	Potassium	14200			P
7782-49-2	Selenium	3.9	U	W	F
7440-22-4	Silver	3.6	U		P
7440-23-5	Sodium	63300			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.6	B		P
7440-66-6	Zinc	5.7	U		P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

019

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1878.0	1863.70	99.2	25000.0	23872.00	95.5	23668.00	94.7	P
Antimony	978.0	1006.60	102.9	2500.0	2378.40	95.1	2352.30	94.1	P
Arsenic	50.4	51.47	102.1	50.0	50.31	100.6	50.89	101.8	F
Barium	1891.0	1959.50	103.6	2500.0	2431.10	97.2	2399.60	96.0	P
Beryllium	478.0	478.34	100.1	500.0	480.64	96.1	473.39	94.7	P
Cadmium	493.0	476.90	96.7	2500.0	2305.50	92.2	2276.50	91.1	P
Calcium	48810.0	48541.00	99.4	25000.0	23416.00	93.7	23061.00	92.2	P
Chromium	480.0	484.00	100.8	2500.0	2326.60	93.1	2296.30	91.9	P
Cobalt	487.0	481.00	98.8	2500.0	2338.70	93.5	2311.10	92.4	P
Copper	486.0	493.87	101.6	2500.0	2433.90	97.4	2399.20	96.0	P
Iron	1962.0	1953.10	99.5	10000.0	9492.80	94.9	9334.60	93.3	P
Lead	98.4	100.49	102.1	50.0	49.93	99.9	50.72	101.4	F
Magnesium	23859.0	24133.00	101.1	25000.0	23491.00	94.0	23156.00	92.6	P
Manganese	474.0	480.77	101.4	2500.0	2356.00	94.2	2320.70	92.8	P
Mercury	5.0	5.09	101.8	2.0	1.95	97.5	1.83	91.5	CV
Nickel	488.0	479.20	98.2	2500.0	2313.30	92.5	2281.20	91.2	P
Potassium	49182.0	48615.00	98.8	25000.0	24189.00	96.8	23805.00	95.2	P
Selenium	50.3	54.41	108.2	50.0	49.73	99.5	46.84	93.7	F
Silver	478.0	501.67	105.0	500.0	489.82	98.0	486.50	97.3	P
Sodium	46804.0	48620.00	103.9	25000.0	24123.00	96.5	23729.00	94.9	P
Thallium	100.7	99.64	98.9	50.0	49.18	98.4	50.67	101.3	F
Vanadium	482.0	493.84	102.5	2500.0	2386.50	95.5	2354.70	94.2	P
Zinc	2921.0	2908.50	99.6	2500.0	2356.00	94.2	2318.30	92.7	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

020

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	24062.00	96.2	25587.00	102.3	P
Antimony				2500.0	2386.90	95.5	2528.40	101.1	P
Arsenic				50.0	49.00	98.0	47.99	96.0	F
Barium				2500.0	2437.20	97.5	2611.80	104.5	P
Beryllium				500.0	478.81	95.8	508.42	101.7	P
Cadmium				2500.0	2321.80	92.9	2432.50	97.3	P
Calcium				25000.0	23369.00	93.5	24583.00	98.3	P
Chromium				2500.0	2329.30	93.2	2458.90	98.4	P
Cobalt				2500.0	2355.00	94.2	2479.10	99.2	P
Copper				2500.0	2438.00	97.5	2598.40	103.9	P
Iron				10000.0	9479.30	94.8	10023.00	100.2	P
Lead				50.0	51.67	103.3	50.40	100.8	F
Magnesium				25000.0	23448.00	93.8	24694.00	98.8	P
Manganese				2500.0	2350.10	94.0	2478.30	99.1	P
Mercury				2.0	1.78	89.0	1.78	89.0	CV
Nickel				2500.0	2317.90	92.7	2441.20	97.6	P
Potassium				25000.0	24160.00	96.6	25660.00	102.6	P
Selenium				50.0	45.63	91.3	50.57	101.1	F
Silver				500.0	490.53	98.1	521.44	104.3	P
Sodium				25000.0	24120.00	96.5	25739.00	103.0	P
Thallium				50.0	53.70	107.4	51.74	103.5	F
Vanadium				2500.0	2384.90	95.4	2530.80	101.2	P
Zinc				2500.0	2351.10	94.0	2467.00	98.7	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	24996.00	100.0			P
Antimony				2500.0	2484.00	99.4			P
Arsenic				50.0	46.97	93.9	47.27	94.5	F
Barium				2500.0	2548.10	101.9			P
Beryllium				500.0	496.71	99.3			P
Cadmium				2500.0	2383.30	95.3			P
Calcium				25000.0	24047.00	96.2			P
Chromium				2500.0	2412.40	96.5			P
Cobalt				2500.0	2433.40	97.3			P
Copper				2500.0	2534.60	101.4			P
Iron				10000.0	9836.60	98.4			P
Lead				50.0	52.14	104.3	52.62	105.2	F
Magnesium				25000.0	24295.00	97.2			P
Manganese				2500.0	2426.80	97.1			P
Mercury				2.0	1.72	86.0	1.78	89.0	CV
Nickel				2500.0	2391.10	95.6			P
Potassium				25000.0	25013.00	100.1			P
Selenium				50.0	47.66	95.3	52.71	105.4	F
Silver				500.0	510.29	102.1			P
Sodium				25000.0	25165.00	100.7			P
Thallium				50.0	53.71	107.4	53.49	107.0	F
Vanadium				2500.0	2473.40	98.9			P
Zinc				2500.0	2423.90	97.0			P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

022

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	46.54	93.1			F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	51.67	103.3	52.95	105.9	F
Magnesium									NR
Manganese									NR
Mercury				2.0	1.72	86.0	1.83	91.5	CV
Nickel									NR
Potassium									NR
Selenium				50.0	45.03	90.1	47.66	95.3	F
Silver									NR
Sodium									NR
Thallium				50.0	52.61	105.2	54.14	108.3	F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

023

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	50.4	47.98	95.2	50.0	50.36	100.7	49.79	99.6	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	50.40	100.8			F
Magnesium									NR
Manganese									NR
Mercury				2.0	2.13	106.5	2.13	106.5	CV
Nickel									NR
Potassium									NR
Selenium	50.3	51.51	102.4	50.0	48.10	96.2	52.25	104.5	F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

024

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	52.62	105.2	50.24	100.5	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	52.67	105.3	51.80	103.6	F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

025

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	49.22	98.4			F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	45.75	91.5			F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source: SKINER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony				120.0	108.81	90.7	112.25	93.5
Arsenic	10.0	10.59	105.9					
Barium								
Beryllium				10.0	9.35	93.5	9.55	95.5
Cadmium				10.0	9.72	97.2	10.91	109.1
Calcium								
Chromium				20.0	16.78	83.9	17.44	87.2
Cobalt				100.0	89.33	89.3	93.59	93.6
Copper				50.0	57.31	114.6	59.20	118.4
Iron								
Lead	3.0	3.17	105.7					
Magnesium								
Manganese				30.0	27.79	92.6	27.96	93.2
Mercury								
Nickel				80.0	76.44	95.6	75.62	94.5
Potassium								
Selenium	5.0	10.84	216.8					
Silver				20.0	26.48	132.4	27.27	136.4
Sodium								
Thallium	10.0	9.01	90.1					
Vanadium				100.0	91.85	91.8	95.11	95.1
Zinc				40.0	44.66	111.6	45.63	114.1

027

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony								
Arsenic	10.0	10.54	105.4					
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	11.16	223.2					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

028

U.S. EPA - CLP

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	14.7	U	14.7	U	14.7	U	14.7	U	14.700	U	P
Antimony	14.8	U	14.8	U	14.8	U	14.8	U	14.800	U	P
Arsenic	3.2	U	3.2	U	3.2	U	3.2	U	3.200	U	F
Barium	0.7	U	1.2	B	0.8	B	0.8	B	0.700	U	P
Beryllium	0.3	U	0.4	B	0.4	B	0.6	B	0.300	U	P
Cadmium	1.5	U	1.5	U	2.0	B	1.9	B	1.530	B	P
Calcium	13.7	U	81.8	B	23.8	B	35.3	B	13.700	U	P
Chromium	2.6	U	2.6	U	2.6	U	2.6	U	2.600	U	P
Cobalt	1.3	U	1.3	U	1.8	B	1.3	U	1.300	U	P
Copper	5.6	B	10.2	B	7.5	B	5.6	B	5.650	B	P
Iron	4.0	U	5.7	B	4.0	U	4.0	U	5.130	B	P
Lead	2.0	U	2.0	U	2.0	U	2.0	U	2.402	B	F
Magnesium	18.0	U	130.6	B	28.4	B	22.3	B	18.000	U	P
Manganese	0.9	U	0.9	U	0.9	U	1.3	B	0.900	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.100	U	CV
Nickel	2.6	U	3.0	B	2.6	U	2.6	U	2.600	U	P
Potassium	79.4	U	79.4	U	79.4	U	79.4	U	79.400	U	P
Selenium	3.9	U	3.9	U	3.9	U	3.9	U	3.900	U	F
Silver	3.8	B	3.6	U	3.6	U	3.6	U	3.600	U	P
Sodium	32.7	U	-73.1	B	-62.6	B	-53.8	B	-61.820	B	P
Thallium	1.3	U	1.3	U	1.3	U	1.3	U	1.300	U	F
Vanadium	2.5	U	3.3	B	2.5	U	2.5	U	2.500	U	P
Zinc	5.7	U	5.7	U	5.7	U	7.1	B	5.700	U	P
Cyanide											NR

029

U.S. EPA - CLP

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			20.6	B	40.3	B					P
Antimony			14.8	U	14.8	U					P
Arsenic			3.2	U	3.2	U	3.2	U			F
Barium			1.4	B	2.2	B					P
Beryllium			0.3	U	0.4	B					P
Cadmium			2.7	B	1.5	B					P
Calcium			29.8	B	27.2	B					P
Chromium			2.6	U	3.0	B					P
Cobalt			1.3	U	2.1	B					P
Copper			6.8	B	12.8	B					P
Iron			4.0	U	9.0	B					P
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium			34.6	B	64.5	B					P
Manganese			1.0	B	0.9	U					P
Mercury			0.1	U	0.1	U	0.1	U			CV
Nickel			2.6	U	3.6	B					P
Potassium			79.4	U	79.4	U					P
Selenium			3.9	U	3.9	U	3.9	U			F
Silver			4.3	B	3.6	U					P
Sodium			-114.8	B	-85.1	B					P
Thallium			1.3	U	1.3	U	1.3	U			F
Vanadium			2.6	B	3.0	B					P
Zinc			5.7	U	5.7	U					P
Cyanide											NR

030

U.S. EPA - CLP

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			3.2	U							F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			2.0	U	2.0	U	2.0	U			F
Magnesium											NR
Manganese											NR
Mercury			0.1	U	0.1	U	0.1	U			CV
Nickel											NR
Potassium											NR
Selenium			3.9	U	3.9	U					F
Silver											NR
Sodium											NR
Thallium			1.3	U	1.3	U					F
Vanadium											NR
Zinc											NR
Cyanide											NR

U.S. EPA - CLP

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	3.2	U	3.2	U	3.2	U	3.2	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury			0.1	U							CV
Nickel											NR
Potassium											NR
Selenium	3.9	U	3.9	U	3.9	U	3.9	U			F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

032

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3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			3.2	U	3.2	U					F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.9	U	3.9	U					F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 ICS Source: ICF-0292

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum	514927	507757	517420	512990.0	101.0	547390	549320.0	108.2
Antimony	0	0	2	28.0		-2	1.4	
Arsenic								
Barium	0	499	-1	475.0	95.2	0	515.3	103.3
Beryllium	0	488	0	474.0	97.1	0	485.2	99.4
Cadmium	0	928	2	858.5	92.5	4	869.4	93.7
Calcium	529351	525385	491620	489820.0	93.2	496160	496220.0	94.4
Chromium	14	464	15	461.8	99.5	19	473.5	102.0
Cobalt	0	475	-1	467.6	98.4	-1	485.0	102.1
Copper	0	488	-10	477.0	97.7	-6	514.2	105.4
Iron	190348	187957	186980	186390.0	99.2	192120	192540.0	102.4
Lead								
Magnesium	543610	533685	525730	524080.0	98.2	539000	539640.0	101.1
Manganese	36	502	29	482.0	96.0	30	494.3	98.5
Mercury								
Nickel	0	897	-1	850.7	94.8	1	867.7	96.7
Potassium	0	0	29	96.6		93	170.6	
Selenium								
Silver	0	899	-1	978.3	108.8	2	1036.3	115.3
Sodium	0	0	813	813.4		809	795.7	
Thallium								
Vanadium	0	473	2	468.6	99.1	5	485.8	102.7
Zinc	71	1001	70	988.9	98.8	72	1022.8	102.2

034

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5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MFQ216S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix: WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75-125	2481.2000		465.5300		2000.00	100.8		P
Antimony	75-125	450.9500		15.8400	B	500.00	87.0		P
Arsenic	75-125	37.1460		3.2000	U	40.00	92.9		F
Barium	75-125	1886.9000		53.9800	B	2000.00	91.6		P
Beryllium	75-125	45.1200		0.3000	U	50.00	90.2		P
Cadmium	75-125	45.3600		1.7800	B	50.00	87.2		P
Calcium									NR
Chromium	75-125	172.2400		2.6000	U	200.00	86.1		P
Cobalt	75-125	433.5600		2.8300	B	500.00	86.1		P
Copper	75-125	237.0500		2.7400	B	250.00	93.7		P
Iron	75-125	1629.5000		635.1600		1000.00	99.4		P
Lead	75-125	23.6485		2.6570	B	20.00	105.0		F
Magnesium									NR
Manganese	75-125	961.1800		516.2500		500.00	89.0		P
Mercury	75-125	0.7110		0.1000	U	1.00	71.1	N	CV
Nickel	75-125	427.9600		2.6000	U	500.00	85.6		P
Potassium									NR
Selenium	75-125	8.6760		3.9000	U	10.00	86.8		F
Silver	75-125	42.6400		3.6000	U	50.00	85.3		P
Sodium									NR
Thallium	75-125	41.6610		1.3000	U	50.00	83.3		F
Vanadium	75-125	442.0700		2.5000	U	500.00	88.4		P
Zinc	75-125	460.7600		11.8600	B	500.00	89.8		P
Cyanide									NR

Comments:

035

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6
DUPLICATES

EPA SAMPLE NO.

MFQ214D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		30.8200	B	54.1300	B	54.9		P
Antimony		14.8000	U	14.8000	U			P
Arsenic		3.2000	U	3.2000	U			F
Barium		58.0600	B	55.8200	B	3.9		P
Beryllium		0.3800	B	0.3000	U	200.0		P
Cadmium		1.5000	U	1.5000	U			P
Calcium		190430.0000		187360.0000		1.6		P
Chromium		2.6000	U	2.6000	U			P
Cobalt		1.3000	U	1.3000	U			P
Copper		4.1500	B	1.9000	U	200.0		P
Iron		52.5600	B	89.4800	B	52.0		P
Lead		2.0000	U	2.7840	B	200.0		F
Magnesium		79217.0000		77929.0000		1.6		P
Manganese		529.1700		520.0100		1.7		P
Mercury		0.1000	U	0.1000	U			CV
Nickel		4.1000	B	2.6000	U	200.0		P
Potassium	5000.0	7299.7000		7177.4000		1.7		P
Selenium		3.9000	U	3.9000	U			F
Silver		3.6000	U	3.6000	U			P
Sodium		36908.0000		36266.0000		1.8		P
Thallium		1.3000	U	1.3000	U			F
Vanadium		2.5000	U	2.5000	U			P
Zinc		5.7000	U	8.0300	B	200.0		P
Cyanide								NR

036

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LABORATORY CONTROL SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Solid LCS Source:

Aqueous LCS Source: EPA-LV 0692

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	1878.0	1790.90	95.4						
Antimony	1024.0	980.95	95.8						
Arsenic	50.4	47.26	93.8						
Barium	1891.0	1879.80	99.4						
Beryllium	478.0	448.13	93.8						
Cadmium	493.0	437.21	88.7						
Calcium	48810.0	44399.00	91.0						
Chromium	480.0	449.03	93.5						
Cobalt	487.0	445.19	91.4						
Copper	486.0	481.03	99.0						
Iron	1962.0	1835.00	93.5						
Lead	49.2	54.39	110.5						
Magnesium	23859.0	22206.00	93.1						
Manganese	474.0	448.39	94.6						
Mercury									
Nickel	488.0	440.84	90.3						
Potassium	49182.0	46336.00	94.2						
Selenium	50.3	46.24	91.9						
Silver	478.0	469.38	98.2						
Sodium	46804.0	46388.00	99.1						
Thallium	50.4	52.18	103.5						
Vanadium	482.0	462.34	95.9						
Zinc	2921.0	2671.60	91.5						
Cyanide									

037

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STANDARD ADDITION RESULTS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q
MFQ203	AS	-.006	10.00	0.029	20.00	0.075	30.00	0.103	-1.5	0.9961	
MFQ209	PB	0.065	10.00	0.102	20.00	0.140	30.00	0.177	17.4	1.0000	
MFQ212	SE	0.024	5.00	0.026	10.00	0.042	15.00	0.053	10.1	0.9657	+
MFQ212	SE	0.015	5.00	0.034	10.00	0.029	15.00	0.049	8.9	0.8924	+

038

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ICP SERIAL DILUTIONS

EPA SAMPLE NO.

MFQ216L

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	465.53		497.20	B	6.8		P
Antimony	15.84	B	74.00	U	100.0		P
Arsenic							NR
Barium	53.98	B	57.00	B	5.6		P
Beryllium	0.30	U	1.50	U			P
Cadmium	1.78	B	7.50	U	100.0		P
Calcium	168590.00		168705.00		0.1		P
Chromium	2.60	U	13.00	U			P
Cobalt	2.83	B	6.50	U	100.0		P
Copper	2.74	B	11.40	B	316.1		P
Iron	635.16		622.90		1.9		P
Lead							NR
Magnesium	69116.00		68250.00		1.3		P
Manganese	516.25		521.60		1.0		P
Mercury							NR
Nickel	2.60	U	13.00	U			P
Potassium	6594.50		6504.50	B	1.4		P
Selenium							NR
Silver	3.60	U	18.00	U			P
Sodium	31986.00		30917.50		3.3		P
Thallium							NR
Vanadium	2.50	U	12.50	U			P
Zinc	11.86	B	29.05	B	144.9		P

039

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F3

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	283.30	BS	3	2.0	F
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium	276.80	BS	10	1.3	F
Vanadium			50		NR
Zinc			20		NR

Comments:
F3: THERMO JARRELL-ASH VIDEO 22E (#2913)

040

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F5

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	3.2	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	3.9	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

F5: THERMO JARRELL-ASH VIDEO 21E (#2936)

041

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: Date: 10/15/92

Flame AA ID Number: M1

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:

M1: TECHNICON MERCURY ANALYZER (#SS4199A-D)

042

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	14.7	P
Antimony	206.80		60	14.8	P
Arsenic			10		NR
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.3	P
Cadmium	226.50		5	1.5	P
Calcium	317.90		5000	13.7	P
Chromium	267.70		10	2.6	P
Cobalt	228.60		50	1.3	P
Copper	324.70		25	1.9	P
Iron	259.90		100	4.0	P
Lead			3		NR
Magnesium	279.00		5000	18.0	P
Manganese	257.60		15	0.9	P
Mercury			0.2		NR
Nickel	231.60		40	2.6	P
Potassium	766.40		5000	79.4	P
Selenium			5		NR
Silver	328.00		10	3.6	P
Sodium	588.90		5000	32.7	P
Thallium			10		NR
Vanadium	292.40		50	2.5	P
Zinc	213.80		20	5.7	P

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

043

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11

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	Cr
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	-0.0006600
Antimony	206.80	0.0000000	0.0000000	0.0002200	0.0000000	0.0130700
Arsenic						
Barium	493.40	0.0000300	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0002000	0.0000000	0.0000000
Calcium	317.90	0.0000000	0.0000000	-0.0001800	0.0000700	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000300	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0002500
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	-0.0000600
Iron	259.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead						
Magnesium	279.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.60	0.0000200	0.0000000	-0.0000100	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0000000	-0.0003100	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	0.0000000	-0.0000300	0.0000000	-0.0037800
Zinc	213.80	0.0000000	0.0000000	0.0001200	0.0000000	0.0000000

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

044

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11

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Cu	Mn	Mo	Ni	Sn
Aluminum	308.20	0.0000000	0.0009700	0.0006000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0000000	-0.0017900	0.0000000
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	-0.0002300	0.0000000
Calcium	317.90	0.0000000	0.0003000	0.0000000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0002500	0.0000700	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	-0.0001800	0.0000000
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	259.90	0.0000000	-0.0030600	0.0002000	0.0000000	-0.0000500
Lead						
Magnesium	279.00	0.0000000	-0.0038500	0.0002000	0.0000000	0.0000000
Manganese	257.60	-0.0000400	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	-0.0002300	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0001000	0.0000000	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	-0.0001100	0.0000000	0.0000000	0.0000000
Zinc	213.80	0.0018900	0.0001100	0.0000000	0.0039800	0.0000000

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

045

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Sr	Ti	V	Zn	__
Aluminum	308.20	0.0000000	0.0000000	-0.0323900	0.0000000	
Antimony	206.80	0.0000000	0.0015000	-0.0094100	-0.0007400	
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.00	0.0000000	0.0000000	-0.0014700	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.90	0.0000300	0.0000000	0.0000000	0.0000000	
Chromium	267.70	0.0000000	0.0000000	0.0005100	0.0000000	
Cobalt	228.60	0.0000000	0.0014400	0.0000000	0.0000000	
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.90	0.0000050	0.0000000	0.0000000	0.0000000	
Lead						
Magnesium	279.00	0.0000000	-0.0038300	0.0000000	0.0000000	
Manganese	257.60	0.0000000	0.0000000	0.0000000	0.0000000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	328.00	0.0000000	-0.0001400	0.0000000	0.0000000	
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	292.40	0.0000000	0.0003400	0.0000000	0.0000000	
Zinc	213.80	0.0000000	0.0000000	0.0000000	0.0000000	

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

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U.S. EPA - CLP

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ICP LINEAR RANGES (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

ICP ID Number: P2 Date: 10/15/92

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	P
Antimony	5.00	25000.0	P
Arsenic			NR
Barium	5.00	100000.0	P
Beryllium	5.00	25000.0	P
Cadmium	5.00	25000.0	P
Calcium	5.00	800000.0	P
Chromium	5.00	200000.0	P
Cobalt	5.00	100000.0	P
Copper	5.00	250000.0	P
Iron	5.00	550000.0	P
Lead			NR
Magnesium	5.00	1000000.0	P
Manganese	5.00	100000.0	P
Mercury			NR
Nickel	5.00	250000.0	P
Potassium	5.00	900000.0	P
Selenium			NR
Silver	5.00	40000.0	P
Sodium	5.00	1000000.0	P
Thallium			NR
Vanadium	5.00	50000.0	P
Zinc	5.00	150000.0	P

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
MFN651	12/17/92		100
MFQ201	12/17/92		100
MFQ202	12/17/92		100
MFQ203	12/17/92		100
MFQ204	12/17/92		100
MFQ206	12/17/92		100
MFQ207	12/17/92		100
MFQ208	12/17/92		100
MFQ209	12/17/92		100
MFQ212	12/17/92		100
MFQ213	12/17/92		100
MFQ214	12/17/92		100
MFQ214D	12/17/92		100
MFQ215	12/17/92		100
MFQ216	12/17/92		100
MFQ216S	12/17/92		100
MFQ217	12/17/92		100
MFQ218	12/17/92		100
MFQ219	12/17/92		100
MFQ220	12/17/92		100
PBW	12/17/92		100

FORM XIII - IN ILM02.1

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSW	01/06/93		100
MFN651	01/06/93		100
MFQ201	01/06/93		100
MFQ202	01/06/93		100
MFQ203	01/06/93		100
MFQ204	01/06/93		100
MFQ206	01/06/93		100
MFQ207	01/06/93		100
MFQ208	01/06/93		100
MFQ209	01/06/93		100
MFQ212	01/06/93		100
MFQ213	01/06/93		100
MFQ214	01/06/93		100
MFQ214D	01/06/93		100
MFQ215	01/06/93		100
MFQ216	01/06/93		100
MFQ216S	01/06/93		100
MFQ217	01/06/93		100
MFQ218	01/06/93		100
MFQ219	01/06/93		100
MFQ220	01/06/93		100
PBW	01/06/93		100

FORM XIII - IN ILM02.1

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSW	01/06/93		100
MFN651	01/06/93		100
MFQ201	01/06/93		100
MFQ202	01/06/93		100
MFQ203	01/06/93		100
MFQ204	01/06/93		100
MFQ206	01/06/93		100
MFQ207	01/06/93		100
MFQ208	01/06/93		100
MFQ209	01/06/93		100
MFQ212	01/06/93		100
MFQ213	01/06/93		100
MFQ214	01/06/93		100
MFQ214D	01/06/93		100
MFQ215	01/06/93		100
MFQ216	01/06/93		100
MFQ216S	01/06/93		100
MFQ217	01/06/93		100
MFQ218	01/06/93		100
MFQ219	01/06/93		100
MFQ220	01/06/93		100
PBW	01/06/93		100

FORM XIII - IN ILM02.1

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: M1 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1100																X									
S0.2	1.00	1103																X									
S0.5	1.00	1106																X									
S1.0	1.00	1109																X									
S2.0	1.00	1112																X									
S5.0	1.00	1115																X									
ICV	2.00	1121																X									
ICB	1.00	1124																X									
CCV	1.00	1127																X									
CCB	1.00	1130																X									
ZZZZZZ	1.00	1133																									
ZZZZZZ	1.00	1136																									
ZZZZZZ	1.00	1139																									
ZZZZZZ	1.00	1142																									
ZZZZZZ	1.00	1145																									
ZZZZZZ	1.00	1148																									
ZZZZZZ	1.00	1151																									
ZZZZZZ	1.00	1154																									
ZZZZZZ	1.00	1157																									
CCV	1.00	1200																X									
CCB	1.00	1203																X									
ZZZZZZ	1.00	1206																									
ZZZZZZ	1.00	1209																									
ZZZZZZ	1.00	1212																									
ZZZZZZ	1.00	1215																									
ZZZZZZ	1.00	1218																									
ZZZZZZ	1.00	1221																									
ZZZZZZ	1.00	1224																									
ZZZZZZ	1.00	1227																									
CCV	1.00	1230																X									
CCB	1.00	1233																X									
ZZZZZZ	1.00	1236																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: M1 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1239																									
ZZZZZZ	1.00	1242																									
ZZZZZZ	1.00	1245																									
ZZZZZZ	1.00	1248																									
ZZZZZZ	1.00	1251																									
ZZZZZZ	1.00	1254																									
ZZZZZZ	1.00	1257																									
ZZZZZZ	1.00	1300																									
ZZZZZZ	1.00	1303																									
CCV	1.00	1306																X									
CCB	1.00	1309																X									
ZZZZZZ	1.00	1312																									
ZZZZZZ	1.00	1315																									
ZZZZZZ	1.00	1318																									
ZZZZZZ	1.00	1321																									
ZZZZZZ	1.00	1324																									
ZZZZZZ	1.00	1327																									
ZZZZZZ	1.00	1330																									
ZZZZZZ	1.00	1333																									
ZZZZZZ	1.00	1336																									
ZZZZZZ	1.00	1339																									
CCV	1.00	1342																X									
CCB	1.00	1345																X									
ZZZZZZ	1.00	1348																									
ZZZZZZ	1.00	1351																									
ZZZZZZ	1.00	1354																									
ZZZZZZ	1.00	1357																									
ZZZZZZ	1.00	1400																									
ZZZZZZ	1.00	1403																									
ZZZZZZ	1.00	1406																									
ZZZZZZ	1.00	1409																									
ZZZZZZ	1.00	1412																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: M1 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1415																									
CCV	1.00	1418																X									
CCB	1.00	1421																X									
ZZZZZZ	1.00	1424																									
ZZZZZZ	1.00	1427																									
ZZZZZZ	1.00	1430																									
ZZZZZZ	1.00	1433																									
ZZZZZZ	1.00	1436																									
ZZZZZZ	1.00	1439																									
ZZZZZZ	1.00	1442																									
ZZZZZZ	1.00	1445																									
ZZZZZZ	1.00	1448																									
ZZZZZZ	1.00	1451																									
CCV	1.00	1454																X									
CCB	1.00	1457																X									
PBW	1.00	1500																X									
MFN651	1.00	1503																X									
MFQ201	1.00	1506																X									
MFQ202	1.00	1509																X									
MFQ203	1.00	1512																X									
MFQ204	1.00	1515																X									
MFQ206	1.00	1518																X									
MFQ207	1.00	1521																X									
MFQ208	1.00	1524																X									
MFQ209	1.00	1527																X									
CCV	1.00	1530																X									
CCB	1.00	1533																X									
MFQ212	1.00	1536																X									
MFQ213	1.00	1539																X									
MFQ214	1.00	1542																X									
MFQ214D	1.00	1545																X									
MFQ215	1.00	1548																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: M1 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ216	1.00	1551																X									
MFQ216S	1.00	1554																X									
MFQ217	1.00	1557																X									
MFQ218	1.00	1600																X									
MFQ219	1.00	1603																X									
CCV	1.00	1606																X									
CCB	1.00	1609																X									
MFQ220	1.00	1612																X									
ZZZZZZ	1.00	1615																									
ZZZZZZ	1.00	1618																									
ZZZZZZ	1.00	1621																									
ZZZZZZ	1.00	1624																									
ZZZZZZ	1.00	1627																									
ZZZZZZ	1.00	1630																									
ZZZZZZ	1.00	1633																									
CCV	1.00	1636																X									
CCB	1.00	1639																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1538				X																					
S10	1.00	1543				X																					
S50	1.00	1548				X																					
S100	1.00	1553				X																					
ICV	1.00	1603				X																					
ICB	1.00	1605				X																					
CRA	1.00	1608				X																					
CCV	1.00	1611				X																					
CCB	1.00	1614				X																					
ZZZZZZ0	2.00	1616																									
ZZZZZZ1	2.00	1619																									
ZZZZZZ2	2.00	1622																									
ZZZZZZ3	2.00	1625																									
ZZZZZZ0	2.00	1629																									
ZZZZZZ1	2.00	1632																									
ZZZZZZ2	2.00	1635																									
ZZZZZZ3	2.00	1638																									
ZZZZZZ	1.00	1641																									
ZZZZZZ	1.00	1643																									
CCV	1.00	1646				X																					
CCB	1.00	1649				X																					
PBW	1.00	1716																									
PBWA	1.00	1721	75.4																								
LCSW	1.00	1726				X																					
LCSWA	1.00	1731	92.7			X																					
MFN651	1.00	1736				X																					
MFN651A	1.00	1741	76.0			X																					
MFQ201	1.00	1746																									
MFQ201A	1.00	1751	34.1																								
ZZZZZZ	1.00	1756																									
ZZZZZZ	1.00	1801																									
CCV	1.00	1806				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1811				X																					
MFQ203	1.00	1817																									
MFQ203A	1.00	1822	73.8																								
MFQ204	1.00	1827				X																					
MFQ204A	1.00	1832	86.7			X																					
MFQ206	1.00	1837				X																					
MFQ206A	1.00	1842	90.6			X																					
MFQ207	1.00	1847				X																					
MFQ207A	1.00	1852	63.4			X																					
ZZZZZZ	1.00	1857																									
ZZZZZZ	1.00	1902																									
CCV	1.00	1907				X																					
CCB	1.00	1912				X																					
MFQ209	1.00	1917				X																					
MFQ209A	1.00	1922	78.0			X																					
MFQ212	1.00	1927				X																					
MFQ212A	1.00	1932	84.6			X																					
MFQ213	1.00	1937				X																					
MFQ213A	1.00	1942	78.6			X																					
MFQ214	1.00	1947				X																					
MFQ214A	1.00	1952	78.6			X																					
ZZZZZZ	1.00	1958																									
ZZZZZZ	1.00	2003																									
CCV	1.00	2008				X																					
CCB	1.00	2013				X																					
MFQ215	1.00	2018				X																					
MFQ215A	1.00	2023	48.4			X																					
MFQ216	1.00	2028				X																					
MFQ216A	1.00	2033	63.4			X																					
MFQ216S	1.00	2038				X																					
ZZZZZZ	1.00	2043																									
MFQ217	1.00	2048				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ217A	1.00	2053	75.3			X																					
ZZZZZZ	1.00	2115																									
ZZZZZZ	1.00	2120																									
CCV	1.00	2125				X																					
CCB	1.00	2131				X																					
MFQ219	1.00	2139				X																					
MFQ219A	1.00	2144	68.7			X																					
MFQ220	1.00	2149				X																					
MFQ220A	1.00	2154	70.7			X																					
MFQ202	1.00	2159																									
MFQ202A	1.00	2204	38.0																								
MFQ208	1.00	2209				X																					
MFQ208A	1.00	2214	49.0			X																					
ZZZZZZ	1.00	2219																									
ZZZZZZ	1.00	2224																									
CCV	1.00	2229				X																					
CCB	1.00	2234				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1538																			X						
S5	1.00	1543																			X						
S50	1.00	1548																			X						
S100	1.00	1553																			X						
ICV	1.00	1603																			X						
ICB	1.00	1605																			X						
CRA	1.00	1608																			X						
CCV	1.00	1611																			X						
CCB	1.00	1614																			X						
ZZZZZZ0	2.00	1616																									
ZZZZZZ1	2.00	1619																									
ZZZZZZ2	2.00	1622																									
ZZZZZZ3	2.00	1625																									
ZZZZZZ0	2.00	1629																									
ZZZZZZ1	2.00	1632																									
ZZZZZZ2	2.00	1635																									
ZZZZZZ3	2.00	1638																									
ZZZZZZ	1.00	1641																									
ZZZZZZ	1.00	1643																									
CCV	1.00	1646																			X						
CCB	1.00	1649																			X						
PBW	1.00	1716																			X						
PBWA	1.00	1721	86.7																		X						
LCSW	1.00	1726																			X						
LCSWA	1.00	1731	75.2																		X						
MFN651	1.00	1736																									
MFN651A	1.00	1741	77.6																								
MFQ201	1.00	1746																			X						
MFQ201A	1.00	1751	39.9																		X						
ZZZZZZ	1.00	1756																									
ZZZZZZ	1.00	1801																									
CCV	1.00	1806																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1811																			X						
MFQ203	1.00	1817																									
MFQ203A	1.00	1822	37.2																								
MFQ204	1.00	1827																			X						
MFQ204A	1.00	1832	103.7																		X						
MFQ206	1.00	1837																			X						
MFQ206A	1.00	1842	74.5																		X						
MFQ207	1.00	1847																			X						
MFQ207A	1.00	1852	41.3																		X						
ZZZZZZ	1.00	1857																									
ZZZZZZ	1.00	1902																									
CCV	1.00	1907																			X						
CCB	1.00	1912																			X						
MFQ209	1.00	1917																									
MFQ209A	1.00	1922	68.4																								
MFQ212	1.00	1927																									
MFQ212A	1.00	1932	59.2																								
MFQ213	1.00	1937																			X						
MFQ213A	1.00	1942	103.8																		X						
MFQ214	1.00	1947																			X						
MFQ214A	1.00	1952	83.7																		X						
ZZZZZZ	1.00	1958																									
ZZZZZZ	1.00	2003																									
CCV	1.00	2008																			X						
CCB	1.00	2013																			X						
MFQ215	1.00	2018																									
MFQ215A	1.00	2023	63.9																								
MFQ216	1.00	2028																			X						
MFQ216A	1.00	2033	59.3																		X						
MFQ216S	1.00	2038																			X						
ZZZZZZ	1.00	2043																									
MFQ217	1.00	2048																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ217A	1.00	2053	73.0																		X						
ZZZZZZ	1.00	2115																									
ZZZZZZ	1.00	2120																									
CCV	1.00	2125																			X						
CCB	1.00	2131																			X						
MFQ219	1.00	2139																			X						
MFQ219A	1.00	2144	53.3																		X						
MFQ220	1.00	2149																			X						
MFQ220A	1.00	2154	59.3																		X						
MFQ202	1.00	2159																									
MFQ202A	1.00	2204	0.0																								
MFQ208	1.00	2209																									
MFQ208A	1.00	2214	0.0																								
ZZZZZZ	1.00	2219																									
ZZZZZZ	1.00	2224																									
CCV	1.00	2229																			X						
CCB	1.00	2234																			X						
MFQ214D	1.00	2239																			X						
MFQ214DA	1.00	2244	62.3																		X						
MFQ218	1.00	2306																			X						
MFQ218A	1.00	2311	54.8																		X						
MFN651	1.00	2316																			X						
MFN651A	1.00	2321	53.3																		X						
MFQ203	1.00	2326																			X						
MFQ203A	1.00	2331	106.8																		X						
ZZZZZZ	1.00	2336																									
ZZZZZZ	1.00	2341																									
CCV	1.00	2346																			X						
CCB	1.00	2351																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1646													X												
S3	1.00	1650													X												
S50	1.00	1655													X												
S100	1.00	1659													X												
ICV	2.00	1706													X												
ICB	1.00	1710													X												
CRA	1.00	1714													X												
CCV	1.00	1719													X												
CCB	1.00	1723													X												
PBW	1.00	1727													X												
PBWA	1.00	1731	102.8												X												
LCSW	1.00	1736													X												
LCSWA	1.00	1740	114.7												X												
MFN651	1.00	1744													X												
MFN651A	1.00	1748	105.8												X												
MFQ201	1.00	1753													X												
MFQ201A	1.00	1757	94.5												X												
MFQ202	1.00	1801													X												
MFQ202A	1.00	1805	98.9												X												
CCV	1.00	1810													X												
CCB	1.00	1814													X												
MFQ203	1.00	1818													X												
MFQ203A	1.00	1822	73.9												X												
MFQ204	1.00	1827													X												
MFQ204A	1.00	1831	73.3												X												
MFQ206	1.00	1835													X												
MFQ206A	1.00	1839	99.5												X												
MFQ207	1.00	1844																									
MFQ207A	1.00	1848	233.2																								
MFQ208	1.00	1852													X												
MFQ208A	1.00	1856	104.7												X												
CCV	1.00	1901													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1905													X												
MFQ209	1.00	1909																									
MFQ209A	1.00	1914	127.4																								
MFQ212	1.00	1918													X												
MFQ212A	1.00	1922	69.9												X												
MFQ213	1.00	1926																									
MFQ213A	1.00	1931	83.5																								
MFQ214	1.00	1935													X												
MFQ214A	1.00	1939	86.7												X												
MFQ214D	1.00	1943													X												
MFQ214DA	1.00	1948	73.5												X												
CCV	1.00	1952													X												
CCB	1.00	1956													X												
MFQ215	1.00	2000													X												
MFQ215A	1.00	2005	90.1												X												
MFQ216	1.00	2009													X												
MFQ216A	1.00	2013	89.8												X												
MFQ217	1.00	2017													X												
MFQ217A	1.00	2022	88.5												X												
MFQ218	1.00	2026													X												
MFQ218A	1.00	2030	103.6												X												
MFQ219	1.00	2034													X												
MFQ219A	1.00	2039	48.1												X												
CCV	1.00	2043													X												
CCB	1.00	2047													X												
MFQ220	1.00	2051													X												
MFQ220A	1.00	2056	56.0												X												
MFQ216S	1.00	2100													X												
ZZZZZZ	1.00	2104																									
CCV	1.00	2108													X												
CCB	1.00	2113													X												
ZZZZZZ	1.00	2128																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	2132																									
ZZZZZZ	1.00	2136																									
ZZZZZZ	1.00	2141																									
ZZZZZZ	1.00	2145																									
ZZZZZZ	1.00	2149																									
ZZZZZZ	1.00	2153																									
ZZZZZZ	1.00	2158																									
MFQ207	1.00	2202													X												
MFQ207A	1.00	2206	231.4												X												
CCV	1.00	2210													X												
CCB	1.00	2215													X												
ZZZZZZ	1.00	2219																									
ZZZZZZ	1.00	2223																									
ZZZZZZ	1.00	2227																									
ZZZZZZ	1.00	2232																									
MFQ213	1.00	2238													X												
MFQ213A	1.00	2242	66.7												X												
ZZZZZZ	1.00	2246																									
ZZZZZZ	1.00	2251																									
ZZZZZZ	1.00	2255																									
ZZZZZZ	1.00	2259																									
CCV	1.00	2303													X												
CCB	1.00	2308													X												
MFQ2090	1.00	2311													X												
MFQ2091	1.00	2313													X												
MFQ2092	1.00	2315													X												
MFQ2093	1.00	2318													X												
ZZZZZZ0	1.00	2320																									
ZZZZZZ1	1.00	2323																									
ZZZZZZ2	1.00	2325																									
ZZZZZZ3	1.00	2327																									
ZZZZZZ	1.00	2330																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCV	1.00	2332													X												
CCB	1.00	2335													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1646																						X			
S10	1.00	1650																						X			
S50	1.00	1655																						X			
S100	1.00	1659																						X			
ICV	2.00	1706																						X			
ICB	1.00	1710																						X			
CRA	1.00	1714																						X			
CCV	1.00	1719																						X			
CCB	1.00	1723																						X			
PBW	1.00	1727																									
PBWA	1.00	1731	97.6																								
LCSW	1.00	1736																						X			
LCSWA	1.00	1740	117.7																					X			
MFN651	1.00	1744																						X			
MFN651A	1.00	1748	66.9																					X			
MFQ201	1.00	1753																						X			
MFQ201A	1.00	1757	65.6																					X			
MFQ202	1.00	1801																									
MFQ202A	1.00	1805	90.2																								
CCV	1.00	1810																						X			
CCB	1.00	1814																						X			
MFQ203	1.00	1818																									
MFQ203A	1.00	1822	67.4																								
MFQ204	1.00	1827																						X			
MFQ204A	1.00	1831	53.9																					X			
MFQ206	1.00	1835																									
MFQ206A	1.00	1839	94.8																								
MFQ207	1.00	1844																									
MFQ207A	1.00	1848	94.8																								
MFQ208	1.00	1852																									
MFQ208A	1.00	1856	91.1																								
CCV	1.00	1901																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1905																						X			
MFQ209	1.00	1909																						X			
MFQ209A	1.00	1914	116.2																					X			
MFQ212	1.00	1918																									
MFQ212A	1.00	1922	74.7																								
MFQ213	1.00	1926																									
MFQ213A	1.00	1931	81.0																								
MFQ214	1.00	1935																						X			
MFQ214A	1.00	1939	78.2																					X			
MFQ214D	1.00	1943																						X			
MFQ214DA	1.00	1948	82.8																					X			
CCV	1.00	1952																						X			
CCB	1.00	1956																						X			
MFQ215	1.00	2000																									
MFQ215A	1.00	2005	85.6																								
MFQ216	1.00	2009																						X			
MFQ216A	1.00	2013	81.9																					X			
MFQ217	1.00	2017																						X			
MFQ217A	1.00	2022	79.2																					X			
MFQ218	1.00	2026																						X			
MFQ218A	1.00	2030	92.9																					X			
MFQ219	1.00	2034																						X			
MFQ219A	1.00	2039	101.0																					X			
CCV	1.00	2043																						X			
CCB	1.00	2047																						X			
MFQ220	1.00	2051																						X			
MFQ220A	1.00	2056	111.4																					X			
MFQ216S	1.00	2100																						X			
ZZZZZZ	1.00	2104																									
CCV	1.00	2108																						X			
CCB	1.00	2113																						X			
PBW	1.00	2128																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F3 Method: F

Start date: 01/11/93 End date: 01/11/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
PBWA	1.00	2132	83.7																								
MFQ202	1.00	2136																						X			
MFQ202A	1.00	2141	78.2																					X			
MFQ203	1.00	2145																						X			
MFQ203A	1.00	2149	57.5																					X			
MFQ206	1.00	2153																						X			
MFQ206A	1.00	2158	68.3																					X			
MFQ207	1.00	2202																						X			
MFQ207A	1.00	2206	66.9																					X			
CCV	1.00	2210																						X			
CCB	1.00	2215																						X			
MFQ208	1.00	2219																						X			
MFQ208A	1.00	2223	80.9																					X			
MFQ212	1.00	2227																						X			
MFQ212A	1.00	2232	55.7																					X			
MFQ213	1.00	2238																						X			
MFQ213A	1.00	2242	69.2																					X			
MFQ215	1.00	2246																						X			
MFQ215A	1.00	2251	66.5																					X			
PBW	1.00	2255																						X			
PBWA	1.00	2259	97.5																					X			
CCV	1.00	2303																						X			
CCB	1.00	2308																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1310				X																					
S10	1.00	1315				X																					
S50	1.00	1320				X																					
S100	1.00	1325				X																					
ICV	1.00	1353				X																					
ICB	1.00	1358				X																					
CRA	1.00	1403				X																					
CCV	1.00	1408				X																					
CCB	1.00	1413				X																					
PBW	1.00	1418				X																					
PBWA	1.00	1423	108.2			X																					
MFQ201	5.00	1428				X																					
MFQ201A	5.00	1433	78.2			X																					
MFQ202	5.00	1438				X																					
MFQ202A	5.00	1443	70.6			X																					
ZZZZZZ	1.00	1449																									
ZZZZZZ	1.00	1454																									
ZZZZZZ	1.00	1502																									
ZZZZZZ	1.00	1507																									
CCV	1.00	1512				X																					
CCB	1.00	1518				X																					
ZZZZZZ	1.00	1523																									
ZZZZZZ	1.00	1528																									
ZZZZZZ	1.00	1533																									
ZZZZZZ	1.00	1538																									
MFQ218	1.00	1543				X																					
MFQ218A	1.00	1548	97.3			X																					
MFQ214D	1.00	1553				X																					
MFQ214DA	1.00	1558	91.3			X																					
ZZZZZZ	1.00	1603																									
ZZZZZZ	1.00	1608																									
CCV	1.00	1613				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1618				X																					
ZZZZZZ	1.00	1623																									
ZZZZZZ	1.00	1628																									
ZZZZZZ	1.00	1633																									
ZZZZZZ	1.00	1638																									
CCV	1.00	1643				X																					
CCB	1.00	1648				X																					
ZZZZZZ0	1.00	1709																									
ZZZZZZ1	1.00	1712																									
ZZZZZZ2	1.00	1714																									
ZZZZZZ3	1.00	1717																									
MFQ2030	1.00	1720				X																					
MFQ2031	1.00	1723				X																					
MFQ2032	1.00	1725				X																					
MFQ2033	1.00	1728				X																					
ZZZZZZ0	1.00	1740																									
ZZZZZZ1	1.00	1742																									
ZZZZZZ2	1.00	1745																									
ZZZZZZ3	1.00	1748																									
ZZZZZZ	1.00	1751																									
ZZZZZZ	1.00	1754																									
CCV	1.00	1756				X																					
CCB	1.00	1759				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1310																			X						
S5	1.00	1315																			X						
S50	1.00	1320																			X						
S100	1.00	1325																			X						
ICV	1.00	1353																			X						
ICB	1.00	1358																			X						
CRA	1.00	1403																			X						
CCV	1.00	1408																			X						
CCB	1.00	1413																			X						
ZZZZZZ	1.00	1418																									
ZZZZZZ	1.00	1423																									
MFQ201	5.00	1428																									
MFQ201A	5.00	1433	57.4																								
MFQ202	5.00	1438																			X						
MFQ202A	5.00	1443	49.2																		X						
MFQ207	5.00	1449																									
MFQ207A	5.00	1454	0.0																								
ZZZZZZ	1.00	1502																									
ZZZZZZ	1.00	1507																									
CCV	1.00	1512																			X						
CCB	1.00	1518																			X						
MFQ209	1.00	1523																			X						
MFQ209A	1.00	1528	92.7																		X						
MFQ215	1.00	1533																			X						
MFQ215A	1.00	1538	78.0																		X						
ZZZZZZ	1.00	1543																									
ZZZZZZ	1.00	1548																									
ZZZZZZ	1.00	1553																									
ZZZZZZ	1.00	1558																									
ZZZZZZ	1.00	1603																									
ZZZZZZ	1.00	1608																									
CCV	1.00	1613																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: F5 Method: F

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1618																			X						
MFQ208	5.00	1623																			X						
MFQ208A	5.00	1628	0.0																		X						
ZZZZZZ	1.00	1633																									
ZZZZZZ	1.00	1638																									
CCV	1.00	1643																			X						
CCB	1.00	1648																			X						
MFQ2120	1.00	1709																			X						
MFQ2121	1.00	1712																			X						
MFQ2122	1.00	1714																			X						
MFQ2123	1.00	1717																			X						
ZZZZZZ0	1.00	1720																									
ZZZZZZ1	1.00	1723																									
ZZZZZZ2	1.00	1725																									
ZZZZZZ3	1.00	1728																									
MFQ2120	1.00	1740																			X						
MFQ2121	1.00	1742																			X						
MFQ2122	1.00	1745																			X						
MFQ2123	1.00	1748																			X						
ZZZZZZ	1.00	1751																									
ZZZZZZ	1.00	1754																									
CCV	1.00	1756																			X						
CCB	1.00	1759																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: P2 Method: P

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1118		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
S	1.00	1120		X						X				X		X				X			X				
S	1.00	1123			X		X	X	X		X	X	X				X		X						X	X	
S	1.00	1125																				X					
ICV	1.00	1128		X			X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICV	1.00	1131																									
ICV	1.00	1134			X																						
ICB	1.00	1137		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1139		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1142		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1145			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1148		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1151		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
PBW	1.00	1153		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
LCSW	1.00	1156		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFN651	1.00	1159		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ201	1.00	1202		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ202	1.00	1204		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ203	1.00	1207		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ204	1.00	1210		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ206	1.00	1213		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ207	1.00	1215		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ208	1.00	1218		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCV	1.00	1221		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1224		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ209	1.00	1226		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ212	1.00	1229		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ213	1.00	1232		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ214	1.00	1235		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ214D	1.00	1237		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ215	1.00	1240		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ216	1.00	1243		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN651

Instrument ID Number: P2 Method: P

Start date: 01/12/93 End date: 01/12/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ216S	1.00	1245		X	X		X	X	X		X	X	X	X			X		X			X			X	X	
MFQ216L	5.00	1248		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ217	1.00	1251		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCV	1.00	1254		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1257		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ218	1.00	1259		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ219	1.00	1302		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ220	1.00	1305		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ216A	1.00	1308																									
CCV	1.00	1310		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1313		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1316		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1319		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1322			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1324		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1327		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

C L P M E T A L S 3.02e

CASE 19220

Run id: P2 9301201
THERMO JARRELL-ASH ICAP61 (#22982)
Analytical method: P
Element: Multi-Element

Acquired: 01/12/93 by SRP
Crunched: 01/12/93 by SRP
Time: 1608
Processing protocol: 3/90

Al Sb Ba Be Cd Ca Cr Co Cu
Fe Pb Mn Ni K Ag Na V Zn

Pos	Sample	Code	Meth	Preparation Batch	Preparation Date	Client ID	Date	Time
1	ICV1	ICV	P			ICV	01/12/93	11:28
2	ICV2	ICV	P			ICV	01/12/93	11:31
3	ICV3	ICV	P			ICV	01/12/93	11:34
4	STDB	ICB	P			ICB	01/12/93	11:37
5	ICSAA	ICSA0	P			ICSA	01/12/93	11:39
6	ICSABB	ICSAB0	P			ICSAB	01/12/93	11:42
7	2XCRDL292Q4	CRI0	P		10/15/92	CRI	01/12/93	11:45
8	HALFSTD	CCV	P			CCV	01/12/93	11:48
9	STDB	CCB	P			CCB	01/12/93	11:51
10	PB	PBW	P	1252	01/06/93	PBW	01/12/93	11:53
11	LCSPW	LCSW	P	1252	01/06/93	LCSW	01/12/93	11:56
12	S212134-01	S	P	1252	01/06/93	MFN651	01/12/93	11:59
13	S212134-02	S	P	1252	01/06/93	MFQ201	01/12/93	12:02
14	S212134-03	S	P	1252	01/06/93	MFQ202	01/12/93	12:04
15	S212134-04	S	P	1252	01/06/93	MFQ203	01/12/93	12:07
16	S212134-05	S	P	1252	01/06/93	MFQ204	01/12/93	12:10
17	S212134-06	S	P	1252	01/06/93	MFQ206	01/12/93	12:13
18	S212134-07	S	P	1252	01/06/93	MFQ207	01/12/93	12:15
19	S212134-08	S	P	1252	01/06/93	MFQ208	01/12/93	12:18
20	HALFSTD	CCV	P			CCV	01/12/93	12:21
21	STDB	CCB	P			CCB	01/12/93	12:24
22	S212134-09	S	P	1252	01/06/93	MFQ209	01/12/93	12:26
23	S212134-10	S	P	1252	01/06/93	MFQ212	01/12/93	12:29
24	S212134-11	S	P	1252	01/06/93	MFQ213	01/12/93	12:32
25	S212134-12	S	P	1252	01/06/93	MFQ214	01/12/93	12:35
26	S212134-12	S2	P	1252	01/06/93	MFQ214D	01/12/93	12:37
27	S212134-13	S	P	1252	01/06/93	MFQ215	01/12/93	12:40
28	S212134-14	S	P	1252	01/06/93	MFQ216	01/12/93	12:43
29	S212134-14	DS	P	1252	01/06/93	MFQ216S	01/12/93	12:45
30	S212134-14	ISD	P	1252		MFQ216L	01/12/93	12:48
31	S212134-15	S	P	1252	01/06/93	MFQ217	01/12/93	12:51
32	HALFSTD	CCV	P			CCV	01/12/93	12:54
33	STDB	CCB	P			CCB	01/12/93	12:57
34	S212134-16	S	P	1252	01/06/93	MFQ218	01/12/93	12:59
35	S212134-17	S	P	1252	01/06/93	MFQ219	01/12/93	13:02
36	S212134-18	S	P	1252	01/06/93	MFQ220	01/12/93	13:05
37	S212134-14	PS	P	1252		MFQ216A	01/12/93	13:08
38	HALFSTD	CCV	P			CCV	01/12/93	13:10
39	STDB	CCB	P			CCB	01/12/93	13:13
40	ICSAA	ICSA1	P			ICSA	01/12/93	13:16
41	ICSABB	ICSAB1	P			ICSAB	01/12/93	13:19
42	2XCRDL292Q4	CRI1	P		10/15/92	CRI	01/12/93	13:22
43	HALFSTD	CCV	P			CCV	01/12/93	13:24

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CASE 19220

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	STDB	CCB	P			CCB	01/12/93	13:27
45	STDB	WS0	P			S0	01/12/93	11:18
46	STD3	WS1	P			S	01/12/93	11:20
47	STD1	WS2	P			S	01/12/93	11:23
48	STD2	WS3	P			S	01/12/93	11:25

Method: CLP01AP2 Standard: STDB

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Avge	.00967	.00027	-.00260	-.00007	.00027	-.00033	.00465
SDev	.00301	.00122	.00140	.00012	.00012	.00042	.00055
%RSD	31.126	458.26	53.846	173.21	43.301	124.90	11.885
#1	.00680	-.00080	-.00400	-.00020	.00040	-.00080	.00525
#2	.00940	.00000	-.00120	.00000	.00020	.00000	.00454
#3	.01280	.00160	-.00260	.00000	.00020	-.00020	.00416

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Avge	.00047	.00000	.00000	.00520	.00080	.00113	.00107
SDev	.00012	.00040	.00000	.00125	.00178	.00076	.00023
%RSD	24.744	.00000	.00000	24.019	222.20	66.811	21.651
#1	.00040	-.00040	.00000	.00620	.00140	.00080	.00080
#2	.00060	.00000	.00000	.00560	.00220	.00200	.00120
#3	.00040	.00040	.00000	.00380	-.00120	.00060	.00120

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Avge	.00027	.00180	.02707	.06367	-.00007	.00000
SDev	.00023	.00087	.00654	.00114	.00012	.00000
%RSD	86.603	48.432	24.174	1.7863	173.21	.00000
#1	.00040	.00080	.02280	.06240	.00000	.00000
#2	.00000	.00220	.03460	.06400	.00000	.00000
#3	.00040	.00240	.02380	.06460	-.00020	.00000

075

Standardization Rpt. Tue 01-12-93 11:23:58 AM page 1

Method: CLP01AP2 Standard: STD3

Elem	Al3082	Ca3179	Fe2599	Mg2790	K_7664	Na5889
Avge	9.2869	23.156	11.443	4.3400	1.0370	4.2151
SDev	.0480	.107	.072	.0234	.0057	.0240
%RSD	.51690	.46313	.62656	.54020	.54924	.56987
#1	9.3414	23.276	11.525	4.3670	1.0432	4.2426
#2	9.2682	23.121	11.395	4.3248	1.0320	4.2042
#3	9.2510	23.070	11.408	4.3282	1.0358	4.1984

076

Method: CLP01AP2 Standard: STD1

Elem	Sb2068	As1936	Ba4934	Be3130	Cd2265	Cr2677	Co2286
Avge	1.1699	1.1314	1.6359	.69427	1.9561	1.0101	.94033
SDev	.0171	.0121	.0298	.01171	.0272	.0141	.01401
%RSD	1.4588	1.0696	1.8209	1.6862	1.3906	1.3919	1.4895
#1	1.1860	1.1434	1.6588	.70380	1.9756	1.0208	.95200
#2	1.1716	1.1316	1.6466	.69780	1.9676	1.0154	.94420
#3	1.1520	1.1192	1.6022	.68120	1.9250	.99420	.92480

Elem	Cu3247	Pb2203	Mn2576	Ni2316	V_2924	Zn2138
Avge	.88413	.91280	2.0395	1.2169	1.0205	1.0276
SDev	.01410	.01041	.0294	.0186	.0155	.0157
%RSD	1.5948	1.1404	1.4409	1.5297	1.5237	1.5249
#1	.89500	.92180	2.0626	1.2302	1.0328	1.0350
#2	.88920	.91520	2.0494	1.2248	1.0256	1.0382
#3	.86820	.90140	2.0064	1.1956	1.0030	1.0096

077

Method: CLP01AP2 Standard: STD2

Elem	Ag3280
Avge	2.6514
SDev	.0263
%RSD	.99011
#1	2.6284
#2	2.6800
#3	2.6458

078

Method: CLP01AP2 Sample Name: ICV1:ICV Operator: LP
Run Time: 01/12/93 11:28:49
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.8637	-.00109	.00331	1.9595	.47834	.47690	48.541
SDev	.0243	.00298	.01164	.0116	.00262	.00252	.271
%RSD	1.3044	272.42	351.81	.59296	.54749	.52853	.55884
#1	1.8911	-.00279	-.00976	1.9709	.48075	.47810	48.762
#2	1.8556	.00235	.00714	1.9599	.47873	.47861	48.622
#3	1.8446	-.00283	.01255	1.9477	.47555	.47401	48.239
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.8780			1.8910	.47800	.49300	48.810
Range	10.000			10.000	10.000	10.000	10.000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.48400	.48100	.49388	1.9531	4.8071	24.133	.48077
SDev	.00114	.00374	.00397	.0122	.0407	.174	.00227
%RSD	.23592	.77653	.80464	.62641	.84608	.72091	.47129
#1	.48466	.48490	.49802	1.9606	4.8155	24.251	.48208
#2	.48466	.48065	.49350	1.9596	4.8429	24.214	.48208
#3	.48269	.47745	.49010	1.9389	4.7629	23.933	.47816
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48000	.48700	.48600	1.9620	4.7390	23.859	.47400
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47920	48.615	.50167	48.620	.49384	2.9085
SDev	.00388	.312	.00360	.249	.00315	.0103
%RSD	.81060	.64243	.71720	.51302	.63881	.35336
#1	.48222	48.899	.50203	48.865	.49515	2.9124
#2	.48057	48.667	.50508	48.629	.49613	2.9163
#3	.47482	48.281	.49791	48.366	.49024	2.8969
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48800	49.182	.47800	46.804	.48200	2.9210
Range	10.000	10.000	10.000	10.000	10.000	10.000

079

Method: CLP01AP2 Sample Name: ICV2;ICV Operator: LP
Run Time: 01/12/93 11:31:36
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01764	.00372	.19824	.00122	.00039	.00118	.12252
SDev	.00861	.01150	.01060	.00071	.00017	.00078	.00369
%RSD	48.802	309.20	5.3446	57.741	43.611	66.070	3.0084
#1	.00940	.01311	.20884	.00081	.00048	.00033	.12655
#2	.01695	-.00910	.18765	.00081	.00048	.00135	.12170
#3	.02658	.00715	.19822	.00204	.00019	.00186	.11931
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			.20200				
Range			10.000				

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02542	.00106	.00756	.11157	.00692	.02613	.00278
SDev	.00198	.00184	.00065	.00182	.00335	.01198	.00049
%RSD	7.7903	173.70	8.6388	1.6276	48.401	45.836	17.634
#1	.02740	-.00000	.00794	.11367	.00985	.01922	.00229
#2	.02542	-.00000	.00681	.11052	.00327	.01922	.00278
#3	.02344	.00319	.00794	.11052	.00765	.03996	.00327
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01973	.04186	.01571	.03292	.00075	.05763
SDev	.00207	.02231	.00238	.00723	.00114	.00055
%RSD	10.486	53.294	15.134	21.951	151.12	.96041
#1	.02192	.06762	.01426	.03292	.00141	.05827
#2	.01781	.02898	.01441	.02569	.00141	.05732
#3	.01945	.02898	.01845	.04015	-.00056	.05731
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

080

Analysis Report QC Standard Tue 01-12-93 11:37:04 AM page 1

Method: CLP01AP2 Sample Name: ICV3;ICV Operator: LP
Run Time: 01/12/93 11:34:24
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00866	1.0066	.00053	.00081	.00029	.00102	.02474
SDev	.01618	.0049	.00057	.00061	.00017	.00129	.00323
%RSD	186.96	.48401	106.11	74.964	57.159	125.94	13.065
#1	.02444	1.0052	-.00012	.00143	.00019	.00238	.02606
#2	.00942	1.0120	.00081	.00081	.00020	.00085	.02710
#3	-.00789	1.0026	.00091	.00020	.00048	-.00017	.02106
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value		.97800					
Range		10.000					

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00165	.00142	.00076	.01014	.00036	.01460	.00065
SDev	.00099	.00221	.00065	.00093	.00442	.01887	.00075
%RSD	60.007	156.11	86.414	9.1299	1233.7	129.24	114.54
#1	.00264	.00319	.00113	.01119	.00108	.00999	.00082
#2	.00165	-.00106	.00113	.00980	.00438	.03534	.00131
#3	.00066	.00213	.00000	.00944	-.00438	-.00154	-.00016
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00192	.31878	.00270	.01526	.00099	.00550
SDev	.00171	.07907	.00289	.00736	.00113	.00225
%RSD	89.214	24.804	107.07	48.237	114.70	40.810
#1	.00137	.40572	.00181	.02329	.00034	.00291
#2	.00384	.25116	.00592	.00883	.00229	.00679
#3	.00055	.29946	.00036	.01365	.00033	.00681
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

081

Method: CLP01AP2 Sample Name: STDB;ICB Operator: LP
Run Time: 01/12/93 11:37:10
Comment: ICB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00431	.00343	.00557	.00041	.00029	.00102	.00269
SDev	.00612	.00385	.01104	.00035	.00017	.00059	.00246
%RSD	142.04	112.11	198.20	86.674	57.880	57.743	91.500
#1	-.00250	.00741	H.01676	.00082	.00019	.00034	.00120
#2	.00609	-.00027	-.00531	.00020	.00019	.00136	.00134
#3	.00935	.00316	.00525	.00020	.00048	.00136	.00554
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00066	-.00106	.00565	-.00280	.00621	.00615	-.00016
SDev	.00114	.00106	.00113	.00152	.00168	.00809	.00049
%RSD	173.18	99.990	20.007	54.433	26.959	131.72	300.20
#1	.00066	-.00000	.00679	-.00175	.00658	.01460	-.00016
#2	-.00132	-.00213	.00452	-.00455	.00438	.00538	.00033
#3	-.00132	-.00106	.00565	-.00210	.00767	-.00154	-.00065
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00055	.00000	.00376	-.02971	-.00000	.00551
SDev	.00171	.04427	.00138	.01104	.00057	.00224
%RSD	312.25	4753e6	36.858	37.156	21860.	40.693
#1	-.00110	.04830	.00333	-.02007	.00033	.00680
#2	-.00192	-.00966	.00264	-.04175	-.00066	.00292
#3	.00137	-.03864	.00531	-.02730	.00032	.00680
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

082

Method: CLP01AP2 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/12/93 11:39:57
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	517.42	.00235	-.10475	-.00126	.00020	.00211	491.62
SDev	4.29	.02698	.05663	.00065	.00029	.00141	4.28
%RSD	.82867	1149.2	54.063	51.470	148.45	67.066	.87144
#1	512.56	-.01895	-.14018	-.00111	-.00010	.00100	486.73
#2	520.68	-.00670	-.03943	-.00197	.00048	.00162	493.39
#3	519.03	.03269	-.13462	-.00070	.00020	.00370	494.73
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01484	-.00142	-.00968	186.98	.03647	525.73	.02897
SDev	.00150	.00123	.00178	1.60	.01213	4.86	.00052
%RSD	10.110	86.371	18.399	.85467	33.266	.92370	1.8003
#1	.01512	-.00213	-.01037	185.14	.02623	520.13	.02872
#2	.01323	-.00000	-.01102	188.01	.03332	528.52	.02957
#3	.01619	-.00213	-.00766	187.79	.04987	528.55	.02862
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00082	.02898	-.00085	.81338	.00240	.06970
SDev	.00405	.05876	.00296	.01686	.00348	.00036
%RSD	493.29	202.76	347.42	2.0730	144.90	.51635
#1	-.00356	.05796	-.00426	.79411	-.00092	.06929
#2	-.00274	-.03864	.00115	.82542	.00210	.06992
#3	.00384	.06762	.00055	.82061	.00602	.06991
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

083

Method: CLP01AP2 Sample Name: ICSABB;ICSAB Operator: LP
Run Time: 01/12/93 11:42:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	512.99	.02802	-.15942	.47505	.47398	.85855	489.82
SDev	1.67	.03675	.07291	.00216	.00220	.00151	2.09
%RSD	.32474	131.15	45.734	.45430	.46474	.17561	.42589
#1	514.15	.02502	-.08239	.47563	.47639	.86016	492.16
#2	511.08	-.00713	-.22735	.47267	.47206	.85832	488.15
#3	513.74	.06618	-.16852	.47687	.47350	.85717	489.15
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46182	.46760	.47697	186.39	4.5047	524.08	.48204
SDev	.00230	.00325	.00168	.74	.0123	2.01	.00174
%RSD	.49888	.69485	.35133	.39690	.27287	.38324	.36163
#1	.46448	.47115	.47746	187.07	4.5152	525.99	.48350
#2	.46047	.46477	.47834	185.60	4.4912	521.99	.48011
#3	.46050	.46689	.47510	186.50	4.5078	524.25	.48252
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.85073	.09660	.97830	.81338	.46859	.98893
SDev	.00482	.07545	.00406	.02605	.00152	.00531
%RSD	.56613	78.102	.41491	3.2034	.32386	.53698
#1	.85621	.18354	.97853	.83506	.47025	.99401
#2	.84881	.05796	.97414	.82061	.46823	.98935
#3	.84717	.04830	.98225	.78447	.46728	.98342
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

084

Method: CLP01AP2 Sample Name: 2XCRDL292Q4:CRI Operator: LP
Run Time: 01/12/93 11:45:29
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.13051	.10882	.02955	.00040	.00936	.00972	.12920
SDev	.03459	.01021	.01271	.00071	.00017	.00078	.04245
%RSD	26.504	9.3829	43.015	174.80	1.7738	8.0032	32.856
#1	.16963	.10053	.04408	.00081	.00926	.01057	.17783
#2	.11793	.10569	.02403	-.00041	.00955	.00904	.11027
#3	.10398	.12022	.02053	.00081	.00926	.00955	.09951

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01679	.08934	.05732	.05289	.03135	.12303	.02780
SDev	.00151	.00213	.00065	.01997	.01204	.04707	.00049
%RSD	9.0078	2.3812	1.1415	37.745	38.413	38.256	1.7652
#1	.01646	.08721	.05770	.07563	.02730	.17604	.02780
#2	.01546	.08934	.05656	.04485	.02185	.08615	.02731
#3	.01843	.09147	.05769	.03821	.04489	.10690	.02829

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07644	.01610	.02648	-.06022	.09185	.04467
SDev	.00405	.01115	.00213	.01391	.00150	.00244
%RSD	5.3042	69.282	8.0466	23.094	1.6340	5.4505
#1	.07370	.00966	.02476	-.04416	.09054	.04435
#2	.07452	.02898	.02582	-.06825	.09152	.04241
#3	.08110	.00966	.02887	-.06825	.09349	.04724

085

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Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/12/93 11:48:16
Comment: CCV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	23.872	2.3784	2.3314	2.4311	.48065	2.3055	23.416
SDev	.242	.0304	.0412	.0249	.00511	.0293	.264
%RSD	1.0156	1.2784	1.7680	1.0232	1.0621	1.2695	1.1275
#1	23.747	2.3468	2.2978	2.4165	.47687	2.2813	23.218
#2	23.718	2.3810	2.3190	2.4171	.47861	2.2971	23.316
#3	24.151	2.4075	2.3774	2.4598	.48645	2.3380	23.716
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3266	2.3387	2.4339	9.4928	2.3104	23.491	2.3560
SDev	.0243	.0267	.0242	.1017	.0315	.239	.0263
%RSD	1.0455	1.1434	.99454	1.0717	1.3617	1.0154	1.1159
#1	2.3088	2.3192	2.4211	9.4151	2.2842	23.292	2.3386
#2	2.3167	2.3277	2.4188	9.4554	2.3017	23.426	2.3431
#3	2.3544	2.3692	2.4618	9.6080	2.3453	23.756	2.3862
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3133	24.189	.48983	24.123	2.3865	2.3560
SDev	.0273	.185	.00530	.305	.0268	.0216
%RSD	1.1787	.76507	1.0810	1.2656	1.1213	.91687
#1	2.2897	24.063	.48435	23.950	2.3691	2.3370
#2	2.3070	24.102	.49023	23.943	2.3731	2.3515
#3	2.3431	24.401	.49491	24.475	2.4173	2.3795
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

086

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/12/93 11:51:02
Comment: CCB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01196	.00402	.00226	.00122	.00039	.00136	.08182
SDev	.00159	.00560	.00624	.00071	.00044	.00089	.00349
%RSD	13.328	139.30	276.15	57.755	113.76	64.946	4.2664
#1	.01056	-.00110	.00784	.00204	.00077	.00187	.08550
#2	.01164	.01000	.00343	.00081	.00049	.00187	.08139
#3	.01369	.00316	-.00448	.00081	-.00009	.00034	.07856
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00066	.00000	.01018	.00571	.00438	.13061	.00082
SDev	.00099	.00106	.00299	.00233	.00396	.01667	.00049
%RSD	150.29	281510.	29.399	40.755	90.319	12.766	59.988
#1	.00066	.00000	.01244	.00770	.00767	.13906	.00131
#2	.00165	.00106	.01131	.00630	.00548	.14136	.00033
#3	-.00033	-.00106	.00679	.00315	-.00001	.11140	.00082
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00301	.00322	.00280	-.07307	.00327	.00451
SDev	.00142	.05320	.00214	.01686	.00170	.00148
%RSD	47.238	1652.3	76.490	23.077	52.019	32.829
#1	.00466	.00000	.00485	-.08993	.00425	.00482
#2	.00219	-.04830	.00295	-.05621	.00425	.00581
#3	.00219	.05796	.00059	-.07307	.00131	.00290
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

087

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Method: CLP01AP2 Sample Name: PB;PBW Operator: LP
Run Time: 01/12/93 11:53:46
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00789	-.00055	-.00032	-.00000	.00029	.00153	.01155
SDev	.00229	.00665	.00716	.00071	.00016	.00118	.00228
%RSD	28.960	1210.6	2208.2	298070.	57.256	77.021	19.732
#1	.00608	.00487	-.00531	-.00041	.00019	.00085	.01245
#2	.01046	.00145	.00788	.00081	.00019	.00290	.01325
#3	.00713	-.00797	-.00354	-.00041	.00048	.00085	.00896
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00165	.00000	.00566	.00513	-.00183	.01613	.00033
SDev	.00114	.00184	.00113	.00040	.00995	.01039	.00049
%RSD	69.249	328630.	19.997	7.8715	542.88	64.419	149.96
#1	-.00231	.00106	.00679	.00490	-.00329	.01690	.00082
#2	-.00033	.00106	.00566	.00560	.00877	.02612	.00033
#3	-.00231	-.00213	.00452	.00490	-.01097	.00538	-.00016
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00082	.00322	.00132	-.06183	-.00033	.00258
SDev	.00237	.02231	.00100	.00278	.00150	.00055
%RSD	288.68	692.82	75.217	4.4988	451.16	21.333
#1	.00219	-.00966	.00028	-.06343	-.00066	.00290
#2	.00219	.02898	.00142	-.05861	.00131	.00290
#3	-.00192	-.00966	.00226	-.06343	-.00164	.00194
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

088

Method: CLP01AP2 Sample Name: LCSPW;LCSW Operator: LP
Run Time: 01/12/93 11:56:32
Comment: LCS
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.7909	.98095	.00231	1.8798	.44813	.43721	44.399
SDev	.0099	.01605	.00561	.0170	.00436	.00409	.435
%RSD	.55260	1.6358	243.15	.90350	.97396	.93498	.98000
#1	1.7929	.96243	-.00177	1.8603	.44323	.43312	43.915
#2	1.7996	.99063	.00870	1.8884	.45160	.44130	44.758
#3	1.7801	.98979	-.00001	1.8908	.44958	.43721	44.525
Errors	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	2.2540	1.1760		2.2690	.57360	.59160	58.573
Low	1.5020	.78400		1.5130	.38240	.39440	39.049

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.44903	.44520	.48104	1.8350	4.4161	22.206	.44839
SDev	.00357	.00535	.00493	.0167	.0439	.208	.00423
%RSD	.79487	1.2023	1.0255	.90835	.99354	.93508	.94336
#1	.44507	.44024	.47538	1.8161	4.3715	21.967	.44381
#2	.45200	.45087	.48443	1.8476	4.4592	22.331	.45215
#3	.45002	.44449	.48330	1.8413	4.4175	22.322	.44921
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.57600	.58440	.58320	2.3540	5.6870	28.631	.56880
Low	.38400	.38960	.38880	1.5670	3.7910	19.087	.37920

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.44085	46.336	.46938	46.388	.46235	2.6716
SDev	.00422	.342	.00239	.397	.00248	.0243
%RSD	.95679	.73777	.50945	.85677	.53647	.90771
#1	.43619	45.952	.46663	45.938	.45972	2.6440
#2	.44441	46.609	.47053	46.533	.46464	2.6810
#3	.44194	46.445	.47098	46.692	.46268	2.6897
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.58560	59.018	.57360	56.165	.57840	3.5050
Low	.39040	39.346	.38240	37.443	.38560	2.3370

089

Method: CLP01AP2 Sample Name: S212134-01:S Operator: LP
Run Time: 01/12/93 11:59:18
Comment: MFN651
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	8.4370	-.00887	.01184	.06087	.00135	.00215	15.086
SDev	.0217	.00325	.01080	.00071	.00000	.00153	.025
%RSD	.25753	36.599	91.216	1.1585	.22199	71.382	.16557
#1	8.4602	-.01258	.01412	.06169	.00135	.00061	15.057
#2	8.4172	-.00743	.02133	.06047	.00135	.00368	15.101
#3	8.4334	-.00659	.00008	.06047	.00136	.00215	15.100

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00169	.00071	.02479	1.6933	.00622	2.6414	.04351
SDev	.00099	.00162	.00065	.0014	.01143	.0131	.00057
%RSD	58.614	229.13	2.6344	.08339	183.66	.49621	1.3028
#1	.00070	-.00106	.02517	1.6946	-.00293	2.6307	.04286
#2	.00169	.00213	.02517	1.6935	.01903	2.6376	.04384
#3	.00268	.00106	.02404	1.6918	.00257	2.6560	.04384

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00247	24.639	.00061	70.956	.00561	.02666
SDev	.00190	.057	.00108	.256	.00204	.00056
%RSD	76.980	.22972	175.98	.36124	36.394	2.0884
#1	.00137	24.681	-.00061	71.247	.00332	.02699
#2	.00466	24.575	.00099	70.766	.00627	.02697
#3	.00137	24.662	.00145	70.855	.00725	.02602

Method: CLP01AP2 Sample Name: S212134-02;S Operator: LP
Run Time: 01/12/93 12:02:02
Comment: MFQ201
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.09055	.00742	.00459	.01752	.00010	.00085	4.5240
SDev	.01330	.00592	.00834	.00035	.00033	.00102	.0265
%RSD	14.691	79.776	181.62	2.0121	344.70	120.70	.58575
#1	.07942	.01083	.00493	.01732	.00048	-.00018	4.4937
#2	.10528	.01085	.01276	.01793	-.00010	.00187	4.5430
#3	.08696	.00059	-.00391	.01732	-.00010	.00085	4.5351

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00099	.00071	.00604	.03393	.00359	.12600	.00082
SDev	.00057	.00061	.00173	.00035	.00456	.01389	.00049
%RSD	57.784	86.599	28.613	1.0264	126.97	11.027	60.067
#1	-.00033	.00000	.00453	.03427	-.00006	.11140	.00033
#2	-.00132	.00106	.00792	.03358	.00870	.12753	.00131
#3	-.00132	.00106	.00566	.03393	.00213	.13906	.00082

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00027	24.375	.00141	70.339	.00032	.00550
SDev	.00171	.165	.00063	.082	.00000	.00056
%RSD	624.50	.67527	45.093	.11686	.65568	10.141
#1	-.00027	24.218	.00090	70.286	.00033	.00485
#2	.00219	24.362	.00212	70.296	.00032	.00581
#3	-.00110	24.546	.00120	70.433	.00032	.00583

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Method: CLP01AP2 Sample Name: S212134-03;S Operator: LP
Run Time: 01/12/93 12:04:47
Comment: MFQ202
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05320	-.00255	-.00083	.00265	.00039	.00068	.66975
SDev	.00619	.01167	.01231	.00061	.00017	.00030	.00401
%RSD	11.641	458.36	1482.1	23.086	43.312	43.508	.59841
#1	.05133	-.00455	-.00462	.00204	.00048	.00034	.67332
#2	.06011	.01000	.01292	.00326	.00049	.00085	.67052
#3	.04816	-.01309	-.01080	.00265	.00019	.00085	.66542

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00099	-.00177	.00792	.02285	-.00442	.12522	-.00000
SDev	.00151	.00061	.00113	.00238	.00987	.01402	.00028
%RSD	152.69	34.646	14.285	10.416	223.07	11.194	54631.
#1	-.00231	-.00213	.00679	.02098	-.01429	.10909	.00033
#2	.00066	-.00213	.00905	.02553	-.00443	.13214	-.00016
#3	-.00132	-.00106	.00792	.02203	.00545	.13444	-.00016

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00027	.24150	.00176	8.7103	.00065	.00452
SDev	.00171	.05796	.00177	.0870	.00247	.00148
%RSD	624.50	24.000	100.72	.99877	380.15	32.683
#1	-.00110	.18354	-.00025	8.8083	-.00164	.00291
#2	.00219	.29946	.00311	8.6806	.00327	.00581
#3	-.00027	.24150	.00242	8.6421	.00032	.00485

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Method: CLP01AP2 Sample Name: S212134-04:S Operator: LP
Run Time: 01/12/93 12:07:31
Comment: MFQ203
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02509	-.00990	.00606	.00550	.00019	.00085	495.19
SDev	.02022	.00796	.00916	.00071	.00058	.00051	4.89
%RSD	80.599	80.357	151.23	12.826	299.99	60.257	.98674
#1	.03732	-.01220	.01658	.00632	.00077	.00136	489.55
#2	.03621	-.01645	-.00015	.00509	.00019	.00085	497.87
#3	.00175	-.00105	.00175	.00509	-.00038	.00034	498.15

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00034	-.00106	.02602	.02315	.00547	146.79	.05952
SDev	.00172	.00184	.00196	.00214	.01901	1.44	.00123
%RSD	498.26	173.18	7.5310	9.2244	347.66	.97929	2.0741
#1	.00164	-.00000	.02828	.02501	.01752	145.14	.05822
#2	-.00133	-.00000	.02489	.02362	.01533	147.68	.06067
#3	-.00134	-.00319	.02489	.02082	-.01645	147.57	.05969

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00110	3.5516	-.00630	83.005	.00001	.10472
SDev	.00217	.1060	.00181	.975	.00057	.00203
%RSD	198.43	2.9836	28.673	1.1741	9576.3	1.9364
#1	.00137	3.5162	-.00422	81.887	.00034	.10406
#2	-.00274	3.6708	-.00742	83.451	-.00065	.10311
#3	-.00192	3.4679	-.00727	83.677	.00033	.10700

Method: CLP01AP2 Sample Name: S212134-05:S Operator: LP
Run Time: 01/12/93 12:10:17
Comment: MFQ204
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03504	.00270	.00784	.02873	.00029	.00139	495.20
SDev	.02185	.01289	.01182	.00071	.00017	.00078	5.14
%RSD	62.360	477.79	150.66	2.4581	58.041	56.315	1.0380
#1	.02227	.00438	-.00530	.02832	.00019	.00054	500.43
#2	.02258	-.01095	.01758	.02954	.00048	.00157	490.16
#3	.06027	.01467	.01125	.02832	.00020	.00208	495.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00075	.01737	.00905	2.2294	.01076	134.67	6.5211
SDev	.00153	.00162	.00235	.0291	.00937	1.63	.0787
%RSD	204.54	9.3569	25.990	1.3034	87.050	1.2082	1.2074
#1	-.00092	.01595	.00830	2.2623	.00090	136.46	6.6099
#2	.00109	.01914	.01169	2.2073	.01955	133.28	6.4598
#3	.00207	.01702	.00716	2.2186	.01184	134.26	6.4937

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01096	11.408	-.00686	138.36	.00144	.04145
SDev	.00535	.077	.00306	2.39	.00282	.00312
%RSD	48.798	.67207	44.627	1.7246	196.13	7.5285
#1	.00548	11.466	-.01009	141.10	-.00182	.04276
#2	.01617	11.321	-.00399	136.76	.00307	.04370
#3	.01123	11.437	-.00651	137.21	.00308	.03789

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Method: CLP01AP2 Sample Name: S212134-06;S Operator: LP
Run Time: 01/12/93 12:13:02
Comment: MFQ206
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.76324	-.01193	-.00847	.08148	.00010	.00084	92.687
SDev	.02559	.00990	.01950	.00106	.00017	.00129	.697
%RSD	3.3523	82.957	230.17	1.2987	172.60	153.71	.75151
#1	.73984	-.02104	-.03098	.08026	-.00010	-.00036	92.552
#2	.79056	-.00140	.00228	.08209	.00019	.00067	93.441
#3	.75934	-.01337	.00328	.08209	.00020	.00220	92.067

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00029	-.00000	.01531	1.3198	.01251	121.40	.32100
SDev	.00249	.00184	.00346	.0085	.01234	.97	.00270
%RSD	862.36	7000600.	22.579	.64372	98.690	.79700	.84160
#1	-.00235	-.00213	.01153	1.3152	-.00173	121.12	.31969
#2	.00062	.00106	.01606	1.3296	.02016	122.48	.32411
#3	.00260	.00106	.01832	1.3145	.01909	120.61	.31920

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00027	4.8429	-.00191	5.2175	.00106	.04551
SDev	.00388	.1246	.00375	.0558	.00151	.00193
%RSD	1417.7	2.5725	196.40	1.0702	142.65	4.2300
#1	-.00274	4.7044	-.00509	5.2095	-.00059	.04359
#2	-.00110	4.8783	-.00287	5.2769	.00138	.04552
#3	.00466	4.9459	.00223	5.1661	.00237	.04744

Method: CLP01AP2 Sample Name: S212134-07;S Operator: LP
Run Time: 01/12/93 12:15:47
Comment: MFQ207
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06203	-.00685	.00706	.07437	.00019	.00119	69.811
SDev	.00542	.01238	.00513	.00093	.00000	.00030	.799
%RSD	8.7427	180.85	72.661	1.2555	1.1457	24.820	1.1444
#1	.06748	.00568	.01289	.07417	.00020	.00136	68.980
#2	.06198	-.01908	.00326	.07539	.00019	.00136	70.574
#3	.05663	-.00715	.00503	.07355	.00019	.00085	69.877

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00161	.00106	.00566	.03348	.00178	108.16	.15829
SDev	.00262	.00184	.00113	.00021	.00604	1.28	.00245
%RSD	162.57	173.21	19.982	.62270	338.84	1.1813	1.5496
#1	.00359	.00319	.00679	.03335	.00872	106.82	.15584
#2	-.00136	.00000	.00453	.03372	-.00114	109.36	.16075
#3	.00260	-.00000	.00566	.03336	-.00224	108.29	.15829

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00137	4.7591	-.00316	5.0907	.00068	.01553
SDev	.00217	.0402	.00065	.0675	.00151	.00195
%RSD	158.75	.84506	20.634	1.3252	222.07	12.547
#1	.00301	4.7720	-.00255	5.0240	.00232	.01358
#2	-.00110	4.7913	-.00308	5.1589	-.00064	.01554
#3	.00219	4.7141	-.00384	5.0890	.00035	.01748

Method: CLP01AP2 Sample Name: S212134-08;S Operator: LP
Run Time: 01/12/93 12:18:31
Comment: MFQ208
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01583	-.00623	.00051	.00204	.00000	.00170	54.240
SDev	.01740	.01500	.01755	.00106	.00017	.00030	.213
%RSD	109.94	240.80	3428.8	51.950	17801.	17.323	.39285
#1	-.00257	-.00537	-.01672	.00082	-.00010	.00187	54.189
#2	.03202	-.02165	.01836	.00265	-.00009	.00187	54.473
#3	.01804	.00832	-.00011	.00265	.00020	.00136	54.056

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00264	.00000	.00340	.01772	.00766	22.883	.00065
SDev	.00249	.00106	.00113	.00158	.00503	.087	.00028
%RSD	94.342	337550.	33.307	8.9032	65.607	.38145	43.255
#1	-.00528	-.00106	.00340	.01609	.00658	22.862	.00033
#2	-.00033	-.00000	.00227	.01784	.00327	22.979	.00082
#3	-.00231	.00106	.00453	.01924	.01314	22.809	.00082

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00192	2.3152	-.00190	19.216	.00064	.00811
SDev	.00285	.0549	.00151	.059	.00205	.00055
%RSD	148.46	2.3726	79.637	.30637	317.98	6.7643
#1	-.00356	2.2991	-.00071	19.229	-.00165	.00779
#2	-.00356	2.2701	-.00360	19.267	.00131	.00779
#3	.00137	2.3764	-.00139	19.152	.00228	.00874

Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/12/93 12:21:14
Comment: CCV#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	23.668	2.3523	2.3327	2.3996	.47339	2.2765	23.061
SDev	.133	.0124	.0224	.0119	.00248	.0113	.122
%RSD	.56025	.52818	.95821	.49665	.52424	.49648	.52917
#1	23.675	2.3563	2.3477	2.4048	.47311	2.2752	23.040
#2	23.532	2.3383	2.3070	2.3859	.47107	2.2660	22.951
#3	23.797	2.3622	2.3434	2.4079	.47601	2.2885	23.192
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.2963	2.3111	2.3992	9.3346	2.2868	23.156	2.3207
SDev	.0141	.0099	.0113	.0445	.0272	.125	.0137
%RSD	.61618	.42749	.47257	.47642	1.1879	.53992	.59235
#1	2.2930	2.3139	2.3984	9.3333	2.2700	23.119	2.3249
#2	2.2841	2.3001	2.3882	9.2909	2.2723	23.053	2.3053
#3	2.3118	2.3192	2.4109	9.3798	2.3181	23.295	2.3318
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.2812	23.805	.48651	23.729	2.3547	2.3183
SDev	.0088	.210	.00476	.125	.0133	.0055
%RSD	.38528	.88191	.97931	.52817	.56425	.23615
#1	2.2831	23.841	.48257	23.733	2.3544	2.3167
#2	2.2716	23.580	.48515	23.601	2.3416	2.3138
#3	2.2889	23.995	.49180	23.851	2.3682	2.3244
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/12/93 12:24:00
Comment: CCB#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00828	-.00339	.00643	.00081	.00039	.00205	.02383
SDev	.00502	.01026	.00702	.00106	.00044	.00030	.00519
%RSD	60.551	302.31	109.31	129.93	114.81	14.448	21.789
#1	.01268	-.01392	H.01314	.00204	.00049	.00188	.02882
#2	.00282	-.00285	-.00087	.00020	-.00010	.00187	.02422
#3	.00935	.00658	.00701	.00020	.00077	.00239	.01846
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00099	.00177	.00754	-.00140	-.00476	.02843	.00049
SDev	.00057	.00123	.00131	.00153	.01261	.01597	.00028
%RSD	57.587	69.266	17.325	109.15	265.15	56.175	57.719
#1	-.00033	.00319	.00905	.00035	.00767	.04687	.00082
#2	-.00132	.00106	.00679	-.00210	L-.01754	.01921	.00033
#3	-.00132	.00106	.00679	-.00245	-.00439	.01921	.00033
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00247	.03864	.00150	-.06263	.00065	.00192
SDev	.00311	.07293	.00407	.01138	.00247	.00096
%RSD	126.20	188.75	271.89	18.176	379.98	49.907
#1	.00466	.11592	.00523	-.05380	.00327	.00288
#2	-.00110	-.02898	.00211	-.07548	-.00164	.00096
#3	.00384	.02898	-.00285	-.05861	.00032	.00192
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

Method: CLP01AP2 Sample Name: S212134-09:S Operator: LP
Run Time: 01/12/93 12:26:45
Comment: MFQ209
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	5.9689	.00132	-.00586	.04200	.00049	.00138	11.909
SDev	.0538	.00302	.00552	.00035	.00029	.00119	.091
%RSD	.90198	228.92	94.261	.84106	58.766	86.006	.76788
#1	6.0156	.00446	-.01137	.04220	.00020	.00206	11.951
#2	5.9811	-.00156	-.00590	.04159	.00049	.00001	11.971
#3	5.9100	.00106	-.00032	.04220	.00078	.00207	11.804

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00312	.00213	.02477	5.9821	.01058	4.5684	.08792
SDev	.00057	.00281	.00112	.0479	.01333	.0196	.00028
%RSD	18.230	132.32	4.5355	.79990	126.04	.42906	.32208
#1	.00279	.00319	.02477	6.0005	.00287	4.5760	.08808
#2	.00280	-.00106	.02364	6.0180	.00289	4.5829	.08759
#3	.00378	.00425	.02589	5.9278	.02598	4.5461	.08808

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00164	1.4619	.00058	1.7175	.00771	.04658
SDev	.00190	.0928	.00483	.0182	.00204	.00297
%RSD	115.47	6.3496	828.81	1.0620	26.449	6.3751
#1	.00055	1.5456	-.00149	1.7384	.00837	.04593
#2	.00055	1.3621	-.00286	1.7095	.00543	.04399
#3	.00384	1.4780	.00611	1.7046	.00935	.04982

Method: CLP01AP2 Sample Name: S212134-10;S Operator: LP
Run Time: 01/12/93 12:29:29
Comment: MFQ212
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.41433	.01309	-.00170	.02627	.00020	.00146	359.54
SDev	.01150	.00388	.01178	.00035	.00000	.00078	6.18
%RSD	2.7765	29.642	691.78	1.3446	1.5269	53.465	1.7187
#1	.40816	.00906	.00598	.02648	.00019	.00078	366.06
#2	.42760	.01681	-.01527	.02586	.00020	.00232	353.77
#3	.40722	.01339	.00418	.02648	.00020	.00129	358.78

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00099	-.00106	.04043	.50609	.00954	136.22	.04873
SDev	.00114	.00184	.00235	.00880	.00548	2.47	.00057
%RSD	115.28	173.22	5.8254	1.7393	57.492	1.8102	1.1628
#1	.00165	-.00213	.03967	.51425	.00406	138.85	.04938
#2	-.00033	.00106	.03854	.49676	.00953	133.96	.04840
#3	.00165	-.00213	.04307	.50725	.01503	135.85	.04840

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00137	5.7638	-.00260	76.142	.00296	.09554
SDev	.00377	.1180	.00396	1.717	.00204	.00246
%RSD	274.95	2.0481	152.27	2.2552	68.858	2.5772
#1	-.00192	5.8926	-.00567	78.055	.00133	.09523
#2	.00055	5.6607	-.00400	74.733	.00231	.09815
#3	.00548	5.7380	.00187	75.639	.00525	.09325

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Method: CLP01AP2 Sample Name: S212134-11:S Operator: LP
Run Time: 01/12/93 12:32:15
Comment: MFQ213
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02482	-.00209	.00214	.03240	.00029	.00150	307.98
SDev	.01226	.01073	.00805	.00247	.00017	.00164	17.53
%RSD	49.413	513.02	376.07	7.6247	57.394	109.18	5.6930
#1	.01471	-.01322	.01132	.02954	.00019	.00031	287.82
#2	.02128	.00819	-.00374	.03382	.00020	.00082	316.46
#3	.03846	-.00124	-.00115	.03382	.00048	.00338	319.65

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00892	-.00106	.02756	.21941	-.00661	133.62	.00393
SDev	.00057	.00184	.00236	.01223	.00289	7.84	.00057
%RSD	6.4142	173.04	8.5505	5.5724	43.778	5.8673	14.420
#1	.00859	-.00213	.02492	.20530	-.00989	124.59	.00425
#2	.00859	-.00213	.02832	.22593	-.00551	137.54	.00327
#3	.00958	.00106	.02945	.22699	-.00443	138.72	.00425

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00658	4.3051	-.00682	60.142	.00069	.06801
SDev	.00237	.3141	.00127	4.066	.00150	.00423
%RSD	36.084	7.2962	18.647	6.7609	215.65	6.2219
#1	.00384	3.9509	-.00827	55.460	-.00061	.06511
#2	.00795	4.4146	-.00590	62.178	.00233	.06606
#3	.00795	4.5498	-.00629	62.788	.00037	.07287

Method: CLP01AP2 Sample Name: S212134-12:S Operator: LP
Run Time: 01/12/93 12:35:00
Comment: MFQ214
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03082	-.00285	.00452	.05807	.00039	.00136	190.43
SDev	.00559	.00953	.00703	.00127	.00044	.00135	2.31
%RSD	18.147	334.14	155.56	2.1913	114.28	99.703	1.2143
#1	.03703	.00571	.01122	.05766	.00049	.00289	191.06
#2	.02929	-.01312	.00515	.05950	-.00010	.00085	192.36
#3	.02616	-.00114	-.00281	.05705	.00077	.00033	187.86

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00185	.00071	.00416	.05256	.01240	79.217	.52917
SDev	.00151	.00374	.00065	.00108	.00506	.955	.00687
%RSD	81.743	526.59	15.714	2.0591	40.814	1.2057	1.2979
#1	.00350	.00425	.00453	.05374	.01532	79.418	.53212
#2	.00053	-.00319	.00340	.05234	.01533	80.056	.53408
#3	.00152	.00106	.00453	.05161	.00656	78.178	.52132

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00411	7.2997	-.00004	36.908	.00235	.00478
SDev	.00207	.1588	.00153	.626	.00295	.00169
%RSD	50.332	2.1758	4073.5	1.6966	125.16	35.440
#1	.00630	7.3609	.00138	36.984	.00530	.00379
#2	.00219	7.4189	-.00166	37.493	-.00059	.00673
#3	.00384	7.1194	.00017	36.247	.00235	.00381

Method: CLP01AP2 Sample Name: S212134-12:S2 Operator: LP
Run Time: 01/12/93 12:37:44
Comment: MFQ214D
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05413	-.00569	.00179	.05583	.00000	.00084	187.36
SDev	.00761	.00989	.00829	.00061	.00034	.00000	2.36
%RSD	14.062	173.67	464.49	1.0953	32155.	.06873	1.2574
#1	.04543	-.01057	-.00462	.05644	-.00039	.00084	190.05
#2	.05742	.00568	.01115	.05583	.00020	.00084	186.36
#3	.05954	-.01220	-.00118	.05522	.00019	.00084	185.67

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00079	.00036	.00077	.08949	-.00553	77.929	.52002
SDev	.00348	.00123	.00131	.00142	.00898	1.027	.00631
%RSD	441.36	345.93	169.84	1.5859	162.38	1.3179	1.2131
#1	-.00046	-.00106	.00002	.08974	-.00333	79.076	.52721
#2	.00251	.00106	.00228	.09076	.00214	77.613	.51740
#3	-.00442	.00106	.00001	.08796	-.01540	77.097	.51544

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00192	7.1774	-.00394	36.266	.00071	.00803
SDev	.00332	.1009	.00196	.495	.00204	.00150
%RSD	173.21	1.4052	49.768	1.3661	287.44	18.610
#1	.00137	7.2933	-.00546	36.835	-.00157	.00674
#2	.00548	7.1097	-.00173	36.038	.00236	.00769
#3	-.00110	7.1291	-.00462	35.927	.00135	.00967

Method: CLP01AP2 Sample Name: S212134-13;S Operator: LP
Run Time: 01/12/93 12:40:30
Comment: MFQ215
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02110	-.00254	-.00333	.05175	.00010	.00102	170.97
SDev	.01353	.01179	.00944	.00215	.00017	.00030	3.14
%RSD	64.132	464.05	283.33	4.1478	175.29	28.982	1.8343
#1	.02716	-.00710	.00342	.04972	.00019	.00136	168.06
#2	.00560	-.01137	-.01412	.05155	-.00010	.00085	170.56
#3	.03054	.01085	.00070	.05399	.00020	.00085	174.29

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00177	.00071	.00076	.03012	-.00696	70.957	.47194
SDev	.00286	.00123	.00235	.00247	.01950	1.317	.00934
%RSD	161.53	173.14	310.25	8.2132	280.09	1.8556	1.9787
#1	-.00342	.00000	-.00113	.02730	-.02414	69.694	.46294
#2	-.00342	.00000	.00001	.03117	-.01097	70.855	.47128
#3	.00153	.00213	.00340	.03190	.01423	72.321	.48159

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00055	6.4915	-.00415	32.734	.00005	.01065
SDev	.00453	.1267	.00406	.599	.00284	.00099
%RSD	826.14	1.9516	97.789	1.8297	6156.8	9.3278
#1	-.00274	6.3563	-.00715	32.147	-.00159	.01066
#2	-.00356	6.5108	-.00578	32.711	-.00159	.01164
#3	.00466	6.6074	.00047	33.345	.00333	.00965

Method: CLP01AP2 Sample Name: S212134-14;S Operator: LP
Run Time: 01/12/93 12:43:14
Comment: MFQ216
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46554	.01584	.00952	.05398	.00019	.00179	168.59
SDev	.00430	.01119	.00416	.00106	.00000	.00051	2.20
%RSD	.92481	70.665	43.724	1.9611	1.1365	28.633	1.3031
#1	.46482	.01412	.01100	.05459	.00019	.00127	167.11
#2	.46164	.00561	.00482	.05276	.00020	.00230	167.54
#3	.47016	.02780	.01274	.05459	.00019	.00178	171.11

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00044	.00284	.00275	.63517	-.00039	69.116	.51625
SDev	.00099	.00162	.00130	.00862	.00219	.867	.00659
%RSD	225.00	57.289	47.489	1.3567	568.63	1.2543	1.2761
#1	.00055	.00106	.00350	.63072	.00181	68.541	.51151
#2	-.00143	.00425	.00350	.62968	-.00258	68.693	.51347
#3	-.00044	.00319	.00124	.64510	-.00039	70.113	.52377

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00082	6.5945	-.00355	31.986	.00073	.01187
SDev	.00047	.0977	.00278	.458	.00149	.00056
%RSD	57.735	1.4818	78.318	1.4311	205.33	4.7485
#1	-.00027	6.4818	-.00073	31.627	.00040	.01154
#2	-.00110	6.6557	-.00363	31.829	.00236	.01154
#3	-.00110	6.6461	-.00629	32.501	-.00058	.01252

Method: CLP01AP2 Sample Name: S212134-14;DS Operator: LP
Run Time: 01/12/93 12:45:59
Comment: MFQ216S
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4812	.45096	1.8569	1.8869	.04513	.04536	169.88
SDev	.0151	.02371	.0235	.0281	.00060	.00030	1.85
%RSD	.60695	5.2573	1.2634	1.4906	1.3417	.65445	1.0885
#1	2.4772	.44270	1.8461	1.8877	.04493	.04519	169.27
#2	2.4685	.47769	1.8409	1.8584	.04464	.04570	168.42
#3	2.4978	.43248	1.8838	1.9146	.04580	.04519	171.96

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.17225	.43357	.23705	1.6295	.43051	69.596	.96119
SDev	.00115	.00503	.00327	.0193	.00662	.823	.01259
%RSD	.66602	1.1593	1.3785	1.1851	1.5379	1.1825	1.3096
#1	.17159	.43180	.23894	1.6281	.43125	69.453	.95792
#2	.17357	.42967	.23328	1.6109	.43674	68.854	.95056
#3	.17158	.43924	.23894	1.6495	.42356	70.481	.97509

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.42797	6.7201	.04265	32.339	.44208	.46076
SDev	.00358	.0148	.00176	.452	.00392	.00350
%RSD	.83718	.21958	4.1315	1.3986	.88620	.75866
#1	.42632	6.7040	.04204	32.311	.44208	.46369
#2	.42550	6.7330	.04127	31.902	.43816	.45689
#3	.43208	6.7233	.04463	32.805	.44600	.46171

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Method: CLP01AP2 Sample Name: S212134-14;ISD/5 Operator: LP
Run Time: 01/12/93 12:48:44
Comment: MFQ216L
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.09945	-.00397	.00423	.01141	.00010	.00083	33.741
SDev	.01048	.00606	.01563	.00035	.00017	.00051	.136
%RSD	10.542	152.56	369.78	3.0964	171.91	61.286	.40198
#1	.10845	-.00283	.01535	.01120	.00019	.00083	33.586
#2	.10195	.00144	.01098	.01120	-.00010	.00135	33.801
#3	.08794	-.01052	-.01365	.01182	.00019	.00032	33.836

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00266	.00036	.00228	.12459	-.00776	13.650	.10433
SDev	.00057	.00061	.00196	.00041	.01046	.072	.00098
%RSD	21.461	172.96	85.805	.32622	134.89	.52427	.94051
#1	-.00233	.00000	.00341	.12412	-.01873	13.581	.10335
#2	-.00233	.00106	.00341	.12482	.00211	13.724	.10531
#3	-.00332	.00000	.00002	.12482	-.00665	13.645	.10433

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00055	1.3009	-.00033	6.1835	.00066	.00581
SDev	.00095	.0477	.00134	.0321	.00057	.00097
%RSD	173.21	3.6630	406.87	.51877	86.074	16.690
#1	-.00110	1.3331	.00076	6.1465	.00131	.00484
#2	.00055	1.3234	.00008	6.2043	.00033	.00678
#3	-.00110	1.2461	-.00183	6.1995	.00033	.00582

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Method: CLP01AP2 Sample Name: S212134-15;S Operator: LP
Run Time: 01/12/93 12:51:29
Comment: MFQ217
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.65351	.00470	.00422	.05296	.00039	.00142	167.25
SDev	.02234	.01766	.01875	.00127	.00017	.00118	1.21
%RSD	3.4178	375.82	444.56	2.4016	43.561	83.158	.72582
#1	.67728	.02350	.02584	.05398	.00049	.00278	168.54
#2	.65027	-.01154	-.00753	.05336	.00048	.00074	167.10
#3	.63296	.00214	-.00566	.05153	.00019	.00074	166.12

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00022	.00355	.00693	.81972	.01262	69.035	.51968
SDev	.00249	.00061	.00408	.00628	.01185	.393	.00345
%RSD	1113.9	17.317	58.897	.76598	93.842	.56863	.66300
#1	.00253	.00425	.01032	.82695	.02247	69.413	.52328
#2	.00055	.00319	.00806	.81645	.01592	69.062	.51936
#3	-.00242	.00319	.00240	.81574	-.00052	68.629	.51641

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00192	6.3305	-.00213	31.733	.00237	.01604
SDev	.00547	.1498	.00324	.146	.00197	.00205
%RSD	285.36	2.3656	152.45	.46117	83.143	12.810
#1	.00466	6.5012	.00161	31.808	.00434	.01440
#2	.00548	6.2693	-.00418	31.827	.00237	.01538
#3	-.00438	6.2210	-.00380	31.564	.00040	.01835

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Method: CLP01AP2 Sample Name: HALFSTD:CCV Operator: LP
Run Time: 01/12/93 12:54:16
Comment: CCV#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.062	2.3869	2.3776	2.4372	.47882	2.3218	23.369
SDev	.054	.0154	.0126	.0037	.00061	.0093	.107
%RSD	.22311	.64636	.53054	.15250	.12652	.40126	.45667
#1	24.107	2.3715	2.3789	2.4397	.47862	2.3201	23.332
#2	24.002	2.4024	2.3644	2.4330	.47833	2.3135	23.286
#3	24.076	2.3869	2.3895	2.4391	.47950	2.3319	23.490
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3293	2.3550	2.4380	9.4793	2.3110	23.448	2.3501
SDev	.0085	.0137	.0059	.0293	.0176	.070	.0056
%RSD	.36649	.58239	.24123	.30935	.76242	.29665	.24013
#1	2.3276	2.3511	2.4414	9.4746	2.2982	23.401	2.3499
#2	2.3217	2.3437	2.4312	9.4526	2.3037	23.415	2.3445
#3	2.3385	2.3703	2.4414	9.5107	2.3311	23.528	2.3558
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3179	24.160	.49054	24.120	2.3849	2.3511
SDev	.0119	.126	.00238	.033	.0043	.0108
%RSD	.51306	.52286	.48575	.13850	.18035	.45950
#1	2.3119	24.102	.48832	24.148	2.3820	2.3554
#2	2.3103	24.073	.49022	24.083	2.3829	2.3388
#3	2.3316	24.304	.49306	24.128	2.3898	2.3592
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/12/93 12:57:01
Comment: CCB#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01047	.00116	.00728	.00081	.00058	.00187	.03530
SDev	.01733	.00718	.00577	.00106	.00017	.00135	.01218
%RSD	165.45	621.15	79.255	129.90	29.539	72.113	34.498
#1	.02783	.00488	.00070	.00204	.00078	.00341	.04935
#2	.01040	.00571	.00966	.00020	.00048	.00136	.02878
#3	-.00682	-.00712	.01149	.00020	.00048	.00085	.02777
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00066	.00071	.00566	-.00128	-.00001	.02228	.00131
SDev	.00099	.00162	.00299	.00417	.01722	.02964	.00085
%RSD	150.04	229.06	52.930	326.59	273100.	133.00	64.941
#1	.00165	.00213	.00905	.00350	H.01972	.05609	.00229
#2	-.00033	.00106	.00339	-.00419	-.01207	.00077	.00082
#3	.00066	-.00106	.00452	-.00315	-.00767	.00999	.00082
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00192	.05796	.00218	-.05380	.00164	.00712
SDev	.00126	.09215	.00319	.03159	.00315	.00113
%RSD	65.465	158.99	145.89	58.723	192.79	15.926
#1	.00301	.11592	.00577	-.02489	.00523	.00581
#2	.00055	.10626	-.00033	-.04898	-.00065	.00778
#3	.00219	-.04830	.00112	-.08752	.00033	.00777
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

Method: CLP01AP2 Sample Name: S212134-16:S Operator: LP
Run Time: 01/12/93 12:59:50
Comment: MFQ218
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04176	-.00023	.00712	.01508	.00020	.00136	5.9678
SDev	.01129	.01682	.00811	.00035	.00029	.00135	.0100
%RSD	27.031	7301.1	113.77	2.3399	147.80	99.680	.16760
#1	.02878	-.01562	.00250	.01487	.00019	-.00018	5.9631
#2	.04720	.01773	.01648	.01548	.00049	.00238	5.9793
#3	.04929	-.00280	.00239	.01487	-.00009	.00187	5.9609

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00099	.00000	.01697	.04792	.00289	.31192	.00343
SDev	.00151	.00281	.00113	.00245	.01081	.01613	.00028
%RSD	152.56	438090.	6.6651	5.1099	373.72	5.1725	8.2461
#1	-.00231	-.00319	.01697	.04547	-.00441	.30040	.00327
#2	.00066	.00106	.01811	.05037	.01532	.33036	.00376
#3	-.00132	.00213	.01584	.04792	-.00223	.30501	.00327

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00219	.32200	.00205	9.7188	.00261	.03207
SDev	.00358	.04765	.00093	.0460	.00150	.00002
%RSD	163.46	14.799	45.348	.47287	57.547	.05147
#1	.00055	.29946	.00144	9.7670	.00130	.03207
#2	.00630	.37674	.00311	9.6755	.00425	.03205
#3	-.00027	.28980	.00159	9.7140	.00228	.03208

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Method: CLP01AP2 Sample Name: S212134-17;S Operator: LP
Run Time: 01/12/93 13:02:35
Comment: MFQ219
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.17680	-.00431	.01676	.09107	.00000	.00184	181.17
SDev	.00714	.00179	.00663	.00154	.00017	.00102	1.74
%RSD	4.0401	41.536	39.566	1.6889	6975.4	55.662	.95828
#1	.18502	-.00375	.02380	.09250	-.00010	.00184	183.17
#2	.17326	-.00631	.01588	.09128	.00020	.00081	180.29
#3	.17212	-.00286	.01062	.08944	-.00009	.00286	180.06

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00033	-.00177	.00306	.26681	.00022	56.515	.02878
SDev	.00198	.00221	.00285	.00315	.01172	.609	.00000
%RSD	599.81	124.88	92.989	1.1821	5390.3	1.0769	.00054
#1	-.00033	-.00425	.00344	.27008	.00642	57.214	.02878
#2	.00165	-.00000	.00570	.26658	.00753	56.103	.02878
#3	-.00231	-.00106	.00004	.26378	-.01330	56.228	.02878

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00247	13.357	-.00323	60.232	.00164	.01197
SDev	.00190	.225	.00252	.978	.00150	.00313
%RSD	76.980	1.6812	78.071	1.6241	91.395	26.140
#1	-.00356	13.611	-.00269	61.352	.00034	.01554
#2	-.00027	13.186	-.00102	59.545	.00328	.01066
#3	-.00356	13.273	-.00597	59.798	.00131	.00971

Method: CLP01AP2 Sample Name: S212134-18:S Operator: LP
Run Time: 01/12/93 13:05:20
Comment: MFQ220
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03458	.00029	.01774	.05012	.00000	.00136	172.47
SDev	.01075	.00725	.00181	.00093	.00016	.00089	.82
%RSD	31.092	2511.5	10.183	1.8635	4243.6	65.039	.47436
#1	.02346	.00740	.01572	.05094	-.00009	.00085	173.36
#2	.03535	.00057	.01831	.05033	-.00009	.00085	172.29
#3	.04492	-.00710	.01920	.04910	.00019	.00238	171.75

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00165	.00035	.00227	.02030	.01167	51.976	.00392
SDev	.00343	.00162	.00226	.00140	.00933	.310	.00028
%RSD	208.00	458.67	99.862	6.8962	79.980	.59710	7.2248
#1	.00363	-.00106	.00453	.02170	.02082	52.302	.00425
#2	.00363	-.00000	.00227	.02030	.01203	51.941	.00376
#3	-.00231	.00213	.00000	.01890	.00216	51.685	.00376

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00082	14.190	.00011	63.348	.00262	.00486
SDev	.00311	.130	.00342	.501	.00205	.00099
%RSD	378.59	.91583	3189.0	.79120	78.328	20.371
#1	.00301	14.297	.00227	63.888	.00328	.00387
#2	.00219	14.229	.00189	63.257	.00426	.00485
#3	-.00274	14.046	-.00383	62.898	.00032	.00585

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Method: CLP01AP2 Sample Name: S212134-14:PS Operator: LP
Run Time: 01/12/93 13:08:05
Comment: MFQ216A
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.48536	.00301	-.01146	.05683	.00029	.00144	172.13
SDev	.01316	.01068	.00270	.00154	.00016	.00078	4.58
%RSD	2.7125	354.47	23.589	2.7061	55.963	53.988	2.6585
#1	.49504	.01499	-.01386	.05704	.00020	.00229	174.66
#2	.49067	-.00044	-.00853	.05826	.00048	.00127	174.89
#3	.47037	-.00551	-.01201	.05520	.00020	.00076	166.85

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00154	.00284	.00765	.64930	.01203	70.308	.52443
SDev	.00099	.00123	.00285	.01741	.00127	1.725	.01376
%RSD	64.434	43.305	37.195	2.6818	10.579	2.4537	2.6232
#1	.00055	.00213	.01029	.65736	.01056	71.222	.53162
#2	.00253	.00213	.00464	.66121	.01275	71.383	.53309
#3	.00154	.00425	.00802	.62931	.01277	68.318	.50857

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00219	6.6976	-.00027	32.611	.00270	.01541
SDev	.00082	.1663	.00267	.953	.00246	.00337
%RSD	37.500	2.4828	986.78	2.9209	91.342	21.873
#1	.00219	6.8296	-.00103	33.222	.00237	.01735
#2	.00137	6.7523	-.00248	33.099	.00041	.01736
#3	.00301	6.5108	.00270	31.514	.00531	.01152

Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/12/93 13:10:51
Comment: CCV#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	25.587	2.5284	2.5192	2.6118	.50843	2.4325	24.583
SDev	.442	.0562	.0402	.0519	.00896	.0395	.378
%RSD	1.7267	2.2233	1.5953	1.9861	1.7622	1.6239	1.5384
#1	25.242	2.4852	2.4907	2.5760	.50213	2.3911	24.261
#2	26.085	2.5920	2.5652	2.6713	.51868	2.4698	25.000
#3	25.433	2.5082	2.5019	2.5882	.50447	2.4366	24.489
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4589	2.4791	2.5984	10.023	2.4276	24.694	2.4783
SDev	.0396	.0406	.0478	.184	.0448	.409	.0439
%RSD	1.6122	1.6381	1.8390	1.8317	1.8462	1.6569	1.7721
#1	2.4236	2.4436	2.5648	9.8627	2.3807	24.330	2.4387
#2	2.5018	2.5234	2.6531	10.224	2.4700	25.137	2.5255
#3	2.4514	2.4702	2.5772	9.9842	2.4321	24.616	2.4706
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4412	25.660	.52144	25.739	2.5308	2.4670
SDev	.0467	.397	.01126	.476	.0452	.0319
%RSD	1.9113	1.5473	2.1601	1.8487	1.7858	1.2928
#1	2.3974	25.280	.51190	25.407	2.4950	2.4423
#2	2.4903	26.072	.53387	26.284	2.5816	2.5030
#3	2.4360	25.628	.51856	25.526	2.5157	2.4557
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/12/93 13:13:38
Comment: CCB#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02056	.00002	.00811	.00143	.00020	.00273	.02976
SDev	.00650	.01370	.00788	.00000	.00000	.00106	.00248
%RSD	31.596	67256.	97.082	.01367	.42684	39.029	8.3187
#1	.02666	-.01306	H.01221	.00143	.00020	.00392	.03246
#2	.02130	.01426	H.01310	.00143	.00020	.00239	.02923
#3	.01373	-.00114	-.00097	.00143	.00020	.00187	.02759
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00066	.00106	.00679	-.00116	-.00074	.03458	.00098
SDev	.00171	.00106	.00226	.00073	.01152	.01160	.00057
%RSD	260.43	99.997	33.334	62.715	1547.9	33.545	57.732
#1	-.00132	.00106	.00905	-.00035	-.01208	.03304	.00131
#2	.00165	.00213	.00452	-.00139	-.00111	.02382	.00131
#3	.00165	-.00000	.00679	-.00175	.01096	.04686	.00033
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00110	.05152	.00429	-.11482	.00262	.00290
SDev	.00095	.03105	.00130	.00695	.00057	.00168
%RSD	86.603	60.273	30.350	6.0561	21.755	57.815
#1	.00219	.02898	.00279	-.11884	.00228	.00484
#2	.00055	.08694	.00516	-.11884	.00327	.00194
#3	.00055	.03864	.00493	-.10679	.00229	.00193
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/12/93 13:16:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	547.39	-.00166	-.17817	-.00012	.00020	.00411	496.16
SDev	10.29	.01428	.03745	.00028	.00029	.00099	7.42
%RSD	1.8793	861.89	21.020	227.18	145.29	24.090	1.4946
#1	535.75	-.01714	-.21911	.00002	.00049	.00360	487.93
#2	555.24	.00116	-.14563	.00005	.00020	.00526	502.32
#3	551.19	.01100	-.16979	-.00044	-.00009	.00349	498.22
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01863	-.00142	-.00579	192.12	.04555	539.00	.02957
SDev	.00219	.00268	.00172	3.28	.00871	8.42	.00017
%RSD	11.773	188.16	29.711	1.7093	19.123	1.5623	.58577
#1	.02116	-.00107	-.00415	188.50	.04655	529.66	.02976
#2	.01739	.00106	-.00758	194.91	.03638	546.02	.02944
#3	.01733	-.00426	-.00565	192.94	.05372	541.32	.02950
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00137	.09338	.00221	.80856	.00453	.07232
SDev	.00082	.08216	.00014	.03159	.00048	.00386
%RSD	60.000	87.982	6.3153	3.9071	10.616	5.3392
#1	.00219	.17388	.00205	.80375	.00509	.06788
#2	.00137	.09660	.00231	.84229	.00428	.07490
#3	.00055	.00966	.00227	.77966	.00422	.07417
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

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Method: CLP01AP2 Sample Name: ICSABB;ICSAB Operator: LP
Run Time: 01/12/93 13:19:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	549.32	.00137	-.19605	.51533	.48525	.86945	496.22
SDev	4.38	.01124	.03970	.00507	.00520	.01196	5.50
%RSD	.79825	821.11	20.249	.98332	1.0721	1.3752	1.1075
#1	544.37	-.00893	-.21786	.50957	.47928	.85564	489.87
#2	552.71	-.00032	-.22005	.51910	.48881	.87658	499.32
#3	550.87	.01335	-.15023	.51732	.48765	.87611	499.46
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47355	.48497	.51421	192.54	4.5691	539.64	.49430
SDev	.00779	.00647	.00615	2.11	.0738	5.71	.00568
%RSD	1.6456	1.3338	1.1969	1.0963	1.6160	1.0577	1.1497
#1	.46457	.47753	.50739	190.11	4.4888	533.06	.48783
#2	.47754	.48816	.51934	193.90	4.5844	543.26	.49849
#3	.47853	.48923	.51590	193.60	4.6340	542.61	.49656
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.86772	.17066	1.0363	.79572	.48580	1.0228
SDev	.00934	.04356	.0095	.03060	.00865	.0114
%RSD	1.0759	25.524	.91194	3.8451	1.7808	1.1158
#1	.85703	.17388	1.0257	.76039	.47622	1.0111
#2	.87429	.12558	1.0438	.81338	.49304	1.0339
#3	.87183	.21252	1.0393	.81338	.48814	1.0233
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

Method: CLP01AP2 Sample Name: 2XCRDL292Q4;CRI Operator: LP
Run Time: 01/12/93 13:22:00
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.14607	.11226	.02621	-.00000	.00955	.01091	.14979
SDev	.02724	.00424	.00641	.00035	.00051	.00030	.02570
%RSD	18.648	3.7764	24.446	8045.4	5.2812	2.7120	17.158
#1	.17746	.11514	.01926	.00020	.01014	.01057	.17332
#2	.12874	.10739	.02748	.00020	.00926	.01108	.15370
#3	.13200	.11424	.03188	-.00041	.00926	.01108	.12236

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01744	.09359	.05920	.06630	.02402	.13071	.02796
SDev	.00099	.00281	.00173	.01386	.00378	.02863	.00158
%RSD	5.6698	3.0059	2.9207	20.908	15.727	21.907	5.6382
#1	.01843	.09466	.06109	.07948	.02839	.14608	.02976
#2	.01745	.09040	.05770	.06758	.02184	.14838	.02682
#3	.01645	.09572	.05882	.05184	.02184	.09767	.02731

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07562	-.02898	.02727	-.10920	.09512	.04564
SDev	.00467	.10039	.00157	.02538	.00371	.00054
%RSD	6.1807	346.41	5.7422	23.240	3.9037	1.1923
#1	.07946	-.14490	.02735	-.13329	.09937	.04627
#2	.07699	.02898	.02880	-.11161	.09251	.04531
#3	.07041	.02898	.02567	-.08270	.09348	.04534

Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/12/93 13:24:47
Comment: CCV#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.996	2.4840	2.4635	2.5481	.49672	2.3833	24.047
SDev	.350	.0186	.0329	.0420	.00800	.0289	.326
%RSD	1.3992	.74692	1.3373	1.6481	1.6106	1.2131	1.3536
#1	25.355	2.5039	2.4908	2.5918	.50504	2.4131	24.375
#2	24.656	2.4672	2.4269	2.5081	.48908	2.3554	23.724
#3	24.976	2.4808	2.4727	2.5442	.49604	2.3814	24.042
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.4124	2.4334	2.5346	9.8366	2.3874	24.295	2.4268
SDev	.0313	.0316	.0375	.1343	.0443	.314	.0345
%RSD	1.2988	1.2995	1.4792	1.3656	1.8540	1.2924	1.4196
#1	2.4454	2.4670	2.5739	9.9793	2.4266	24.600	2.4637
#2	2.3831	2.4043	2.4992	9.7126	2.3394	23.972	2.3955
#3	2.4088	2.4288	2.5308	9.8179	2.3962	24.314	2.4210
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3911	25.013	.51029	25.165	2.4734	2.4239
SDev	.0292	.424	.01001	.388	.0365	.0205
%RSD	1.2214	1.6933	1.9626	1.5423	1.4773	.84606
#1	2.4196	25.464	.52115	25.571	2.5118	2.4461
#2	2.3612	24.623	.50142	24.798	2.4390	2.4056
#3	2.3925	24.952	.50831	25.126	2.4695	2.4200
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/12/93 13:27:34
Comment: CCB#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04034	.01054	.00713	.00224	.00039	.00153	.02717
SDev	.01739	.00438	.00058	.00071	.00034	.00164	.00500
%RSD	43.115	41.550	8.0994	31.494	86.388	107.16	18.417
#1	.03313	.01169	.00688	.00265	.00020	.00085	.02779
#2	.06018	.01423	.00673	.00265	.00078	.00341	.03183
#3	.02771	.00570	.00780	.00143	.00019	.00034	.02188
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00297	.00213	.01282	.00898	.00728	.06454	.00065
SDev	.00229	.00368	.00235	.00272	.01097	.02066	.00057
%RSD	76.979	173.19	18.370	30.270	150.64	32.012	86.590
#1	.00165	-.00000	.01357	.00979	.00327	.05378	.00033
#2	.00561	.00638	.01471	.01120	H.01970	.08835	.00131
#3	.00165	.00000	.01018	.00595	-.00111	.05147	.00033
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00356	.00644	.00287	-.08511	.00295	.00418
SDev	.00289	.07378	.00375	.03075	.00205	.00203
%RSD	81.043	1145.6	130.40	36.133	69.406	48.649
#1	.00055	-.05796	.00135	-.11161	.00229	.00581
#2	.00384	.08694	.00714	-.05139	.00525	.00482
#3	.00630	-.00966	.00013	-.09234	.00131	.00190
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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C L P M E T A L S 3.02e

S212134--ARSENIC

Run id: F5 9301104
THERMO JARRELL-ASH VIDEO 21E (#2936)
Analytical method: F
Element: Multi-Element

Acquired: 01/11/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1030
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/11/93	15:38
2	10 PPB	WS1	F			S10	01/11/93	15:43
3	50 PPB	WS2	F			S50	01/11/93	15:48
4	100 PPB	WS3	F			S100	01/11/93	15:53
5	ICV-2	ICV	F			ICV	01/11/93	16:03
6	CAL BLK	ICB	F			ICB	01/11/93	16:05
7	CRA	CRA0	F			CRA	01/11/93	16:08
8	50 PPB	CCV	F			CCV	01/11/93	16:11
9	CAL BLK	CCB	F			CCB	01/11/93	16:14
10	X	M0S	F			ZZZZZZ0	01/11/93	16:16
11	X	M1S	F			ZZZZZZ1	01/11/93	16:19
12	X	M2S	F			ZZZZZZ2	01/11/93	16:22
13	X	M3S	F			ZZZZZZ3	01/11/93	16:25
14	X	M0S	F			ZZZZZZ0	01/11/93	16:29
15	X	M1S	F			ZZZZZZ1	01/11/93	16:32
16	X	M2S	F			ZZZZZZ2	01/11/93	16:35
17	X	M3S	F			ZZZZZZ3	01/11/93	16:38
18	X	X	F			ZZZZZZ	01/11/93	16:41
19	X	X	F			ZZZZZZ	01/11/93	16:43
20	50 PPB	CCV	F			CCV	01/11/93	16:46
21	CAL BLK	CCB	F			CCB	01/11/93	16:49
22	PB	PBW	F	1252	01/06/93	PBW	01/11/93	17:16
23	PB	ASPBW	F	1252		PBWA	01/11/93	17:21
24	LCSFW	LCSW	F	1252	01/06/93	LCSW	01/11/93	17:26
25	LCSFW	ASLCSW	F	1252		LCSWA	01/11/93	17:31
26	S212134-01	S	F	1252	01/06/93	MFN651	01/11/93	17:36
27	S212134-01	AS	F	1252		MFN651A	01/11/93	17:41
28	S212134-02	S	F	1252	01/06/93	MFQ201	01/11/93	17:46
29	S212134-02	AS	F	1252		MFQ201A	01/11/93	17:51
30	X	X	F			ZZZZZZ	01/11/93	17:56
31	X	X	F			ZZZZZZ	01/11/93	18:01
32	50 PPB	CCV	F			CCV	01/11/93	18:06
33	CAL BLK	CCB	F			CCB	01/11/93	18:11
34	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	18:17
35	S212134-04	AS	F	1252		MFQ203A	01/11/93	18:22
36	S212134-05	S	F	1252	01/06/93	MFQ204	01/11/93	18:27
37	S212134-05	AS	F	1252		MFQ204A	01/11/93	18:32
38	S212134-06	S	F	1252	01/06/93	MFQ206	01/11/93	18:37
39	S212134-06	AS	F	1252		MFQ206A	01/11/93	18:42
40	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	18:47
41	S212134-07	AS	F	1252		MFQ207A	01/11/93	18:52
42	X	X	F			ZZZZZZ	01/11/93	18:57
43	X	X	F			ZZZZZZ	01/11/93	19:02

S212134--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/11/93	19:07
45	CAL BLK	CCB	F			CCB	01/11/93	19:12
46	S212134-09	S	F	1252	01/06/93	MFQ209	01/11/93	19:17
47	S212134-09	AS	F	1252		MFQ209A	01/11/93	19:22
48	S212134-10	S	F	1252	01/06/93	MFQ212	01/11/93	19:27
49	S212134-10	AS	F	1252		MFQ212A	01/11/93	19:32
50	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	19:37
51	S212134-11	AS	F	1252		MFQ213A	01/11/93	19:42
52	S212134-12	S	F	1252	01/06/93	MFQ214	01/11/93	19:47
53	S212134-12	AS	F	1252		MFQ214A	01/11/93	19:52
54	X	X	F			ZZZZZZ	01/11/93	19:58
55	X	X	F			ZZZZZZ	01/11/93	20:03
56	50 PPB	CCV	F			CCV	01/11/93	20:08
57	CAL BLK	CCB	F			CCB	01/11/93	20:13
58	S212134-13	S	F	1252	01/06/93	MFQ215	01/11/93	20:18
59	S212134-13	AS	F	1252		MFQ215A	01/11/93	20:23
60	S212134-14	S	F	1252	01/06/93	MFQ216	01/11/93	20:28
61	S212134-14	AS	F	1252		MFQ216A	01/11/93	20:33
62	S212134-14	DS	F	1252	01/06/93	MFQ216S	01/11/93	20:38
63	X	X	F			ZZZZZZ	01/11/93	20:43
64	S212134-15	S	F	1252	01/06/93	MFQ217	01/11/93	20:48
65	S212134-15	AS	F	1252		MFQ217A	01/11/93	20:53
66	X	X	F			ZZZZZZ	01/11/93	21:15
67	X	X	F			ZZZZZZ	01/11/93	21:20
68	50 PPB	CCV	F			CCV	01/11/93	21:25
69	CAL BLK	CCB	F			CCB	01/11/93	21:31
70	S212134-17	S	F	1252	01/06/93	MFQ219	01/11/93	21:39
71	S212134-17	AS	F	1252		MFQ219A	01/11/93	21:44
72	S212134-18	S	F	1252	01/06/93	MFQ220	01/11/93	21:49
73	S212134-18	AS	F	1252		MFQ220A	01/11/93	21:54
74	S212134-03	S	F	1252	01/06/93	MFQ202	01/11/93	21:59
75	S212134-03	AS	F	1252		MFQ202A	01/11/93	22:04
76	S212134-08	S	F	1252	01/06/93	MFQ208	01/11/93	22:09
77	S212134-08	AS	F	1252		MFQ208A	01/11/93	22:14
78	X	X	F			ZZZZZZ	01/11/93	22:19
79	X	X	F			ZZZZZZ	01/11/93	22:24
80	50 PPB	CCV	F			CCV	01/11/93	22:29
81	CAL BLK	CCB	F			CCB	01/11/93	22:34

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C L P M E T A L S 3.02e

S212134--SELENIUM

Run id: F5 9301154
THERMO JARRELL-ASH VIDEO 21E (#2936)
Analytical method: F
Element: Multi-Element

Acquired: 01/11/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1034
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/11/93	15:38
2	5 PPB	WS1	F			S5	01/11/93	15:43
3	50 PPB	WS2	F			S50	01/11/93	15:48
4	100 PPB	WS3	F			S100	01/11/93	15:53
5	ICV-2	ICV	F			ICV	01/11/93	16:03
6	CAL BLK	ICB	F			ICB	01/11/93	16:05
7	CRA	CRA0	F			CRA	01/11/93	16:08
8	50 PPB	CCV	F			CCV	01/11/93	16:11
9	CAL BLK	CCB	F			CCB	01/11/93	16:14
10	X	M0S	F			ZZZZZZ0	01/11/93	16:16
11	X	M1S	F			ZZZZZZ1	01/11/93	16:19
12	X	M2S	F			ZZZZZZ2	01/11/93	16:22
13	X	M3S	F			ZZZZZZ3	01/11/93	16:25
14	X	M0S	F			ZZZZZZ0	01/11/93	16:29
15	X	M1S	F			ZZZZZZ1	01/11/93	16:32
16	X	M2S	F			ZZZZZZ2	01/11/93	16:35
17	X	M3S	F			ZZZZZZ3	01/11/93	16:38
18	X	X	F			ZZZZZZ	01/11/93	16:41
19	X	X	F			ZZZZZZ	01/11/93	16:43
20	50 PPB	CCV	F			CCV	01/11/93	16:46
21	CAL BLK	CCB	F			CCB	01/11/93	16:49
22	PB	PBW	F	1252	01/06/93	PBW	01/11/93	17:16
23	PB	ASPBW	F	1252		PBWA	01/11/93	17:21
24	LCSFW	LCSW	F	1252	01/06/93	LCSW	01/11/93	17:26
25	LCSFW	ASLCSW	F	1252		LCSWA	01/11/93	17:31
26	S212134-01	S	F	1252	01/06/93	MFN651	01/11/93	17:36
27	S212134-01	AS	F	1252		MFN651A	01/11/93	17:41
28	S212134-02	S	F	1252	01/06/93	MFQ201	01/11/93	17:46
29	S212134-02	AS	F	1252		MFQ201A	01/11/93	17:51
30	X	X	F			ZZZZZZ	01/11/93	17:56
31	X	X	F			ZZZZZZ	01/11/93	18:01
32	50 PPB	CCV	F			CCV	01/11/93	18:06
33	CAL BLK	CCB	F			CCB	01/11/93	18:11
34	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	18:17
35	S212134-04	AS	F	1252		MFQ203A	01/11/93	18:22
36	S212134-05	S	F	1252	01/06/93	MFQ204	01/11/93	18:27
37	S212134-05	AS	F	1252		MFQ204A	01/11/93	18:32
38	S212134-06	S	F	1252	01/06/93	MFQ206	01/11/93	18:37
39	S212134-06	AS	F	1252		MFQ206A	01/11/93	18:42
40	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	18:47
41	S212134-07	AS	F	1252		MFQ207A	01/11/93	18:52
42	X	X	F			ZZZZZZ	01/11/93	18:57
43	X	X	F			ZZZZZZ	01/11/93	19:02

S212134--SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/11/93	19:07
45	CAL BLK	CCB	F			CCB	01/11/93	19:12
46	S212134-09	S	F	1252	01/06/93	MFQ209	01/11/93	19:17
47	S212134-09	AS	F	1252		MFQ209A	01/11/93	19:22
48	S212134-10	S	F	1252	01/06/93	MFQ212	01/11/93	19:27
49	S212134-10	AS	F	1252		MFQ212A	01/11/93	19:32
50	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	19:37
51	S212134-11	AS	F	1252		MFQ213A	01/11/93	19:42
52	S212134-12	S	F	1252	01/06/93	MFQ214	01/11/93	19:47
53	S212134-12	AS	F	1252		MFQ214A	01/11/93	19:52
54	X	X	F			ZZZZZZ	01/11/93	19:58
55	X	X	F			ZZZZZZ	01/11/93	20:03
56	50 PPB	CCV	F			CCV	01/11/93	20:08
57	CAL BLK	CCB	F			CCB	01/11/93	20:13
58	S212134-13	S	F	1252	01/06/93	MFQ215	01/11/93	20:18
59	S212134-13	AS	F	1252		MFQ215A	01/11/93	20:23
60	S212134-14	S	F	1252	01/06/93	MFQ216	01/11/93	20:28
61	S212134-14	AS	F	1252		MFQ216A	01/11/93	20:33
62	S212134-14	DS	F	1252	01/06/93	MFQ216S	01/11/93	20:38
63	X	X	F			ZZZZZZ	01/11/93	20:43
64	S212134-15	S	F	1252	01/06/93	MFQ217	01/11/93	20:48
65	S212134-15	AS	F	1252		MFQ217A	01/11/93	20:53
66	X	X	F			ZZZZZZ	01/11/93	21:15
67	X	X	F			ZZZZZZ	01/11/93	21:20
68	50 PPB	CCV	F			CCV	01/11/93	21:25
69	CAL BLK	CCB	F			CCB	01/11/93	21:31
70	S212134-17	S	F	1252	01/06/93	MFQ219	01/11/93	21:39
71	S212134-17	AS	F	1252		MFQ219A	01/11/93	21:44
72	S212134-18	S	F	1252	01/06/93	MFQ220	01/11/93	21:49
73	S212134-18	AS	F	1252		MFQ220A	01/11/93	21:54
74	S212134-03	S	F	1252	01/06/93	MFQ202	01/11/93	21:59
75	S212134-03	AS	F	1252		MFQ202A	01/11/93	22:04
76	S212134-08	S	F	1252	01/06/93	MFQ208	01/11/93	22:09
77	S212134-08	AS	F	1252		MFQ208A	01/11/93	22:14
78	X	X	F			ZZZZZZ	01/11/93	22:19
79	X	X	F			ZZZZZZ	01/11/93	22:24
80	50 PPB	CCV	F			CCV	01/11/93	22:29
81	CAL BLK	CCB	F			CCB	01/11/93	22:34
82	S212134-12	S2	F	1252	01/06/93	MFQ214D	01/11/93	22:39
83	S212134-12	ASS2	F	1252		MFQ214DA	01/11/93	22:44
84	S212134-16	S	F	1252	01/06/93	MFQ218	01/11/93	23:06
85	S212134-16	AS	F	1252		MFQ218A	01/11/93	23:11
86	S212134-01	S	F	1252	01/06/93	MFN651	01/11/93	23:16
87	S212134-01	AS	F	1252		MFN651A	01/11/93	23:21
88	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	23:26
89	S212134-04	AS	F	1252		MFQ203A	01/11/93	23:31
90	X	X	F			ZZZZZZ	01/11/93	23:36
91	X	X	F			ZZZZZZ	01/11/93	23:41
92	50 PPB	CCV	F			CCV	01/11/93	23:46
93	CAL BLK	CCB	F			CCB	01/11/93	23:51

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2344 GFAA ID: F1 F2 F3 F4 (F5) F6 Method: 150

Date: 1/11/93 Reviewed By: [illegible] Standards Prepared: 800 1/11/93

Operator: 609

Disk # 51 S212134

Acq ~~S212121~~

SAMIN ✓✓

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301103-04		RUN ID:	9301153-54	
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[✓] 10,5 [] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	~~10~~		
	11	+10	1:1	As only
	12	+20		
	13	+30		
new case 50 1/11/93	14	16		
	15	+10	1:1	
	16	+20		
	17	+30		
	18	X		
	19	X		
	20	CCV		
	21	CCB		
Rerun	22	PBW		
	23	PBWA		
	24	LCSW		
	25	LCSWA		
	26	S212134-01		RSD
	27	01A		
<40%	28	02		<40%
	29	02A		
	30	X ~~03~~ 50		
	31	X ~~03A~~ 1/11/93		
	32	CCV		
	33	CCB		
M(9)	34	04		RSD
	35	04A		
	36	05		
	37	05A		
	38	06		
	39	06A		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2344
Page 2 of 2

	40	07	<40%
	41	07A	
	42	X	
	43	X	
	44	CCV	
	45	CCB	
	46	09	RSD
	47	09A	
	48	10	M(7)
	49	10A	
	50	11	
	51	11A	
	52	12	
	53	12A	
	54	X	
	55	X	
	56	CCV	
	57	CCB	
	58	13	RSD
	59	13A	
	60	14	
	61	14A	
	62	14S	
	63	X	
	64	15	
	65	15A	
	66	X	
	67	X	
	68	CCV	
	69	CCB	
	70	17	
	71	17A	
	72	18	
	73	18A	
<40%	74	03	<40%
	75	03A	
	76	08	<40%
	77	08A	
	78	X	
	79	X	
	80	CCV	
	81	CCB	
	82	12D	
	83	12D	
OUT <40%	84	16	
	85	16A	
CCV	86	01 ~~X~~ SGT 1/11/93	
	87	01A ~~X~~	
Se only	88	04	
	89	04A	
	90	X	
	91	X	
	92	CCV	
	93	CCB	
	94	09	
Se only	95	09A	

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/11/93	15:38

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

2	STD2(10,5)	WS1	S	1.00x	01/11/93	15:43

	<-As->		<-Se->	
Burns (Abs)	0.043 A	0.037 A	0.024A	0.022A
Mean	0.0400		0.0230	
CV %	10.61		0.00	

3	STD3(50)	WS2	S	1.00x	01/11/93	15:48

	<-As->		<-Se->	
Burns (Abs)	0.182 A	0.185 A	0.142A	0.147A
Mean	0.1835		0.1445	
CV %	0.00		2.45	

4	STD4(100)	WS3	S	1.00x	01/11/93	15:53

	<-As->		<-Se->	
Burns (Abs)	0.343 A	0.344 A	0.231A	0.248A
Mean	0.3435		0.2395	
CV %	0.00		5.02	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003924	0.003434027
Coef[2]:	-4.899999e-006	-1.041768e-005
Correl. coef.:	1.0000	0.9992

5	ICV-2	ICV	ICV	1.00x	01/11/93	16:03

	<-As->	<-Se->
Burns (Conc)	51.474	54.408
Mean	51.4740	54.4080
CV %	---	---
Sample value	51.47	54.41

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/11/93	16:05

	<-As----->	<-Se----->
Burns (Conc)	1.021	3.235
Mean	1.0210	3.2350
CV %	---	---
Sample value	3.20U	3.90U

7	CRA	CRA	CRA	1.00x	01/11/93	16:08

	<-As----->	<-Se----->
Burns (Conc)	10.589	10.840
Mean	10.5890	10.8400
CV %	---	---
Sample value	10.59	10.84

8	50 PPB	CCV	CCV	1.00x	01/11/93	16:11

	<-As----->	<-Se----->
Burns (Conc)	50.306	49.726
Mean	50.3060	49.7260
CV %	---	---
Sample value	50.31	49.73

9	CAL BLK	CCB	CCB	1.00x	01/11/93	16:14

	<-As----->	<-Se----->
Burns (Conc)	0.765	2.346
Mean	0.7650	2.3460
CV %	---	---
Sample value	3.20U	3.90U

10	X	MOS	ZZZZZZ0	2.00x	01/11/93	16:16

	<-As----->	<-Se----->
Burns (Abs)	0.088 A	0.009A
Mean	0.0880	0.0090
CV %	---	---
Spike added:	0.00	0.00

11	X	M1S	ZZZZZZ1	2.00x	01/11/93	16:19

	<-As----->	<-Se----->
Burns (Abs)	0.117 A	0.011A
Mean	0.1170	0.0110
CV %	---	---
Spike added:	10.00	5.00

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	X	M2S	ZZZZZZ2	2.00x	01/11/93	16:22

	<-As---------->	<-Se---------->
Burns (Abs)	0.154 A	0.013A
Mean	0.1540	0.0130
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	X	M3S	ZZZZZZ3	2.00x	01/11/93	16:25

	<-As---------->	<-Se---------->
Burns (Abs)	0.200 A	0.023A
Mean	0.2000	0.0230
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.08380	0.00740
Slope:	0.00373	0.00088
Correlation:	0.9948	0.9135
X intercept:	-22.466	-8.409
Sample value:	44.933	16.818

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	X	M0S	ZZZZZZ0	2.00x	01/11/93	16:29

	<-As---------->	<-Se---------->
Burns (Abs)	0.081 A	0.004A
Mean	0.0810	0.0040
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	X	M1S	ZZZZZZ1	2.00x	01/11/93	16:32

	<-As---------->	<-Se---------->
Burns (Abs)	0.109 A	0.007A
Mean	0.1090	0.0070
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	X	M2S	ZZZZZZ2	2.00x	01/11/93	16:35

	<-As---------->	<-Se---------->
Burns (Abs)	0.140 A	0.011A
Mean	0.1400	0.0110
CV %	---	---
Spike added:	20.00	10.00

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	X	M3S	ZZZZZZ3	2.00x	01/11/93	16:38

	<-As----->	<-Se----->
Burns (Abs)	0.147 A	0.018A
Mean	0.1470	0.0180
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.08490	0.00310
Slope:	0.00229	0.00092
Correlation:	0.9731	0.9807
X intercept:	-37.074	-3.370
Sample value:	74.148	6.739

18	X	X	ZZZZZZ	1.00x	01/11/93	16:41

	<-As----->	<-Se----->
Burns (Conc)	2.813	4.727
Mean	2.8130	4.7270
CV %	---	---
Sample value	3.20U	4.73

19	X	X	ZZZZZZ	1.00x	01/11/93	16:43

	<-As----->	<-Se----->
Burns (Conc)	0.510	4.727
Mean	0.5100	4.7270
CV %	---	---
Sample value	3.20U	4.73

20	50 PPB	CCV	2 CCV	1.00x	01/11/93	16:46

	<-As----->	<-Se----->
Burns (Conc)	50.889	46.843
Mean	50.8890	46.8430
CV %	---	---
Sample value	50.89	46.84

21	CAL BLK	CCB	2 CCB	1.00x	01/11/93	16:49

	<-As----->	<-Se----->
Burns (Conc)	0.255	2.051
Mean	0.2550	2.0510
CV %	---	---
Sample value	3.20U	3.90U

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
22	PB	PBW	PBW	1.00x	01/11/93	17:16

	<-As->		<-Se->	
Burns (Conc)	1.021	0.255	2.642	1.463
Mean	0.6380		2.0525	
CV %	84.90		40.62	
Sample value	3.20U		3.90U	

23	PB	ASPBW	PBWA	1.00x	01/11/93	17:21

	<-As->		<-Se->	
Burns (Conc)	17.188	12.952	8.981	8.366
Mean	15.0700		8.6735	
CV %	19.88		5.01	
Sample value	15.07		8.67	
Spike added	20.00		10.00	
Spike recovery, %	75.35 ***		86.73	

24	LCSFW	LCSW	LCSW	1.00x	01/11/93	17:26

	<-As->		<-Se->	
Burns (Conc)	47.982	46.537	46.843	45.628
Mean	47.2595		46.2355	
CV %	2.16		1.86	
Sample value	47.26		46.24	

25	LCSFW	ASLCSW	LCSWA	1.00x	01/11/93	17:31

	<-As->		<-Se->	
Burns (Conc)	66.110	65.500	53.974	53.542
Mean	65.8050		53.7580	
CV %	0.66		0.57	
Sample value	65.81		53.76	
Spike added	20.00		10.00	
Spike recovery, %	92.73		75.23 ***	

26	S212134-01	S	MFN651	1.00x	01/11/93	17:36

	<-As->		<-Se->	
Burns (Conc)	2.557	1.276	2.938	2.938
Mean	1.9165		2.9380	
CV %	47.26		0.00	
Sample value	3.20U		3.90U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	-01	AS	MFN651A	1.00x	01/11/93	17:41

	<-As->		<-Se->	
Burns (Conc)	16.922	13.479	9.598	5.931
Mean	15.2005		7.7645	
CV %	16.02		33.40 ***	
Sample value	15.20		7.76	
Spike added	20.00		10.00	
Spike recovery, %	76.00 ***		77.64 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-02	S	MFQ201	1.00x	01/11/93	17:46

	<-As->		<-Se->	
Burns (Conc)	0.000	0.000	1.463	2.642
Mean	0.0000		2.0525	
CV %	---		40.62	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-02	AS	MFQ201A	1.00x	01/11/93	17:51

	<-As->		<-Se->	
Burns (Conc)	7.980	5.646	5.629	2.346
Mean	6.8130		3.9875	
CV %	24.22		58.22	
Sample value	6.81		3.99	
Spike added	20.00		10.00	
Spike recovery, %	34.07 ***		39.88 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	1.00x	01/11/93	17:56

	<-As->		<-Se->	
Burns (Conc)	0.765	-0.255	5.027	2.051
Mean	0.2550		3.5390	
CV %	282.84		59.46	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	X	X	ZZZZZZ	1.00x	01/11/93	18:01

	<-As->		<-Se->	
Burns (Conc)	-0.764	0.510	2.642	3.235
Mean	-0.1270		2.9385	
CV %	709.33		14.27	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV 3	CCV	1.00x	01/11/93	18:06

	<-As->		<-Se->	
Burns (Conc)	49.433	48.561	44.426	46.843
Mean	48.9970		45.6345	
CV %	1.26		3.75	
Sample value	49.00		45.63	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB 3	CCB	1.00x	01/11/93	18:11

	<-As->		<-Se->	
Burns (Conc)	0.000	-0.255	0.583	0.000
Mean	-0.1275		0.2915	
CV %	141.42		141.42	
Sample value	3.20U		3.90U	

34	-04	S	MFQ203	1.00x	01/11/93	18:17

	<-As->		<-Se->	
Burns (Conc)	11.112	7.460	9.907	6.840
Mean	9.2860		8.3735	
CV %	27.81		25.90 ***	
Sample value	9.29		8.37	

35	-04	AS	MFQ203A	1.00x	01/11/93	18:22

	<-As->		<-Se->	
Burns (Conc)	24.718	23.363	12.092	12.092
Mean	24.0405		12.0920	
CV %	3.99		0.00	
Sample value	24.04		12.09	
Spike added	20.00		10.00	
Spike recovery, %	73.77 ***		37.18 ***	

36	-05	S	MFQ204	1.00x	01/11/93	18:27

	<-As->		<-Se->	
Burns (Conc)	3.584	3.070	2.051	2.642
Mean	3.3270		2.3465	
CV %	10.92		17.81	
Sample value	3.33		3.90U	

37	-05	AS	MFQ204A	1.00x	01/11/93	18:32

	<-As->		<-Se->	
Burns (Conc)	21.204	20.129	10.218	10.528
Mean	20.6665		10.3730	
CV %	3.68		2.11	
Sample value	20.67		10.37	
Spike added	20.00		10.00	
Spike recovery, %	86.69		103.73	

38	-06	S	MFQ206	1.00x	01/11/93	18:37

	<-As->		<-Se->	
Burns (Conc)	2.044	0.765	2.051	3.532
Mean	1.4045		2.7915	
CV %	64.39		37.51	
Sample value	3.20U		3.90U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-06	AS	MFQ206A	1.00x	01/11/93	18:42

	<-As->		<-Se->	
Burns (Conc)	18.255	17.988	8.060	6.840
Mean	18.1215		7.4500	
CV %	1.04		11.58	
Sample value	18.12		7.45	
Spike added	20.00		10.00	
Spike recovery, %	90.61		74.50 ***	

40	-07	S	MFQ207	1.00x	01/11/93	18:47

	<-As->		<-Se->	
Burns (Conc)	-0.509	-1.018	3.532	2.938
Mean	-0.7635		3.2350	
CV %	47.14		12.98	
Sample value	3.20U		3.90U	

41	-07	AS	MFQ207A	1.00x	01/11/93	18:52

	<-As->		<-Se->	
Burns (Conc)	13.215	12.162	4.129	4.129
Mean	12.6885		4.1290	
CV %	5.87		0.00	
Sample value	12.69		4.13	
Spike added	20.00		10.00	
Spike recovery, %	63.44 ***		41.29 ***	

42	X	X	ZZZZZZ	1.00x	01/11/93	18:57

	<-As->		<-Se->	
Burns (Conc)	0.255	0.000	3.532	2.938
Mean	0.1275		3.2350	
CV %	141.42		12.98	
Sample value	3.20U		3.90U	

43	X	X	ZZZZZZ	1.00x	01/11/93	19:02

	<-As->		<-Se->	
Burns (Conc)	0.000	1.532	3.830	4.727
Mean	0.7660		4.2785	
CV %	141.42		14.82	
Sample value	3.20U		4.28	

44	50 PPB	CCV 4	CCV	1.00x	01/11/93	19:07

	<-As->		<-Se->	
Burns (Conc)	49.723	46.249	51.406	49.726
Mean	47.9860		50.5660	
CV %	5.12		2.35	
Sample value	47.99		50.57	

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ARGOS MODEL SA4 Version 1.29

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	CAL BLK	CCB	CCB	1.00x	01/11/93	19:12

	<-As->		<-Se->	
Burns (Conc)	0.255	0.510	0.000	-0.291
Mean	0.3825		-0.1455	
CV %	47.14		141.42	
Sample value	3.20U		3.90U	

46	-09	S	MFQ209	1.00x	01/11/93	19:17

	<-As->		<-Se->	
Burns (Conc)	2.044	1.021	3.830	3.235
Mean	1.5325		3.5325	
CV %	47.20		11.91	
Sample value	3.20U		3.90U	

47	-09	AS	MFQ209A	1.00x	01/11/93	19:22

	<-As->		<-Se->	
Burns (Conc)	16.922	14.271	8.060	5.629
Mean	15.5965		6.8445	
CV %	12.02		25.11 ***	
Sample value	15.60		6.84	
Spike added	20.00		10.00	
Spike recovery, %	77.98 ***		68.44 ***	

48	-10	S	MFQ212	1.00x	01/11/93	19:27

	<-As->		<-Se->	
Burns (Conc)	2.813	2.044	8.060	7.448
Mean	2.4285		7.7540	
CV %	22.39		5.58	
Sample value	3.20U		7.75	

49	-10	AS	MFQ212A	1.00x	01/11/93	19:32

	<-As->		<-Se->	
Burns (Conc)	17.188	16.656	14.947	12.406
Mean	16.9220		13.6765	
CV %	2.22		13.14	
Sample value	16.92		13.68	
Spike added	20.00		10.00	
Spike recovery, %	84.61 ***		59.22 ***	

50	-11	S	MFQ213	1.00x	01/11/93	19:37

	<-As->		<-Se->	
Burns (Conc)	-0.764	0.765	1.757	4.727
Mean	0.0005		3.2420	
CV %	>9999.99		64.78	
Sample value	3.20U		3.90U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-11	AS	MFQ213A	1.00x	01/11/93	19:42

	<-As->		<-Se->	
Burns (Conc)	16.391	15.064	11.464	9.289
Mean	15.7275		10.3765	
CV %	5.97		14.82	
Sample value	15.73		10.38	
Spike added	20.00		10.00	
Spike recovery, %	78.64 ***		103.77	

52	-12	S	MFQ214	1.00x	01/11/93	19:47

	<-As->		<-Se->	
Burns (Conc)	-0.255	-1.018	2.642	2.051
Mean	-0.6365		2.3465	
CV %	84.76		17.81	
Sample value	3.20U		3.90U	

53	-12	AS	MFQ214A	1.00x	01/11/93	19:52

	<-As->		<-Se->	
Burns (Conc)	16.656	14.800	8.366	8.366
Mean	15.7280		8.3660	
CV %	8.34		0.00	
Sample value	15.73		8.37	
Spike added	20.00		10.00	
Spike recovery, %	78.64 ***		83.66 ***	

54	X	X	ZZZZZZ	1.00x	01/11/93	19:58

	<-As->		<-Se->	
Burns (Conc)	0.765	0.765	3.235	5.027
Mean	0.7650		4.1310	
CV %	0.00		30.67	
Sample value	3.20U		4.13	

55	X	X	ZZZZZZ	1.00x	01/11/93	20:03

	<-As->		<-Se->	
Burns (Conc)	0.765	0.510	4.129	6.233
Mean	0.6375		5.1810	
CV %	28.28		28.72 ***	
Sample value	3.20U		5.18	

56	50 PPB	CCV 5	CCV	1.00x	01/11/93	20:08

	<-As->		<-Se->	
Burns (Conc)	47.693	46.249	47.659	47.659
Mean	46.9710		47.6590	
CV %	2.17		0.02	
Sample value	46.97		47.66	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB	CCB	1.00x	01/11/93	20:13

	<-As->		<-Se->	
Burns (Conc)	-0.509	-0.764	-0.871	0.583
Mean	-0.6365		-0.1440	
CV %	28.33		713.98	
Sample value	3.20U		3.90U	

58	-13	S	MFQ215	1.00x	01/11/93	20:18

	<-As->		<-Se->	
Burns (Conc)	1.276	1.021	2.346	1.757
Mean	1.1485		2.0515	
CV %	15.70		20.30	
Sample value	3.20U		3.90U	

59	-13	AS	MFQ215A	1.00x	01/11/93	20:23

	<-As->		<-Se->	
Burns (Conc)	10.589	8.760	8.060	4.727
Mean	9.6745		6.3935	
CV %	13.37		36.86 ***	
Sample value	9.67		6.39	
Spike added	20.00		10.00	
Spike recovery, %	48.37 ***		63.93 ***	

60	-14	S	MFQ216	1.00x	01/11/93	20:28

	<-As->		<-Se->	
Burns (Conc)	-0.764	0.765	2.051	2.051
Mean	0.0005		2.0510	
CV %	>9999.99		0.00	
Sample value	3.20U		3.90U	

61	-14	AS	MFQ216A	1.00x	01/11/93	20:33

	<-As->		<-Se->	
Burns (Conc)	12.952	12.425	5.931	5.931
Mean	12.6885		5.9310	
CV %	2.94		0.00	
Sample value	12.69		5.93	
Spike added	20.00		10.00	
Spike recovery, %	63.44 ***		59.31 ***	

62	-14	DS	MFQ216S	1.00x	01/11/93	20:38

	<-As->		<-Se->	
Burns (Conc)	37.427	36.865	9.598	7.754
Mean	37.1460		8.6760	
CV %	1.07		15.03	
Sample value	37.15		8.68	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
63	X	X	ZZZZZZ	1.00x	01/11/93	20:43

	<-As->		<-Se->	
Burns (Conc)	12.688	11.637	7.448	6.536
Mean	12.1625		6.9920	
CV %	6.11		9.22	
Sample value	12.16		6.99	

64	-15	S	MFQ217	1.00x	01/11/93	20:48

	<-As->		<-Se->	
Burns (Conc)	-0.255	0.510	1.169	1.463
Mean	0.1275		1.3160	
CV %	424.26		15.80	
Sample value	3.20U		3.90U	

65	-15	AS	MFQ217A	1.00x	01/11/93	20:53

	<-As->		<-Se->	
Burns (Conc)	16.125	14.006	7.144	7.448
Mean	15.0655		7.2960	
CV %	9.95		2.95	
Sample value	15.07		7.30	
Spike added	20.00		10.00	
Spike recovery, %	75.33 ***		72.96 ***	

66	X	X	ZZZZZZ	1.00x	01/11/93	21:15

	<-As->		<-Se->	
Burns (Conc)	-0.255	1.532	2.346	3.532
Mean	0.6385		2.9390	
CV %	197.90		28.53	
Sample value	3.20U		3.90U	

67	X	X	ZZZZZZ	1.00x	01/11/93	21:20

	<-As->		<-Se->	
Burns (Conc)	0.000	0.000	3.532	0.876
Mean	0.0000		2.2040	
CV %	---		85.21	
Sample value	3.20U		3.90U	

68	50 PPB	CCV	6 CCV	1.00x	01/11/93	21:25

	<-As->		<-Se->	
Burns (Conc)	49.433	45.098	55.281	50.143
Mean	47.2655		52.7120	
CV %	6.49		6.89	
Sample value	47.26		52.71	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
69	CAL BLK	CCB	CCB	1.00x	01/11/93	21:31

	<-As->		<-Se->	
Burns (Conc)	-1.018	0.765	1.757	0.291
Mean	-0.1265		1.0240	
CV %	996.66		101.23	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
70	-17	S	MFQ219	1.00x	01/11/93	21:39

	<-As->		<-Se->	
Burns (Conc)	0.510	-0.764	0.000	1.463
Mean	-0.1270		0.7315	
CV %	709.33		141.42	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
71	-17	AS	MFQ219A	1.00x	01/11/93	21:44

	<-As->		<-Se->	
Burns (Conc)	13.479	14.006	5.027	5.629
Mean	13.7425		5.3280	
CV %	2.71		7.99	
Sample value	13.74		5.33	
Spike added	20.00		10.00	
Spike recovery, %	68.71 ***		53.28 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
72	-18	S	MFQ220	1.00x	01/11/93	21:49

	<-As->		<-Se->	
Burns (Conc)	1.276	1.276	0.583	2.346
Mean	1.2760		1.4645	
CV %	0.00		85.12	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
73	-18	AS	MFQ220A	1.00x	01/11/93	21:54

	<-As->		<-Se->	
Burns (Conc)	14.800	13.479	5.629	6.233
Mean	14.1395		5.9310	
CV %	6.61		7.20	
Sample value	14.14		5.93	
Spike added	20.00		10.00	
Spike recovery, %	70.69 ***		59.31 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
74	-03	S	MFQ202	1.00x	01/11/93	21:59

	<-As->		<-Se->	
Burns (Conc)	-0.509	-0.509	1.757	-0.291
Mean	-0.5090		0.7330	
CV %	0.00		197.57	
Sample value	3.20U		3.90U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
75	-03	AS	MFQ202A	1.00x	01/11/93	22:04

	<-As->		<-Se->	
Burns (Conc)	7.980	7.200	2.051	2.642
Mean	7.5900		2.3465	
CV %	7.27		17.81	
Sample value	7.59		3.90U	
Spike added	20.00		10.00	
Spike recovery, %	37.95 ***		0.00 ***	

76	-08	S	MFQ208	1.00x	01/11/93	22:09

	<-As->		<-Se->	
Burns (Conc)	0.765	-0.509	0.876	2.642
Mean	0.1280		1.7590	
CV %	703.79		70.99	
Sample value	3.20U		3.90U	

77	-08	AS	MFQ208A	1.00x	01/11/93	22:14

	<-As->		<-Se->	
Burns (Conc)	9.543	10.065	4.129	2.642
Mean	9.8040		3.3855	
CV %	3.76		31.06	
Sample value	9.80		3.90U	
Spike added	20.00		10.00	
Spike recovery, %	49.02 ***		0.00 ***	

78	X	X	ZZZZZZ	1.00x	01/11/93	22:19

	<-As->		<-Se->	
Burns (Conc)	0.000	-1.018	2.938	2.642
Mean	-0.5090		2.7900	
CV %	141.42		7.50	
Sample value	3.20U		3.90U	

79	X	X	ZZZZZZ	1.00x	01/11/93	22:24

	<-As->		<-Se->	
Burns (Conc)	2.044	-0.764	2.051	2.346
Mean	0.6400		2.1985	
CV %	310.24		9.49	
Sample value	3.20U		3.90U	

80	50 PPB	CCV 7	CCV	1.00x	01/11/93	22:29

	<-As->		<-Se->	
Burns (Conc)	47.693	45.386	44.426	45.628
Mean	46.5395		45.0270	
CV %	3.51		1.89	
Sample value	46.54		45.03	

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Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 15

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
81	CAL BLK	CCB	CCB	1.00x	01/11/93	22:34

	<-As->		<-Se->	
Burns (Conc)	0.000	-0.509	0.583	0.583
Mean	-0.2545		0.5830	
CV %	141.42		0.00	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
82	-12	S2	MFQ214D	1.00x	01/11/93	22:39

	<-As->		<-Se->	
Burns (Conc)	0.510	0.255	1.757	1.169
Mean	0.3825		1.4630	
CV %	47.14		28.42	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
83	-12	ASS2	MFQ214DA	1.00x	01/11/93	22:44

	<-As->		<-Se->	
Burns (Conc)	15.594	14.006	6.840	5.629
Mean	14.8000		6.2345	
CV %	7.59		13.74	
Sample value	14.80		6.23	
Spike added	20.00		10.00	
Spike recovery, %	74.00 ***		62.34 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
84	-16	S	MFQ218	1.00x	01/11/93	23:06

	<-As->		<-Se->	
Burns (Conc)	1.532	1.021	0.583	1.757
Mean	1.2765		1.1700	
CV %	28.31		70.95	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
85	-16	AS	MFQ218A	1.00x	01/11/93	23:11

	<-As->		<-Se->	
Burns (Conc)	4.614	4.872	5.027	5.931
Mean	4.7430		5.4790	
CV %	3.85		11.67	
Sample value	4.74		5.48	
Spike added	20.00		10.00	
Spike recovery, %	23.72 ***		54.79 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
86	-01	S	MFN651	1.00x	01/11/93	23:16

	<-As->		<-Se->	
Burns (Conc)	-1.272	-1.526	1.757	1.169
Mean	-1.3990		1.4630	
CV %	12.84		28.42	
Sample value	3.20U		3.90U	

1/12/93
Se only JLS

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 16

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
87	-01	AS	MFN651A	1.00x	01/11/93	23:21

	As		Se	
Burns (Conc)	8.240	7.980	5.027	5.629
Mean	8.1100		5.3280	
CV %	2.27		7.99	
Sample value	8.11		5.33	
Spike added	20.00		10.00	
Spike recovery, %	40.55 ***		53.28 ***	

Se only JLS 1/12/93

88	-04	S	MFQ203	1.00x	01/11/93	23:26

	As		Se	
Burns (Conc)	1.788	-1.018	2.642	3.830
Mean	0.3850		3.2360	
CV %	515.36		25.96	
Sample value	3.20U		3.90U	

89	-04	AS	MFQ203A	1.00x	01/11/93	23:31

	As		Se	
Burns (Conc)	14.271	14.271	11.152	10.218
Mean	14.2710		10.6850	
CV %	0.00		6.18	
Sample value	14.27		10.69	
Spike added	20.00		10.00	
Spike recovery, %	71.35 ***		106.85	

90	X	X	ZZZZZZ	1.00x	01/11/93	23:36

	As		Se	
Burns (Conc)	-0.255	-1.272	2.938	4.129
Mean	-0.7635		3.5335	
CV %	94.19		23.83	
Sample value	3.20U		3.90U	

91	X	X	ZZZZZZ	1.00x	01/11/93	23:41

	As		Se	
Burns (Conc)	-1.272	-0.509	3.235	1.463
Mean	-0.8905		2.3490	
CV %	60.59		53.34	
Sample value	3.20U		3.90U	

92	50 PPB	CCV 8	CCV	1.00x	01/11/93	23:46

	As		Se	
Burns (Conc)	44.811	43.379	48.481	46.843
Mean	44.0950		47.6620	
CV %	2.30		2.43	
Sample value	44.10 ***		47.66	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F5 9301104 Analyst: SGJ Page 17

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
93	CAL BLK	CCB	CCB	1.00x	01/11/93	23:51

	<-As----->		<-Se----->	
Burns (Conc)	-0.255	-0.764	1.757	-0.291
Mean	-0.5095		0.7330	
CV %	70.64		197.57	
Sample value	3.20U		3.90U	

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C L P M E T A L S 3.02e

S212134--ARSENIC

Run id: F5 9301201
THERMO JARRELL-ASH VIDEO 21E (#2936)
Analytical method: F
Element: Multi-Element

Acquired: 01/12/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1038
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/12/93	13:10
2	10 PPB	WS1	F			S10	01/12/93	13:15
3	50 PPB	WS2	F			S50	01/12/93	13:20
4	100 PPB	WS3	F			S100	01/12/93	13:25
5	ICV-2	ICV	F			ICV	01/12/93	13:53
6	CAL BLK	ICB	F			ICB	01/12/93	13:58
7	CRA	CRA0	F			CRA	01/12/93	14:03
8	50 PPB	CCV	F			CCV	01/12/93	14:08
9	CAL BLK	CCB	F			CCB	01/12/93	14:13
10	PB	PBW	F	1252	01/06/93	PBW	01/12/93	14:18
11	PB	ASPBW	F	1252		PBWA	01/12/93	14:23
12	S212134-02	S	F	1252	01/06/93	MFQ201	01/12/93	14:28
13	S212134-02	AS	F	1252		MFQ201A	01/12/93	14:33
14	S212134-03	S	F	1252	01/06/93	MFQ202	01/12/93	14:38
15	S212134-03	AS	F	1252		MFQ202A	01/12/93	14:43
16	X	X	F			ZZZZZZ	01/12/93	14:49
17	X	X	F			ZZZZZZ	01/12/93	14:54
18	X	X	F			ZZZZZZ	01/12/93	15:02
19	X	X	F			ZZZZZZ	01/12/93	15:07
20	50 PPB	CCV	F			CCV	01/12/93	15:12
21	CAL BLK	CCB	F			CCB	01/12/93	15:18
22	X	X	F			ZZZZZZ	01/12/93	15:23
23	X	X	F			ZZZZZZ	01/12/93	15:28
24	X	X	F			ZZZZZZ	01/12/93	15:33
25	X	X	F			ZZZZZZ	01/12/93	15:38
26	S212134-16	S	F	1252	01/06/93	MFQ218	01/12/93	15:43
27	S212134-16	AS	F	1252		MFQ218A	01/12/93	15:48
28	S212134-12	S2	F	1252	01/06/93	MFQ214D	01/12/93	15:53
29	S212134-12	ASS2	F	1252		MFQ214DA	01/12/93	15:58
30	X	X	F			ZZZZZZ	01/12/93	16:03
31	X	X	F			ZZZZZZ	01/12/93	16:08
32	50 PPB	CCV	F			CCV	01/12/93	16:13
33	CAL BLK	CCB	F			CCB	01/12/93	16:18
34	X	X	F			ZZZZZZ	01/12/93	16:23
35	X	X	F			ZZZZZZ	01/12/93	16:28
36	X	X	F			ZZZZZZ	01/12/93	16:33
37	X	X	F			ZZZZZZ	01/12/93	16:38
38	50 PPB	CCV	F			CCV	01/12/93	16:43
39	CAL BLK	CCB	F			CCB	01/12/93	16:48
40	X	M0S	F			ZZZZZZ0	01/12/93	17:09
41	X	M1S	F			ZZZZZZ1	01/12/93	17:12
42	X	M2S	F			ZZZZZZ2	01/12/93	17:14
43	X	M3S	F			ZZZZZZ3	01/12/93	17:17

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S212134--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212134-04	M0S	F	1252		MFQ2030	01/12/93	17:20
45	S212134-04	M1S	F	1252		MFQ2031	01/12/93	17:23
46	S212134-04	M2S	F	1252		MFQ2032	01/12/93	17:25
47	S212134-04	M3S	F	1252		MFQ2033	01/12/93	17:28
48	X	M0S	F			ZZZZZZ0	01/12/93	17:40
49	X	M1S	F			ZZZZZZ1	01/12/93	17:42
50	X	M2S	F			ZZZZZZ2	01/12/93	17:45
51	X	M3S	F			ZZZZZZ3	01/12/93	17:48
52	X	X	F			ZZZZZZ	01/12/93	17:51
53	X	X	F			ZZZZZZ	01/12/93	17:54
54	50 PPB	CCV	F			CCV	01/12/93	17:56
55	CAL BLK	CCB	F			CCB	01/12/93	17:59

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C L P M E T A L S 3.02e

S212134--SELENIUM

Run id: F5 9301251
THERMO JARRELL-ASH VIDEO 21E (#2936)
Analytical method: F
Element: Multi-Element

Acquired: 01/12/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1041
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/12/93	13:10
2	5 PPB	WS1	F			S5	01/12/93	13:15
3	50 PPB	WS2	F			S50	01/12/93	13:20
4	100 PPB	WS3	F			S100	01/12/93	13:25
5	ICV-2	ICV	F			ICV	01/12/93	13:53
6	CAL BLK	ICB	F			ICB	01/12/93	13:58
7	CRA	CRA0	F			CRA	01/12/93	14:03
8	50 PPB	CCV	F			CCV	01/12/93	14:08
9	CAL BLK	CCB	F			CCB	01/12/93	14:13
10	PB	PBW	F			PBW	01/12/93	14:18
11	PB	ASPBW	F			PBWA	01/12/93	14:23
12	S212134-02	S	F	1252	01/06/93	MFQ201	01/12/93	14:28
13	S212134-02	AS	F	1252		MFQ201A	01/12/93	14:33
14	S212134-03	S	F	1252	01/06/93	MFQ202	01/12/93	14:38
15	S212134-03	AS	F	1252		MFQ202A	01/12/93	14:43
16	S212134-07	S	F	1252	01/06/93	MFQ207	01/12/93	14:49
17	S212134-07	AS	F	1252		MFQ207A	01/12/93	14:54
18	X	X	F			ZZZZZZ	01/12/93	15:02
19	X	X	F			ZZZZZZ	01/12/93	15:07
20	50 PPB	CCV	F			CCV	01/12/93	15:12
21	CAL BLK	CCB	F			CCB	01/12/93	15:18
22	S212134-09	S	F	1252	01/06/93	MFQ209	01/12/93	15:23
23	S212134-09	AS	F	1252		MFQ209A	01/12/93	15:28
24	S212134-13	S	F	1252	01/06/93	MFQ215	01/12/93	15:33
25	S212134-13	AS	F	1252		MFQ215A	01/12/93	15:38
26	X	X	F			ZZZZZZ	01/12/93	15:43
27	X	X	F			ZZZZZZ	01/12/93	15:48
28	X	X	F			ZZZZZZ	01/12/93	15:53
29	X	X	F			ZZZZZZ	01/12/93	15:58
30	X	X	F			ZZZZZZ	01/12/93	16:03
31	X	X	F			ZZZZZZ	01/12/93	16:08
32	50 PPB	CCV	F			CCV	01/12/93	16:13
33	CAL BLK	CCB	F			CCB	01/12/93	16:18
34	S212134-08	S	F	1252	01/06/93	MFQ208	01/12/93	16:23
35	S212134-08	AS	F	1252		MFQ208A	01/12/93	16:28
36	X	X	F			ZZZZZZ	01/12/93	16:33
37	X	X	F			ZZZZZZ	01/12/93	16:38
38	50 PPB	CCV	F			CCV	01/12/93	16:43
39	CAL BLK	CCB	F			CCB	01/12/93	16:48
40	S212134-10	M0S	F	1252		MFQ2120	01/12/93	17:09
41	S212134-10	M1S	F	1252		MFQ2121	01/12/93	17:12
42	S212134-10	M2S	F	1252		MFQ2122	01/12/93	17:14
43	S212134-10	M3S	F	1252		MFQ2123	01/12/93	17:17

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S212134--SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	X	M0S	F			ZZZZZZ0	01/12/93	17:20
45	X	M1S	F			ZZZZZZ1	01/12/93	17:23
46	X	M2S	F			ZZZZZZ2	01/12/93	17:25
47	X	M3S	F			ZZZZZZ3	01/12/93	17:28
48	S212134-10	M0S	F	1252		MFQ2120	01/12/93	17:40
49	S212134-10	M1S	F	1252		MFQ2121	01/12/93	17:42
50	S212134-10	M2S	F	1252		MFQ2122	01/12/93	17:45
51	S212134-10	M3S	F	1252		MFQ2123	01/12/93	17:48
52	X	X	F			ZZZZZZ	01/12/93	17:51
53	X	X	F			ZZZZZZ	01/12/93	17:54
54	50 PPB	CCV	F			CCV	01/12/93	17:56
55	CAL BLK	CCB	F			CCB	01/12/93	17:59

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2345 GFAA ID: F1 F2 F3 F4 (F5) F6 Method: 150

Date: 1/12/93 Reviewed By: MS Standards Prepared: 8:00 1/12/93
Operator: JLS

Disk # 11
Acq
SAMIN ✓ 5212134

Standards Source
1. Calibration: 10 ppm
2. ICV: [✓] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301201		RUN ID:	9301251	
Element:	[✓] AS	[] PB	Element:	[✓] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments			Sample ID	Dilution	Comments
	STD1	1	0 PPB		
	STD2	2	[] 10,5 [] 3,10		
	STD3	3	50 PPB		
	STD4	4	100 PPB		
		5	ICV		
		6	ICB		
		7	CRA		
		8	CCV		
		9	CCB		
		10	PBW		As/only
		11	PBWA		
		12	02		
		13	02A		
		14	03		
		15	03A	1:4	
		16	07		
Se/only		17	07A		
		18	~~08~~ X JLS		
		19	~~08A~~ X		
		20	CCV		
		21	CCB		
		22	09		
Se/only		23	09A		
		24	13		
		25	13A		
		26	16		As/only
		27	16A		
		28	12D		
		29	12DA		
		30	X		
		31	X		
		32	CCV		
		33	CCB		
		34	08	1:4	
Se/only		35	08A		
		36	X		
		37	X		
		38	CCV		
		39	CCB 460		

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2345
Page 2 of 2

	40	10	run
Se/only	41	+5	
	42	+10	
	43	+15	
✓	44	04	
	45	+10	
	46	+20	As/only
	47	+30	
	48	10	
Se/only	49	+5	
	50	+10	
	51	+15	
	52	X	
	53	X	
	54	CCV	
	55	CCB	
	56		
	57		
	58		
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	94		
	95		

C L P M E T A L S 3.02e

S212134--LEAD

Run id: F3 9301103
THERMO JARRELL-ASH VIDEO 22E (#2913)
Analytical method: F
Element: Multi-Element

Acquired: 01/11/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1043
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/11/93	16:46
2	3 PPB	WS1	F			S3	01/11/93	16:50
3	50 PPB	WS2	F			S50	01/11/93	16:55
4	100 PPB	WS3	F			S100	01/11/93	16:59
5	ICV-4	ICV	F			ICV	01/11/93	17:06
6	CAL BLK	ICB	F			ICB	01/11/93	17:10
7	CRA	CRA0	F			CRA	01/11/93	17:14
8	50 PPB	CCV	F			CCV	01/11/93	17:19
9	CAL BLK	CCB	F			CCB	01/11/93	17:23
10	PB	PBW	F	1252	01/06/93	PBW	01/11/93	17:27
11	PB	ASPBW	F	1252		PBWA	01/11/93	17:31
12	LCSFW	LCSW	F	1252	01/06/93	LCSW	01/11/93	17:36
13	LCSFW	ASLCSW	F	1252		LCSWA	01/11/93	17:40
14	S212134-01	S	F	1252	01/06/93	MFN651	01/11/93	17:44
15	S212134-01	AS	F	1252		MFN651A	01/11/93	17:48
16	S212134-02	S	F	1252	01/06/93	MFQ201	01/11/93	17:53
17	S212134-02	AS	F	1252		MFQ201A	01/11/93	17:57
18	S212134-03	S	F	1252	01/06/93	MFQ202	01/11/93	18:01
19	S212134-03	AS	F	1252		MFQ202A	01/11/93	18:05
20	50 PPB	CCV	F			CCV	01/11/93	18:10
21	CAL BLK	CCB	F			CCB	01/11/93	18:14
22	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	18:18
23	S212134-04	AS	F	1252		MFQ203A	01/11/93	18:22
24	S212134-05	S	F	1252	01/06/93	MFQ204	01/11/93	18:27
25	S212134-05	AS	F	1252		MFQ204A	01/11/93	18:31
26	S212134-06	S	F	1252	01/06/93	MFQ206	01/11/93	18:35
27	S212134-06	AS	F	1252		MFQ206A	01/11/93	18:39
28	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	18:44
29	S212134-07	AS	F	1252		MFQ207A	01/11/93	18:48
30	S212134-08	S	F	1252	01/06/93	MFQ208	01/11/93	18:52
31	S212134-08	AS	F	1252		MFQ208A	01/11/93	18:56
32	50 PPB	CCV	F			CCV	01/11/93	19:01
33	CAL BLK	CCB	F			CCB	01/11/93	19:05
34	S212134-09	S	F	1252	01/06/93	MFQ209	01/11/93	19:09
35	S212134-09	AS	F	1252		MFQ209A	01/11/93	19:14
36	S212134-10	S	F	1252	01/06/93	MFQ212	01/11/93	19:18
37	S212134-10	AS	F	1252		MFQ212A	01/11/93	19:22
38	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	19:26
39	S212134-11	AS	F	1252		MFQ213A	01/11/93	19:31
40	S212134-12	S	F	1252	01/06/93	MFQ214	01/11/93	19:35
41	S212134-12	AS	F	1252		MFQ214A	01/11/93	19:39
42	S212134-12	S2	F	1252	01/06/93	MFQ214D	01/11/93	19:43
43	S212134-12	ASS2	F	1252		MFQ214DA	01/11/93	19:48

S212134--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/11/93	19:52
45	CAL BLK	CCB	F			CCB	01/11/93	19:56
46	S212134-13	S	F	1252	01/06/93	MFQ215	01/11/93	20:00
47	S212134-13	AS	F	1252		MFQ215A	01/11/93	20:05
48	S212134-14	S	F	1252	01/06/93	MFQ216	01/11/93	20:09
49	S212134-14	AS	F	1252		MFQ216A	01/11/93	20:13
50	S212134-15	S	F	1252	01/06/93	MFQ217	01/11/93	20:17
51	S212134-15	AS	F	1252		MFQ217A	01/11/93	20:22
52	S212134-16	S	F	1252	01/06/93	MFQ218	01/11/93	20:26
53	S212134-16	AS	F	1252		MFQ218A	01/11/93	20:30
54	S212134-17	S	F	1252	01/06/93	MFQ219	01/11/93	20:34
55	S212134-17	AS	F	1252		MFQ219A	01/11/93	20:39
56	50 PPB	CCV	F			CCV	01/11/93	20:43
57	CAL BLK	CCB	F			CCB	01/11/93	20:47
58	S212134-18	S	F	1252	01/06/93	MFQ220	01/11/93	20:51
59	S212134-18	AS	F	1252		MFQ220A	01/11/93	20:56
60	S212134-14	DS	F	1252	01/06/93	MFQ216S	01/11/93	21:00
61	X	X	F			ZZZZZZ	01/11/93	21:04
62	50 PPB	CCV	F			CCV	01/11/93	21:08
63	CAL BLK	CCB	F			CCB	01/11/93	21:13
64	PB	PBW	F			PBW	01/11/93	21:28
65	PB	ASPBW	F			PBWA	01/11/93	21:32
66	X	X	F			ZZZZZZ	01/11/93	21:36
67	X	X	F			ZZZZZZ	01/11/93	21:41
68	X	X	F			ZZZZZZ	01/11/93	21:45
69	X	X	F			ZZZZZZ	01/11/93	21:49
70	X	X	F			ZZZZZZ	01/11/93	21:53
71	X	X	F			ZZZZZZ	01/11/93	21:58
72	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	22:02
73	S212134-07	AS	F	1252		MFQ207A	01/11/93	22:06
74	50 PPB	CCV	F			CCV	01/11/93	22:10
75	CAL BLK	CCB	F			CCB	01/11/93	22:15
76	X	X	F			ZZZZZZ	01/11/93	22:19
77	X	X	F			ZZZZZZ	01/11/93	22:23
78	X	X	F			ZZZZZZ	01/11/93	22:27
79	X	X	F			ZZZZZZ	01/11/93	22:32
80	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	22:38
81	S212134-11	AS	F	1252		MFQ213A	01/11/93	22:42
82	X	X	F			ZZZZZZ	01/11/93	22:46
83	X	X	F			ZZZZZZ	01/11/93	22:51
84	PB	PBW	F			PBW	01/11/93	22:55
85	PB	ASPBW	F			PBWA	01/11/93	22:59
86	50 PPB	CCV	F			CCV	01/11/93	23:03
87	CAL BLK	CCB	F			CCB	01/11/93	23:08
88	S212134-09	M0S	F	1252		MFQ2090	01/11/93	23:11
89	S212134-09	M1S	F	1252		MFQ2091	01/11/93	23:13
90	S212134-09	M2S	F	1252		MFQ2092	01/11/93	23:15
91	S212134-09	M3S	F	1252		MFQ2093	01/11/93	23:18
92	X	M0S	F			ZZZZZZ0	01/11/93	23:20
93	X	M1S	F			ZZZZZZ1	01/11/93	23:23
94	X	M2S	F			ZZZZZZ2	01/11/93	23:25
95	X	M3S	F			ZZZZZZ3	01/11/93	23:27

S212134--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
96	X	X	F			ZZZZZZ	01/11/93	23:30
97	50 PPB	CCV	F			CCV	01/11/93	23:32
98	CAL BLK	CCB	F			CCB	01/11/93	23:35

C L P M E T A L S 3.02e

S212134--THALLIUM

Run id: F3 9301153
THERMO JARRELL-ASH VIDEO 22E (#2913)
Analytical method: F
Element: Multi-Element

Acquired: 01/11/93 by MAS
Crunched: 01/13/93 by MAS
Time: 1048
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/11/93	16:46
2	10 PPB	WS1	F			S10	01/11/93	16:50
3	50 PPB	WS2	F			S50	01/11/93	16:55
4	100 PPB	WS3	F			S100	01/11/93	16:59
5	ICV-4	ICV	F			ICV	01/11/93	17:06
6	CAL BLK	ICB	F			ICB	01/11/93	17:10
7	CRA	CRA0	F			CRA	01/11/93	17:14
8	50 PPB	CCV	F			CCV	01/11/93	17:19
9	CAL BLK	CCB	F			CCB	01/11/93	17:23
10	PB	PBW	F	1252	01/06/93	PBW	01/11/93	17:27
11	PB	ASPBW	F	1252		PBWA	01/11/93	17:31
12	LCSFW	LCSW	F	1252	01/06/93	LCSW	01/11/93	17:36
13	LCSFW	ASLCSW	F	1252		LCSWA	01/11/93	17:40
14	S212134-01	S	F	1252	01/06/93	MFN651	01/11/93	17:44
15	S212134-01	AS	F	1252		MFN651A	01/11/93	17:48
16	S212134-02	S	F	1252	01/06/93	MFQ201	01/11/93	17:53
17	S212134-02	AS	F	1252		MFQ201A	01/11/93	17:57
18	S212134-03	S	F	1252	01/06/93	MFQ202	01/11/93	18:01
19	S212134-03	AS	F	1252		MFQ202A	01/11/93	18:05
20	50 PPB	CCV	F			CCV	01/11/93	18:10
21	CAL BLK	CCB	F			CCB	01/11/93	18:14
22	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	18:18
23	S212134-04	AS	F	1252		MFQ203A	01/11/93	18:22
24	S212134-05	S	F	1252	01/06/93	MFQ204	01/11/93	18:27
25	S212134-05	AS	F	1252		MFQ204A	01/11/93	18:31
26	S212134-06	S	F	1252	01/06/93	MFQ206	01/11/93	18:35
27	S212134-06	AS	F	1252		MFQ206A	01/11/93	18:39
28	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	18:44
29	S212134-07	AS	F	1252		MFQ207A	01/11/93	18:48
30	S212134-08	S	F	1252	01/06/93	MFQ208	01/11/93	18:52
31	S212134-08	AS	F	1252		MFQ208A	01/11/93	18:56
32	50 PPB	CCV	F			CCV	01/11/93	19:01
33	CAL BLK	CCB	F			CCB	01/11/93	19:05
34	S212134-09	S	F	1252	01/06/93	MFQ209	01/11/93	19:09
35	S212134-09	AS	F	1252		MFQ209A	01/11/93	19:14
36	S212134-10	S	F	1252	01/06/93	MFQ212	01/11/93	19:18
37	S212134-10	AS	F	1252		MFQ212A	01/11/93	19:22
38	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	19:26
39	S212134-11	AS	F	1252		MFQ213A	01/11/93	19:31
40	S212134-12	S	F	1252	01/06/93	MFQ214	01/11/93	19:35
41	S212134-12	AS	F	1252		MFQ214A	01/11/93	19:39
42	S212134-12	S2	F	1252	01/06/93	MFQ214D	01/11/93	19:43
43	S212134-12	ASS2	F	1252		MFQ214DA	01/11/93	19:48

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S212134--THALLIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/11/93	19:52
45	CAL BLK	CCB	F			CCB	01/11/93	19:56
46	S212134-13	S	F	1252	01/06/93	MFQ215	01/11/93	20:00
47	S212134-13	AS	F	1252		MFQ215A	01/11/93	20:05
48	S212134-14	S	F	1252	01/06/93	MFQ216	01/11/93	20:09
49	S212134-14	AS	F	1252		MFQ216A	01/11/93	20:13
50	S212134-15	S	F	1252	01/06/93	MFQ217	01/11/93	20:17
51	S212134-15	AS	F	1252		MFQ217A	01/11/93	20:22
52	S212134-16	S	F	1252	01/06/93	MFQ218	01/11/93	20:26
53	S212134-16	AS	F	1252		MFQ218A	01/11/93	20:30
54	S212134-17	S	F	1252	01/06/93	MFQ219	01/11/93	20:34
55	S212134-17	AS	F	1252		MFQ219A	01/11/93	20:39
56	50 PPB	CCV	F			CCV	01/11/93	20:43
57	CAL BLK	CCB	F			CCB	01/11/93	20:47
58	S212134-18	S	F	1252	01/06/93	MFQ220	01/11/93	20:51
59	S212134-18	AS	F	1252		MFQ220A	01/11/93	20:56
60	S212134-14	DS	F	1252	01/06/93	MFQ216S	01/11/93	21:00
61	X	X	F			ZZZZZZ	01/11/93	21:04
62	50 PPB	CCV	F			CCV	01/11/93	21:08
63	CAL BLK	CCB	F			CCB	01/11/93	21:13
64	PB	PBW	F	1252	01/06/93	PBW	01/11/93	21:28
65	PB	ASPBW	F	1252		PBWA	01/11/93	21:32
66	S212134-03	S	F	1252	01/06/93	MFQ202	01/11/93	21:36
67	S212134-03	AS	F	1252		MFQ202A	01/11/93	21:41
68	S212134-04	S	F	1252	01/06/93	MFQ203	01/11/93	21:45
69	S212134-04	AS	F	1252		MFQ203A	01/11/93	21:49
70	S212134-06	S	F	1252	01/06/93	MFQ206	01/11/93	21:53
71	S212134-06	AS	F	1252		MFQ206A	01/11/93	21:58
72	S212134-07	S	F	1252	01/06/93	MFQ207	01/11/93	22:02
73	S212134-07	AS	F	1252		MFQ207A	01/11/93	22:06
74	50 PPB	CCV	F			CCV	01/11/93	22:10
75	CAL BLK	CCB	F			CCB	01/11/93	22:15
76	S212134-08	S	F	1252	01/06/93	MFQ208	01/11/93	22:19
77	S212134-08	AS	F	1252		MFQ208A	01/11/93	22:23
78	S212134-10	S	F	1252	01/06/93	MFQ212	01/11/93	22:27
79	S212134-10	AS	F	1252		MFQ212A	01/11/93	22:32
80	S212134-11	S	F	1252	01/06/93	MFQ213	01/11/93	22:38
81	S212134-11	AS	F	1252		MFQ213A	01/11/93	22:42
82	S212134-13	S	F	1252	01/06/93	MFQ215	01/11/93	22:46
83	S212134-13	AS	F	1252		MFQ215A	01/11/93	22:51
84	PB	PBW	F	1252	01/06/93	PBW	01/11/93	22:55
85	PB	ASPBW	F	1252		PBWA	01/11/93	22:59
86	50 PPB	CCV	F			CCV	01/11/93	23:03
87	CAL BLK	CCB	F			CCB	01/11/93	23:08

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

JSK 1/12/93

AA Sequence # 2088 GFAA ID: F1 F2 (F3) F4 F5 F6 Method: 160

Date: 1/11/93 Reviewed By: MS Standards Prepared: 8:00 1/11/93

Operator: SS

Disk # 52
Acq ✓
SAMIN S212 134

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [✓] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:		
RUN ID:	9301103	
Element:	[] AS	[✓] PB
Background:	BS	BS
Wavelength (nm):	197.2	283.3
Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0

Channel B:		
RUN ID:	9301153	
Element:	[] SE	[✓] TL
Background:	BS	BS
Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[] 10,5 [✓] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	PBW		RSD
	11	PBWA		
	12	LCSW		
	13	LCSWA		
	14	S212134-01		
	15	01A		
	16	02		
	17	02A		
	18	03		RSD
	19	03A		
	20	CCV		
	21	CCB		
	22	04		RSD
	23	04A		
	24	05		
	25	05A		
	26	06		RSD
	27	06A		
RSD	28	07		RSD
	29	07A		
	30	08		RSD
	31	08A		
	32	CCV		
	33	CCB		
M(16)	34	09		
	35	09A		
	36	10		RSD
	37	10A		
RSD	38	11		RSD
	39	11A467		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2088
Page 2 of ~~2~~ 3
JST 1/12/93

40	12		
41	12A		
42	12D		
43	12DA		
44	CCV		
45	CCB		
46	13		250
47	13A		
48	14		
49	14A		
50	15		
51	15A		
52	16		
53	16A		
54	17		
55	17A		
56	CCV		
57	CCB		
58	18		
59	18A		
60	14S		
61	X		
62	CCV		
63	CCB		
64	PBW		remove
65	PBWA		
66	03		
67	03A		
68	04		
69	04A		
70	05		
71	05A		
72	07		
73	07A		
74	CCV		
75	CCB		
76	08		
77	08A		
78	10		
79	10A		
80	11		
81	11A		
82	13		
83	13		
84	PBW		
85	PBWA		
86	CCV		
87	CCB		
88	09		
89	+10		
90	+20		
91	+30		
92	~~00~~		
93	~~+10~~		
94	~~+20~~		
95	~~+30~~		

Ti only

Ti only

Ti only

Ti only

NOT needed
JST 1/12/93

Pb only

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2088
Page 3 of 3

96	X		
97	CCU		
98	CCB		
99			
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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/12/93	13:10

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

2 STD2(10,5)	WS1	S	1.00x	01/12/93 13:15

	<-As->		<-Se->	
Burns (Abs)	0.053 A	0.048 A	0.047A	0.042A
Mean	0.0505		0.0445	
CV %	7.00		7.94	

3 STD3(50)	WS2	S	1.00x	01/12/93 13:20

	<-As->		<-Se->	
Burns (Abs)	0.230 A	0.222 A	0.210A	0.211A
Mean	0.2260		0.2105	
CV %	2.50		0.00	

4 STD4(100)	WS3	S	1.00x	01/12/93 13:25

	<-As->		<-Se->	
Burns (Abs)	0.445 A	0.440 A	0.355A	0.350A
Mean	0.4425		0.3525	
CV %	0.80		1.00	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.004675746	0.005052937
Coef[2]:	-2.539437e-006	-1.536766e-005
Correl. coef.:	0.9999	0.9963

5 ICV-2	ICV	ICV	1.00x	01/12/93 13:53

	<-As->		<-Se->	
Burns (Conc)	48.771	47.191	51.654	51.365
Mean	47.9810		51.5095	
CV %	2.33		0.40	
Sample value	47.98		51.51	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/12/93	13:58

	As		Se	
Burns (Conc)	0.000	-1.282	0.595	0.595
Mean	-0.6410		0.5950	
CV %	141.42		0.00	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
7	CRA	CRA	CRA	1.00x	01/12/93	14:03

	As		Se	
Burns (Conc)	10.973	10.107	11.271	11.059
Mean	10.5400		11.1650	
CV %	5.81		1.34	
Sample value	10.54		11.16	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
8	50 PPB	CCV	CCV	1.00x	01/12/93	14:08

	As		Se	
Burns (Conc)	52.165	48.545	47.963	48.242
Mean	50.3550		48.1025	
CV %	5.08		0.41	
Sample value	50.35		48.10	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
9	CAL BLK	CCB	CCB	1.00x	01/12/93	14:13

	As		Se	
Burns (Conc)	-1.709	-1.923	0.794	0.595
Mean	-1.8160		0.6945	
CV %	8.33		20.26	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
10	PB	PBW	PBW	1.00x	01/12/93	14:18

	As		Se	
Burns (Conc)	-1.923	-1.069	0.198	0.000
Mean	-1.4960		0.0990	
CV %	40.37		141.42	
Sample value	3.20U		3.90U	

AS only
1-12-93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
11	PB	ASPBW	PBWA	1.00x	01/12/93	14:23

	As		Se	
Burns (Conc)	21.860	21.422	14.492	15.363
Mean	21.6410		14.9275	
CV %	1.43		4.13	
Sample value	21.64		14.93	
Spike added	20.00		10.00	
Spike recovery, %	108.21		149.27 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	S212134-02	S	MFQ201	5.00x	01/12/93	14:28

	<-As->		<-Se->	
Burns (Conc)	1.498	-0.214	2.192	-0.198
Mean	0.6420		0.9970	
CV %	188.56		169.51	
Sample value	16.00U		19.50U	

13	-02	AS	MFQ201A	5.00x	01/12/93	14:33

	<-As->		<-Se->	
Burns (Conc)	16.182	15.095	6.048	5.433
Mean	15.6385		5.7405	
CV %	4.92		7.58	
Sample value	78.19		28.71	
Spike added	20.00		10.00	
Spike recovery, %	78.19 ***		57.41 ***	

14	-03	S	MFQ202	5.00x	01/12/93	14:38

	<-As->		<-Se->	
Burns (Conc)	-0.428	-1.069	0.000	0.595
Mean	-0.7485		0.2975	
CV %	60.56		141.42	
Sample value	16.00U		19.50U	

15	-03	AS	MFQ202A	5.00x	01/12/93	14:43

	<-As->		<-Se->	
Burns (Conc)	14.443	13.791	5.638	4.210
Mean	14.1170		4.9240	
CV %	3.27		20.51	
Sample value	70.58		24.62	
Spike added	20.00		10.00	
Spike recovery, %	70.58 ***		49.24 ***	

16	-07	S	MFQ207	5.00x	01/12/93	14:49

	<-As->		<-Se->	
Burns (Conc)	0.428	-1.282	0.595	0.595
Mean	-0.4270		0.5950	
CV %	283.17		0.00	
Sample value	16.00U		19.50U	

Se only 1-12-93 SF

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-07	AS	MFQ207A	5.00x	01/12/93	14:54

	<-As->		<-Se->	
Burns (Conc)	14.660	14.443	2.392	3.804
Mean	14.5515		3.0980	
CV %	1.05		32.23	
Sample value	72.75		19.50U	
Spike added	20.00		10.00	
Spike recovery, %	72.75 ***		0.00 ***	

1-12-93 Se only

18	X	X	ZZZZZZ	1.00x	01/12/93	15:02

	<-As->		<-Se->	
Burns (Conc)	-1.282	-0.641	0.595	0.595
Mean	-0.9615		0.5950	
CV %	47.14		0.00	
Sample value	3.20U		3.90U	

19	X	X	ZZZZZZ	1.00x	01/12/93	15:07

	<-As->		<-Se->	
Burns (Conc)	-1.282	-1.496	0.993	0.198
Mean	-1.3890		0.5955	
CV %	10.89		94.40	
Sample value	3.20U		3.90U	

20	50 PPB	CCV 2	CCV	1.00x	01/12/93	15:12

	<-As->		<-Se->	
Burns (Conc)	50.579	48.997	53.986	50.505
Mean	49.7880		52.2455	
CV %	2.25		4.71	
Sample value	49.79		52.25	

21	CAL BLK	CCB 2	CCB	1.00x	01/12/93	15:18

	<-As->		<-Se->	
Burns (Conc)	0.000	-2.136	0.198	0.595
Mean	-1.0680		0.3965	
CV %	141.42		70.80	
Sample value	3.20U		3.90U	

22	-09	S	MFQ209	1.00x	01/12/93	15:23

	<-As->		<-Se->	
Burns (Conc)	1.927	0.642	3.400	3.198
Mean	1.2845		3.2990	
CV %	70.74		4.33	
Sample value	3.20U		3.90U	

Se only

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-09	AS	MFQ209A	1.00x	01/12/93	15:28

	<-As->		<-Se->	
Burns (Conc)	17.926	17.054	9.581	8.952
Mean	17.4900		9.2665	
CV %	3.53		4.80	
Sample value	17.49		9.27	
Spike added	20.00		10.00	
Spike recovery, %	87.45		92.66	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-13	S	MFQ215	1.00x	01/12/93	15:33

	<-As->		<-Se->	
Burns (Conc)	-1.496	0.428	2.593	2.192
Mean	-0.5340		2.3925	
CV %	254.77		11.85	
Sample value	3.20U		3.90U	

1-12-93 Se only SS

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-13	AS	MFQ215A	1.00x	01/12/93	15:38

	<-As->		<-Se->	
Burns (Conc)	14.225	14.877	7.701	7.909
Mean	14.5510		7.8050	
CV %	3.17		1.88	
Sample value	14.55		7.80	
Spike added	20.00		10.00	
Spike recovery, %	72.75 ***		78.05 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	-16	S	MFQ218	1.00x	01/12/93	15:43

	<-As->		<-Se->	
Burns (Conc)	0.428	-0.428	1.991	0.794
Mean	0.0000		1.3925	
CV %	>9999.99		60.78	
Sample value	3.20U		3.90U	

As only

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	-16	AS	MFQ218A	1.00x	01/12/93	15:48

	<-As->		<-Se->	
Burns (Conc)	20.547	18.362	8.533	9.161
Mean	19.4545		8.8470	
CV %	7.94		5.02	
Sample value	19.45		8.85	
Spike added	20.00		10.00	
Spike recovery, %	97.27		88.47	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-12	S2	MFQ214D	1.00x	01/12/93	15:53

	<-As->		<-Se->	
Burns (Conc)	0.856	0.214	1.391	1.991
Mean	0.5350		1.6910	
CV %	84.85		25.09	
Sample value	3.20U		3.90U	

AS only

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-12	ASS2	MFQ214DA	1.00x	01/12/93	15:58

1-12-93

	<-As->		<-Se->	
Burns (Conc)	19.017	17.490	10.002	8.117
Mean	18.2535		9.0595	
CV %	5.92		14.71	
Sample value	18.25		9.06	
Spike added	20.00		10.00	
Spike recovery, %	91.26		90.59	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	1.00x	01/12/93	16:03

	<-As->		<-Se->	
Burns (Conc)	-0.428	0.000	-0.593	-1.183
Mean	-0.2140		-0.8880	
CV %	141.42		46.98	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	X	X	ZZZZZZ	1.00x	01/12/93	16:08

	<-As->		<-Se->	
Burns (Conc)	21.641	14.225	9.581	6.666
Mean	17.9330		8.1235	
CV %	29.24 ***		25.37 ***	
Sample value	17.93		8.12	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV 3	CCV	1.00x	01/12/93	16:13

	<-As->		<-Se->	
Burns (Conc)	53.981	51.259	53.692	51.654
Mean	52.6200		52.6730	
CV %	3.66		2.74	
Sample value	52.62		52.67	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB 3	CCB	1.00x	01/12/93	16:18

	<-As->		<-Se->	
Burns (Conc)	-1.282	-0.428	-0.198	2.192
Mean	-0.8550		0.9970	
CV %	70.63		169.51	
Sample value	3.20U		3.90U	

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 7

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-08	S	MFQ208	5.00x	01/12/93	16:23

	As		Se	
Burns (Conc)	-0.641	0.000	2.192	1.192
Mean	-0.3205		1.6920	
CV %	141.42		41.79	
Sample value	16.00U		19.50U	

1-12-93 Se only

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-08	AS	MFQ208A	5.00x	01/12/93	16:28

	As		Se	
Burns (Conc)	15.095	14.443	0.993	2.192
Mean	14.7690		1.5925	
CV %	3.12		53.24	
Sample value	73.85		19.50U	
Spike added	20.00		10.00	
Spike recovery, %	73.85 ***		0.00 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	X	X	ZZZZZZ	1.00x	01/12/93	16:33

	As		Se	
Burns (Conc)	-1.069	-0.428	0.000	0.198
Mean	-0.7485		0.0990	
CV %	60.56		141.42	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	X	X	ZZZZZZ	1.00x	01/12/93	16:38

	As		Se	
Burns (Conc)	-1.496	-1.709	0.794	-0.395
Mean	-1.6025		0.1995	
CV %	9.40		421.43	
Sample value	3.20U		3.90U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	50 PPB	CCV	CCV	1.00x	01/12/93	16:43

	As		Se	
Burns (Conc)	51.259	49.223	51.654	51.943
Mean	50.2410		51.7985	
CV %	2.87		0.39	
Sample value	50.24		51.80	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	CAL BLK	CCB	CCB	1.00x	01/12/93	16:48

	As		Se	
Burns (Conc)	-0.428	-0.855	-0.198	0.993
Mean	-0.6415		0.3975	
CV %	47.07		211.87	
Sample value	3.20U		3.90U	

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-10	MOS	MFQ2120	1.00x	01/12/93	17:09

	As	Se
Burns (Abs)	-0.005 A	0.024A
Mean	-0.0050	0.0240
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-10	M1S	MFQ2121	1.00x	01/12/93	17:12

	As	Se
Burns (Abs)	0.032 A	0.026A
Mean	0.0320	0.0260
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	-10	M2S	MFQ2122	1.00x	01/12/93	17:14

	As	Se
Burns (Abs)	0.083 A	0.042A
Mean	0.0830	0.0420
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	-10	M3S	MFQ2123	1.00x	01/12/93	17:17

	As	Se
Burns (Abs)	0.119 A	0.053A
Mean	0.1190	0.0530
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	-0.00620	0.02080
Slope:	0.00423	0.00206
Correlation:	0.9976	0.9657
X intercept:	1.466	-10.097
Sample value:	-1.466	10.097

Se only
1-12-93
JR

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
44	-04	MOS	MFQ2030	1.00x	01/12/93	17:20

	As	Se
Burns (Abs)	-0.006 A	-0.012A
Mean	-0.0060	-0.0120
CV %	---	---
Spike added:	0.00	0.00

AS only

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F5 9301201 Analyst: SGJ* Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	-04	M1S	MFQ2031	1.00x	01/12/93	17:23

	<-As----->	<-Se----->
Burns (Abs)	0.029 A	0.015A
Mean	0.0290	0.0150
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
46	-04	M2S	MFQ2032	1.00x	01/12/93	17:25

	<-As----->	<-Se----->
Burns (Abs)	0.075 A	0.016A
Mean	0.0750	0.0160
CV %	---	---
Spike added:	20.00	10.00

As only 1-12-93 JL

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-04	M3S	MFQ2033	1.00x	01/12/93	17:28

	<-As----->	<-Se----->
Burns (Abs)	0.103 A	0.017A
Mean	0.1030	0.0170
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	-0.00150	0.00420
Slope:	0.00355	0.00104
Correlation:	0.9952	0.8348
X intercept:	0.423	-4.038
Sample value:	-0.423	4.038

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	-10	MOS	MFQ2120	1.00x	01/12/93	17:40

	<-As----->	<-Se----->
Burns (Abs)	-0.008 A	0.015A
Mean	-0.0080	0.0150
CV %	---	---
Spike added:	0.00	0.00

Se only

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
49	-10	M1S	MFQ2121	1.00x	01/12/93	17:42

	<-As----->	<-Se----->
Burns (Abs)	0.037 A	0.034A
Mean	0.0370	0.0340
CV %	---	---
Spike added:	10.00	5.00

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	-10	M2S	MFQ2122	1.00x	01/12/93	17:45

	<-As->	<-Se->
Burns (Abs)	0.070 A	0.029A
Mean	0.0700	0.0290
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-10	M3S	MFQ2123	1.00x	01/12/93	17:48

	<-As->	<-Se->
Burns (Abs)	0.110 A	0.049A
Mean	0.1100	0.0490
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	-0.00580	0.01720
Slope:	0.00387	0.00194
Correlation:	0.9984	0.8924
X intercept:	1.499	-8.866
Sample value:	-1.499	8.866

Se only
1-12-93
JJ

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	X	X	ZZZZZZ	1.00x	01/12/93	17:51

	<-As->	<-Se->
Burns (Conc)	-0.428	3.400
Mean	-0.4280	3.4000
CV %	---	---
Sample value	3.20U	3.90U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	X	X	ZZZZZZ	1.00x	01/12/93	17:54

	<-As->	<-Se->
Burns (Conc)	0.856	3.602
Mean	0.8560	3.6020
CV %	---	---
Sample value	3.20U	3.90U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	50 PPB	CCV	5 CCV	1.00x	01/12/93	17:56

	<-As->	<-Se->
Burns (Conc)	49.223	45.748
Mean	49.2230	45.7480
CV %	---	---
Sample value	49.22	45.75

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	CAL BLK	CCB	CCB	1.00x	01/12/93	17:59

	<-As----->	<-Se----->
Burns (Conc)	-0.428	0.595
Mean	-0.4280	0.5950
CV %	---	---
Sample value	3.20U	3.90U

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/11/93	16:46

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

2	STD2(3,10)	WS1	S	1.00x	01/11/93	16:50

	<-Pb->		<-Tl->	
Burns (Abs)	0.007 A	0.012 A	0.029A	0.031A
Mean	0.0095		0.0300	
CV %	37.22		0.00	

3	STD3(50)	WS2	S	1.00x	01/11/93	16:55

	<-Pb->		<-Tl->	
Burns (Abs)	0.177 A	0.181 A	0.133A	0.130A
Mean	0.1790		0.1315	
CV %	0.00		0.00	

4	STD4(100)	WS3	S	1.00x	01/11/93	16:59

	<-Pb->		<-Tl->	
Burns (Abs)	0.314 A	0.321 A	0.239A	0.229A
Mean	0.3175		0.2340	
CV %	1.56		3.02	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.003973403	0.002938465
Coef[2]:	-7.977414e-006	-5.994368e-006
Correl. coef.:	0.9999	1.0000

5	ICV-4	ICV	ICV	2.00x	01/11/93	17:06

	<-Pb->		<-Tl->	
Burns (Conc)	49.457	51.033	51.314	48.324
Mean	50.2450		49.8190	
CV %	2.22		4.24	
Sample value	100.49		99.64	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/11/93	17:10

	<-Pb->		<-Tl->	
Burns (Conc)	1.515	-0.754	1.023	-0.340
Mean	0.3805		0.3415	
CV %	421.66		282.22	
Sample value	2.00U		1.30U	

7	CRA	CRA	CRA	1.00x	01/11/93	17:14

	<-Pb->		<-Tl->	
Burns (Conc)	3.039	3.294	9.014	9.014
Mean	3.1665		9.0140	
CV %	5.69		0.00	
Sample value	3.17		9.01	

8	50 PPB	CCV	CCV	1.00x	01/11/93	17:19

	<-Pb->		<-Tl->	
Burns (Conc)	50.086	49.771	50.455	47.900
Mean	49.9285		49.1775	
CV %	0.44		3.67	
Sample value	49.93		49.18	

9	CAL BLK	CCB	CCB	1.00x	01/11/93	17:23

	<-Pb->		<-Tl->	
Burns (Conc)	-0.503	-0.754	0.341	1.023
Mean	-0.6285		0.6820	
CV %	28.24		70.71	
Sample value	2.00U		1.30U	

10	PB	PBW	PBW	1.00x	01/11/93	17:27

	<-Pb->		<-Tl->	
Burns (Conc)	2.275	2.530	0.000	0.341
Mean	2.4025		0.1705	
CV %	7.50		141.42	
Sample value	2.40		1.30U	

11	PB	ASPBW	PBWA	1.00x	01/11/93	17:31

	<-Pb->		<-Tl->	
Burns (Conc)	25.462	20.472	22.470	16.554
Mean	22.9670		19.5120	
CV %	15.36		21.44 ***	
Sample value	22.97		19.51	
Spike added	20.00		20.00	
Spike recovery, %	102.82		97.56	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	LCSFW	LCSW	LCSW	1.00x	01/11/93	17:36

	<-Pb->		<-Tl->	
Burns (Conc)	55.192	53.582	53.478	50.884
Mean	54.3870		52.1810	
CV %	2.09		3.52	
Sample value	54.39		52.18	

13	LCSFW	ASLCSW	LCSWA	1.00x	01/11/93	17:40

	<-Pb->		<-Tl->	
Burns (Conc)	80.439	74.234	80.651	70.802
Mean	77.3365		75.7265	
CV %	5.67		9.20	
Sample value	77.34		75.73	
Spike added	20.00		20.00	
Spike recovery, %	114.75		117.73 ***	

14	S212134-01	S	MFN651	1.00x	01/11/93	17:44

	<-Pb->		<-Tl->	
Burns (Conc)	8.449	9.231	2.050	1.023
Mean	8.8400		1.5365	
CV %	6.26		47.26	
Sample value	8.84		1.54	

15	-01	AS	MFN651A	1.00x	01/11/93	17:48

	<-Pb->		<-Tl->	
Burns (Conc)	31.717	28.283	16.919	12.933
Mean	30.0000		14.9260	
CV %	8.09		18.88	
Sample value	30.00		14.93	
Spike added	20.00		20.00	
Spike recovery, %	105.80		66.94 ***	

16	-02	S	MFQ201	1.00x	01/11/93	17:53

	<-Pb->		<-Tl->	
Burns (Conc)	3.549	4.572	0.000	0.000
Mean	4.0605		0.0000	
CV %	17.81		---	
Sample value	4.06		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-02	AS	MFQ201A	1.00x	01/11/93	17:57

	<-Pb->		<-Tl->	
Burns (Conc)	23.508	22.400	14.374	11.857
Mean	22.9540		13.1155	
CV %	3.41		13.57	
Sample value	22.95		13.12	
Spike added	20.00		20.00	
Spike recovery, %	94.47		65.58 ***	

18	-03	S	MFQ202	1.00x	01/11/93	18:01

	<-Pb->		<-Tl->	
Burns (Conc)	3.039	2.784	0.682	0.341
Mean	2.9115		0.5115	
CV %	6.19		47.14	
Sample value	2.91		1.30U	

19	-03	AS	MFQ202A	1.00x	01/11/93	18:05

	<-Pb->		<-Tl->	
Burns (Conc)	24.902	20.472	20.604	15.461
Mean	22.6870		18.0325	
CV %	13.81		20.17 ***	
Sample value	22.69		18.03	
Spike added	20.00		20.00	
Spike recovery, %	98.88		90.17	

20	50 PPB	CCV	CCV	1.00x	01/11/93	18:10

	<-Pb->		<-Tl->	
Burns (Conc)	50.086	51.350	50.455	50.884
Mean	50.7180		50.6695	
CV %	1.76		0.60	
Sample value	50.72		50.67	

21	CAL BLK	CCB	CCB	1.00x	01/11/93	18:14

	<-Pb->		<-Tl->	
Burns (Conc)	-0.503	-0.252	-0.340	0.000
Mean	-0.3775		-0.1700	
CV %	47.02		141.42	
Sample value	2.00U		1.30U	

22	-04	S	MFQ203	1.00x	01/11/93	18:18

	<-Pb->		<-Tl->	
Burns (Conc)	-0.252	-0.252	0.341	-0.340
Mean	-0.2520		0.0005	
CV %	0.00		>9999.99	
Sample value	2.00U		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-04	AS	MFQ203A	1.00x	01/11/93	18:22

	<-Pb->		<-Tl->	
Burns (Conc)	16.395	13.184	16.189	10.787
Mean	14.7895		13.4880	
CV %	15.35		28.32 ***	
Sample value	14.79		13.49	
Spike added	20.00		20.00	
Spike recovery, %	73.95 ***		67.44 ***	

24	-05	S	MFQ204	1.00x	01/11/93	18:27

	<-Pb->		<-Tl->	
Burns (Conc)	1.262	1.262	0.000	-0.340
Mean	1.2620		-0.1700	
CV %	0.00		141.42	
Sample value	2.00U		1.30U	

25	-05	AS	MFQ204A	1.00x	01/11/93	18:31

	<-Pb->		<-Tl->	
Burns (Conc)	14.250	15.052	10.787	10.787
Mean	14.6510		10.7870	
CV %	3.87		0.00	
Sample value	14.65		10.79	
Spike added	20.00		20.00	
Spike recovery, %	73.25 ***		53.93 ***	

26	-06	S	MFQ206	1.00x	01/11/93	18:35

	<-Pb->		<-Tl->	
Burns (Conc)	17.205	19.651	0.341	0.000
Mean	18.4280		0.1705	
CV %	9.39		141.42	
Sample value	18.43		1.30U	

27	-06	AS	MFQ206A	1.00x	01/11/93	18:39

	<-Pb->		<-Tl->	
Burns (Conc)	41.151	35.499	22.470	15.461
Mean	38.3250		18.9655	
CV %	10.43		26.13 ***	
Sample value	38.33		18.97	
Spike added	20.00		20.00	
Spike recovery, %	99.49		94.83	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-07	S	MFQ207	1.00x	01/11/93	18:44

	<-Pb->		<-Tl->	
Burns (Conc)	6.891	6.115	0.341	0.682
Mean	6.5030		0.5115	
CV %	8.44		47.14	
Sample value	6.50		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-07	AS	MFQ207A	1.00x	01/11/93	18:48

	<-Pb->		<-Tl->	
Burns (Conc)	34.913	71.389	22.470	15.461
Mean	53.1510		18.9655	
CV %	48.53 ***		26.13 ***	
Sample value	53.15		18.97	
Spike added	20.00		20.00	
Spike recovery, %	233.24 ***		94.83	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	-08	S	MFQ208	1.00x	01/11/93	18:52

	<-Pb->		<-Tl->	
Burns (Conc)	2.530	1.515	0.341	1.365
Mean	2.0225		0.8530	
CV %	35.49		84.89	
Sample value	2.02		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	-08	AS	MFQ208A	1.00x	01/11/93	18:56

	<-Pb->		<-Tl->	
Burns (Conc)	25.743	20.198	21.722	14.736
Mean	22.9705		18.2290	
CV %	17.07		27.10 ***	
Sample value	22.97		18.23	
Spike added	20.00		20.00	
Spike recovery, %	104.74		91.15	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV	CCV	1.00x	01/11/93	19:01

	<-Pb->		<-Tl->	
Burns (Conc)	52.304	51.033	54.351	53.043
Mean	51.6685		53.6970	
CV %	1.74		1.72	
Sample value	51.67		53.70	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB	CCB	1.00x	01/11/93	19:05

	<-Pb->		<-Tl->	
Burns (Conc)	0.252	1.009	0.341	0.682
Mean	0.6305		0.5115	
CV %	84.90		47.14	
Sample value	2.00U		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-09	S	MFQ209	1.00x	01/11/93	19:09

	<-Pb->		<-Tl->	
Burns (Conc)	16.665	15.320	1.365	0.682
Mean	15.9925		1.0235	
CV %	5.95		47.19	
Sample value	15.99		1.30U	

35	-09	AS	MFQ209A	1.00x	01/11/93	19:14

	<-Pb->		<-Tl->	
Burns (Conc)	44.494	38.455	26.248	20.233
Mean	41.4745		23.2405	
CV %	10.30		18.30	
Sample value	41.47		23.24	
Spike added	20.00		20.00	
Spike recovery, %	127.41 ***		116.20 ***	

36	-10	S	MFQ212	1.00x	01/11/93	19:18

	<-Pb->		<-Tl->	
Burns (Conc)	4.316	4.060	0.000	1.023
Mean	4.1880		0.5115	
CV %	4.32		141.42	
Sample value	4.19		1.30U	

37	-10	AS	MFQ212A	1.00x	01/11/93	19:22

	<-Pb->		<-Tl->	
Burns (Conc)	20.472	15.857	18.386	11.500
Mean	18.1645		14.9430	
CV %	17.97		32.58 ***	
Sample value	18.16		14.94	
Spike added	20.00		20.00	
Spike recovery, %	69.88 ***		74.71 ***	

38	-11	S	MFQ213	1.00x	01/11/93	19:26

	<-Pb->		<-Tl->	
Burns (Conc)	2.275	1.768	0.682	-0.680
Mean	2.0215		0.0010	
CV %	17.73		>9999.99	
Sample value	2.02		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-11	AS	MFQ213A	1.00x	01/11/93	19:31

	<-Pb->		<-Tl->	
Burns (Conc)	21.571	15.857	19.123	13.292
Mean	18.7140		16.2075	
CV %	21.59 ***		25.44 ***	
Sample value	18.71		16.21	
Spike added	20.00		20.00	
Spike recovery, %	83.46 ***		81.04 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-12	S	MFQ214	1.00x	01/11/93	19:35

	<-Pb->		<-Tl->	
Burns (Conc)	1.768	0.756	0.000	-0.340
Mean	1.2620		-0.1700	
CV %	56.70		141.42	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-12	AS	MFQ214A	1.00x	01/11/93	19:39

	<-Pb->		<-Tl->	
Burns (Conc)	18.560	16.126	16.919	14.374
Mean	17.3430		15.6465	
CV %	9.92		11.50	
Sample value	17.34		15.65	
Spike added	20.00		20.00	
Spike recovery, %	86.72		78.24 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	-12	S2	MFQ214D	1.00x	01/11/93	19:43

	<-Pb->		<-Tl->	
Burns (Conc)	2.784	2.784	0.341	1.023
Mean	2.7840		0.6820	
CV %	0.00		70.71	
Sample value	2.78		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	-12	ASS2	MFQ214DA	1.00x	01/11/93	19:48

	<-Pb->		<-Tl->	
Burns (Conc)	19.105	15.857	18.754	14.374
Mean	17.4810		16.5640	
CV %	13.14		18.70	
Sample value	17.48		16.56	
Spike added	20.00		20.00	
Spike recovery, %	73.49 ***		82.82 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
44	50 PPB	CCV	CCV	1.00x	01/11/93	19:52

	<-Pb->		<-Tl->	
Burns (Conc)	49.771	51.033	51.745	51.745
Mean	50.4020		51.7450	
CV %	1.77		0.01	
Sample value	50.40		51.74	

45	CAL BLK	CCB	CCB	1.00x	01/11/93	19:56

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	-0.252	1.023	0.682
Mean	-0.1260		0.8525	
CV %	141.42		28.28	
Sample value	2.00U		1.30U	

46	-13	S	MFQ215	1.00x	01/11/93	20:00

	<-Pb->		<-Tl->	
Burns (Conc)	0.756	0.756	0.682	1.023
Mean	0.7560		0.8525	
CV %	0.00		28.28	
Sample value	2.00U		1.30U	

47	-13	AS	MFQ215A	1.00x	01/11/93	20:05

	<-Pb->		<-Tl->	
Burns (Conc)	19.651	16.395	19.862	14.374
Mean	18.0230		17.1180	
CV %	12.77		22.67 ***	
Sample value	18.02		17.12	
Spike added	20.00		20.00	
Spike recovery, %	90.12		85.59	

48	-14	S	MFQ216	1.00x	01/11/93	20:09

	<-Pb->		<-Tl->	
Burns (Conc)	2.784	2.530	-0.340	0.341
Mean	2.6570		0.0005	
CV %	6.76		>9999.99	
Sample value	2.66		1.30U	

49	-14	AS	MFQ216A	1.00x	01/11/93	20:13

	<-Pb->		<-Tl->	
Burns (Conc)	22.676	18.560	18.386	14.374
Mean	20.6180		16.3800	
CV %	14.12		17.32	
Sample value	20.62		16.38	
Spike added	20.00		20.00	
Spike recovery, %	89.81		81.90 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	-15	S	MFQ217	1.00x	01/11/93	20:17

	<-Pb->		<-Tl->	
Burns (Conc)	2.530	3.294	1.023	0.682
Mean	2.9120		0.8525	
CV %	18.55		28.28	
Sample value	2.91		1.30U	

51	-15	AS	MFQ217A	1.00x	01/11/93	20:22

	<-Pb->		<-Tl->	
Burns (Conc)	22.400	18.833	18.018	13.652
Mean	20.6165		15.8350	
CV %	12.23		19.50	
Sample value	20.62		15.84	
Spike added	20.00		20.00	
Spike recovery, %	88.52		79.18 ***	

52	-16	S	MFQ218	1.00x	01/11/93	20:26

	<-Pb->		<-Tl->	
Burns (Conc)	5.600	5.857	0.682	-0.340
Mean	5.7285		0.1710	
CV %	3.17		422.61	
Sample value	5.73		1.30U	

53	-16	AS	MFQ218A	1.00x	01/11/93	20:30

	<-Pb->		<-Tl->	
Burns (Conc)	27.716	25.182	20.233	16.919
Mean	26.4490		18.5760	
CV %	6.77		12.61	
Sample value	26.45		18.58	
Spike added	20.00		20.00	
Spike recovery, %	103.60		92.88	

54	-17	S	MFQ219	1.00x	01/11/93	20:34

	<-Pb->		<-Tl->	
Burns (Conc)	-2.005	-1.505	1.708	1.708
Mean	-1.7550		1.7080	
CV %	20.15		0.00	
Sample value	2.00U		1.71	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	-17	AS	MFQ219A	1.00x	01/11/93	20:39

	<-Pb->		<-Tl->	
Burns (Conc)	10.279	8.970	22.470	21.349
Mean	9.6245		21.9095	
CV %	9.62		3.62	
Sample value	9.63		21.91	
Spike added	20.00		20.00	
Spike recovery, %	48.13 ***		101.01	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	50 PPB	CCV 5	CCV	1.00x	01/11/93	20:43

	<-Pb->		<-Tl->	
Burns (Conc)	52.304	51.985	55.667	51.745
Mean	52.1445		53.7060	
CV %	0.43		5.16	
Sample value	52.15		53.71	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB 5	CCB	1.00x	01/11/93	20:47

	<-Pb->		<-Tl->	
Burns (Conc)	0.252	0.504	0.682	0.000
Mean	0.3780		0.3410	
CV %	47.14		141.42	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
58	-18	S	MFQ220	1.00x	01/11/93	20:51

	<-Pb->		<-Tl->	
Burns (Conc)	-2.753	-0.754	0.341	1.023
Mean	-1.7535		0.6820	
CV %	80.61		70.71	
Sample value	2.00U		1.30U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
59	-18	AS	MFQ220A	1.00x	01/11/93	20:56

	<-Pb->		<-Tl->	
Burns (Conc)	12.388	10.017	23.973	20.604
Mean	11.2025		22.2885	
CV %	14.97		10.69	
Sample value	11.20		22.29	
Spike added	20.00		20.00	
Spike recovery, %	56.01 ***		111.44	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
60	-14	DS	MFQ216S	1.00x	01/11/93	21:00

	<-Pb->		<-Tl->	
Burns (Conc)	22.953	24.344	43.301	40.021
Mean	23.6485		41.6610	
CV %	4.16		5.57	
Sample value	23.65		41.66	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
61	X	X	ZZZZZZ	1.00x	01/11/93	21:04

	<-Pb->		<-Tl->	
Burns (Conc)	-0.252	0.000	0.682	0.000
Mean	-0.1260		0.3410	
CV %	141.42		141.42	
Sample value	2.00U		1.30U	

62	50 PPB	CCV	CCV	1.00x	01/11/93	21:08

	<-Pb->		<-Tl->	
Burns (Conc)	52.942	52.304	55.667	51.314
Mean	52.6230		53.4905	
CV %	0.86		5.75	
Sample value	52.62		53.49	

63	CAL BLK	CCB	CCB	1.00x	01/11/93	21:13

	<-Pb->		<-Tl->	
Burns (Conc)	-0.503	0.000	0.682	0.682
Mean	-0.2515		0.6820	
CV %	141.42		0.00	
Sample value	2.00U		1.30U	

64	PB	PBW	PBW	1.00x	01/11/93	21:28

	<-Pb->		<-Tl->	
Burns (Conc)	3.804	2.784	0.682	0.000
Mean	3.2940		0.3410	
CV %	21.90 ***		141.42	
Sample value	3.29		1.30U	

65	PB	ASPBW	PBWA	1.00x	01/11/93	21:32

	<-Pb->		<-Tl->	
Burns (Conc)	20.746	19.651	17.285	16.189
Mean	20.1985		16.7370	
CV %	3.83		4.63	
Sample value	20.20		16.74	
Spike added	20.00		20.00	
Spike recovery, %	84.52 ***		83.68 ***	

66	-03	S	MFQ202	1.00x	01/11/93	21:36

	<-Pb->		<-Tl->	
Burns (Conc)	2.530	2.784	0.682	1.365
Mean	2.6570		1.0235	
CV %	6.76		47.19	
Sample value	2.66		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
67	-03	AS	MFQ202A	1.00x	01/11/93	21:41

	<-Pb->		<-Tl->	
Burns (Conc)	22.123	21.296	15.461	15.825
Mean	21.7095		15.6430	
CV %	2.69		1.65	
Sample value	21.71		15.64	
Spike added	20.00		20.00	
Spike recovery, %	95.26		78.21 ***	

68	-04	S	MFQ203	1.00x	01/11/93	21:45

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	0.756	0.682	-0.680
Mean	0.3780		0.0010	
CV %	141.42		>9999.99	
Sample value	2.00U		1.30U	

69	-04	AS	MFQ203A	1.00x	01/11/93	21:49

	<-Pb->		<-Tl->	
Burns (Conc)	12.653	13.184	12.215	10.787
Mean	12.9185		11.5010	
CV %	2.91		8.78	
Sample value	12.92		11.50	
Spike added	20.00		20.00	
Spike recovery, %	64.60 ***		57.51 ***	

70	-06	S	MFQ206	1.00x	01/11/93	21:53

	<-Pb->		<-Tl->	
Burns (Conc)	19.651	19.651	0.000	0.682
Mean	19.6510		0.3410	
CV %	0.02		141.42	
Sample value	19.65		1.30U	

71	-06	AS	MFQ206A	1.00x	01/11/93	21:58

	<-Pb->		<-Tl->	
Burns (Conc)	33.455	33.164	14.374	12.933
Mean	33.3095		13.6535	
CV %	0.62		7.46	
Sample value	33.31		13.65	
Spike added	20.00		20.00	
Spike recovery, %	68.29 ***		68.27 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
72	-07	S	MFQ207	1.00x	01/11/93	22:02

	<-Pb->		<-Tl->	
Burns (Conc)	6.632	6.373	1.708	1.023
Mean	6.5025		1.3655	
CV %	2.82		35.47	
Sample value	6.50		1.37	

73	-07	AS	MFQ207A	1.00x	01/11/93	22:06

	<-Pb->		<-Tl->	
Burns (Conc)	52.304	53.262	14.013	15.461
Mean	52.7830		14.7370	
CV %	1.28		6.95	
Sample value	52.78		14.74	
Spike added	20.00		20.00	
Spike recovery, %	231.40 ***		66.86 ***	

74	50 PPB	CCV	CCV	1.00x	01/11/93	22:10

	<-Pb->		<-Tl->	
Burns (Conc)	51.985	51.350	53.043	52.177
Mean	51.6675		52.6100	
CV %	0.87		1.16	
Sample value	51.67		52.61	

75	CAL BLK	CCB	CCB	1.00x	01/11/93	22:15

	<-Pb->		<-Tl->	
Burns (Conc)	0.000	-0.252	0.341	0.341
Mean	-0.1260		0.3410	
CV %	141.42		0.00	
Sample value	2.00U		1.30U	

76	-08	S	MFQ208	1.00x	01/11/93	22:19

	<-Pb->		<-Tl->	
Burns (Conc)	2.784	4.060	0.341	1.023
Mean	3.4220		0.6820	
CV %	26.37 ***		70.71	
Sample value	3.42		1.30U	

77	-08	AS	MFQ208A	1.00x	01/11/93	22:23

	<-Pb->		<-Tl->	
Burns (Conc)	19.105	20.472	16.554	15.825
Mean	19.7885		16.1895	
CV %	4.88		3.18	
Sample value	19.79		16.19	
Spike added	20.00		20.00	
Spike recovery, %	81.83 ***		80.94 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
78	-10	S	MFQ212	1.00x	01/11/93	22:27

	<-Pb->		<-Tl->	
Burns (Conc)	4.060	3.294	0.682	0.341
Mean	3.6770		0.5115	
CV %	14.73		47.14	
Sample value	3.68		1.30U	

79	-10	AS	MFQ212A	1.00x	01/11/93	22:32

	<-Pb->		<-Tl->	
Burns (Conc)	15.320	16.665	10.431	11.857
Mean	15.9925		11.1440	
CV %	5.95		9.05	
Sample value	15.99		11.14	
Spike added	20.00		20.00	
Spike recovery, %	61.57 ***		55.72 ***	

TL
JST 1/12/93

80	-11	S	MFQ213	1.00x	01/11/93	22:38

	<-Pb->		<-Tl->	
Burns (Conc)	2.275	3.039	0.341	1.708
Mean	2.6570		1.0245	
CV %	20.33		94.35	
Sample value	2.66		1.30U	

81	-11	AS	MFQ213A	1.00x	01/11/93	22:42

	<-Pb->		<-Tl->	
Burns (Conc)	15.857	16.126	13.652	14.013
Mean	15.9915		13.8325	
CV %	1.19		1.85	
Sample value	15.99		13.83	
Spike added	20.00		20.00	
Spike recovery, %	66.67 ***		69.17 ***	

82	-13	S	MFQ215	1.00x	01/11/93	22:46

	<-Pb->		<-Tl->	
Burns (Conc)	1.262	0.756	0.341	0.341
Mean	1.0090		0.3410	
CV %	35.46		0.00	
Sample value	2.00U		1.30U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
83	-13	AS	MFQ215A	1.00x	01/11/93	22:51

	<-Pb->		<-Tl->	
Burns (Conc)	15.857	15.320	12.574	14.013
Mean	15.5885		13.2935	
CV %	2.44		7.65	
Sample value	15.59		13.29	
Spike added	20.00		20.00	
Spike recovery, %	77.94 ***		66.47 ***	

84	PB	PBW	PBW	1.00x	01/11/93	22:55

	<-Pb->		<-Tl->	
Burns (Conc)	3.294	3.039	-0.340	0.000
Mean	3.1665		-0.1700	
CV %	5.69		141.42	
Sample value	3.17		1.30U	

Pb only

85	PB	ASPBW	PBWA	1.00x	01/11/93	22:59

JST 1/12/93

	<-Pb->		<-Tl->	
Burns (Conc)	22.400	22.676	19.862	19.123
Mean	22.5380		19.4925	
CV %	0.87		2.68	
Sample value	22.54		19.49	
Spike added	20.00		20.00	
Spike recovery, %	96.86		97.46	

86	50 PPB	CCV	CCV	1.00x	01/11/93	23:03

	<-Pb->		<-Tl->	
Burns (Conc)	54.225	51.668	55.227	53.043
Mean	52.9465		54.1350	
CV %	3.41		2.85	
Sample value	52.95		54.13	

87	CAL BLK	CCB	CCB	1.00x	01/11/93	23:08

	<-Pb->		<-Tl->	
Burns (Conc)	-0.252	0.252	0.000	0.682
Mean	-0.0000		0.3410	
CV %	>9999.99		141.42	
Sample value	2.00U		1.30U	

88	-09	MOS	MFQ2090	1.00x	01/11/93	23:11

	<-Pb->	<-Tl->
Burns (Abs)	0.065 A	0.002A
Mean	0.0650	0.0020
CV %	---	---
Spike added:	0.00	0.00

Pb only

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
89	-09	M1S	MFQ2091	1.00x	01/11/93	23:13

	<-Pb->	<-Tl->
Burns (Abs)	0.102 A	0.027A
Mean	0.1020	0.0270
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
90	-09	M2S	MFQ2092	1.00x	01/11/93	23:15

	<-Pb->	<-Tl->
Burns (Abs)	0.140 A	0.054A
Mean	0.1400	0.0540
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
91	-09	M3S	MFQ2093	1.00x	01/11/93	23:18

	<-Pb->	<-Tl->
Burns (Abs)	0.177 A	0.082A
Mean	0.1770	0.0820
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.06490	0.00120
Slope:	0.00374	0.00267
Correlation:	1.0000	0.9997
X intercept:	-17.353	-0.449
Sample value:	17.353	0.449

Pb only JSX 1/12/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
92	~~-09~~ X	M0S	~~MFQ2090~~	1.00x	01/11/93	23:20

	<-Pb->	<-Tl->
Burns (Abs)	0.069 A	0.003A
Mean	0.0690	0.0030
CV %	---	---
Spike added:	0.00	0.00

NOT NEEDED

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
93	~~-09~~ X	~~M1S~~	~~MFQ2091~~	1.00x	01/11/93	23:23

JSX 1/12/93

	<-Pb->	<-Tl->
Burns (Abs)	0.105 A	0.023A
Mean	0.1050	0.0230
CV %	---	---
Spike added:	10.00	10.00

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Jarrell-Ash Video 22
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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
94	~~-09~~ X	M2S	~~MFG2092~~	1.00x	01/11/93	23:25

	<-Pb->	<-Tl->
Burns (Abs)	0.140 A	0.052A
Mean	0.1400	0.0520
CV %	---	---
Spike added:	20.00	20.00

NOT Needed JST 1/12/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
95	~~-09~~ X	M3S	~~MFG2093~~	1.00x	01/11/93	23:27

	<-Pb->	<-Tl->
Burns (Abs)	0.174 A	0.084A
Mean	0.1740	0.0840
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.06950	-0.00030
Slope:	0.00350	0.00272
Correlation:	0.9999	0.9949
X intercept:	-19.857	0.110
Sample value:	19.857	-0.110

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
96	X	X	ZZZZZZ	1.00x	01/11/93	23:30

	<-Pb->	<-Tl->
Burns (Conc)	0.252	0.000
Mean	0.2520	0.0000
CV %	---	---
Sample value	2.00U	1.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
97	50 PPB	CCV	CCV	1.00x	01/11/93	23:32

	<-Pb->	<-Tl->
Burns (Conc)	50.401	53.043
Mean	50.4010	53.0430
CV %	---	---
Sample value	50.40	53.04

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
98	CAL BLK	CCB	CCB	1.00x	01/11/93	23:35

	<-Pb->	<-Tl->
Burns (Conc)	0.000	1.023
Mean	0.0000	1.0230
CV %	---	---
Sample value	2.00U	1.30U

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C L P M E T A L S 3.02e

S212134--MERCURY

Run id: M1 9235206
TECHNICON MERCURY ANALYZER (#SS4199A-D)
Analytical method: CV
Element: Hg

Acquired: 12/17/92 by KDJ
Crunched: 01/11/93 by DNP
Time: 1404
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	CV			S0	12/17/92	11:00
2	0.2 PPB	WS1	CV			S0.2	12/17/92	11:03
3	0.5 PPB	WS2	CV			S0.5	12/17/92	11:06
4	1.0 PPB	WS3	CV			S1.0	12/17/92	11:09
5	2.0 PPB	WS4	CV			S2.0	12/17/92	11:12
6	5.0 PPB	WS5	CV			S5.0	12/17/92	11:15
7	ICV-5	ICV	CV			ICV	12/17/92	11:21
8	CAL BLK	ICB	CV			ICB	12/17/92	11:24
9	2 PPB	CCV	CV			CCV	12/17/92	11:27
10	CAL BLK	CCB	CV			CCB	12/17/92	11:30
11	X	X	CV			ZZZZZZ	12/17/92	11:33
12	X	X	CV			ZZZZZZ	12/17/92	11:36
13	X	X	CV			ZZZZZZ	12/17/92	11:39
14	X	X	CV			ZZZZZZ	12/17/92	11:42
15	X	X	CV			ZZZZZZ	12/17/92	11:45
16	X	X	CV			ZZZZZZ	12/17/92	11:48
17	X	X	CV			ZZZZZZ	12/17/92	11:51
18	X	X	CV			ZZZZZZ	12/17/92	11:54
19	X	X	CV			ZZZZZZ	12/17/92	11:57
20	2 PPB	CCV	CV			CCV	12/17/92	12:00
21	CAL BLK	CCB	CV			CCB	12/17/92	12:03
22	X	X	CV			ZZZZZZ	12/17/92	12:06
23	X	X	CV			ZZZZZZ	12/17/92	12:09
24	X	X	CV			ZZZZZZ	12/17/92	12:12
25	X	X	CV			ZZZZZZ	12/17/92	12:15
26	X	X	CV			ZZZZZZ	12/17/92	12:18
27	X	X	CV			ZZZZZZ	12/17/92	12:21
28	X	X	CV			ZZZZZZ	12/17/92	12:24
29	X	X	CV			ZZZZZZ	12/17/92	12:27
30	2 PPB	CCV	CV			CCV	12/17/92	12:30
31	CAL BLK	CCB	CV			CCB	12/17/92	12:33
32	X	X	CV			ZZZZZZ	12/17/92	12:36
33	X	X	CV			ZZZZZZ	12/17/92	12:39
34	X	X	CV			ZZZZZZ	12/17/92	12:42
35	X	X	CV			ZZZZZZ	12/17/92	12:45
36	X	X	CV			ZZZZZZ	12/17/92	12:48
37	X	X	CV			ZZZZZZ	12/17/92	12:51
38	X	X	CV			ZZZZZZ	12/17/92	12:54
39	X	X	CV			ZZZZZZ	12/17/92	12:57
40	X	X	CV			ZZZZZZ	12/17/92	13:00
41	X	X	CV			ZZZZZZ	12/17/92	13:03
42	2 PPB	CCV	CV			CCV	12/17/92	13:06
43	CAL BLK	CCB	CV			CCB	12/17/92	13:09

S212134--MERCURY

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	X	X	CV			ZZZZZZ	12/17/92	13:12
45	X	X	CV			ZZZZZZ	12/17/92	13:15
46	X	X	CV			ZZZZZZ	12/17/92	13:18
47	X	X	CV			ZZZZZZ	12/17/92	13:21
48	X	X	CV			ZZZZZZ	12/17/92	13:24
49	X	X	CV			ZZZZZZ	12/17/92	13:27
50	X	X	CV			ZZZZZZ	12/17/92	13:30
51	X	X	CV			ZZZZZZ	12/17/92	13:33
52	X	X	CV			ZZZZZZ	12/17/92	13:36
53	X	X	CV			ZZZZZZ	12/17/92	13:39
54	2 PPB	CCV	CV			CCV	12/17/92	13:42
55	CAL BLK	CCB	CV			CCB	12/17/92	13:45
56	X	X	CV			ZZZZZZ	12/17/92	13:48
57	X	X	CV			ZZZZZZ	12/17/92	13:51
58	X	X	CV			ZZZZZZ	12/17/92	13:54
59	X	X	CV			ZZZZZZ	12/17/92	13:57
60	X	X	CV			ZZZZZZ	12/17/92	14:00
61	X	X	CV			ZZZZZZ	12/17/92	14:03
62	X	X	CV			ZZZZZZ	12/17/92	14:06
63	X	X	CV			ZZZZZZ	12/17/92	14:09
64	X	X	CV			ZZZZZZ	12/17/92	14:12
65	X	X	CV			ZZZZZZ	12/17/92	14:15
66	2 PPB	CCV	CV			CCV	12/17/92	14:18
67	CAL BLK	CCB	CV			CCB	12/17/92	14:21
68	X	X	CV			ZZZZZZ	12/17/92	14:24
69	X	X	CV			ZZZZZZ	12/17/92	14:27
70	X	X	CV			ZZZZZZ	12/17/92	14:30
71	X	X	CV			ZZZZZZ	12/17/92	14:33
72	X	X	CV			ZZZZZZ	12/17/92	14:36
73	X	X	CV			ZZZZZZ	12/17/92	14:39
74	X	X	CV			ZZZZZZ	12/17/92	14:42
75	X	X	CV			ZZZZZZ	12/17/92	14:45
76	X	X	CV			ZZZZZZ	12/17/92	14:48
77	X	X	CV			ZZZZZZ	12/17/92	14:51
78	2 PPB	CCV	CV			CCV	12/17/92	14:54
79	CAL BLK	CCB	CV			CCB	12/17/92	14:57
80	PB	PBW	CV	1252	12/17/92	PBW	12/17/92	15:00
81	S212134-01	S	CV	1252	12/17/92	MFN651	12/17/92	15:03
82	S212134-02	S	CV	1252	12/17/92	MFQ201	12/17/92	15:06
83	S212134-03	S	CV	1252	12/17/92	MFQ202	12/17/92	15:09
84	S212134-04	S	CV	1252	12/17/92	MFQ203	12/17/92	15:12
85	S212134-05	S	CV	1252	12/17/92	MFQ204	12/17/92	15:15
86	S212134-06	S	CV	1252	12/17/92	MFQ206	12/17/92	15:18
87	S212134-07	S	CV	1252	12/17/92	MFQ207	12/17/92	15:21
88	S212134-08	S	CV	1252	12/17/92	MFQ208	12/17/92	15:24
89	S212134-09	S	CV	1252	12/17/92	MFQ209	12/17/92	15:27
90	2 PPB	CCV	CV			CCV	12/17/92	15:30
91	CAL BLK	CCB	CV			CCB	12/17/92	15:33
92	S212134-10	S	CV	1252	12/17/92	MFQ212	12/17/92	15:36
93	S212134-11	S	CV	1252	12/17/92	MFQ213	12/17/92	15:39
94	S212134-12	S	CV	1252	12/17/92	MFQ214	12/17/92	15:42
95	S212134-12	S2	CV	1252	12/17/92	MFQ214D	12/17/92	15:45

S212134--MERCURY

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
96	S212134-13	S	CV	1252	12/17/92	MFQ215	12/17/92	15:48
97	S212134-14	S	CV	1252	12/17/92	MFQ216	12/17/92	15:51
98	S212134-14	DS	CV	1252	12/17/92	MFQ216S	12/17/92	15:54
99	S212134-15	S	CV	1252	12/17/92	MFQ217	12/17/92	15:57
100	S212134-16	S	CV	1252	12/17/92	MFQ218	12/17/92	16:00
101	S212134-17	S	CV	1252	12/17/92	MFQ219	12/17/92	16:03
102	2 PPB	CCV	CV			CCV	12/17/92	16:06
103	CAL BLK	CCB	CV			CCB	12/17/92	16:09
104	S212134-18	S	CV	1252	12/17/92	MFQ220	12/17/92	16:12
105	X	X	CV			ZZZZZZ	12/17/92	16:15
106	X	X	CV			ZZZZZZ	12/17/92	16:18
107	X	X	CV			ZZZZZZ	12/17/92	16:21
108	X	X	CV			ZZZZZZ	12/17/92	16:24
109	X	X	CV			ZZZZZZ	12/17/92	16:27
110	X	X	CV			ZZZZZZ	12/17/92	16:30
111	X	X	CV			ZZZZZZ	12/17/92	16:33
112	2 PPB	CCV	CV			CCV	12/17/92	16:36
113	CAL BLK	CCB	CV			CCB	12/17/92	16:39

S42134

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Original is filed in CSF MAB1454/ 19205

TMA/Skinner & Sherman Labs
MERCURY BENCH SHEET

SEQ NO: 495
RUN IDS:
Reviewed 12/17/92

9235201 02 03 04 05 06 07 08 09 10

ANALYST MS
INSTR: M1(water)
METHOD: HG
WAVELENGTH 253.7 mm

CALIBRATION TIME 11:00

RUN DATE 12/17/92
STANDARDS PREPPED
DATE: 12/17/92
STANDARD SOURCE
CALIB: 10 ppm HP 920930
ICV: ICV-5-34 CCV: 2 ppb

		PK HT(mm)
01	BLANK	0
02	0.2 PPB	3
03	0.5 PPB	7
04	1.0 PPB	18
05	2.0 PPB	35
06	5.0 PPB	84

r = 0.9995

	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
07	ICV-5	ICV	43	2.54	
08	CAL BLK	ICB	0	0	
09	2 PPB	CCV	33	1.95	
10	CAL BLK	CCB	0	0	
11	PB		0	0	
12	5212092-01	MBKG85	3	0.18	
13	01D	MBKG85D	2	0.12	
14	PB		0	0	
15	5212126-08	MAX543	4	0.24	
16	09 MS 12/15/92	544	0	0	
17	10	545			
18	X				
19	X				
20	CCV		31	1.83	
21	CCB		0	0	
22	PB				
23	~~5212105~~ 5212109-01	MDDR52			
24	02 MS 12/17/92	MDDR53	11	0.65	
25	03	57	0	0	
26	03D	57D	0	0	
27	03S	57S	15	0.89	
28	04	58	0	0	
29	05	59	0	0	
30	CCV		30	MS 12/17/92 ~~1.76~~ 1.78	
31	CCB		0	0	
32	X				
33	PB				
34	5212121-01	MAZ670			
35	02	671			
36	03	672			
37	04	673			
38	04D	673D			
39	04S	673S	14	0.83	

Revised 07/92

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TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: 495

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	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
40	05	MAZ674	2	0.12	
41	06	MAZ675	0	0	
42	CCV		30	1.78	
43	CCB		0	0	
44	07	MAZ676	1	0.06	
45	08	677	0	0	
46	09	678			
47	10	679			
48	11	680			
49	12	681			
50	13	682			
51	14	683			
52	15	684			
53	16	685			
54	CCV		29	1.72	
55	CCB		0	0	
56	17	MAZ686			
57	PB				
58	S212189-01	MBLK02			
59	02	04			
60	03	06			
61	04	08			
62	05	10			
63	05D	10D			
64	05S	10S	13	0.77	
65	06	12	0	0	
66	CCV		30	1.78	
67	CCB		0	0	
68	07	MBLK14			
69	08	16			
70	09	18			
71	10	20			
72	11	22			
73	12	24			
74	13	26	1	0.06	
75	14	28	0	0	
76	15	30			
77	16	32			
78	CCV		29	1.72	
79	CCB		0	0	
80	PB				
81	S212134-01	MFN651			
82	02	MFQ201			
83	03	202			
84	04	203			
85	05	204			

193

TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: 495

Copy
Original is filed in CSF MABH54/19205

	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
86	06	MFQ206	0	0	
87	07	207			
88	08	208			
89	09	209			
90	CCV		31	1.83	
91	CCB		0	0	
92	10	MFQ 212	2	0.12	
93	11	213	0	0	
94	12	214			
95	12D	214D			
96	13	215			
97	14	216			
98	14S	216S	12 MS 12/18/92	0.71 MS 12/18/92	
99	15	217	0	0	
100	16	218			
101	17	219			
102	CCV		36	2.1	
103	CCB		0	0	
104	18	MFQ220	3	0.18	
105	PB		0	0	
106	S212152-01	MABH54			
107	02	55			
108	03	60			
109	04	64			
110	04D	64D			
111	04S	64S	27	1.60	rerun
112	CCV		36	2.13	
113	CCB		0	0	
114	X OK MS 12/17/92				
115	X				
116	S212152-04	MABH64	1	0.06	
117	04S	64S	12	0.71	
118	X		0	0	
119	X		0	0	
120	CCV		28	1.66	
121	CCB		0	0	
122	PB				
123	S212223-01	NP50727WC(UF)			
124	02	NP50725/WC(UF)			
125	02D	D			
126	02S	S	15	0.89	
127	PB		0	0	
128	S212224-01	NP50728WC(F)			
129	02	NP50726WC(F)			
130	02D	D			
131	02S	S	14	0.83	
132	CCV		32	1.89	
133	CCB		0	0	

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TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: 495

Copy
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	SAMPLE ID	CLIENT ID	PK HT(mm)	CONC(ppb)	COMMENT
134	PB		0	0	
135	S212150-09	MDDZ62			
136	14	67			
137	15	68			
138	CCV		28	1,66	
139	CCB		0	0	
140					
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195

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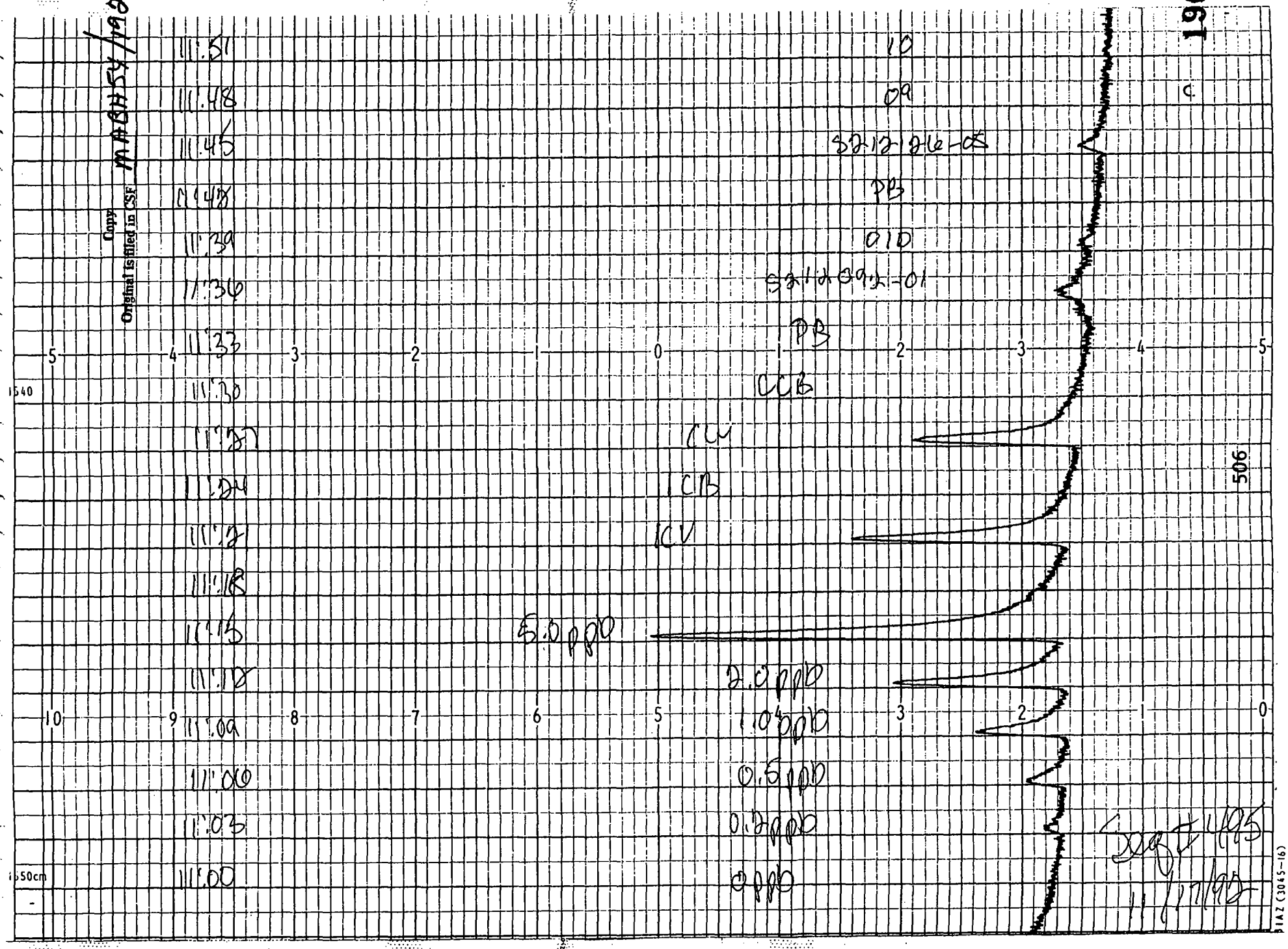

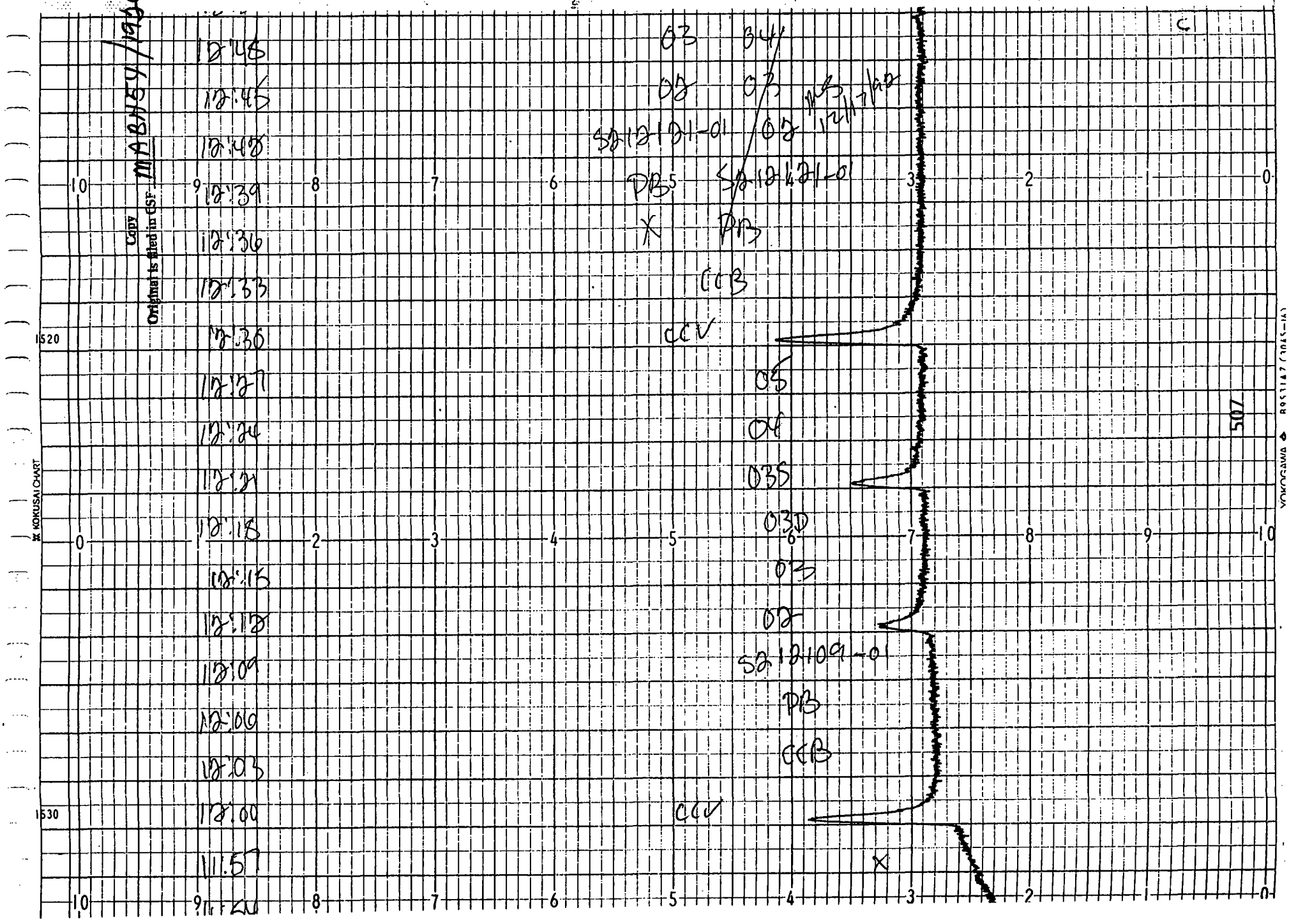
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YOKOGAWA
507
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12:06
12:03
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04
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S2121121-01
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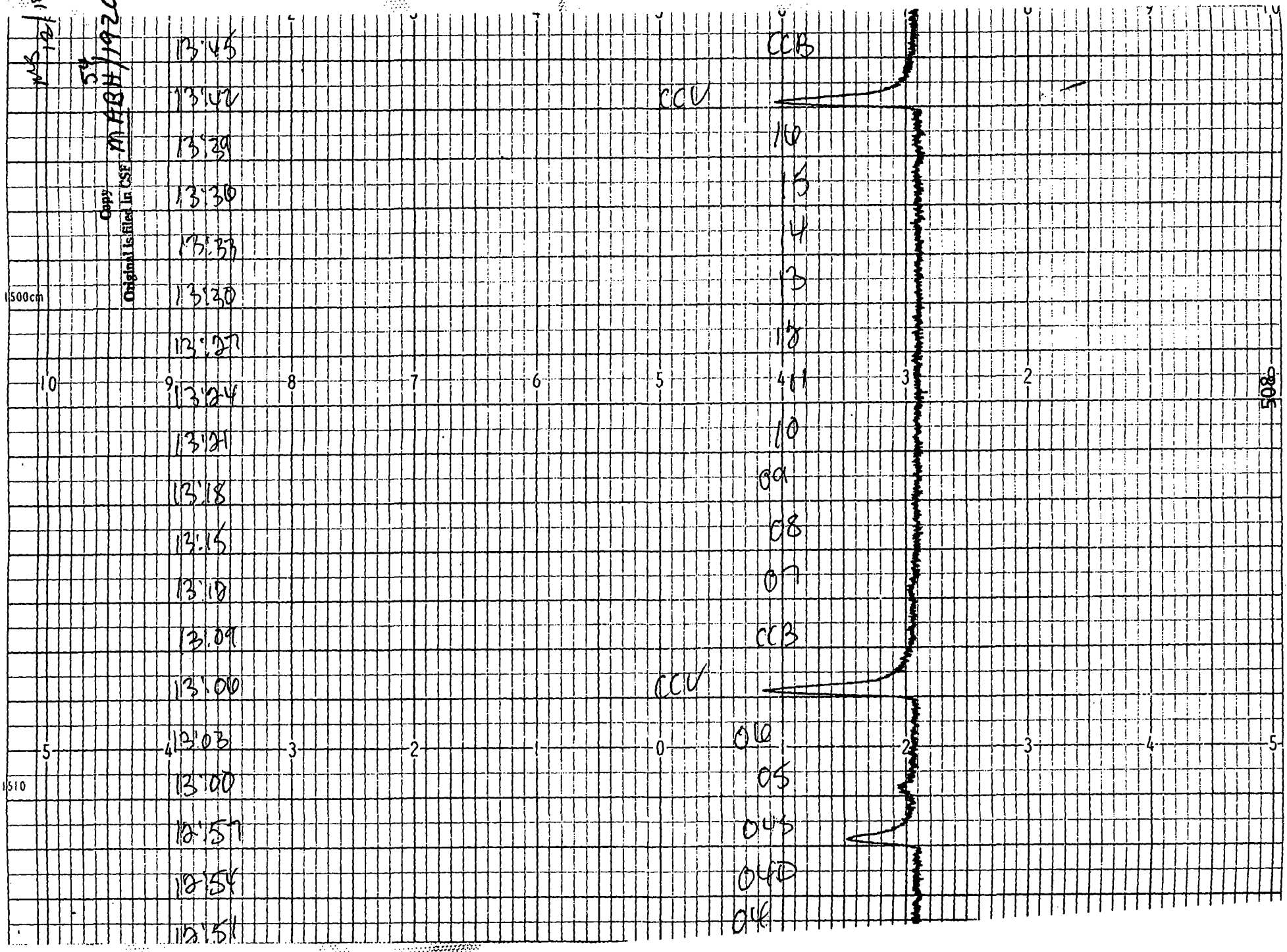
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13:03
13:00
12:57
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CCB
CCU
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12
11
10
09
08
07
CCB
CCU
06
05
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01
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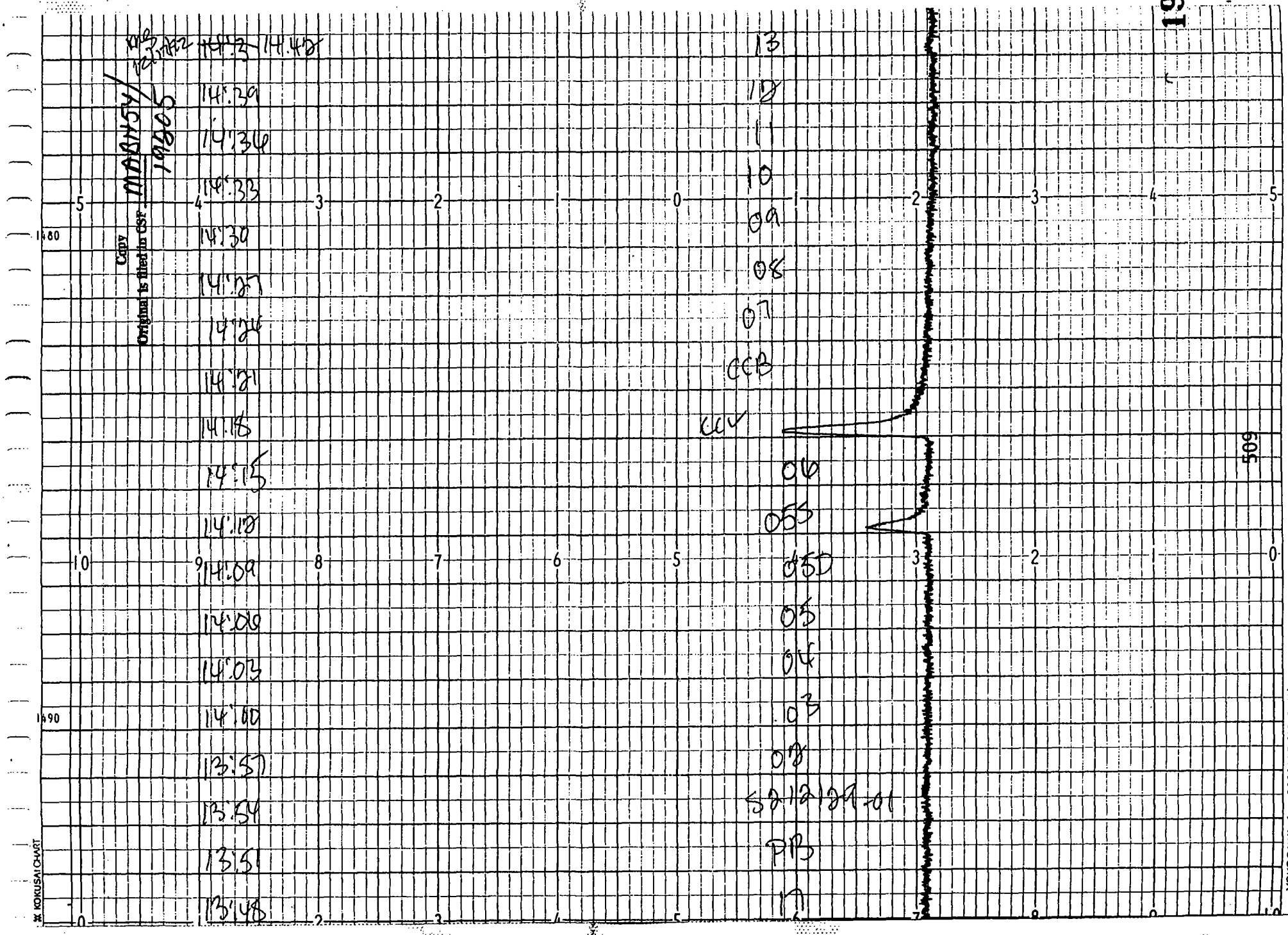
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13:48
13
12
11
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09
08
07
CCB
CCV
06
05
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PB
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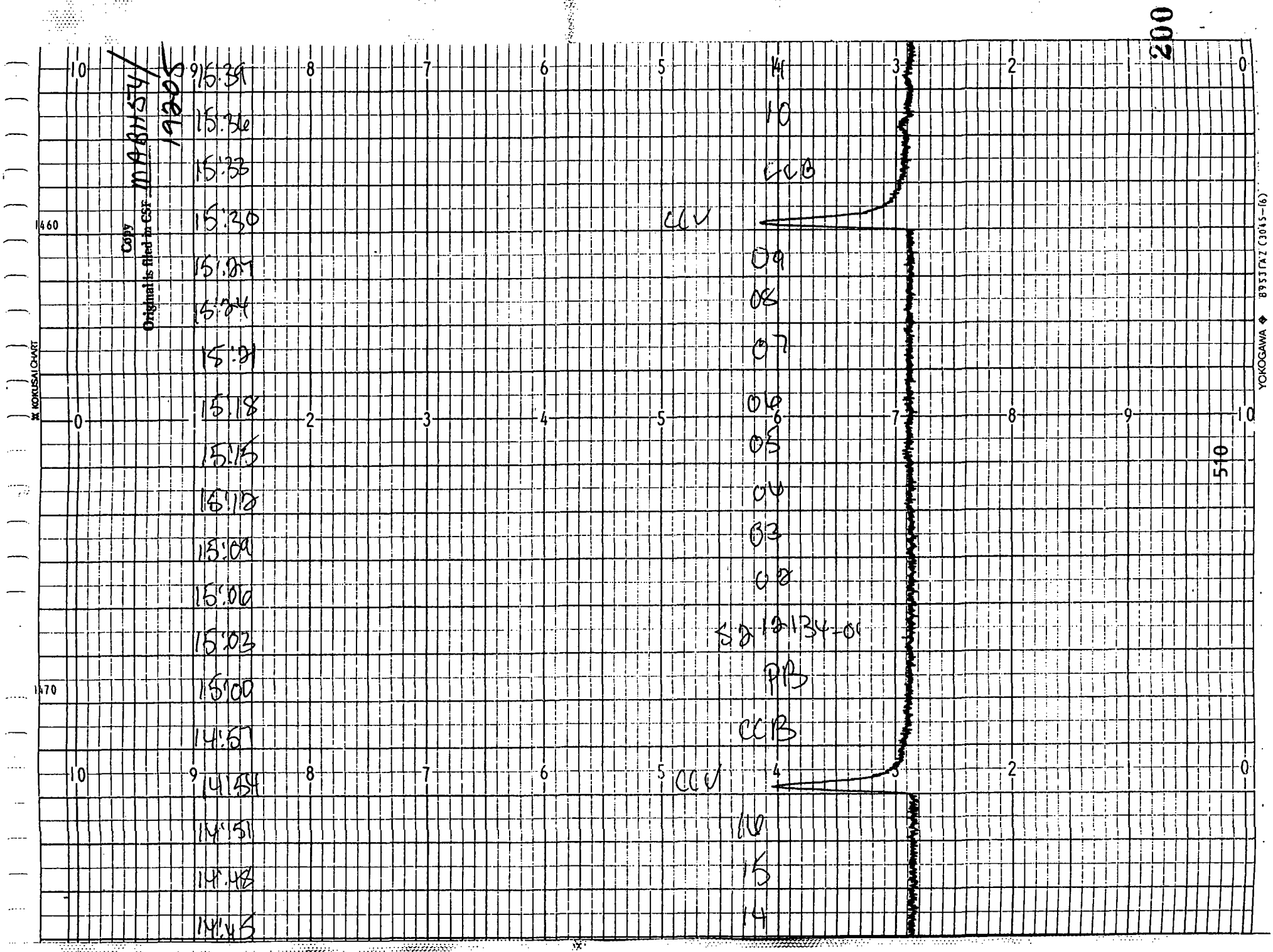
YOKOGAWA
B9531AZ (3045-16)
199
509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YOKOGAWA
B953FAZ (3045-(6)
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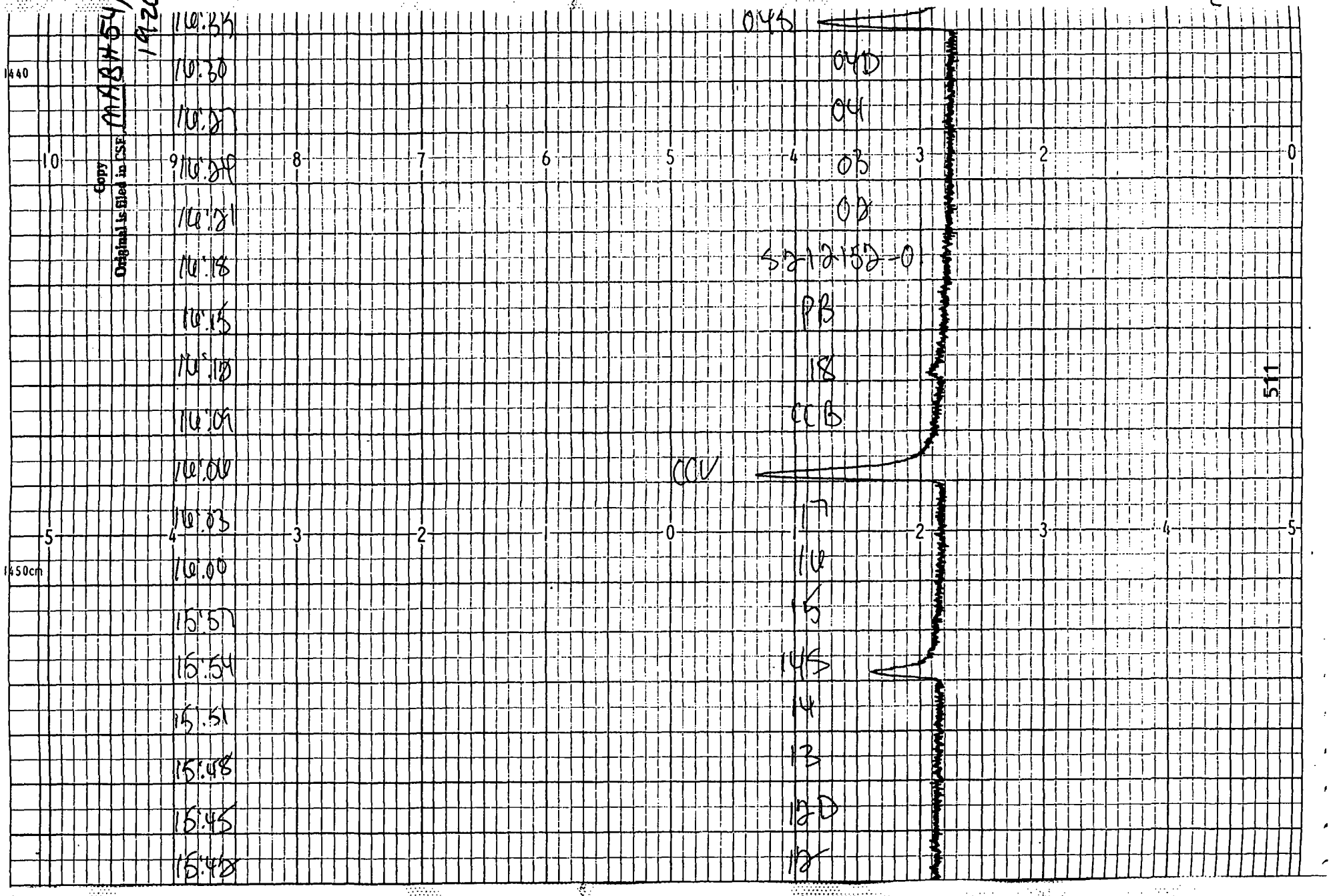
200
510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16:18
16:15
16:12
16:09
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16:03
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15:48
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04D
04
03
02
52-12-52-0
PB
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CCV
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12D
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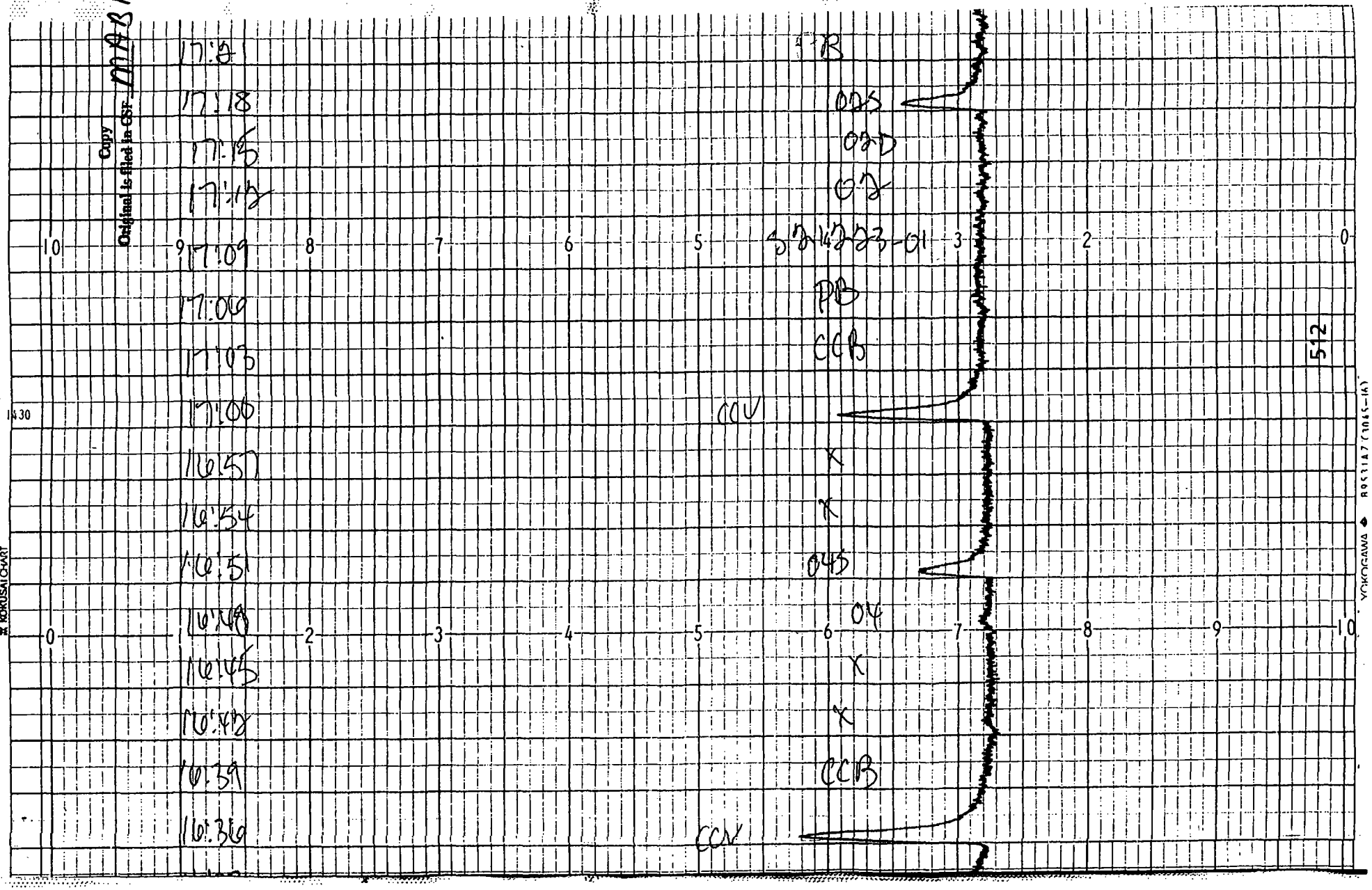

19205

Copy
Original is filed in CSE MABH 54

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MB 12/18/92 ~~17:54~~ 17:57

MB 12/18/92 ~~17:51~~ 17:54

MB 12/18/92 ~~17:48~~ 17:57

MB 12/18/92 ~~17:45~~ 17:48

MB 12/18/92 ~~17:42~~ 17:45

17:48

17:39

17:36

17:33

1620

17:30

17:27

17:24

CCB

CCV

15

14

S218150-09

PB

CCB

CCV

025

020

02

S212004-01

SAMPLE PREPARATION REPORT: AQUEOUS

Prep batch: 1252

Date: 01/08/93

Printed by JLS

Approved: JLS 1/8/93

pH AS RECEIVED

Sample ID	Lab code	pH	pH(CN)
S212134-01	S	2.5	
S212134-02	S	2.0	
S212134-03	S	2.0	
S212134-04	S	2.0	
S212134-05	S	2.0	
S212134-06	S	2.0	
S212134-07	S	2.0	
S212134-08	S	2.5	
S212134-09	S	2.0	
S212134-10	S	2.0	
S212134-11	S	2.0	
S212134-12	S	2.5	
S212134-12	S2	2.5	
S212134-13	S	2.0	
S212134-14	S	2.0	
S212134-15	S	2.0	
S212134-16	S	2.0	
S212134-17	S	2.0	
S212134-18	S	2.0	

Prep code CV (Mercury)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	PB	PBW	100	100	12/17/92 0800	JLS	1.00
MFN651	S212134-01	S	100	100	12/17/92 0800	JLS	1.00
MFQ201	S212134-02	S	100	100	12/17/92 0800	JLS	1.00
MFQ202	S212134-03	S	100	100	12/17/92 0800	JLS	1.00
MFQ203	S212134-04	S	100	100	12/17/92 0800	JLS	1.00
MFQ204	S212134-05	S	100	100	12/17/92 0800	JLS	1.00
MFQ206	S212134-06	S	100	100	12/17/92 0800	JLS	1.00
MFQ207	S212134-07	S	100	100	12/17/92 0800	JLS	1.00
MFQ208	S212134-08	S	100	100	12/17/92 0800	JLS	1.00
MFQ209	S212134-09	S	100	100	12/17/92 0800	JLS	1.00
MFQ212	S212134-10	S	100	100	12/17/92 0800	JLS	1.00
MFQ213	S212134-11	S	100	100	12/17/92 0800	JLS	1.00
MFQ214	S212134-12	S	100	100	12/17/92 0800	JLS	1.00
MFQ214D	S212134-12	S2	100	100	12/17/92 0800	JLS	1.00
MFQ215	S212134-13	S	100	100	12/17/92 0800	JLS	1.00
MFQ216S	S212134-14	DS	100	100	12/17/92 0800	JLS	1.00
MFQ216	S212134-14	S	100	100	12/17/92 0800	JLS	1.00
MFQ217	S212134-15	S	100	100	12/17/92 0800	JLS	1.00
MFQ218	S212134-16	S	100	100	12/17/92 0800	JLS	1.00
MFQ219	S212134-17	S	100	100	12/17/92 0800	JLS	1.00
MFQ220	S212134-18	S	100	100	12/17/92 0800	JLS	1.00

SAMPLE PREPARATION REPORT: AQUEOUS

Prep batch: 1252

Date: 01/08/93

Printed by JLS

Approved: JLS 1/8/93

Prep code F (Furnace)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSFW	LCSW	100	100	01/06/93 0800	JLS	1.00
	PB	PBW	100	100	01/06/93 0800	JLS	1.00
MFN651	S212134-01	S	100	100	01/06/93 0800	JLS	1.00
MFQ201	S212134-02	S	100	100	01/06/93 0800	JLS	1.00
MFQ202	S212134-03	S	100	100	01/06/93 0800	JLS	1.00
MFQ203	S212134-04	S	100	100	01/06/93 0800	JLS	1.00
MFQ204	S212134-05	S	100	100	01/06/93 0800	JLS	1.00
MFQ206	S212134-06	S	100	100	01/06/93 0800	JLS	1.00
MFQ207	S212134-07	S	100	100	01/06/93 0800	JLS	1.00
MFQ208	S212134-08	S	100	100	01/06/93 0800	JLS	1.00
MFQ209	S212134-09	S	100	100	01/06/93 0800	JLS	1.00
MFQ212	S212134-10	S	100	100	01/06/93 0800	JLS	1.00
MFQ213	S212134-11	S	100	100	01/06/93 0800	JLS	1.00
MFQ214	S212134-12	S	100	100	01/06/93 0800	JLS	1.00
MFQ214D	S212134-12	S2	100	100	01/06/93 0800	JLS	1.00
MFQ215	S212134-13	S	100	100	01/06/93 0800	JLS	1.00
MFQ216S	S212134-14	DS	100	100	01/06/93 0800	JLS	1.00
MFQ216	S212134-14	S	100	100	01/06/93 0800	JLS	1.00
MFQ217	S212134-15	S	100	100	01/06/93 0800	JLS	1.00
MFQ218	S212134-16	S	100	100	01/06/93 0800	JLS	1.00
MFQ219	S212134-17	S	100	100	01/06/93 0800	JLS	1.00
MFQ220	S212134-18	S	100	100	01/06/93 0800	JLS	1.00

SAMPLE PREPARATION REPORT: AQUEOUS

Prep batch: 1252

Date: 01/08/93

Printed by JLS

Approved: JLS 1/8/93

Prep code P (ICP)

Client ID	Sample ID	Lab Code	Initial vol, ml	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSPW	LCSW	100	100	01/06/93 0800	JLS	1.00
	PB	PBW	100	100	01/06/93 0800	JLS	1.00
MFN651	S212134-01	S	100	100	01/06/93 0800	JLS	1.00
MFQ201	S212134-02	S	100	100	01/06/93 0800	JLS	1.00
MFQ202	S212134-03	S	100	100	01/06/93 0800	JLS	1.00
MFQ203	S212134-04	S	100	100	01/06/93 0800	JLS	1.00
MFQ204	S212134-05	S	100	100	01/06/93 0800	JLS	1.00
MFQ206	S212134-06	S	100	100	01/06/93 0800	JLS	1.00
MFQ207	S212134-07	S	100	100	01/06/93 0800	JLS	1.00
MFQ208	S212134-08	S	100	100	01/06/93 0800	JLS	1.00
MFQ209	S212134-09	S	100	100	01/06/93 0800	JLS	1.00
MFQ212	S212134-10	S	100	100	01/06/93 0800	JLS	1.00
MFQ213	S212134-11	S	100	100	01/06/93 0800	JLS	1.00
MFQ214	S212134-12	S	100	100	01/06/93 0800	JLS	1.00
MFQ214D	S212134-12	S2	100	100	01/06/93 0800	JLS	1.00
MFQ215	S212134-13	S	100	100	01/06/93 0800	JLS	1.00
MFQ216S	S212134-14	DS	100	100	01/06/93 0800	JLS	1.00
MFQ216	S212134-14	S	100	100	01/06/93 0800	JLS	1.00
MFQ217	S212134-15	S	100	100	01/06/93 0800	JLS	1.00
MFQ218	S212134-16	S	100	100	01/06/93 0800	JLS	1.00
MFQ219	S212134-17	S	100	100	01/06/93 0800	JLS	1.00
MFQ220	S212134-18	S	100	100	01/06/93 0800	JLS	1.00

DATE [redacted] ANALYST JR FOR GFAA/ICP

WATERS PREP LOG

DATE _____ ANALYST _____ FOR MERCURY

PREP BATCH # 252

REVIEWED BY [illegible]

Thermo Analytical/SKINNER &SHERMAN

LCS SOURCE		Digest 1 (GFAA)		Digest 2 (ICP)			Digest 3 (Hg)	Description Color Clarity
Client ID	Lab ID	Initial Vol(ml)	Final Vol(ml)	Initial Vol(ml)	Final Vol(ml)	pH	Initial Vol(ml)	
MFN651	5212134 01	100	100	100	100	2.5		Colorless, SLT cloudy
MFQ201	02					2.0		, clear
202	03							
203	04							
204	05							
206	06							
207	07							
208	08					2.5		
209	09					2.0		LT brown, cloudy
212	10							colorless, clear
213	11							
214	12					2.5		"
D	12:D							
215	13					2.0		
216	14							
S	14:DS							
217	15							
218	16							
219	17							
220	18							
	LCSW							
	PB							

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Page

TMA/SKINNER & SHERMAN LABORATORIES
MERCURY PREPARATION LOG

DATE 12/17/92

PREPARED BY MS

S212134

WORK ORDER

SKINNER & SHERMAN ID	CLIENT ID	INITIAL VOL (ML)	INITIAL WT (GM)	FINAL VOL (ML)	COMMENTS
PB				100	
LCSHG	LCSS	XXXX			
S212134-01	MFN651	100		100	
02	MFQ201				
03	202				
04	203				
05	204				
06	206				
07	207				
08	208				
09	209				
10	212				
11	213				
12	214				
12D	214D				
13	215				
14 ~~135~~ MS 12/17/92	216				
145	216S				
15	217				
16	218				
17	219				
18	220				

REVIEWED BY: [illegible] 12/18/92

PAGE: 048208

(1)

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD B

DATE PREPARED: 12/20/92
PREPARED BY: LP

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: 10 HNO3
50 HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC

Reprepped 12/31/92 SRF

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

209

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(2)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 1

DATE PREPARED: 12/20/92
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 ppm	5 ml	5 ppm
As	HPAs-2		1000 ppm	5 ml	5 ppm
Ba	HPBa-1		1000 ppm	5 ml	5 ppm
Be	HPBe-1		1000 ppm	1 ml	1 ppm
Cd	HPCd-1		1000 ppm	5 ml	5 ppm
Cr	HPCr-1		1000 ppm	5 ml	5 ppm
Co	HPCo-1		1000 ppm	5 ml	5 ppm
Cu	HPCu-1		1000 ppm	5 ml	5 ppm
Pb	HPPb-1		1000 ppm	5 ml	5 ppm
Mn	MVMn-3		1000 ppm	5 ml	5 ppm
Ni	MVNi-3		1000 ppm	5 ml	5 ppm
Se	MVSe-4		1000 ppm	5 ml	5 ppm
Tl	HPTl-1		1000 ppm	5 ml	5 ppm
V	HPV-1		1000 ppm	5 ml	5 ppm
Zn	HPZn-1		1000 ppm	5 ml	5 ppm
Ti	HPTi-1		1000 ppm	5 ml	5 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

210

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(3)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 2

DATE PREPARED: 12/23/92
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 20 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Ag	APAg-1		1000 ppm	1 ml	1.0 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

211

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(4)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 3

DATE PREPARED: 12/20/92
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: 10 HNO3
50 HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
AL	HPAL-1		10,000ppm	5 ml	50 ppm
Ca	HPCa-1		10,000ppm	5 ml	50 ppm
Fe	HPFe-1		10,000ppm	2 ml	20 ppm
Mg	HPMg-1		10,000ppm	5 ml	50 ppm
K	HPK-1		10000ppm	5.0 ml	50 ppm
Na	HPNa-1		10000ppm	5.0 ml	50 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

212

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(5)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Initial Calibration Verification Solutions

DATE PREPARED: 12/31/92
PREPARED BY: SRP

FINAL VOLUME:

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4/2 HNO3 ← ICV 2
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICV-1	QCICV1	~200		20ml → 200ml	
b) ICV-2	QCICV2	-152		20ml → 100ml	
c) ICV-3	QCICV3	-179		20ml → 200ml	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

213

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(6)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Interference Check Sample Solutions

DATE PREPARED: 12/20/92
PREPARED BY: LP

FINAL VOLUME: 200 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICSAA	QCICSA	-83		20 ml →	200 ml
b) ICSABR	QCICSA	-83		20 ml →	200 ml
	QCICSB	-47		20 ml →	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

214

7A

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: 2X CONTRACT REQUIRED DETECTION LIMIT SOLUTION P2

DATE PREPARED: 1/5/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 PPm	120 ul	120 PPb
As	HPAs-2		1000 PPm	30 ul	30 PPb
Be	HPBe-1		1000 PPm	10 ul	10 PPb
Cd	HPCd-1		1000 PPm	10 ul	10 ppb
Cr	HPCr-1		1000 PPm	20 ul	20 ppb
Co	HPCo-1		1000 PPm	100 ul	100 ppb
Cu	HPCu-1		1000 PPm	50 ul	50 ppb
Pb	HPPb-1		1000 PPm	30 ul	30 ppb
Mn	MVMn-3		1000 PPm	30 ul	30 ppb
Ni	MVNi-3		1000 PPm	80 ul	80 ppb
Se	HPSe-1		1000 PPm	100 ul	100 ppb
V	HPV-1		1000 PPm	100 ul	100 ppb
Tl	HPTl-1		1000 PPm	500 ul	500 ppb
Ag	HPAg-1		1000 PPm	20 ul	20 ppb
Zn	HPZn-1		1000 PPm	40 ul	40 ppb
Ti	HPTi-1		1000 PPm	100 ul	100 ppb
Sr	MVSr-3		1000 PPm	400 ul	400 ppb
Mo	MVMo-3		1000 PPm	400 ul	400 ppb
Sn	MVSn-2		1000 PPm	400 ul	400 ppb
Li	MVLi-3		1000 PPm	200 ul	200 ppb

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(8)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Continuing Calibration Verification Solution (HalfSTD)

DATE PREPARED: 12/20/92
PREPARED BY: [illegible]

FINAL VOLUME: 500 ml

MATRIX: 1 %HNO3
5 %HCl
___Other

MLS ADDED: ___HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
STD1	In House			250 ml	500 ml
STD3	In House			250 ml	
Ag	HPAg-1		1000 ppm	250 ul	

Riprepped 12/31/92 SRP

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

216

TMA/SKINNER & SHERMAN LABORATORIES, INC.
STANDARDS TRACKING LOG BOOK -- SECTION 2
STANDARD PREPARATION LOG

STANDARD IDENTITY Hg Working Standard

DATE PREPARED: PREPARED BY:

FINAL VOLUME: 100 ml

MATRIX: 2 %HNO3 ___ %HCL ___ Other

MLS ADDED: 2 HNO3 ___ HCl ___ Other

ELEMENT	SOURCE/LOT#	STOCK CONC	VOLUME ADDED	FINAL CONC
12/1/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
12/2/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
12/3/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
JW 12/8/92	Hp Lot# 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 µl	—
MS 12/9/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/10/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 µl	—
MS 12/11/92	Hp Lot #290930	10 ppm	MS 12/11/92 1 ml	100 ppb
	Cr	5%	25 µl	—
MS 12/14/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 µl	—
MS 12/15/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/16/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/17/92	Hp Lot #290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—

SOURCE: QC=USEPA ICV=USEPA MV=METALS VENTURES S=SPEX OTHER=IDENTIFY

ver 1.1 04/17/91

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (If applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: NMED

Sampler (Name): Stephen West

Sampler Signature: [signature]

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI		O&M		OIL	
				NPLD		UST	

5. Date Shipped: 12-9-92

Carrier: Fed Ex

Airbill Number: 6159041556

6. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254, ATTN: Jeff Deparlo

7. Date Received -- Received by: 12-10-92 [signature]

Laboratory Contract Number: 68D00108

Unit Price: 106.00

8. Transfer to

Date Received

Received by

Contract Number

Price

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MIS Liq.	Non Water - Mis Liq.
												Samples [illegible]								
MFQ218	4	Low	Grab	2/6	X							6-039915	C0920-[illegible]	12/8/92 1280	SDN					
MFQ201	2	Low	Grab	2/6	X							6-005199	C0920-MW1	12/7/92 1375	SDN					
MFN651	2	Low	Grab	2/6	X							6-005447	C0920-MW1	12/7/92 1375	SDN					
MFQ206	2	Low	Grab	2/6	X							6-005439	C0920-MW1	12/7/92 1700	SDN					
MFQ207	2	Low	Grab	2/6	X							6-005440	C0920-MW4	12/7/12 1700	SDN					
MFQ202	2	Low	Grab	2/6	X							6-005297	C0920-B	12/7/92 1320	SDN					
MFQ203	1	Low	Grab	2/6	X							6-005178	C0920-MT1	12/7/92 1530	SDN					
MFQ204	1	Low	Grab	2/6	X							6-005178	C0920-MT2	12/7/92 1535	SDN					
MFN649	5	Low	Comp	6	X							6-005377	C0925-MT	12/7/92 1700	SDN					
MFQ211	5	Low	Comp	6	X							6-005450	C0925-FCC	12/8/92 1020	SDN					

Shipment for Case complete? (Y/N): N

Page 2 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: [signature]

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12.9.92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	
		[signature]	12/10/92 9:30		

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Copy Original is filed in CSF

Inorg-2

1 340104

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: NMED

Sampler (Name): Stephen Wust

Sampler Signature: [signature]

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI		O&M		OIL	
				NPLD	X	UST	

5. Date Shipped: 12 9 92

Carrier: Fed Ex

Airbill Number: 6159041556

6. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254

ATTN: Jeff Dipaolo

7. Date Received -- Received by: 12-10-92 J. DeSoto

Laboratory Contract Number: 68D00108

Unit Price: 106.00

8. Transfer to:

Date Received:

Received by:

Contract Number:

Price:

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MS Liq.	Non Water - MS Liq.
												Sample Log In Agreed								
MFR216	2	Low	Grab	2/6	X							6-039916 6-005314	C092W-MW3	12/8/92 1235	SDW					
MFQ217	2	Low	Grab	2/6	X							6-039914	C092W-MW3	12/8/92 1235	SDW					
MFR214	2	Low	Grab	2/6	X							6-005292 6-005295	C092W-MW3	12/8/92 1235	SDW					
MFR215	2	Low	Grab	2/6	X							6-005394	C092W-MW3	12/8/92 1235	SDW					
MFQ219	2	Low	Grab	2/6								6-039916	C092W-MW2	12/8/92 1600	SDW					
MFQ220	2	Low	Grab	2/6	X							6-039919	C092W-MW2	12/8/92 1600	SDW					
MFQ212	1	Low	Grab	2/6								6-005311	C092W-HCUH	12/8/92 1010	SDW					
MFQ209	1	Low	Grab	2/6	X							6-005498	C092W-HCBG	12/8/92 0950	SDW					
MFR213	2	Low	Grab	2/6	X							6-005389	C092W-ESC	12/8/92 0950	SDW					
MFQ208	1	Low	Grab	2/6	X							6-005412	C092W-SPR	12/8/92 0940	SDW					

Shipment for Case complete? (Y/N): N

Page 1 of 3

Sample used for a spike and/or duplicate: MFQ216, MFQ217, MFR214, MFR215

Additional Sampler Signatures: Mary C Martz

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12 9 92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		J. DeSoto	12/10/92 9:30		

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION: Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Copy Original is filed in CSF MFN651

Page 2

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FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 6159041556

231M 6159041556

RECIPIENT'S COPY

1 Date 12-9-92

From (Your Name) Please Print: Maura Hanning
Your Phone Number (Very Important): 666-[illegible]
Company: New [illegible] Environment Bureau
Department/Floor No.:
Street Address: 1190 St Francis Dr #N 5000
City: Santa Fe State: NM ZIP Required: 8 7 5 0 1

2 To (Recipient's Name) Please Print: Jeff DePaolo
Recipient's Phone Number (Very Important): (617) 890-7200
Company: Sherman & Sherman
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 Second Ave.
City: Waltham State: MA ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on Invoice.): 8157 1149-173

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [ ] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
55 [X] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOV'T LETTER
41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed intervention required)
80 [ ] TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill in Box H)
1 [ ] WEEKDAY or 31 [ ] SATURDAY

DELIVER
2 [ ] WEEKDAY or 3 [ ] SATURDAY (Extra charge) (Not available to all locations)

4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845 ..... X ..... kg. III
7 [ ] OTHER SPECIAL SERVICE
9 [ ] SATURDAY PICK-UP (Extra charge)
[ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	70	0
Total 1	Total 70	Total 0

DIM SHIPMENT (Chargeable Weight) [ ] lbs.
L x W x H

Received At: 1 [ ] Regular Stop 2 [ ] On-Call Stop 3 [ ] Drop Box 4 [ ] B.S.C. 5 [ ] Station

Emp. No. Date
[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold
Street Address
City: J. DePaolo State: Zip:
Received By: X 12-10-92 9:30
Date/Time Received FedEx Employee Number

7 Release Signature

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #136
136
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Copy
Original is Filed in CSF MFrk49

530

240

SAMPLE LOG-IN SHEET

Lab Name: Skinner Sherman	Page 1 of 2
Received By (Print Name): J. DePolo	Log-in Date: 12-10-92
Received By (Signature): J. DePolo	Copy MFN649 ~~(Original is filed in CSF)~~
Case Number: 19220	Sample Delivery Group No.: MFN649, 650, 649 / SAS Number: NA

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* Intact ☑ Broken ☐
2. Custody Seal Nos. — NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* Present ☑ Absent ☐
6. Airbill No. — 6159041556
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-10-92
11. Time Received: 9:30

Sample Transfer	
Fraction	Fraction
Area #	Area #
By	By
On	On

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFN649	6005377	S212197 01	OK
650	6005326	02	
651	6005447	S212134 01	
MFQ201	6005199	02	
202	6005297	03	
203	6005178	04	
204	6005198	05	
205	6005444	S212197 09	
206	6005439	S212134 06	
207	6005440	07	
208	6005442	08	
209	6005448	09	
210	6005469	S212197 10	
211	6005450	11	
212	6005391	S212134 10	
213	6005389	11	
214	6005393 6005395	12	
215	6005394	13	
216	6005396 6039913	14	

*Contact SMO and attach record of resolution

Received By: KDJ 1/11/93	Logbook No.
Date	Logbook Page No.

FORM DC-1

ILM02.0

SAMPLE LOG-IN SHEET

Lab Name: Shaner Hermann	Page 2 of 2
Received By (Print Name): J. DePaolo	Log-in Date: 12-10-92
Received By (Signature): J. DePaolo	
Case Number: 19220	Sample Delivery Group No.: MFN649, 651 / SAS Number: N/A

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* — Intact ☑ Broken ☐
2. Custody Seal Nos. — N/A
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* — Present ☑ Absent ☐
6. Airbill No. — 6159041556
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-10-92
11. Time Received: 9:30

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFQ217	6039914	SQ12134 15	OK
218	6039915	16	
219	6039918	17	
220	6039919	18	

Sample Transfer

Fraction	Fraction
Area #	Area #
By	By
On	On

*Contact SMO and attach record of resolution

Received By: 1/11/93	Logbook No.
Date	Logbook Page No.

FORM DC-1

TMA/Skinner & Sherman Labs SAMPLE LOG-IN

WORKORDER S212134 CLIENT U.S. EPA No. SAMPLES:

PROTCL CLP TURNARND 35 DAYS 18

COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)

CUSTODIAN J DePaolo SDG/BATCH MFN651

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE 19220

SHIPER & # Fedex#6159041556 PO/CONTRACT# 68D00108

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Nina Smith

CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # NA COMMENTS:

SAMPLE CONTAINERS INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 12-10-92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	MFN651	WATER	12-10-92	2.41	Total Metals	
2	MFQ201			2.10		
3	202			2.13		
4	203			2.00		
5	204			1.77		
6	206			2.24		
7	207			2.06		
8	208			2.25		
9	209			2.24		
10	212			1.87		
11	213			1.93		
12	214			2.36	D	
13	215			2.11		
14	216			2.08	S	
15	217			1.91		
16	218			1.85		TBINSOTE
17	219			1.97		
18	220			2.00		
19						
20						
21						
22						
23						
24						
25						
26						
27						

Complete
12-10-92

Samples are from ~~site~~ known to have Rad-Contamination: YES ___ NO NA

Samples have detectable amounts of Radioactive Material: YES ___ NO NA

SUBCONTRACT: YES/NO TO: DATE: 12-10-92

REVIEWED 1/11/93

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* EPA/CLP required

Rev 1.6

PAGE: 0069

Sample Delivery Group (SDG)
Traffic Report (TR) Cover Sheet

Lab Name: Skinner & Sherman Contract No.: 68-D00108

Lab Code: S&S Case No.: 19220 SAS No.: NA -

Full Sample Analysis Price in Contract: $ 106.00

SDG No./First Sample in SDG: MFN651 Sample Receipt Date: 12-10-92
(Lowest EPA Sample Number in first shipment of samples received under SDG) (MM / DD / YY)

Last Sample in SDG: MFQ220 Sample Receipt Date: 12-10-92
(Highest EPA Sample Number in last shipment of samples received under SDG) (MM / DD / YY)

EPA Sample Numbers in the SDG (listed in alphanumeric order):

1	MFN651	11	MFQ213
2	MFQ201	12	214
3	202	13	215
4	203	14	216
5	204	15	217
6	206	16	218
7	207	17	219
8	208	18	220
9	209	19	
10	212	20	

Note: There are a maximum of 20 field samples in an SDG.

Attach Traffic Reports to this form in alphanumeric order
(i.e., the order listed on this form)

J. Dibaolo 12-10-92
Sample Custodian Date

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REFERENCE 18

CLP Data Sheets and Data Validation

General chemistry analysis for water

TABLE 4, 8: LSI GENERAL CHEMISTRY ANALYSES FOR WATER SAMPLES, WHITEWATER & HANOVER CREEKS SITE

SAS No.	F2	F6	F1	F8	F12	F10	F11
Station	CO92W-B	CO92W-SPR	CO92W-MW1	CO92W-ESC	CO92W-MW2	CO92W-MW3	CO92W-MW3
Location	TripBlank	Fierro Spr	Continental Well 1	Escobar	Continental Well 2	Continental Well 3	Continental MW3 Dupl
Sample Index		GW1	GW3	GW2	GW4	GW5	GW5

SAS No.	F5	F20	F13	F16	F15	F14	F22
Station	CO92W-MW4	CH92W-SW	CH92W-16S	CH92W-WD4	CH92W-WD10	CH92W-7GS	CH92W-CB6D
Location	Continental Well 4	Solano	Well 16S	Chino Well WD4	Chino Well WD10	Well 7GS	Chino Well CB6D
Sample Index	GW6	GW7	GW8	GW9	GW10	GW11	GW12

SAS No.	F7	F17	F3	F4	F9	F18	F19	F21
Station	CO92W-HCBG	CH92W-LB	CO92W-MT1	CO92W-MT2	CO92W-HCUH	CH92W-HCBU	CH92W-HCBH	CH92W-HCWD
Location	Hanover Cr FierroSpr	LuckyBill Cyn	ContMagnPile Seep	ContMagnPile SurfDecant	Hanover Cr UnionHill	Hanover Cr BullHill	Hanover Cr BlackHawk	Hanover Cr WDump
Sample Index	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MAR 1993 RECEIVED

Site Name Whitewater

Case# SAS 7655F

SDG# 7655-F1

Date: 2-11-1993

Subject: **CLP Data Review**

From: Dr Melvin Ritter , Chemist , Region VI

To : K. Hill , 6H-MA , Region VI

M.C. Ritter 2/19/93

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.
Samples were:

INORGANIC:
7655-F1
7655-F5
7655-F13 TO
7655-F22

ORGANIC:

The data was found:

( ) Acceptable

(X) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HO
Mike Hiatt, EMSL/Las Vegas
Regional TPO
Mitzie Dovel,Mantech ENV,VA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: 2-11-1993

Subject: CLP Data Review

From: Mahmoud El-Feky, Data Coordinator ,Region VI

To: Dr. Melvin Ritter , Chemist , Region VI

Attached is the data review summary for Site Whitewater
Case # SAS 7655F
SDG # 7655-F1

Data was found: ( ) Acceptable

(X) Provisional

( ) Unacceptable

Action required by TPO: (X) Yes

( ) No

COMMENTS:

Laboratory failed to perform MS analysis at the contract required frequency. Reanalysis and resubmission will be done by the laboratory.

MANTECH ENVIRONMENTAL TECHNOLOGY, INC.
ESAT REGION VI
c/o U.S. ENVIRONMENTAL PROTECTION AGENCY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

MEMORANDUM

DATE: February 9, 1993

TO: Dr. Melvin Ritter, Chemist, US EPA, Region VI

Bill Blanton

FROM: Bill Blanton, ESAT ETM, Region VI

SUBJECT: CLP Data Review

Attached is the data review summary for Case #SAS7655F
SDG #7655-F1
Site Whitewater

COMMENTS:

The data package is provisional.

The matrix spike recoveries for carbonate, chloride, fluoride, nitrate, and sulfate were not determined at the required frequency specified by SAS 7655F page 4. No matrix spike for these analytes was performed for this SDG. The laboratory failed to comply with the SAS specified frequency for matrix spike requirements.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS7655F
LABORATORY American Anal (OK)
CONTRACT # SAS7655F
SDG # 7655-F1
SOW# ILM02.1 & Methods 160.1, 300.0, & Std Methods 2320B
ACCT # 3TGBDN78 SF # TGBUZZ

SITE Whitewater
NO. OF SAMPLES/
MATRIX 12/water
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME V. Chapman
COMPLETION DATE Feb. 8, 1993

SAMPLE NO.: 7655-F1, 7655-F5, 7655-F13, 7655-F14, 7655-F15, 7655-F16, 7655-F17, 7655-F18, 7655-F19, 7655-F20, 7655-F21, 7655-F22

DATA ASSESSMENT SUMMARY

	ICP	IC	ALK	TDS
1. HOLDING TIMES	O	O	O	O
2. CALIBRATIONS	O	O	O	O
3. BLANKS	X	O	O	O
4. ICS	O			
5. LCS	O	O		
6. DUPLICATE ANALYSIS	O	O	O	O
7. MATRIX SPIKE	X	M	M	O
8. MSA		NA		
9. SERIAL DILUTION	O			
10. SAMPLE VERIFICATION	X	X	X	X
11. OTHER QC	NA	NA	NA	NA
12. OVERALL ASSESSMENT	X	M	M	O

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
N/A= Not applicable

ACTION ITEMS: Metal samples were not preserved with acid; blank concentrations were above the instrument detection limits; and matrix spike recoveries were outside of the quality control limits.

AREAS OF CONCERN: Matrix spike recoveries were not determined at the SAS specified frequency for carbonate, chloride, fluoride, nitrate, and sulfate.

NOTABLE PERFORMANCE:

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F1 Site Whitewater Lab American Anal (OK)

COMMENTS:

Twelve water samples were analyzed at low concentrations for bicarbonate, carbonate, chloride, fluoride, nitrate, sulfate, total dissolved solids (TDS), calcium, magnesium, potassium, and sodium. The data package is provisional because: metal sample solution were not preserved with acid; matrix spike recoveries were not determined for carbonate, chloride, fluoride, nitrate, and sulfate; blank concentrations were above the instrument detection limits; and matrix spike recoveries were outside of the quality control limits.

1. Holding Times

All holding time criteria were met.

2. Calibrations

All calibrations were acceptable.

3. Blanks

A. Calibration Blanks

The concentrations of potassium in the calibration blanks were above the absolute value of the negative IDLs.

The following samples are biased low by the indicated calibration blank concentrations:

potassium results for samples 7655-F5, 7655-F14, and 7655-F22 by a -613 ug/L concentration; and

potassium results for samples 7655F-17, 7655F-18, 7655-F19, 7655F-F20 and 7655-F21 by -549 ug/L concentration.

The potassium sample results are also qualified by the preparation blank.

B. Preparation Blank

The concentrations of sodium and potassium in the preparation blank were above the absolute value of the negative IDLs. The potassium sample results are biased low by -422 ug/L in the preparation blank. The sodium sample results are not significantly affected. No false negatives are possible.

C. All other blank results were acceptable.

Case SAS7655F SDG 7655-F1 Site Whitewater Lab American Anal (OK)

4. ICS

The interference check sample criteria were met.

5. LCS

All of the laboratory control sample results were acceptable.

6. Duplicate Analysis

All of the duplicate results met technical quality control criteria.

7. Matrix Spike

Matrix spike recoveries were not determined at the SAS specified frequency for carbonate, chloride, fluoride, nitrate, and sulfate. This data package, SAS7655F SDG F1, for 12 water samples, was submitted in addition to SAS7655F SDG 7655-F2 for 10 water samples, for a total of 22 water samples. The SDGs were not analyzed on the same day. The SAS 7655F (page 4) requested one set of quality control for each 20 samples. Only one set was performed for the above analytes and it was submitted with data package SAS7655F SDG 7655-F2. The laboratory failed to comply with the SAS specified frequency of matrix spikes.

Based on the QC for SAS 7655F SDG 7655-F2, all fluoride and nitrate results above the IDL are qualified as estimated (J and UJ) due to matrix spike recoveries of 131.3% and 273.5%, respectively. Physical or chemical interference may exist in the samples. The amount of the fluoride and nitrate spikes (1000 ug/L) were twice the amount requested by the SAS request (500 ug/L).

All calcium sample results are qualified as estimated (J) due to a 161.9% matrix spike recovery. Physical or chemical interferences may exist in the samples.

All of the other analytes had acceptable matrix spike recoveries.

8. MSA

Not applicable.

9. Serial Dilutions

All serial dilution results met quality control criteria.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F1 Site Whitewater Lab American Anal (OK)

10. Sample Verification

The Total Dissolved Solids for the following samples are not 10000 ug/L U, they are as indicated below. The results were not properly transcribed from page 144.

Sample	TDS ug/L
7655-F13	5120000
7655-F14	3500000
7655-F15	5740000
7655-F16	17600000
7655-F18	2650000
7655-F20	4090000
7655-F21	2300000
7655-F21D	2320000
7655-F22	5210000

The laboratory did not submit authorizing documentation for permission to use 10 fold higher IDLs for chloride, fluoride, and nitrate.

The bicarbonate duplicate results on Form 6 (page 25) are both 110000 ug/L, not 20000 ug/L. The results were not properly transcribed from page 145.

The bicarbonate result for sample 7655-F1 should be 21000 ug/L, not 174000 ug/L. The results were not properly transcribed from page 146.

The laboratory did not submit information concerning the standardization of the 0.02 N sulfuric acid.

Information concerning the source and preparation of the ion chromatography standard was not submitted.

The "Spike Added" for calcium, magnesium, potassium, and sodium should have been 25000 ug/L, not 20000 ug/L (SAS7655 Table 4).

11. Other QC

The Traffic Report does not indicate that the metal samples were preserved with acid to a pH less than 2. All calcium, magnesium, potassium, and sodium are qualified as estimated (J and UJ). The reported sample results are the lowest at which they are present.

There were no other Section 11 quality control problems.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F1 Site Whitewater Lab American Anal (OK)

12. Overall Assessment

The data package is provisional due to the following deficiencies.

The metal samples were not preserved with acid.

The matrix spike recoveries were not determined for carbonate, chloride, fluoride, nitrate, and sulfate for this data package.

The blank concentrations were above the instrument detection limits for potassium.

The matrix spike recoveries were outside of the quality control limits for calcium, fluoride and nitrate.

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No.	SDG No. 7655-F1	SDG Nos. To Follow	SAS No. 7655F	Date Rec 1-26-93

EPA Lab ID: AATS

Lab Location: BROKEN ARROW, OK

Region: 6 Audit No.: SAS7655F/SDG F1

Re_Submitted CSF? Yes ____ No X

Box No(s): ONE

COMMENTS:

1990

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by:	V. A. Chapman	V. A. Chapman, Jr./ESAT Data Reviewer	Date 2-5-93
Audited by:			Date
Audited by:			Date
	Signature	Printed Name/Title	

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature Printed Name/Title

DC-2___

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DATA SUMMARY

Case No. SAS7655F SDG F1

Laboratory AATS

Matrix WATER

Units µg/L

EPA TR #	F1	F13	F14	F15	F16	F17	F18	F19	F20	F21	F22	F5		COMMENTS
Lab I.D. 11992	01	04	05	06	07	08	09	10	11	12	03	02		
BICARBONATE	21,000	U	266,000	U	U	U	175,000	110,000	U	87,000	59,000	469,000		
CARBONATE	162,000	U	U	U	U	U	U	U	U	U	U	U		
CHLORIDE	4,090	51800	92,500	49,800	41,800	5770	78,800	56,600	76,300	66400	54,000	9,620		
FLUORIDE	1,190	6440	U	9,750	68,100	U	U	U	1,460	U	7,050	723		
NITRATE	U	U	2,210	U	2,110	U	U	2240	5360	U	U	2,070		
SULFATE	16,100	3,360,000	2,000,000	3,670,000	12,600,000	74400	1,700,000	1,260,000	2,770,000	1,520,000	3,270,000	205000		
TDS	250,000	5,120,000	3500,000	5,738,000	17,500,000	177,000	2,650,000	1,990,000	4,090,000	2,300,000	5,210,000	702,000		
CALCIUM	3,850 BN	520,000 N	829,000 N	434,000 N	342,000 N	18,200 N	437,000 N	353,000 N	508,000 N	426,000 N	506,000 N	70,100 N		
MAGNESIUM	293 B	147,000	79,300	459,000	1,360,000	6260	164,000	93800	198,000	105,000	408,000	99,600		
POTASSIUM	22600	26,400	5460	17,900	7,490	1,460 B	5,790	4180 B	1,230 B	3,860 B	3,150 B	4,020 B		
SODIUM	74,200	114,000	64,100	106,000	84,500	10,700	80,900	101,000	62,900	78200	59,000	4,360 B		

10

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
EPA HOUSTON LABORATORY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

RESUBMITTED DATA REVIEW REPORT

DATE:	March 5, 1993	CASE #:	_____
	_____	SAS #:	7655F
TO:	K. Hill 6H-MA	SDG #:	7655-F1
	USEPA Region 6	SITE NAME:	Whitewater
FROM:	Victor Chapman ESAT	LAB NAME:	American Analytical (OK)

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

1. The laboratory did preform the required analysis of bicarbonate, chloride, fluoride, nitrate, and sulfate in a matrix spike sample as requested. The matrix spike frequency requirement was met for these analytes. The fluoride and nitrate samples results, previously qualified as estimated (J and UJ), are now acceptable.

2. However, the laboratory failed to perform the carbonate matrix spike at a frequency contractually required by the SAS. The carbonate sample results remain unqualified.

3. The laboratory corrected the amount reported for the calcium, magnesium, potassium, and sodium spike added from 20000 µg/L to 25000 µg/L. This resulted in a revision of the matrix spike recoveries.

   Calcium sample results were previous qualified as estimated(J) due to a 161.9% matrix spike recovery. The calcium sample results are now qualified as estimated (J) due to a 129.5% matrix spike recovery.

   Magnesium sample results were not previously qualified, but based on the resubmitted information the magnesium sample results are now qualified as estimated (J) due to a 147.4% matrix spike recovery. Physical or chemical interferences may be present in the sample matrix.

   The data review for the potassium and sodium sample results are not affected.

4. The resubmitted Total Dissolved Solids sample results contain decimal point errors. The laboratory is being asked for a correction but the reviewer calculated the following results. However, these TDS results are qualified as estimated pending laboratory resubmission.

Sample	TDS µg/L	
	should be	should not be
7655-F13	5120000	511000
7655-F14	3500000	350000
7655-F16	17600000	1760000
7655-F18	2650000	265000
7655-F20	4090000	409000
7655-F21	2300000	230000
7655-F22	5210000	506000

5. The laboratory could not submit a telephone log to support the use of higher IDL for chloride, fluoride, and nitrate. The reviewer attached a copy of the Region VI telephone log. Please place in the data package.

6. Please place the resubmitted pages in the data package and remove the previously submitted pages. Additional resubmitted pages have been requested.

MEMORANDUM

B. Blanton

TO: M. Ritter

FROM: B. Blanton

SUBJECT: Effects of Laboratory Resubmissions on Non-Compliant Data SAS7655F SDG 7655-F1

DATE: March 10, 1993

COPIES: File
M. El-Feky

REF: MEM489
I-990

The laboratory failed to perform the carbonate matrix spike at the frequency rate contractually required by the SAS. Only one carbonate matrix spike was performed for 22 samples. The carbonate sample results were not previously qualified and no change in the data review report is necessary for carbonate. The laboratory did perform matrix spike analyses for bicarbonate, chloride, fluoride, nitrate, and sulfate as requested. The laboratory complied with this aspect of the contract and the matrix spike quality control criteria were met for these analytes. The fluoride and nitrate samples results, previously qualified as estimated (J and UJ), are now acceptable.

The laboratory did not sign the revised Cover Page.

The Form 1s were not in alphanumeric order in the original data package or in the resubmission as required by ILM02.0 and SAS 7655F Paragraph 9.

The laboratory did not submit a revised Form DC-2.

The TDS for sample 7655-F15 should be 5740000 μ/L, not 287000 μ/L. The laboratory found 0.2870 gram TDS in 50 mL of sample.

Using the raw data, the reviewer found that the laboratory made decimal point errors were made correcting the following TDS results. The reported results are 10X lower than the results calculated by the reviewer. The TDS results are estimated (J) pending the laboratory response. The laboratory has been asked to resolve this discrepancy.

Sample	TDS μg/L	
	should be	should not be
7655-F13	5120000	511000
7655-F14	3500000	350000
7655-F16	17600000	1760000
7655-F18	2650000	265000
7655-F20	4090000	409000
7655-F21	2300000	230000
7655-F22	5210000	506000

MEMORANDUM

Bill Blanton

To:	**M. Ritter**	**From:**	**W. E. Blanton**
Subject:	**SAS 7655F SDG 7655-F1 Laboratory Resubmissions**	**Date:**	**March 8, 1993**
Copies:	**M. El Feky** **File**	**Ref:**	**MEM490** **I-990**

Attached is a list of issues needing clarification and items needing corrections and omissions for SAS case 7655F SDG 7655-F1. The samples in this case were analyzed by:

Americal Analytical and Technical Services
1700 W. Albany, Suite C
Broken Arrow, OK 74012

Attention: Steve Markham

These laboratory resubmissions are necessary to enable the Environmental Protection Agency to maximize the usability of the laboratory results in this data package. The laboratory resubmissions should be submitted to:

Ms. Christy Macdowell
ManTech Environmental Technology, Inc.
c/o US EPA
10625 Fallstone Rd.
Houston, TX 77099

Ms. Macdowell will then distribute the laboratory resubmission to the appropriate data reviewer who will prepare the resubmission report for this case.

In Reference to Case
SAS No.:7655F
SDG No.:7655-F1
Laboratory:AATS

In reference to data for the following sample numbers:

7655-F1, 7655-F5, 7655-F13, 7655-F14, 7655-F15, 7655-F16, 7655-F17, 7655-F18, 7655-F19, 7655-F20, 7655-F21, 7655-F22

Summary of Questions/Issues:

The carbonate matrix spike analysis was not performed for this data package, only the bicarbonate. Please explain.

The laboratory did not sign the revised Cover Page. Please submit.

The Form 1s are not in alphanumeric order in the original data package or in the resubmission as required by ILM02.0 and SAS 7655F Paragraph 9. Please resubmit.

The laboratory did not submit a revised Form DC-2. Please submit.

The laboratory made errors while correcting the Total Dissolved Solids results. Please correct and resubmit.

The TDS for sample 7655-F15 should be 5740000 µ/L, not 287000 µ/L. The laboratory found 0.2870 gram TDS in 50 mL of sample.

Decimal point errors were made while correcting the following TDS results. The reported results are 10X lower than the results calculated by the reviewer.

Sample	TDS µg/L	
	should be	should not be
7655-F13	5120000	511000
7655-F14	3500000	350000
7655-F16	17600000	1760000
7655-F18	2650000	265000
7655-F20	4090000	409000
7655-F21	2300000	230000
7655-F22	5210000	506000

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Myra Perez	From Rhonda Holder
Co. Reg VI	Co. VIAR/SMO
Dept.	Phone #
Fax #	Fax #

SAS/Case No.: 7655-F-01

TELEPHONE

Date: 12/15/92

Initial Contact: Chuck Hoover, with AATS

Secondary Contact: Myra Perez, with Reg VI

Other Contact: _____, with _____

QUESTION/ISSUE DISCUSSED: A sample labelled 7655-F-12 was received on 12/10 and 12/12. The sample received on 12/10 had a station location of C092W-MW2. The sample received on 12/12 had a station location of C#92W-CB6D.
12/16/92 Lab should send SAS packing lists to Region VI.

RESOLUTION: 12/17/92
Lab should use 7655-F-22 as the sample id for the sample received on 12/12 labelled 7655-F-12 and note the situation in the narrative.

Coordinator: Rhonda Holder Date: 12/17/92

SAMPLE MANAGEMENT OFFICE

Operated by Viar & Company
a subsidiary of DynCorp
under contract # 68-D9-0135
to the U.S. Environmental Protection Agency

FAX COMMUNICATION

Date: 12-16-92

To: **Fax Number:**

Name: Myra Perez

Company: Reg VI

From: Rhonda Holder
SAS Coordinator
(703) 519-1447

Subject: SAS 7621-F-01 + SAS 7655-F-01
Southern Shipbuilding Whitewater

Number of Pages, Including This Page: 1

Comments or Special Instructions:

For SAS 7655-F-01 the laboratory reported that there was a duplication of sample ids. Sample 7655-F-12 was received on 12/10/92. Then another sample labelled 7655-F-12 on 12/12/92. Should we assign a new sample number to one of the samples?

Regarding SAS 7621-F-01 sample id assignment: The laboratory finally called and said change ids would be a problem. They have already generated the data. They would have to go back & change the numbers on all the raw data. Can the lab leave the ids the same in the raw data + note the situation in the narrative?

SMO FAX NUMBER - (703) 683-0378
P.O. Box 818, Alexandria, Virginia 22313. Phone: (703) 684-5678

C21-001-73

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No. 7655-F

1. Project Code 173 51571149	Account Code	2. Region No. 6	Sampling Co.	4. Date Shipped 12-11-92	Carrier FED EX	6. Sample Description (Enter in Column A)	7. Preservative (Enter in Column C)
Regional Information		Sampler (Name) STEPHEN WUST		Airbill Number 6159041560		1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (Specify)	1. HCl 2. HNO3 3. NAHSO4 4. H2SO4 5. NAOH 6. Other (SAS) (Specify) 7. Ice only N. Not preserved
Non-Superfund Program		Sampler Signature [signature]		5. Ship To AATS 1700 WEST ALBANY SUITE A BROKEN ARROW OK 74012			
Site Name WHITEWATER AND HANOVER CREEKS		3. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST					
City, State BAYARD NM	Site Spill ID						

Sample Numbers	A Matrix Enter from Box 6	B Conc Low Med High	C Preservative Used from Box 7	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Designated Field QC
1. 7655-F1	2	LOW	7	General Chem		6-005298	C092W-MW1	12/7/92 13:25	SJW	—
2. 7655-F5	2	LOW	7	General Chem		6-005441	C092W-MW4	12/7/92 17:00	SJW	—
3. 7655-F12	2	LOW	7	General Chem		6-039939	CH92W-CB6D	12/9/92 16:05	SJW	—
4. 7655-F13	2	LOW	7	General Chem		6-039938	CH92W-16S	12/9/92 11:36	SJW	—
5. 7655-F14	2	LOW	7	General Chem		6-039941	CH92W-7GS	12/9/92 13:40	SJW	—
6. 7655-F15	2	LOW	7	General Chem		6-039958	CH92W-WD10	12/9/92 15:20	SJW	—
7. 7655-F16	2	LOW	7	General Chem		6-039956	CH92W-WD4	12/9/92 16:45	SJW	—
8. 7655-F17	1	LOW	7	GEN CHEM		6-039962	CH92W-LB	12/10/92 15:35	SJW	—
9. 7655-F18	1	LOW	7	GEN CHEM		6-005386	CH92W-HCBU	12/10/92 12:18	SJW	—
10. 7655-F19	1	LOW	7	GEN CHEM		6-005384	CH92W-HCBH	12/10/92 11:50	SJW	—

Shipment for SAS complete? (Y)N)

PAGE 1 OF 2

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-11-92 2:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-3 (4-91)

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United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No. 7655-F

1. Project Code 173 51571149	Account Code	2. Region No. 6	Sampling Co.	4. Date Shipped 12-11-92	Carrier FED EX	6. Sample Description (Enter in Column A)	7. Preservative (Enter in Column C)
Regional Information		Sampler (Name) STEPHEN WEST		Airbill Number 615904 1560		1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (Specify)	1. HCl 2. HNO3 3. $NAHSO_4$ 4. H_2SO_4 5. NAOH 6. Other (SAS) (Specify) 7. Ice only N. Not preserved
Non-Superfund Program		Sampler Signature [signature]		5. Ship To AATS 1700 WEST ALBANY SUITE A BROKEN ARROW OK 74012			
Site Name WHITEWATER AND HANOVER CREEKS		3. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST (✓ NPLD)					
City, State BAYARD, NM	Site Spill ID						

Sample Numbers	A Matrix Enter from Box 6	B Conc Low Med High	C Preserv-ative Used from Box 7	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Designated Field QC
1. 7655-F20	2	Low	7	GEN CHEM		6-005382	CH92W-SW	12/10/92 15:10	SOW	—
2. 7655-F21	1	Low	7	GEN CHEM		6-039586	CH92W-HCWD	12/10/92 11:20	SOW	—
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Shipment for SAS complete? (Y/N) Y

PAGE 2 OF 2

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-11-92 2:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-3 (4-91)

DISTRIBUTION:
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DOCUMENT INVENTORY
Form DC-2

CASE 7655-F-01

SDG 7655-F-1

CLERK [illegible]

DOCUMENT	FROM PAGE	TO PAGE	
Case File Inventory Sheet (Do not number)			
Hard Copy Data Package	001	045	
RUN LOGS/RAW DATA			
ICP	046	106	
DX100	107	143	
TDS	144	144	
Alkalinity	145	146	
DIGESTION SHEETS			
ICP Sample Prep	147	147	
SHIPPING MANIFEST			
SDG TR Cover Sheet	148	148	
SAS Client Request	150	154	
Airbill	155	155	
Traffic Report	156	157	
Chain of Custody Records	156	157	
Sample Log-in (DC-1)	158	158	
Sample Tags	159	170	
Freezer Log	149	149	
Standard Solutions prep	147A	147 E	

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

001

ab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

SOW No.: 3/90_

EPA Sample No.	Lab Sample ID
_7655F1_____	__1199201_____
_7655F1D_____	__1199201D_____
_7655F13_____	__1199204_____
_7655F14_____	__1199205_____
_7655F15_____	__1199206_____
_7655F16_____	__1199207_____
_7655F17_____	__1199208_____
_7655F18_____	__1199209_____
_7655F19_____	__1199210_____
_7655F20_____	__1199211_____
7655F20D_____	__1199210D_____
_7655F21_____	__1199212_____
7655F21D_____	__1199212D_____
_7655F22_____	__1199203_____
_7655F5_____	__1199202_____
_7655F5S_____	__1199202S_____
_____	_____
_____	_____
_____	_____
_____	_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Diana S. Baker for Name: Jason D. Ruckman

Date: January 15, 1993 Title: Inorganic Program Manager

COVER PAGE - IN ILM02.1

002

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 003

7655F1

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199201___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	174000			AK
	Carbonate	162000			AK
	Chloride	4090			I
	Fluoride	1190			I
	Nitrate	100	U		I
	Sulfate	16100			I
	TDS	250000			T
7440-70-2	Calcium	3850	B	N	P
7439-95-4	Magnesium	293	B		P
7440-09-7	Potassium	22600			P
7440-23-5	Sodium	74200			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE No. 013

7655F5

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199202___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	469000			AK
	Carbonate	20000	U		AK
	Chloride	9620			I
	Fluoride	723			I
	Nitrate	2070			I
	Sulfate	205000			I
	TDS	702000			T
7440-70-2	Calcium	70100		N	P
7439-95-4	Magnesium	99600			P
7440-09-7	Potassium	4020	B		P
7440-23-5	Sodium	4360	B		P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

012

7655F22

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199203___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	59000			AK
	Carbonate	20000	U		AK
	Chloride_	54000			I_
	Fluoride_	7050			I_
	Nitrate__	100	U		I_
	Sulfate__	3270000			I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	506000		N	P_
7439-95-4	Magnesium	408000			P_
7440-09-7	Potassium	3150	B		P_
7440-23-5	Sodium___	59000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.: 004

7655F13

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199204___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	51800			I_
	Fluoride_	6440			I_
	Nitrate__	100	U		I_
	Sulfate__	3360000			I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	520000		N	P_
7439-95-4	Magnesium	147000			P_
7440-09-7	Potassium	26400			P_
7440-23-5	Sodium___	114000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 005

7655F14

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199205___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	266000	_		AK
	Carbonate	20000	U		AK
	Chloride_	92500	_		I_
	Fluoride_	50.0	U		I_
	Nitrate__	2210	_		I_
	Sulfate__	2000000	_		I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	829000	_	N	P_
7439-95-4	Magnesium	79300	_		P_
7440-09-7	Potassium	5460	_		P_
7440-23-5	Sodium___	64100	_		P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1

INORGANIC ANALYSES DATA SHEET

006

EPA SAMPLE NO.

7655F15

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Lab Sample ID: 1199206___

Level (low/med): LOW__ Date Received: 12/12/92

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	49800			I_
	Fluoride_	9750			I_
	Nitrate__	100	U		I_
	Sulfate__	3670000			I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	436000		N	P_
7439-95-4	Magnesium	459000			P_
7440-09-7	Potassium	17900			P_
7440-23-5	Sodium___	106000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F16

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199207___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	41800			I_
	Fluoride_	68100			I_
	Nitrate__	2110			I_
	Sulfate__	12600000			I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	392000		N	P_
7439-95-4	Magnesium	1360000			P_
7440-09-7	Potassium	7490			P_
7440-23-5	Sodium___	84500			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 007

7655F17

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199208___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	5770			I_
	Fluoride_	50.0	U		I_
	Nitrate__	100	U		I_
	Sulfate__	74400			I_
	TDS_____	177000			T_
7440-70-2	Calcium__	18200		N	P_
7439-95-4	Magnesium	6260			P_
7440-09-7	Potassium	1460	B		P_
7440-23-5	Sodium___	10700			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

008
EPA SAMPLE NO.

7655F18

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199209___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	175000			AK
	Carbonate	20000	U		AK
	Chloride	78800			I
	Fluoride	50.0	U		I
	Nitrate	100	U		I
	Sulfate	1700000			I
	TDS	10000	U		T
7440-70-2	Calcium	437000		N	P
7439-95-4	Magnesium	164000			P
7440-09-7	Potassium	5790			P
7440-23-5	Sodium	80900			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

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1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F19

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Lab Sample ID: 1199210___

Level (low/med): LOW__ Date Received: 12/12/92

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	110000			AK
	Carbonate	20000	U		AK
	Chloride	56600			I
	Fluoride	50.0	U		I
	Nitrate	2240			I
	Sulfate	1260000			I
	TDS	1990000			T
7440-70-2	Calcium	353000		N	P
7439-95-4	Magnesium	93800			P
7440-09-7	Potassium	4180	B		P
7440-23-5	Sodium	101000			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F20

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199211___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	76300			I_
	Fluoride_	1460			I_
	Nitrate__	5360			I_
	Sulfate__	2770000			I_
	TDS_____	10000	U		T_
7440-70-2	Calcium__	508000		N	P_
7439-95-4	Magnesium	198000			P_
7440-09-7	Potassium	1230	B		P_
7440-23-5	Sodium___	62900			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F21

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199212___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	87000			AK
	Carbonate	20000	U		AK
	Chloride	66400			I
	Fluoride	50.0	U		I
	Nitrate	100	U		I
	Sulfate	1520000			I
	TDS	10000	U		T
7440-70-2	Calcium	426000		N	P
7439-95-4	Magnesium	105000			P
7440-09-7	Potassium	3860	B		P
7440-23-5	Sodium	78200			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_	100000.0	101090.0	101.1	100000.0	100655.0	100.7	101065.0	101.1	I_
Fluoride_	_10000.0	10161.00	101.6	_10000.0	_8814.00	_88.1	_9977.00	_99.8	I_
Nitrate__	_50000.0	50343.00	100.7	_50000.0	50086.00	100.2	50275.00	100.6	I_
Sulfate__	100000.0	101522.0	101.5	100000.0	101005.0	101.0	101280.0	101.3	I_
TDS_____									NR
Calcium__	_51382.0	50873.76	_99.0	_25000.0	26046.89	104.2	25607.43	102.4	P_
Magnesium	_25587.0	24664.17	_96.4	_25000.0	25834.51	103.3	25089.52	100.4	P_
Potassium	_50563.0	50776.57	100.4	_25000.0	25551.77	102.2	24891.01	_99.6	P_
Sodium___	_52348.0	50194.15	_95.9	_25000.0	25411.96	101.6	24268.91	_97.1	P_

1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

U.S. EPA - CLP

015

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_				100000.0	101060.0	101.1			I_
Fluoride_				_10000.0	10055.00	100.6			I_
Nitrate__				_50000.0	50174.00	100.3			I_
Sulfate__				100000.0	101366.0	101.4			I_
TDS_____									NR
Calcium__				_25000.0	26034.42	104.1			P_
Magnesium				_25000.0	25920.32	103.7			P_
Potassium				_25000.0	26253.41	105.0			P_
Sodium___				_25000.0	25005.59	100.0			P_

1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

ILM02.1

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

016

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_									NR
Fluoride_									NR
Nitrate__									NR
Sulfate__									NR
TDS_____									NR
Calcium__	51382.0	49674.93	96.7	25000.0	24920.76	99.7	24544.70	98.2	P_
Magnesium	25587.0	24542.60	95.9	25000.0	24942.25	99.8	24557.27	98.2	P_
Potassium									NR
Sodium___									NR

1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

ILM02.1

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

AA CRDL Standard Source: _____

ICP CRDL Standard Source: IN. VEN.____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS_____								
Calcium__				10000.0	10120.59	101.2	10177.34	101.8
Magnesium				10000.0	10083.91	100.8	10158.81	101.6
Potassium				10000.0	9816.08	98.2	10340.60	103.4
Sodium___				10000.0	9955.53	99.6	9873.62	98.7

FORM II (PART 2) - IN

ILM02.1

U.S. EPA - CLP

018

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

AA CRDL Standard Source: _____

ICP CRDL Standard Source: IN. VEN.____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS_____								
Calcium__				10000.0	10070.38	100.7	9940.91	99.4
Magnesium				10000.0	10237.19	102.4	10047.03	100.5
Potassium								
Sodium___								

FORM II (PART 2) - IN

ILM02.1

3
BLANKS

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Bicarbona	20000.0	U							20000.000	U	AK
Carbonate	20000.0	U							20000.000	U	AK
Chloride	150.0	U	150.0	U	150.0	U	150.0	U			I
Fluoride	50.0	U	50.0	U	50.0	U	50.0	U			I
Nitrate	100.0	U	100.0	U	100.0	U	100.0	U			I
Sulfate	200.0	U	200.0	U	200.0	U	200.0	U			I
TDS	10000.0	U									T
Calcium	596.0	U	596.0	U	596.0	U	596.0	U	596.000	U	P
Magnesium	-7.5	B	6.0	U	10.4	B	6.2	B	6.000	U	P
Potassium	-558.6	B	-613.1	B	-245.2	B	-545.0	B	-422.343	B	P
Sodium	-125.0	B	-189.4	B	-236.2	B	-276.6	B	-97.338	B	P

FORM III - IN

ILM02.1

3
BLANKS

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Bicarbona											NR
Carbonate											NR
Chloride											NR
Fluoride											NR
Nitrate											NR
Sulfate											NR
TDS											NR
Calcium	596.0	U	596.0	U	596.0	U					P
Magnesium	6.0	U	6.0	U	14.4	B					P
Potassium											NR
Sodium											NR

FORM III - IN

ILM02.1

U.S. EPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No: 7655-F SDG No.: 7655F1

ICP ID Number: TJA61_____ ICS Source: EPA-LV87____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS_____								
Calcium__	529351	525385	508120	504358.7	96.0	538363	508870.5	96.9
Magnesium	543610	533685	513233	508130.6	95.2	536468	511248.2	95.8
Potassium	0	0	-886	-980.9		-831	-599.5	
Sodium___	0	0	824	799.0		808	788.4	

U.S. EPA - CLP

4
ICP INTERFERENCE CHECK SAMPLE

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No: 7655-F SDG No.: 7655F1

ICP ID Number: TJA61_____ ICS Source: EPA-LV87____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS_____								
Calcium__	529351	525385	486908	484461.1	92.2	484097	483489.3	92.0
Magnesium	543610	533685	494713	493945.6	92.6	491456	491037.0	92.0
Potassium								
Sodium___								

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

7655F5S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix: __WATER_____ Level (low/med): _LOW____
% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona									NR
Carbonate									NR
Chloride_									NR
Fluoride_									NR
Nitrate__									NR
Sulfate__									NR
TDS_____									NR
Calcium__	75-125	102469.0310		70082.2970		20000.00	161.9	N	P
Magnesium		136430.5780		99581.0940		20000.00	184.2		P
Potassium	75-125	25095.3690		4019.0740	B	20000.00	105.4		P
Sodium___	75-125	25103.9900		4355.1840	B	20000.00	103.7		P

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

7655F1D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona								NR
Carbonate								NR
Chloride_								NR
Fluoride_								NR
Nitrate__								NR
Sulfate__								NR
TDS_____								NR
Calcium__		3848.0630	B	4071.1660	B	5.6		P
Magnesium		292.5050	B	274.3590	B	6.4		P
Potassium	5000.0	22636.2420		21989.1010		2.9		P
Sodium___		74221.0230		72418.9530		2.5		P

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6
DUPLICATES

EPA SAMPLE NO.

7655F19D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona		20000.0000	U	20000.0000	U			AK
Carbonate		20000.0000	U	20000.0000	U			AK
Chloride_								NR
Fluoride_								NR
Nitrate__								NR
Sulfate__								NR
TDS_____								NR
Calcium__								NR
Magnesium								NR
Potassium								NR
Sodium___								NR

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6
DUPLICATES

EPA SAMPLE NO.

7655F21D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona								NR
Carbonate								NR
Chloride_								NR
Fluoride_								NR
Nitrate__								NR
Sulfate__								NR
TDS_____		10000.0000	U	10000.0000	U			T_
Calcium__								NR
Magnesium								NR
Potassium								NR
Sodium___								NR

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7
LABORATORY CONTROL SAMPLE

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Solid LCS Source: _____

Aqueous LCS Source: EPA-LV_____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Bicarbona	50000.0	52800.00	105.6						
Carbonate	20000.0	20000.00	100.0						
Chloride									
Fluoride									
Nitrate									
Sulfate									
TDS									
Calcium	51382.0	49725.38	96.8						
Magnesium	25587.0	24419.90	95.4						
Potassium	50563.0	50892.38	100.7						
Sodium	52348.0	49385.13	94.3						

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8
STANDARD ADDITION RESULTS

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q

FORM VIII - IN ILM02.1

U.S. EPA - CLP

9
ICP SERIAL DILUTION

EPA SAMPLE NO.

7655F1LL

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Bicarbona							
Carbonate							
Chloride							
Fluoride							
Nitrate							
Sulfate							
TDS							
Calcium	3848.06	B	4038.95	B	5.0		P
Magnesium	292.50	B	259.42	B	11.3		P
Potassium	22636.24		21730.25	B	4.0		P
Sodium	74221.02		77008.16		3.8		P

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10
Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
ICP ID Number: TJA61_____ Date: 03/23/92
Flame AA ID Number : _____
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000		
Carbonate			20000		
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium	317.93		5000	596.0	P
Magnesium	228.62		5000	6.0	P
Potassium	324.75		5000	4.0	P
Sodium	259.94		5000	12.0	P

Comments:

U.S. EPA - CLP

10
Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
ICP ID Number: _____ Date: 12/01/92
Flame AA ID Number : BICARBONATE_
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000	20000.0	AK
Carbonate			20000	20000.0	AK
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium			5000		
Magnesium			5000		
Potassium			5000		
Sodium			5000		

Comments:

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10
Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
ICP ID Number: _____ Date: 12/01/92
Flame AA ID Number : CARBONATE___
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000		
Carbonate			20000	20000.0	AK
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium			5000		
Magnesium			5000		
Potassium			5000		
Sodium			5000		

Comments:

U.S. EPA - CLP

11A
ICP Interelement Correction Factors (Annually)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

ICP ID Number: TJA61_____ Date: 02/21/92

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	CR_
Bicarbona	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Carbonate	228.80	0.0000000	0.0000000	-0.0000700	0.0000000	0.0000000
Chloride	308.22	0.0000000	0.0000000	0.0002540	0.0005170	0.0006990
Fluoride	217.58	0.0002990	0.0000000	0.0002720	0.0001130	0.0000000
Nitrate						
Sulfate	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
TDS	267.72	0.0000210	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0007470	0.0000000	0.0000000	0.0000000	0.0018020
Magnesium	228.62	0.0000000	0.0000000	0.0000370	0.0000100	0.0003760
Potassium	324.75	0.0000000	0.0000000	-0.0001200	-0.0000400	0.0000000
Sodium	259.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000940

Comments:

U.S. EPA - CLP

11B
ICP Interelement Correction Factors (Annually)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

ICP ID Number: TJA61_____ Date: 02/21/92

Analyte	Wave-length (nm)	Interelement Correction Factors for : CU_	MN_	NI_	TI_	V__
Bicarbona	313.04	0.0000000	0.0000000	0.0000000	0.0000460	0.0057490
Carbonate	228.80	0.0000000	0.0000000	-0.0019100	0.0000000	0.0000850
Chloride	308.22	0.0005070	0.0005770	0.0009100	0.0000000	0.0085440
Fluoride	217.58	0.0000000	0.0005130	0.0055440	0.0000000	0.0012250
Nitrate						
Sulfate	493.41	0.0000860	0.0000000	0.0000000	0.0000000	0.0000000
TDS	267.72	0.0000690	0.0000720	0.0000470	0.0001510	0.0003100
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	228.62	0.0000000	0.0000000	-0.0010600	0.0036200	0.0000000
Potassium	324.75	0.0000000	0.0000000	0.0000250	-0.0009200	0.0011200
Sodium	259.94	0.0001650	0.0018050	0.0002090	0.0005280	0.0008700

Comments:

U.S. EPA - CLP

12
ICP Linear Ranges (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

ICP ID Number: TJA61_____ Date: 03/25/92

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Bicarbona	7.00	50000.0	P
Carbonate	7.00	100000.0	P
Chloride	7.00	1000000.0	P
Fluoride	7.00	50000.0	P
Nitrate			NR
Sulfate	7.00	100000.0	P
TDS	7.00	50000.0	P
Calcium	7.00	650000.0	P
Magnesium	7.00	50000.0	P
Potassium	7.00	55000.0	P
Sodium	7.00	400000.0	P

Comments:

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
7655F1___	_12/16/92__	_____	___100__
7655F13__	_12/16/92__	_____	___100__
7655F14__	_12/16/92__	_____	___100__
7655F15__	_12/16/92__	_____	___100__
7655F16__	_12/16/92__	_____	___100__
7655F17__	_12/16/92__	_____	___100__
7655F18__	_12/16/92__	_____	___100__
7655F19__	_12/16/92__	_____	___100__
7655F1D__	_12/16/92__	_____	___100__
7655F20__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F22__	_12/16/92__	_____	___100__
7655F5___	_12/16/92__	_____	___100__
7655F5S__	_12/16/92__	_____	___100__
LCSW_____	_12/16/92__	_____	___100__
PBW_____	_12/16/92__	_____	___100__
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

FORM XIII - IN ILM02.1

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.:_____ SAS No.: 7655-F SDG No.:7655F1

Method: T_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
7655F1___	_12/16/92__	_____	___100__
7655F13__	_12/16/92__	_____	___100__
7655F14__	_12/16/92__	_____	___100__
7655F15__	_12/16/92__	_____	___100__
7655F16__	_12/16/92__	_____	___100__
7655F17__	_12/16/92__	_____	___100__
7655F18__	_12/16/92__	_____	___100__
7655F19__	_12/16/92__	_____	___100__
7655F20__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F22__	_12/16/92__	_____	___100__
7655F5___	_12/16/92__	_____	___100__

FORM XIII - IN ILM02.1

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: TJA61_____ Method: P_

Start Date: 12/18/92 End Date: 12/18/92

EPA Sample No.	D/F	Time	% R	Analytes																					
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA											
S0	1.00	1251									X	X	X	X											
S	1.00	1255									X	X	X	X											
S	1.00	1257																							
S	1.00	1301																							
S	1.00	1305																							
ICV	1.00	1308									X	X	X	X											
ICB	1.00	1311									X	X	X	X											
ICSA	1.00	1314									X	X	X	X											
ICSAB	1.00	1317									X	X	X	X											
CRI	1.00	1321									X	X	X	X											
CCV	1.00	1324									X	X	X	X											
CCB	1.00	1327									X	X	X	X											
PBW	1.00	1330									X	X	X	X											
LCSW	1.00	1333									X	X	X	X											
7655F1	1.00	1336									X	X	X	X											
7655F1L	5.00	1339									X	X	X	X											
7655F1D	1.00	1342									X	X	X	X											
7655F5	1.00	1345									X	X	X	X											
7655F5S	1.00	1348									X	X	X	X											
7655F22	1.00	1351									X	X	X	X											
7655F13	1.00	1354									X	X	X	X											
7655F14	1.00	1357										X	X	X											
CCV	1.00	1400									X	X	X	X											
CCB	1.00	1404									X	X	X	X											
7655F15	1.00	1407									X	X	X	X											
7655F16	1.00	1410									X		X	X											
7655F17	1.00	1413									X	X	X	X											
7655F18	1.00	1416									X	X	X	X											
7655F19	1.00	1419									X	X	X	X											
7655F20	1.00	1422									X	X	X	X											
7655F21	1.00	1425									X	X	X	X											
ICSA	1.00	1428									X	X	X	X											

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: TJA61_____ Method: P_

Start Date: 12/18/92 End Date: 12/18/92

EPA Sample No.	D/F	Time	% R	Analytes										
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA
ICSAB	1.00	1431									X	X	X	X
CRI	1.00	1434									X	X	X	X
CCV	1.00	1437									X	X	X	X
CCB	1.00	1440									X	X	X	X

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: TJA61_____ Method: P_

Start Date: 12/23/92 End Date: 12/23/92

EPA Sample No.	D/F	Time	% R	Analytes																					
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA											
S0	1.00	1412									X	X													
S	1.00	1415									X	X													
S	1.00	1418																							
S	1.00	1421																							
S	1.00	1424																							
ICV	1.00	1427									X	X													
ICB	1.00	1430									X	X													
ICSA	1.00	1433									X	X													
ICSAB	1.00	1436									X	X													
CRI	1.00	1440									X	X													
CCV	1.00	1443									X	X													
CCB	1.00	1446									X	X													
ZZZZZZ	1.00	1449																							
ZZZZZZ	1.00	1452																							
ZZZZZZ	1.00	1455																							
7655F16	10.00	1458										X													
7655F14	10.00	1501									X														
ICSA	1.00	1504									X	X													
ICSAB	1.00	1507									X	X													
CRI	1.00	1510									X	X													
CCV	1.00	1514									X	X													
CCB	1.00	1517									X	X													

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: DX100_____ Method: I_

Start Date: 12/10/92 End Date: 12/12/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA												
S_____	1.00	1246				X	X	X	X																	
S_____	1.00	1257				X	X	X	X																	
S_____	1.00	1308				X	X	X	X																	
ICV_____	1.00	1642				X	X	X	X																	
ICB_____	1.00	1653				X	X	X	X																	
7655F1__	1.00	1704				X	X	X	X																	
7655F5__	1.00	1715				X	X	X																		
7655F22_	1.00	1726				X	X	X																		
7655F13_	1.00	1737				X	X	X																		
7655F14_	1.00	1748				X	X	X																		
7655F15_	1.00	1759				X	X	X																		
7655F16_	1.00	1810				X		X																		
7655F17_	1.00	1821				X	X	X	X																	
7655F18_	1.00	1832				X	X	X																		
7655F19_	1.00	1843				X	X	X																		
CCV_____	1.00	1854				X	X	X	X																	
CCB_____	1.00	1905				X	X	X	X																	
7655F20_	1.00	1915				X	X	X																		
7655F21_	1.00	1927				X	X	X																		
7655F5__	10.00	1938							X																	
7655F22_	100.00	1949							X																	
7655F13_	100.00	2000							X																	
7655F14_	100.00	2011							X																	
7655F15_	100.00	2021							X																	
7655F16_	100.00	2033					X		X																	
7655F18_	100.00	2043							X																	
7655F19_	100.00	2054							X																	
CCV_____	1.00	2105				X	X	X	X																	
CCB_____	1.00	2116				X	X	X	X																	
7655F20_	100.00	2127							X																	
7655F21_	100.00	2142							X																	
CCV_____	1.00	2153				X	X	X	X																	
_____																										

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: DX100_____ Method: I_

Start Date: 12/10/92 End Date: 12/12/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
CCB	1.00	2204				X	X	X	X																		

FORM XIV - IN ILM02.1

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: TDS_____ Method: T_

Start Date: 12/16/92 End Date: 12/16/92

EPA Sample No.	D/F	Time	% R	Analytes																					
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA											
7655F1__	1.00	1000								X															
7655F5__	1.00	1005								X															
7655F22_	1.00	1010								X															
7655F13_	1.00	1015								X															
7655F14_	1.00	1020								X															
7655F15_	1.00	1025								X															
7655F16_	1.00	1030								X															
7655F17_	1.00	1035								X															
7655F18_	1.00	1040								X															
7655F19_	1.00	1045								X															
7655F20_	1.00	1050								X															
7655F21_	1.00	1055								X															
7655F21D	1.00	1100								X															

U.S. EPA - CLP

14
ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: BICARBONATE__ Method: AK

Start Date: 12/16/92 End Date: 12/16/92

EPA Sample No.	D/F	Time	% R	Analytes										
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA
PBW	1.00	1130		X										
LCSW	1.00	1135		X										
7655F1	1.00	1140		X										
7655F5	1.00	1145		X										
7655F22	1.00	1150		X										
7655F13	1.00	1155		X										
7655F14	1.00	1200		X										
7655F15	1.00	1205		X										
7655F16	1.00	1210		X										
7655F17	1.00	1215		X										
7655F18	1.00	1220		X										
7655F19	1.00	1225		X										
7655F19D	1.00	1230		X										
7655F20	1.00	1235		X										
7655F21	1.00	1240		X										

U.S. EPA - CLP

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ANALYSIS RUN LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: CARBONATE____ Method: AK

Start Date: 12/16/92 End Date: 12/16/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA												
PBW	1.00	1130			X																					
LCSW	1.00	1135			X																					
7655F1	1.00	1140			X																					
7655F5	1.00	1145			X																					
7655F22	1.00	1150			X																					
7655F13	1.00	1155			X																					
7655F14	1.00	1200			X																					
7655F15	1.00	1205			X																					
7655F16	1.00	1210			X																					
7655F17	1.00	1215			X																					
7655F18	1.00	1220			X																					
7655F19	1.00	1225			X																					
7655F19D	1.00	1230			X																					
7655F20	1.00	1235			X																					
7655F21	1.00	1240			X																					

ICP RUN LOG

SWOK/AATS

ANALYST: B DATE 12-18-92

INSTRUMENT: TJA61 CALIBRATION STD: SOURCE

Reviewed AY Stan 12/20/92 TJ121218.ASC

Client ID	LAB ID	Time	Dilution Factor	Analytes
	STD0	1254		Ca, Mg, Na, K
	STD1	1257		"
	STD4	1301		—
	STD2	1305		—
	STD3	1308		—
	ICV	1308		Ca, Mg, Na, K
	ICB	1311		"
	ICSAI	1314		"
	ICSABI	1317		"
	CRII	1321		—
	CCV	1324		Ca, Mg, Na, K
	CCB	1327		"
	PBW	1330		"
	LCSW	1333		"
7655-F1	11992.01	1336		"
7655-F1L	11992.01L	1339		"
7655-F1D	11992.01D	1342		"
7655-F5	11992.02	1345		"
7655-F5S	11992.02S	1348		"
7655-F-22 ~~7655-F12~~	11992.03	1351		"
7655-F13	11992.04	1354		"
7655-F14	11992.05	1357		Mg, Na, K Dilute & rerun Ca.

ICP RUN LOG

SWOK/AATS

ANALYST: B DATE 12-18-92

INSTRUMENT: ICAP1 CALIBRATION STD: SOURCE

Client ID	LAB ID	Time	Dilution Factor	Analytes
	CCV	1400 ~~1357~~		Ca, Mg, Na, K
	CCB	1404		"
7655-F15	11992.06	1407		"
7655-F16	11992.07	1410		Ca, Na, K Dilute & Rerun Mg
7655-F17	11992.08	1413		Ca, Mg, Na, K
7655-F18	11992.09	1416		"
7655-F19	11992.10	1419		"
7655-F20	11992.11	1422		"
7655-F21	11992.12	1425		"
	ICSAF	1428		"
	ICSABF	1431		"
	CRIF	1434		—
	CCV	1437		Ca, Mg, Na, K
	CCB	1440		"
				B 12-18-92

Standardization Rpt.

Fri 12-18-92 12:54:53 PM

048

ethod: CLP

Standard: STD0

Elem	Ag	Al	Ba	Be	Ca ✓	Cd	Co
Avge	-.00092	.01876	.00000	.00467	.00848	-.00005	-.00000
SDev	.00065	.00060	.00000	.00016	.00214	.00009	.00023
%RSD	70.434	3.1701	.00000	3.5348	25.300	173.21	15710.
#1	-.00155	.01829	.00000	.00457	.00600	-.00015	-.00027
#2	-.00026	.01943	.00000	.00486	.00971	.00000	.00009
#3	-.00095	.01857	.00000	.00457	.00971	.00000	.00017

Elem	Cr	Cu	Fe	K ✓	Mg ✓	Mn	Na ✓
Avge	.00162	.00224	.06695	.02819	.00172	.01229	.05610
SDev	.00141	.00030	.00033	.00503	.00123	.00000	.00121
%RSD	87.051	13.572	.49276	17.854	71.531	.00000	2.1659
#1	.00000	.00198	.06657	.02257	.00030	.01229	.05486
#2	.00257	.00257	.06714	.02971	.00234	.01229	.05729
#3	.00229	.00215	.06714	.03229	.00252	.01229	.05614

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Avge	.00079	.00391	.00067	.00114	.00067	.00066	.00984
SDev	.00162	.00084	.00033	.00029	.00060	.00015	.00080
%RSD	205.86	21.415	49.487	25.000	89.214	23.406	8.1751
#1	-.00008	.00389	.00029	.00086	.00000	.00084	.00947
#2	-.00021	.00475	.00086	.00143	.00086	.00057	.01076
#3	.00265	.00308	.00086	.00114	.00114	.00057	.00929

Standardization Rpt. Fri 12-18-92 12:57:59 PM page 1

ethod: CLP Standard: STD1

Elem	Ag	Al	Ba	Be	Ca	Co	Cr
Avge	.82687	3.0879	3.2224	.50000	29.532	.63645	.99333
SDev	.00265	.0088	.0198	.00198	.183	.00284	.00759
%RSD	.31989	.28613	.61538	.39590	.62130	.44660	.76443
#1	.82985	3.0977	3.2445	.50229	29.739	.63964	1.0006
#2	.82595	3.0854	3.2163	.49886	29.464	.63551	.99400
#3	.82480	3.0806	3.2062	.49886	29.392	.63420	.98543

Elem	Cu	Fe	K	Mg	Mn	Na	Ni
Avge	.66824	3.4486	.37771	4.8955	1.4902	4.5324	1.6975
SDev	.00275	.0201	.00086	.0116	.0086	.0201	.0123
%RSD	.41132	.58193	.22693	.23749	.57434	.44291	.72213
#1	.67121	3.4709	.37771	4.9084	1.4997	4.5554	1.7061
#2	.66774	3.4431	.37686	4.8922	1.4877	4.5234	1.6835
#3	.66578	3.4319	.37857	4.8858	1.4831	4.5184	1.7030

Elem	Sb	V	Zn
Avge	.40714	1.3590	1.0968
SDev	.00159	.0068	.0032
%RSD	.39072	.49853	.28865
#1	.40571	1.3663	1.1002
#2	.40686	1.3580	1.0964
#3	.40886	1.3529	1.0939

Standardization Rpt. Fri 12-18-92 01:01:04 PM page 1

ethod: CLP Standard: STD4

Elem	Cd
Avge	.10121
SDev	.00154
%RSD	1.5232
#1	.10232
#2	.10185
#3	.09945

Standardization Rpt. Fri 12-18-92 01:05:55 PM page 1

ethod: CLP Standard: STD2

Elem	Pb	As
Avge	1.2717	.30104
SDev	.0043	.00065
%RSD	.34016	.21580
#1	1.2711	.30153
#2	1.2677	.30129
#3	1.2763	.30030

Standardization Rpt. Fri 12-18-92 01:08:37 PM

ethod: CLP Standard: STD3

Elem	Ti
Avge	3.4886
SDev	.0335
%RSD	.96015
#1	3.4509
#2	3.5149
#3	3.5000

Analysis Report QC Standard Fri 12-18-92 01:11:43 PM page 1

Method: CLP Sample Name: ICV Operator:
Run Time: 12/18/92 13:08:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	515.39	1907.5	1998.7	481.09	50874.	527.47	513.69
SDev	2.07	10.7	8.3	1.64	186.	4.95	1.69
%RSD	.40160	.55989	.41696	.34057	.36611	.93781	.32872
#1	517.71	1919.8	2006.1	482.91	51076.	529.88	514.08
#2	513.74	1901.4	1989.7	480.61	50710.	521.78	511.84
#3	514.71	1901.2	2000.3	479.74	50835.	530.76	515.15
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	478.00	1878.0	1891.0	478.00	48810.	493.00	487.00
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	520.24	517.02	2039.9	50777.	24664.	512.08	50194.
SDev	3.21	2.15	8.3	228.	66.	2.55	226.
%RSD	.61651	.41552	.40811	.44817	.26792	.49869	.44939
#1	523.70	519.16	2049.5	50572.	24723.	514.97	50450.
#2	517.36	514.87	2034.3	50736.	24592.	510.15	50024.
#3	519.67	517.02	2036.0	51022.	24677.	511.11	50109.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	480.00	486.00	1962.0	49182.	23859.	474.00	46804.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	512.28	4946.6	1019.1	-5.5985	500.98	3096.1	Q5.3264
SDev	11.19	30.7	19.3	.4722	1.22	12.0	20.865
%RSD	2.1838	.61964	1.8977	8.4348	.24335	.38818	391.73
#1	507.69	4968.6	996.88	-5.0532	501.69	3106.8	Q-16.264
#2	504.11	4911.6	1028.6	-5.8708	499.57	3083.1	Q6.8614
#3	525.03	4959.5	1031.9	-5.8714	501.68	3098.2	Q25.382
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Fail
Value	488.00	4739.0	1024.0		482.00	2921.0	1000.0
Range	10.000	10.000	10.000		10.000	10.000	10.000

ethod: CLP Sample Name: ICB Operator:
Run Time: 12/18/92 13:11:47
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.91967	-4.9439	.00008	-.08783	2.4286	-.64127	.23391
SDev	.89366	1.8706	.00009	.00287	4.3871	.73099	.87749
%RSD	97.172	37.837	118.84	3.2674	180.64	113.99	375.14
#1	-1.9174	-6.8112	.00017	-.08947	6.4606	-1.2444	-.51265
#2	-.19269	-3.0700	-.00002	-.08452	3.0686	-.85105	1.2005
#3	-.64891	-4.9505	.00008	-.08951	-2.2433	.17168	.01392
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.0727	-.90341	5.6333	-558.58	-7.4572	1.6120	-125.00
SDev	2.7235	1.07362	.0016	93.65	2.6885	.5582	16.14
%RSD	88.633	118.84	.02792	16.766	36.052	34.627	12.915
#1	-2.1124	-1.9542	5.6336	-538.15	-5.8988	1.9345	-106.38
#2	-.95956	.19172	5.6347	-660.76	-10.562	.96747	-133.51
#3	-6.1463	-.94781	5.6316	-476.84	-5.9112	1.9341	-135.10
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.5092	-10.650	1.1667	.82008	-1.7561	1.0956	21.829
SDev	4.4032	7.024	10.722	.81980	.6043	.3590	2.729
%RSD	291.75	65.954	919.02	99.966	34.412	32.772	12.500
#1	1.8419	-5.6676	-8.2074	.00055	-1.4035	.89623	23.435
#2	-3.0508	-18.683	-1.1504	.81952	-2.4539	1.5100	18.679
#3	5.7367	-7.5985	12.858	1.6402	-1.4109	.88040	23.374
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

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Method: CLP Sample Name: ICSAI Operator:
Run Time: 12/18/92 13:14:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-10.343	524460.	16.550	.19009	508120.	1.0054	-15.581
SDev	1.821	860.	1.024	.01116	2275.	4.2949	2.321
%RSD	17.608	.16394	6.1861	5.8716	.44774	427.16	14.894
#1	-8.5411	525160.	17.732	.18095	510590.	-3.8005	-12.976
#2	L-12.183	523500.	15.959	.20253	506110.	2.3486	-16.339
#3	L-10.304	524720.	15.958	.18678	507660.	4.4682	-17.428
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.81631	16.131	189840.	-885.56	513230.	10.065	824.00
SDev	.59405	1.008	494.	283.17	449.	.475	20.37
%RSD	72.773	6.2518	.26025	31.976	.08740	4.7195	2.4722
#1	.22514	16.728	190320.	-722.07	513240.	10.598	846.34
#2	1.4132	14.967	189340.	-1212.5	512780.	9.9127	819.21
#3	.81059	16.698	189850.	-722.07	513680.	9.6849	806.45
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	6.2935	1.5893	-17.307	-69.368	1.1321	76.599	-177.98
SDev	7.5193	24.823	26.255	1.252	2.3449	1.118	107.38
%RSD	119.48	1561.9	151.70	1.8042	207.13	1.4593	60.334
#1	-2.3131	28.796	7.1091	-68.002	3.0427	77.888	-61.575
#2	9.6054	L-19.825	-45.078	-69.641	-1.4848	76.013	-273.17
#3	11.588	-4.2030	-13.952	-70.460	1.8383	75.896	-199.18
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report Fri 12-18-92 01:20:57 PM

Method: CLP Sample Name: ICSABI Operator:
Run Time: 12/18/92 13:17:57
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	961.11	520070.	497.28	465.96	504360.	956.96	465.62
SDev	3.62	1510.	.89	1.48	1457.	2.17	2.44
%RSD	.37614	.29043	.17839	.31775	.28885	.22647	.52362
#1	958.19	518510.	496.38	464.33	503090.	954.93	464.82
#2	965.15	521530.	498.15	467.21	505950.	959.24	463.68
#3	959.99	520170.	497.32	466.35	504040.	956.70	468.36
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	466.83	517.69	188870.	-980.93	508130.	474.92	799.00
SDev	2.54	2.20	470.	370.86	1468.	.86	17.58
%RSD	.54358	.42524	.24908	37.807	.28887	.18124	2.1999
#1	469.74	516.36	188400.	-1130.8	506550.	473.94	787.30
#2	465.65	520.23	189340.	-558.58	509460.	475.28	790.49
#3	465.10	516.49	188860.	-1253.4	508380.	475.54	819.21
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	908.26	4565.6	-25.793	-70.853	467.37	1001.8	-195.39
SDev	5.91	27.6	16.051	.473	1.23	2.6	50.71
%RSD	.65092	.60390	62.232	.66704	.26289	.26014	25.953
#1	912.93	4569.0	-38.039	-70.581	467.92	998.82	-136.94
#2	901.61	4591.4	-7.6212	-70.579	468.23	1003.3	-221.68
#3	910.25	4536.6	-31.718	-71.399	465.96	1003.3	-227.56
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Method: CLP Sample Name: CRII Operator:
Run Time: 12/18/92 13:21:02
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	6.8728	515.56	394.15	9.6476	10121.	9.8840	100.27
SDev	1.0677	20.28	1.02	.1694	37.	.4870	.71
%RSD	15.535	3.9331	.25976	1.7559	.36965	4.9273	.70404
#1	5.7601	524.87	393.56	9.5497	10104.	10.279	99.897
#2	6.9696	529.51	395.34	9.8432	10163.	9.3400	99.831
#3	7.8888	492.30	393.56	9.5498	10094.	10.032	101.09
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	21.081	53.512	241.24	9816.1	10084.	32.902	9955.5
SDev	2.723	.623	5.93	545.4	14.	.486	29.7
%RSD	12.918	1.1638	2.4565	5.5565	.13442	1.4768	.29829
#1	23.194	54.227	246.87	9741.1	10073.	32.418	9924.2
#2	18.008	53.089	241.80	9312.0	10099.	32.899	9983.2
#3	22.042	53.221	235.05	10395.	10080.	33.389	9959.3
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	78.750	125.00	100.05	-1.0979	94.058	41.635	119.77
SDev	7.210	11.12	4.01	.4732	.611	.632	25.07
%RSD	9.1561	8.9001	4.0118	43.103	.65003	1.5170	20.932
#1	80.977	134.36	102.38	-.82536	94.413	41.653	108.77
#2	84.583	127.93	102.36	-.82400	93.352	42.258	148.46
#3	70.688	112.70	95.420	-1.6443	94.408	40.995	102.08
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Method: CLP Sample Name: CCV Operator:
in Time: 12/18/92 13:24:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1305.9	10277.	10181.	246.54	26047.	120.70	2608.1
SDev	3.8	24.	40.	1.72	110.	1.94	9.8
%RSD	.28917	.23380	.39450	.69699	.42051	1.6047	.37463
#1	1301.6	10253.	10141.	244.64	25923.	118.78	2598.2
#2	1307.7	10301.	10181.	246.98	26089.	120.68	2608.3
#3	1308.5	10277.	10221.	248.00	26129.	122.65	2617.8
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1033.2	1286.5	5191.0	25552.	25835.	2601.5	25412.
SDev	5.9	3.1	19.1	145.	44.	10.5	36.
%RSD	.57384	.23787	.36713	.56742	.16990	.40175	.14195
#1	1026.5	1283.1	5169.0	25395.	25784.	2589.9	25372.
#2	1035.4	1287.4	5200.2	25579.	25866.	2604.4	25442.
#3	1037.8	1289.0	5203.6	25681.	25853.	2610.2	25422.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2605.7	961.21	2458.7	-2.7292	2560.5	2633.5	1073.6
SDev	8.3	17.45	54.8	.8204	13.7	11.6	18.9
%RSD	.31891	1.8151	2.2298	30.061	.53454	.43924	1.7570
#1	2596.5	954.39	2395.5	-1.9082	2544.7	2620.5	1063.3
#2	2612.7	948.20	2486.7	-3.5491	2569.0	2642.6	1062.1
#3	2608.0	981.04	2493.8	-2.7304	2567.9	2637.4	1095.4
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

Method: CLP Sample Name: CCB Operator:
Run Time: 12/18/92 13:27:10
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.22681	10.254	1.7734	-.08782	6.4491	.82800	-.09526
SDev	.86656	5.121	.0001	.00579	3.9590	.57377	.36923
%RSD	382.07	49.941	.00292	6.5926	61.388	69.296	387.59
#1	-1.1095	12.736	1.7734	-.08446	2.0968	.93886	.08057
#2	-.19361	4.3653	1.7734	-.08449	9.8363	1.3383	.15318
#3	.62267	13.662	1.7733	-.09450	7.4142	.20689	-.51955
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.7847	-.56778	9.8514	-613.08	-1.0096	1.9316	-189.36
SDev	2.4502	.60051	.8435	437.03	8.2660	.0010	6.38
%RSD	87.987	105.76	8.5618	71.285	818.78	.05055	3.3705
#1	-5.2813	-.94710	9.0069	-885.56	8.4661	1.9309	-189.36
#2	-.38371	-.88080	9.8535	-108.99	-6.7403	1.9328	-195.74
#3	-2.6891	.12457	10.694	-844.69	-4.7545	1.9312	-182.97
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.4590	-8.0502	-1.1603	.27382	-1.7537	1.1055	8.2210
SDev	4.2970	2.2429	12.1883	.47298	1.2145	.3601	15.537
%RSD	174.74	27.862	1050.5	172.73	69.258	32.574	188.99
#1	-3.9976	-8.8196	-8.1819	.00139	-2.4585	.90702	-9.3823
#2	2.3954	-5.5238	-8.2126	.00010	-2.4513	.88824	14.023
#3	-5.7749	-9.8071	12.914	.81998	-.35123	1.5211	20.022
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

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Method: CLP Sample Name: PBW Operator:
Run Time: 12/18/92 13:30:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.09934	14.280	.00017	-.09284	20.153	.85110	-.46792
SDev	1.1313	5.988	.00016	.01040	6.162	2.0106	.45625
%RSD	1138.8	41.932	94.858	11.200	30.574	236.24	97.506
#1	1.1384	11.759	-.00002	-.10449	27.245	3.1591	-.90026
#2	.26559	9.9643	.00027	-.08451	17.095	-.52061	-.51247
#3	-1.1059	21.116	.00027	-.08951	16.119	-.08520	.00897
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.0567	-1.9982	11.258	-422.34	-5.0304	.96446	-97.338
SDev	3.0800	1.8955	.485	520.75	11.7874	.00111	.921
%RSD	291.48	94.858	4.3092	123.30	234.32	.11549	.94585
#1	2.4959	.19048	11.537	177.11	5.7502	.96451	-98.401
#2	-2.6888	-3.0928	10.697	-762.94	-17.616	.96555	-96.806
#3	-2.9771	-3.0924	11.538	-681.20	-3.2251	.96332	-96.806
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.6933	1.2662	3.5015	.54646	-.69944	.69405	13.089
SDev	3.5166	12.462	10.751	.47381	2.19405	1.0151	30.324
%RSD	207.68	984.18	307.05	86.706	313.69	146.26	231.68
#1	2.4194	9.5701	5.8370	-.00066	1.7602	1.5823	-14.613
#2	4.7903	7.2917	-8.2257	.81998	-2.4552	-.41242	45.487
#3	-2.1296	-13.063	12.893	.82005	-1.4033	.91231	8.3920
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

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061

Method: CLP Sample Name: LCSW Operator:
Run Time: 12/18/92 13:33:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	506.33	1886.1	1972.4	473.44	49725.	524.15	503.27
SDev	5.42	22.4	20.9	6.22	486.	3.28	4.45
%RSD	1.0707	1.1901	1.0615	1.3130	.97637	.62527	.88414
#1	502.20	1881.2	1975.1	474.30	49772.	522.58	500.76
#2	504.31	1866.6	1950.3	466.83	49218.	521.94	500.64
#3	512.47	1910.6	1991.9	479.17	50186.	527.91	508.41
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	517.00	1958.0	2078.0	508.00	51382.	516.00	499.00
Range	20.000	20.000	20.000	20.000	20.000	20.000	20.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	513.33	508.59	1992.6	50892.	24420.	502.42	49385.
SDev	4.61	4.28	20.3	348.	204.	4.82	400.
%RSD	.89744	.84137	1.0167	.68421	.83359	.95980	.81005
#1	513.33	508.99	1992.1	50920.	24414.	502.42	49430.
#2	508.73	504.13	1972.7	50531.	24220.	497.60	48964.
#3	517.94	512.66	2013.2	51226.	24626.	507.24	49761.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	514.00	525.00	1981.0	50563.	25587.	509.00	52348.
Range	20.000	20.000	20.000	20.000	20.000	20.000	20.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	509.08	4869.6	1046.1	-6.1428	492.19	3045.9	1.9070
SDev	9.88	25.8	12.6	.9450	6.32	27.8	1.7675
%RSD	1.9400	.52922	1.2082	15.383	1.2847	.91201	92.682
#1	498.54	4842.7	1042.7	-6.6890	492.19	3043.1	-.12950
#2	518.12	4872.1	1035.6	-6.6878	485.87	3019.6	3.0410
#3	510.59	4894.0	1060.1	-5.0517	498.52	3074.9	2.8096
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	504.00	5203.0	1024.0		517.00	3052.0	
Range	20.000	20.000	20.000		20.000	20.000	

062

Method: CLP Sample Name: 7655-F1 Operator:
Run Time: 12/18/92 13:36:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.8374	650.51	16.550	.39212	3848.1	-.00373	1.4153
SDev	.0295	9.56	1.024	.16362	22.9	.66119	1.1669
%RSD	1.6031	1.4692	6.1862	41.726	.59434	17705.	82.451
#1	-1.8034	642.45	17.733	.20319	3831.3	-.02726	.11408
#2	-1.8555	648.02	15.959	.48661	3874.1	-.65285	2.3689
#3	-1.8533	661.07	15.959	.48655	3838.8	.66891	1.7628
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.49468	6.2732	332.86	22636.	292.51	8.5846	74221.
SDev	1.58740	1.3320	3.41	154.	6.39	.0014	376.
%RSD	320.89	21.234	1.0252	.68160	2.1836	.01607	.50627
#1	1.3307	6.1058	329.77	22616.	299.00	8.5857	74330.
#2	-1.2633	5.0328	336.52	22493.	292.28	8.5849	74531.
#3	-1.5515	7.6811	332.29	22800.	286.23	8.5830	73803.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.06945	12.975	-9.6162	5.4619	-1.6482	8.6633	12.175
SDev	7.47338	15.894	13.3069	.9463	.6051	.0179	20.394
%RSD	10761.	122.50	138.38	17.325	36.710	.20681	167.51
#1	-6.4016	-4.5637	-18.951	4.9153	-2.3469	8.6812	11.261
#2	8.1739	17.062	-15.519	4.9159	-1.2977	8.6454	33.010
#3	-1.9807	26.426	5.6209	6.5546	-1.3001	8.6632	-7.7467
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

063

ethod: CLP Sample Name: 7655-F1L Operator:
un Time: 12/18/92 13:39:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.0235	182.38	4.7288	.49633	807.79	.45034	1.1555
SDev	.5371	8.41	1.0238	.01422	10.27	.28591	1.2603
%RSD	17.764	4.6134	21.651	2.8650	1.2713	63.488	109.07
#1	-2.7112	173.68	5.3198	.48463	804.73	.47783	2.3923
#2	-2.7156	182.99	5.3200	.49219	819.24	.15167	1.2012
#3	-3.6437	190.47	3.5465	.51215	799.40	.72152	-.12707
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.4609	1.2747	75.954	4346.0	51.883	2.7075	15402.
SDev	1.1988	1.0722	.489	481.9	4.775	.2792	61.
%RSD	34.639	84.115	.64315	11.088	9.2037	10.310	.39443
#1	-2.1171	2.3463	75.673	4877.4	46.373	2.8701	15343.
#2	-3.8450	.20179	76.518	4223.4	54.830	2.3852	15464.
#3	-4.4205	1.2761	75.671	3937.3	54.445	2.8672	15397.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	8.6117	-9.9548	-14.166	1.7760	-3.3122	4.5356	10.042
SDev	3.9313	4.5516	7.336	.6255	2.9916	.4143	10.402
%RSD	45.650	45.723	51.786	35.218	90.319	9.1351	103.58
#1	7.8995	L-14.851	-11.819	2.4584	-.85686	4.7671	2.4095
#2	5.0853	-9.1627	-8.2909	1.2299	-2.4356	4.7825	21.890
#3	12.850	-5.8512	-22.389	1.6397	-6.6441	4.0573	5.8273
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

ethod: CLP Sample Name: 7655-F1D Operator: 064
Run Time: 12/18/92 13:42:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.7280	608.34	17.733	.39542	4071.2	.21081	.41750
SDev	1.1731	5.70	.000	.17523	18.3	1.9585	1.7591
%RSD	43.004	.93737	.00041	44.314	.44921	929.04	421.34
#1	-4.0456	607.14	17.733	.50157	4064.3	2.4655	-1.0792
#2	-2.3412	614.55	17.733	.49152	4091.9	-.76412	-.02338
#3	-1.7971	603.34	17.733	.19317	4057.3	-1.0689	2.3551
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.3578	5.7481	330.63	21989.	274.36	8.5920	72419.
SDev	2.1236	.8412	1.46	193.	18.21	.0008	293.
%RSD	156.40	14.634	.44138	.87840	6.6373	.00964	.40400
#1	-2.1252	5.0331	329.79	21921.	261.07	8.5927	72536.
#2	-2.9910	5.5361	332.31	21839.	266.89	8.5911	72635.
#3	1.0428	6.6750	329.78	22207.	295.12	8.5921	72086.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.4999	7.1243	-10.162	6.2814	-2.3517	7.3726	20.955
SDev	6.8371	9.2416	9.151	.9464	2.1057	.0189	11.723
%RSD	151.94	129.72	90.047	15.066	89.540	.25586	55.947
#1	-7.5597	2.1265	-15.413	5.7354	-4.4559	7.3814	14.143
#2	3.3327	17.789	-15.478	7.3742	-2.3548	7.3510	14.229
#3	-9.2727	1.4579	.40416	5.7346	-.24446	7.3854	34.492
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F5 Operator:
Run Time: 12/18/92 13:45:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.7042	69.056	64.394	.19012	70082.	.56369	1.2920
SDev	.2489	11.535	.480	.00578	161.	.87120	2.0242
%RSD	14.606	16.704	.74539	3.0393	.22995	154.55	156.67
#1	-1.8177	56.488	63.839	.18345	70266.	.37777	.05222
#2	-1.8761	79.161	64.671	.19339	69963.	-.19955	.19595
#3	-1.4187	71.520	64.671	.19352	70018.	1.5128	3.6280
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.36898	5.7479	373.06	4019.1	99581.	194.88	4355.2
SDev	1.4501	1.1118	1.29	187.3	136.	.56	25.5
%RSD	393.01	19.342	.34613	4.6603	.13634	.28534	.58625
#1	1.9052	6.6573	374.47	4182.6	99700.	195.53	4380.7
#2	-.97603	6.0777	372.77	3814.7	99433.	194.56	4329.7
#3	.17776	4.5085	371.94	4059.9	99610.	194.56	4355.2
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.30929	7.7950	-.84365	-3.2772	.48526	17.569	-6.0402
SDev	7.78705	3.2381	8.09764	1.6387	1.2167	.159	12.8112
%RSD	2517.7	41.541	959.83	50.003	250.73	.90343	212.10
#1	1.5579	4.2304	-5.5517	-3.2776	1.8902	17.460	-16.258
#2	6.3744	10.555	8.5066	-1.6383	-.21952	17.751	-10.196
#3	-8.8602	8.5998	-5.4859	-4.9157	-.21486	17.497	8.3330
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

ethod: CLP Sample Name: 7655-F5S Operator: 066
Run Time: 12/18/92 13:48:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.5449	123.17	74.480	.19325	102470.	-1.4868	-1.3768
SDev	.7146	13.86	.000	.00002	523.	.4602	1.9434
%RSD	28.079	11.254	.00004	.01040	.51033	30.949	141.16
#1	-3.1202	113.32	74.479	.19326	102730.	-.98786	-2.5733
#2	-1.7450	117.16	74.480	.19323	102810.	-1.8945	.86564
#3	-2.7694	139.02	74.480	.19327	101870.	-1.5780	-2.4226
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.01844	6.2987	539.69	25095.	136430.	233.82	25104.
SDev	2.18138	.3469	3.81	290.	702.	1.65	98.
%RSD	11829.	5.5081	.70618	1.1555	.51423	.70617	.39116
#1	-.97865	6.6982	539.98	25150.	136890.	234.78	25157.
#2	2.4783	6.1241	543.35	25354.	136780.	234.78	25165.
#3	-1.5550	6.0737	535.75	24782.	135620.	231.92	24991.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.6439	2.5744	-20.256	-4.9156	-.15856	19.298	2.1658
SDev	3.8346	7.1824	15.413	.0006	.00424	.398	17.467
%RSD	82.572	278.99	76.091	.01159	2.6734	2.0600	806.50
#1	-4.4658	-4.3717	-30.850	-4.9154	-.15984	19.146	-13.154
#2	-.90143	9.9718	-27.344	-4.9163	-.15382	19.749	21.187
#3	-8.5643	2.1231	-2.5740	-4.9152	-.16200	18.999	-1.5356
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: ~~7655 F12~~ Operator:
Run Time: 12/18/92 13:51:44 7655-F-22
Comment:
Mode: CONC Corr. Factor: 1 1/12/93

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-6.8111	6668.1	20.866	25.505	506380.	177.41	1794.0
SDev	1.5034	31.3	.416	.173	453.	.89	4.1
%RSD	22.073	.46924	1.9917	.67963	.08952	.50210	.22605
#1	-8.5471	6692.3	20.866	25.602	506830.	176.39	1797.6
#2	-5.9298	6679.2	20.451	25.607	506390.	178.04	1794.7
#3	-5.9565	6632.8	21.282	25.304	505920.	177.80	1789.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-18.062	4.3168	92653.	3147.1	408470.	H128750.	59026.
SDev	.632	.3567	225.	165.2	2074.	507.	374.
%RSD	3.4977	8.2633	.24309	5.2486	.50771	.39409	.63401
#1	L-17.333	4.6496	92890.	2956.4	410720.	H129290.	59447.
#2	L-18.442	3.9402	92629.	3242.5	408060.	H128690.	58901.
#3	L-18.412	4.3605	92441.	3242.5	406630.	H128280.	58730.
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	483.76	L-38.308	L-70.170	-72.367	-5.3312	H71438.	-16.704
SDev	5.32	10.846	5.767	.946	1.5519	243.	6.600
%RSD	1.1008	28.313	8.2190	1.3074	29.110	.33971	39.511
#1	486.75	L-50.146	L-76.589	-72.913	-5.5764	H71715.	-19.407
#2	486.91	L-35.930	L-65.424	-71.274	-6.7460	H71332.	-21.524
#3	477.61	L-28.848	L-68.497	-72.913	-3.6713	H71266.	-9.1820
Errors	LC Pass	LC Low	LC Low	NOCHECK	LC Pass	LC High	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F13 Operator: 068
Run Time: 12/18/92 13:54:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-13.111	100960.	3.1201	25.559	519540.	137.20	1856.3
SDev	.252	1698.	.3852	.295	8021.	1.80	23.4
%RSD	1.9248	1.6819	12.347	1.1526	1.5439	1.3087	1.2601
#1	L-13.088	102810.	2.6952	25.850	528340.	139.14	1883.2
#2	L-12.871	100570.	3.2187	25.567	517620.	136.87	1845.0
#3	L-13.374	99483.	3.4465	25.261	512650.	135.59	1840.8
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.11876	H210910.	156570.	26390.	146600.	30020.	114450.
SDev	1.07918	4474.	2541.	780.	2450.	481.	1962.
%RSD	908.67	2.1213	1.6232	2.9562	1.6713	1.6039	1.7143
#1	-.81498	H215850.	159390.	27275.	149340.	30560.	116640.
#2	-.66570	H209770.	155860.	26090.	145860.	29868.	113830.
#3	1.1244	H207120.	154460.	25804.	144610.	29633.	112870.
Errors	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	575.42	L-81.685	-34.273	-61.720	3.2845	8607.8	-11.468
SDev	19.22	17.244	16.368	1.251	1.9113	108.5	33.553
%RSD	3.3405	21.111	47.757	2.0273	58.191	1.2604	292.59
#1	595.75	L-98.529	-18.069	-63.085	2.8307	8725.4	-48.219
#2	572.98	L-82.460	-33.951	-61.447	1.6409	8586.5	17.528
#3	557.54	L-64.066	-50.800	-60.628	5.3818	8511.6	-3.7123
Errors	LC Pass	LC Low	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F14 Operator: 069
Run Time: 12/18/92 13:57:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.2842	-62.839	43.111	.07853	S1924700.	-.31463	1.3669
SDev	.8867	16.298	1.379	.07824	283.	1.93238	2.7218
%RSD	20.697	25.937	3.1984	99.634	.01470	614.18	199.13
#1	-5.3073	-81.645	44.330	.16812	S1924400.	-2.1922	-1.4991
#2	-3.8064	-54.047	41.615	.04376	S1924800.	-.41995	1.6829
#3	-3.7389	-52.824	43.388	.02370	S1924900.	1.6683	3.9168
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.97322	37.399	203.07	5463.2	79340.	34.054	64121.
SDev	1.7612	1.482	2.13	295.7	1529.	.315	1540.
%RSD	180.97	3.9634	1.0500	5.4121	1.9265	.92638	2.4016
#1	1.3580	35.941	205.05	5654.0	81080.	33.834	65876.
#2	2.5102	38.904	200.81	5122.6	78212.	34.415	62992.
#3	-.94854	37.351	203.34	5613.1	78729.	33.913	63496.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-6.2674	L-21.319	-19.487	-102.68	4.7025	2787.1	1.1060
SDev	3.3020	22.740	24.044	2.88	2.4277	50.9	16.427
%RSD	52.685	106.67	123.38	2.8023	51.626	1.8245	1485.2
#1	-9.9156	L-46.232	-38.404	-105.69	6.1083	2845.3	20.059
#2	-3.4837	L-16.046	7.5705	-102.41	1.8992	2751.5	-7.7280
#3	-5.4027	-1.6780	-27.628	-99.951	6.0999	2764.5	-9.0133
Errors	LC Pass	LC Low	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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Method: CLP Sample Name: CCV Operator: 070
Run Time: 12/18/92 14:00:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1276.5	9923.7	9929.0	241.67	25607.	122.16	2546.9
SDev	5.3	27.4	50.3	1.70	83.	.72	18.0
%RSD	.41188	.27583	.50652	.70162	.32486	.59123	.70531
#1	1271.7	9893.6	9871.0	239.72	25518.	121.46	2526.2
#2	1282.1	9947.1	9961.5	242.50	25682.	122.90	2556.1
#3	1275.6	9930.4	9954.4	242.79	25623.	122.12	2558.4
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1009.3	1253.8	5052.7	24891.	25090.	2526.5	24269.
SDev	3.1	4.4	21.5	263.	111.	9.5	164.
%RSD	.30822	.35176	.42581	1.0557	.44258	.37520	.67504
#1	1005.8	1248.7	5028.3	25191.	24965.	2515.5	24081.
#2	1011.8	1256.9	5061.2	24700.	25179.	2532.0	24343.
#3	1010.1	1255.8	5068.8	24782.	25124.	2532.0	24383.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2565.7	936.53	2421.7	-1.9037	2533.8	2586.8	976.47
SDev	16.0	12.56	53.7	.8201	12.5	15.0	20.79
%RSD	.62456	1.3410	2.2164	43.078	.49214	.57821	2.1291
#1	2547.9	926.72	2360.9	-1.0835	2519.4	2569.7	976.30
#2	2570.2	950.69	2441.5	-2.7236	2541.5	2597.3	997.35
#3	2579.0	932.20	2462.6	-1.9039	2540.5	2593.4	955.77
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

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ethod: CLP Sample Name: CCB Operator:
Run Time: 12/18/92 14:04:00
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.41146	3.1012	1.7732	.39452	48.065	.89503	.73348
SDev	.23395	5.6861	.0001	.08099	11.558	.44836	2.7950
%RSD	56.859	183.35	.00546	20.530	24.046	50.094	381.06
#1	-.18811	8.0282	1.7731	.33811	58.217	.37909	3.3082
#2	-.39154	-3.1206	1.7731	.48732	50.491	1.1159	1.1313
#3	-.65474	4.3960	1.7733	.35811	35.486	1.1901	-2.2391
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.76780	1.9581	15.483	-245.23	10.391	4.1879	-236.16
SDev	2.84150	1.1214	.485	417.48	18.416	.5570	15.74
%RSD	370.08	57.271	3.1295	170.24	177.23	13.300	6.6662
#1	2.4964	2.8401	15.758	-68.120	22.921	4.8310	-218.08
#2	-2.1124	2.3381	15.768	54.496	19.006	3.8663	-246.80
#3	-2.6875	.69603	14.924	-722.07	-10.754	3.8663	-243.61
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.9463	-7.0938	-2.3238	-.13634	-2.0989	.02496	4.9856
SDev	5.6383	11.5036	5.3583	.23725	2.1924	.75101	7.2502
%RSD	142.87	162.16	230.59	174.01	104.46	3008.3	145.42
#1	1.4991	-5.0963	2.3271	-.41029	-.34125	-.42591	11.669
#2	-3.5786	3.2803	-8.1831	.00055	-1.3998	.89192	6.0109
#3	-9.7594	-19.465	-1.1153	.00071	-4.5556	-.39112	-2.7226
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

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ethod: CLP Sample Name: 7655-F15 Operator:
Run Time: 12/18/92 14:07:04
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca ✓	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-6.8717	47432.	13.342	11.705	435510.	103.20	412.00
SDev	1.0477	652.	.262	.285	7779.	.94	7.96
%RSD	15.247	1.3737	1.9668	2.4329	1.7863	.91256	1.9316
#1	-7.9421	46747.	13.039	11.419	427520.	103.67	403.16
#2	-6.8248	47503.	13.498	11.705	435930.	103.81	414.25
#3	-5.8482	48045.	13.489	11.989	443060.	102.12	418.59
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K ✓	Mg ✓	Mn	Na ✓
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.3875	7981.3	86166.	17861.	458720.	H56571.	105870.
SDev	3.8996	122.5	1401.	493.	5772.	933.	1443.
%RSD	281.05	1.5348	1.6254	2.7587	1.2583	1.6497	1.3629
#1	-4.2794	7853.0	84708.	17343.	452800.	H55609.	104350.
#2	-2.9307	7993.9	86289.	17916.	459050.	H56632.	106040.
#3	3.0475	8097.0	87501.	18324.	464330.	H57473.	107220.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	267.34	-.70297	-34.438	-59.671	5.6168	32763.	30.326
SDev	14.75	10.9025	12.518	.626	.7806	429.	24.755
%RSD	5.5162	1550.9	36.349	1.0493	13.897	1.3100	81.629
#1	257.36	-8.1524	-29.440	-58.988	4.9123	32334.	18.739
#2	284.28	-5.7671	-48.682	-60.217	5.4820	32763.	13.490
#3	260.38	11.811	-25.190	-59.809	6.4560	33193.	58.749
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F16 Operator: 073
Run Time: 12/18/92 14:10:08
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-18.599	690260.	1.9073	95.482	392250.	560.78	10083.
SDev	1.460	6583.	.2943	1.310	5117.	2.56	116.
%RSD	7.8525	.95375	15.432	1.3723	1.3046	.45627	1.1499
#1	L-18.858	696780.	1.6004	96.915	397430.	563.29	10210.
#2	L-19.912	690390.	1.9343	95.187	392110.	560.86	10055.
#3	L-17.026	683620.	2.1872	94.344	387200.	558.18	9983.2
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-54.149	H266190.	5401.3	7493.2	H1124700.	H556600.	84480.
SDev	3.497	3418.	64.3	816.4	9593.	10826.	747.
%RSD	6.4572	1.2842	1.1901	10.895	.85295	1.9451	.88459
#1	L-50.140	H269760.	5466.9	8433.2	H1134700.	H567930.	85322.
#2	L-56.568	H265880.	5398.6	6961.9	H1123700.	H555520.	84223.
#3	L-55.739	H262940.	5338.4	7084.5	H1115600.	H546360.	83896.
Errors	LC Low	LC High	LC Pass	LC Pass	LC High	LC High	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	3332.8	L-221.39	L-144.35	-46.972	-23.914	H92743.	-830.98
SDev	53.5	9.52	7.55	.472	2.908	843.	71.55
%RSD	1.6061	4.3002	5.2267	1.0058	12.161	.90861	8.6108
#1	3389.8	L-211.94	L-150.06	-46.700	-21.921	H93613.	-906.91
#2	3324.9	L-230.98	L-147.20	-47.518	-22.569	H92684.	-821.22
#3	3283.6	L-221.27	L-135.80	-46.698	-27.251	H91931.	-764.81
Errors	LC Pass	LC Low	LC Low	NOCHECK	LC Pass	LC High	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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Method: CLP Sample Name: 7655-F17 Operator: 074
Run Time: 12/18/92 14:13:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.2054	253.22	31.325	.10101	18161.	.29635	2.0155
SDev	1.2649	13.96	.512	.32586	111.	1.1289	.8967
%RSD	57.356	5.5144	1.6348	322.60	.61209	380.95	44.488
#1	-1.9243	261.27	31.029	-.07958	18216.	-.78717	2.7132
#2	-1.1047	261.30	31.029	.47719	18033.	.21042	1.0041
#3	-3.5872	237.10	31.916	-.09457	18233.	1.4658	2.3291
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.9325	45.572	57.455	1457.8	6260.9	88.019	10726.
SDev	.8806	3.232	.473	239.5	32.3	7.317	81.
%RSD	45.566	7.0930	.82285	16.428	.51552	8.3128	.75584
#1	-2.7004	49.233	57.721	1280.7	6296.7	96.394	10773.
#2	-2.1258	44.369	57.734	1730.2	6234.0	84.796	10633.
#3	-.97136	43.113	56.909	1362.4	6252.1	82.866	10773.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.5487	-7.1747	-14.896	.54669	-1.0318	20.921	5.7975
SDev	10.359	5.4397	13.272	.94605	2.1887	1.061	11.023
%RSD	668.87	75.817	89.095	173.05	212.12	5.0709	190.13
#1	-5.8432	-13.444	-9.0063	.00071	-3.4856	21.547	17.262
#2	13.388	-4.3674	-5.5889	1.6391	.71917	21.519	-4.7229
#3	-2.8992	-3.7122	-30.094	.00026	-.32908	19.696	4.8535
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

ethod: CLP Sample Name: 7655-F18 Operator: **075**
Run Time: 12/18/92 14:16:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.7880	-74.136	38.853	.50431	437010.	1.0650	-.73112
SDev	1.5666	8.366	.272	.01000	1935.	1.2181	.68351
%RSD	41.357	11.284	.69927	1.9818	.44288	114.37	93.488
#1	-3.5585	-78.047	39.010	.49433	439120.	.10475	-.34851
#2	-2.3488	-64.531	39.010	.50427	435310.	2.4352	-1.5203
#3	-5.4566	-79.829	38.540	.51432	436610.	.65514	-.32461
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.7348	38.197	223.83	5790.2	164140.	70.792	80863.
SDev	2.5976	3.171	1.75	403.2	1056.	3.990	508.
%RSD	149.73	8.3009	.78176	6.9641	.64355	5.6361	.62852
#1	4.2312	40.605	225.23	5980.9	165340.	75.261	81445.
#2	1.9267	39.381	224.39	6062.7	163360.	69.530	80503.
#3	-.95336	34.604	221.87	5327.0	163720.	67.586	80642.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-6.4955	3.7141	-17.358	-55.711	-4.4367	73.793	-7.8943
SDev	5.5623	5.5347	2.124	.820	2.1085	.007	15.7026
%RSD	85.632	149.02	12.238	1.4711	47.525	.00978	198.91
#1	-11.988	7.5535	-19.811	-56.531	-2.3281	73.801	7.4051
#2	-6.6317	6.2190	-16.100	-54.892	-4.4369	73.788	-7.1168
#3	-.86644	-2.6302	-16.164	-55.710	-6.5452	73.789	-23.971
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Method: CLP Sample Name: 7655-F19 Operator: 076
Run Time: 12/18/92 14:19:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.5757	59.743	25.414	.20345	353080.	6.4753	1.3535
SDev	.5176	2.786	1.024	.00763	4000.	.4164	.2981
%RSD	20.096	4.6640	4.0286	3.7499	1.1329	6.4306	22.023
#1	-2.3039	59.951	24.823	.19513	351960.	6.8952	1.5402
#2	-3.1726	56.859	24.823	.21012	349760.	6.4682	1.0097
#3	-2.2506	62.420	26.596	.20509	357520.	6.0625	1.5106
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.76693	46.444	351.37	4175.7	93844.	51.390	100980.
SDev	1.45022	.356	3.52	123.2	820.	.536	866.
%RSD	189.09	.76569	1.0010	2.9499	.87419	1.0433	.85714
#1	-.96023	46.625	350.24	4162.1	93643.	51.719	100630.
#2	-2.1108	46.035	348.56	4059.9	93142.	50.772	100350.
#3	.77024	46.674	355.31	4305.2	94745.	51.680	101970.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2.5328	-.81481	-26.490	-40.963	-1.9571	2284.9	-11.004
SDev	13.444	4.59001	19.243	.000	1.6065	25.2	11.794
%RSD	530.80	563.32	72.645	.00093	82.086	1.1008	107.17
#1	16.510	3.7026	-4.8727	-40.963	-.20569	2275.5	2.3169
#2	1.3931	-.67285	-32.844	-40.963	-3.3622	2265.8	-15.217
#3	-10.305	-5.4742	-41.752	-40.964	-2.3034	2313.4	-20.113
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F20 Operator: 077
Run Time: 12/18/92 14:22:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.1445	82439.	25.047	17.683	507710.	52.528	1417.4
SDev	1.1575	773.	.687	.175	4466.	2.301	14.8
%RSD	27.929	.93820	2.7428	.99020	.87966	4.3811	1.0428
#1	-5.4431	82253.	24.300	17.785	506660.	53.484	1414.8
#2	-3.7693	83288.	25.651	17.784	512610.	49.903	1433.3
#3	-3.2212	81775.	25.191	17.481	503860.	54.197	1404.1
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.4894	6123.9	2242.8	1233.0	198150.	42871.	62861.
SDev	2.6542	63.1	19.5	51.4	1605.	342.	637.
%RSD	59.122	1.0311	.87076	4.1712	.81004	.79752	1.0134
#1	-7.5538	6116.0	2242.5	1239.8	198030.	42814.	62783.
#2	-2.9976	6190.6	2262.4	1280.7	199810.	43237.	63533.
#3	-2.9167	6065.0	2223.4	1178.5	196610.	42560.	62266.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	522.83	L-27.645	-22.352	-32.907	1.4640	16458.	-77.124
SDev	7.57	12.948	19.364	.625	1.8046	116.	20.390
%RSD	1.4486	46.835	86.634	1.8995	123.27	.70317	26.439
#1	518.24	L-39.022	-38.043	-33.589	.40561	16460.	-64.748
#2	531.57	-13.557	-28.302	-32.771	.43868	16573.	-65.966
#3	518.67	L-30.356	-.71058	-32.362	3.5476	16342.	-100.66
Errors	LC Pass	LC Low	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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Method: CLP Sample Name: 7655-F21 Operator: 078
Run Time: 12/18/92 14:25:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.8319	7100.4	21.200	1.0585	426190.	27.051	31.879
SDev	.2630	24.7	.000	.0050	1644.	1.600	3.593
%RSD	9.2870	.34751	.00212	.47120	.38572	5.9145	11.272
#1	-2.9821	7113.7	21.200	1.0584	427570.	25.215	34.518
#2	-2.9853	7071.9	21.201	1.0536	424370.	27.793	33.332
#3	-2.5282	7115.6	21.200	1.0635	426620.	28.145	27.786
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2.3186	922.79	10715.	3862.4	105140.	5750.7	78235.
SDev	1.4515	5.21	38.	484.6	489.	23.7	489.
%RSD	62.601	.56495	.35676	12.547	.46481	.41284	.62445
#1	2.5090	924.91	10741.	3324.3	105440.	5765.8	78589.
#2	3.6655	916.86	10671.	3998.6	104580.	5723.3	77677.
#3	.78133	926.62	10733.	4264.3	105410.	5762.9	78439.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	25.893	-2.1442	-3.4803	-56.257	.32919	11646.	1.3350
SDev	4.645	5.8747	16.6238	.946	1.0423	33.	4.8746
%RSD	17.940	273.98	477.65	1.6810	316.63	.28720	365.14
#1	30.568	-6.2287	9.3344	-55.711	.33812	11677.	-3.3914
#2	21.278	4.5884	2.4893	-55.711	1.3670	11611.	1.0511
#3	25.833	-4.7924	-22.265	-57.349	-.71755	11650.	6.3453
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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:thod: CLP Sample Name: ICSAF Operator: 079
Run Time: 12/18/92 14:28:35
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	L-10.411	547040.	17.141	.49030	538360.	2.2021	-16.371
SDev	.451	2516.	1.024	.01086	3270.	1.8289	3.707
%RSD	4.3280	.46001	5.9727	2.2158	.60733	83.053	22.646
#1	L-10.591	544180.	15.958	.47912	534590.	4.1428	-12.699
#2	-9.8980	547990.	17.732	.49097	540220.	.51058	-20.113
#3	L-10.743	548930.	17.732	.50082	540280.	1.9529	-16.301
Errors	LC Low	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	3.5160	18.495	201580.	-831.06	536470.	20.760	808.04
SDev	.7563	.967	1168.	450.21	2539.	.494	2.76
%RSD	21.509	5.2293	.57952	54.173	.47327	2.3797	.34206
#1	3.2870	17.541	200230.	-803.81	533620.	21.320	806.45
#2	4.3603	19.475	202180.	-395.10	537280.	20.578	806.45
#3	2.9008	18.469	202330.	-1294.3	538500.	20.384	811.24
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	10.347	54.826	3.2374	-71.827	-1.3315	80.152	-211.26
SDev	6.816	25.645	19.473	1.251	2.2922	.716	29.45
%RSD	65.869	46.776	601.51	1.7421	172.15	.89368	13.940
#1	4.0803	52.397	-18.927	-72.919	1.0335	79.824	-177.70
#2	9.3581	81.599	11.040	-70.461	-1.4847	80.974	-223.28
#3	17.604	30.481	17.600	-72.099	-3.5433	79.659	-232.79
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: ICSABF Operator: 080
Run Time: 12/18/92 14:31:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	971.25	517940.	505.60	481.46	508870.	979.48	478.20
SDev	7.47	4278.	5.42	5.41	5245.	9.70	4.73
%RSD	.76912	.82604	1.0715	1.1230	1.0307	.98996	.98887
#1	965.72	514400.	500.87	479.18	505930.	970.57	476.10
#2	979.75	522700.	511.51	487.64	514930.	989.81	483.62
#3	968.27	516730.	504.41	477.58	505760.	978.07	474.88
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	477.34	522.69	190830.	-599.46	511250.	489.00	788.36
SDev	8.78	4.98	1944.	178.16	4183.	4.80	12.90
%RSD	1.8398	.95280	1.0188	29.720	.81823	.98104	1.6362
#1	476.17	520.46	189690.	-476.84	507930.	488.08	780.91
#2	486.65	528.40	193070.	-517.71	515950.	494.19	803.25
#3	469.20	519.22	189720.	-803.81	509870.	484.73	780.91
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	939.27	4678.4	23.437	-67.715	472.41	1017.3	-216.30
SDev	10.82	57.5	19.052	1.086	4.93	6.8	13.75
%RSD	1.1517	1.2301	81.290	1.6038	1.0427	.66606	6.3591
#1	940.11	4625.0	1.4950	-67.305	468.35	1014.1	-210.81
#2	949.64	4739.4	33.035	-68.946	477.89	1025.1	-231.95
#3	928.05	4670.7	35.781	-66.894	470.98	1012.8	-206.13
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: CRIF Operator: 081
Run Time: 12/18/92 14:34:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca ✓	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	7.1609	542.76	402.43	10.123	10177.	10.209	101.40
SDev	.2365	14.14	3.07	.008	38.	.294	2.40
%RSD	3.3031	2.6058	.76323	.07546	.37132	2.8834	2.3675
#1	7.0286	555.48	400.66	10.122	10196.	10.381	102.14
#2	7.4340	545.28	400.66	10.117	10134.	9.8690	103.34
#3	7.0202	527.53	405.98	10.132	10202.	10.377	98.714
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K ✓	Mg ✓	Mn	Na ✓
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	19.159	54.922	242.62	10341.	10159.	40.145	9873.6
SDev	1.152	.803	7.50	239.	35.	.002	88.2
%RSD	6.0124	1.4620	3.0931	2.3160	.34388	.00433	.89375
#1	19.159	54.230	251.06	10436.	10160.	40.143	9884.3
#2	20.311	55.803	240.08	10518.	10123.	40.146	9780.5
#3	18.007	54.734	236.71	10068.	10193.	40.146	9956.1
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	84.135	116.24	115.23	-1.9167	95.108	41.399	126.49
SDev	5.438	14.80	4.03	.4730	1.609	1.018	2.28
%RSD	6.4632	12.729	3.4993	24.679	1.6922	2.4579	1.8001
#1	79.662	106.76	112.91	-2.4628	95.462	42.270	124.67
#2	82.556	133.29	112.90	-1.6439	96.511	41.646	129.04
#3	90.188	108.66	119.89	-1.6433	93.351	40.281	125.75
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report QC Standard Fri 12-18-92 02:40:48 PM page 1

Method: CLP Sample Name: CCV Operator: 082
Run Time: 12/18/92 14:37:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1313.1	10193.	10382.	254.09	26034.	125.19	2644.9
SDev	9.0	91.	92.	2.71	200.	.44	22.4
%RSD	.68708	.89374	.88338	1.0647	.76829	.34859	.84842
#1	1322.9	10297.	10486.	257.18	26265.	124.84	2669.6
#2	1305.1	10128.	10311.	252.18	25905.	125.68	2625.9
#3	1311.5	10153.	10350.	252.90	25933.	125.05	2639.2
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1052.3	1299.4	5203.7	26253.	25920.	2590.8	25006.
SDev	7.9	10.1	52.6	415.	237.	20.2	236.
%RSD	.75432	.77782	1.0104	1.5800	.91350	.77813	.94533
#1	1061.4	1311.0	5264.4	26621.	26188.	2614.0	25278.
#2	1046.4	1292.8	5173.3	25804.	25738.	2577.3	24853.
#3	1049.3	1294.4	5173.3	26335.	25835.	2581.2	24885.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2664.2	968.08	2532.2	-2.7343	2580.5	2644.6	1041.9
SDev	24.5	25.90	30.8	.0021	22.8	17.5	15.2
%RSD	.91991	2.6758	1.2164	.07627	.88369	.66094	1.4607
#1	2690.4	963.67	2510.8	-2.7366	2606.9	2664.7	1058.6
#2	2660.2	944.66	2518.2	-2.7327	2567.9	2636.7	1038.4
#3	2641.9	995.90	2567.5	-2.7335	2566.9	2632.5	1028.7
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

Analysis Report QC Standard Fri 12-18-92 02:43:52 PM page 1

ethod: CLP Sample Name: CCB Operator: 083
Run Time: 12/18/92 14:40:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.52055	20.478	2.0504	-.04308	11.680	.74125	.78062
SDev	1.2647	9.167	.4798	.07604	4.430	.88909	2.2358
%RSD	242.95	44.767	23.402	176.50	37.924	119.94	286.41
#1	.26721	24.829	1.7733	-.08947	13.212	1.1999	-.96890
#2	-.59830	9.9455	1.7734	-.08446	6.6880	1.3073	.01124
#3	1.8927	26.660	2.6045	.04468	15.140	-.28350	3.2995
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.96057	.14710	10.124	-544.96	6.1906	4.1852	-276.59
SDev	1.72841	1.0734	1.288	818.80	8.3718	.5569	4.87
%RSD	179.94	729.73	12.721	150.25	135.23	13.307	1.7623
#1	-2.6894	.19149	8.9954	-599.45	1.2499	3.8624	-272.33
#2	-.95979	-.94783	9.8491	-1335.2	1.4651	3.8649	-281.90
#3	.76744	1.1976	11.527	299.73	15.857	4.8283	-275.52
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.5730	-8.2760	1.1829	.00025	-1.0494	-1.0380	29.061
SDev	5.3018	11.1313	8.8529	.81904	1.6081	1.1532	16.722
%RSD	148.39	134.50	748.41	324610.	153.24	111.10	57.543
#1	1.4486	-16.020	2.3269	.00071	-1.4031	-1.7180	23.596
#2	-3.0511	-13.288	-8.1864	-.81902	-2.4511	.29348	15.754
#3	-9.1165	4.4802	9.4083	.81907	.70615	-1.6896	47.832
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

ICP RUN LOG

SWOK/AATS

ANALYST: [illegible] DATE 12-23-92

INSTRUMENT: TJA61 CALIBRATION STD: SOURCE

Reviewed BY [illegible] 12/28/92 T5141223.ASC

Client ID	LAB ID	Time	Dilution Factor	Analytes
	STD0	1415		Ca, Cd, Fe, Mg
	STD1	1418		Ca, Fe, Mg
	STD4	1421		Cd
	STD2	1424		—
	STD3	1427		—
	ICV	1427		Ca, Cd, Fe, Mg
	ICB	1430		"
	ICSAI	1433		"
	ICSABI	1436		"
	CRII	1440		Cd
	CCV	1443		Ca, Cd, Fe, Mg
	CCB	1446		"
15701A	12047.02A	1449		Fe-4000
11148A DISS	11988.02A	1452		Cd-10
MESN38A	12023.07A	1455		Cd-10
7655-F16	11992.07	1458	10	Mg
7655-F14	11992.05	1501	10	Ca
	ICSAF	1504		Ca, Cd, Fe, Mg
	ICSABF	1507		"
	CRIF	1510		Cd
	CCV	1514		Ca, Cd, Fe, Mg
	CCB	1517		"

085

Method: CLP Standard: STD0

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Avge	-.00138	.01729	.00005	.00457	.00410	.00020	.00003
SDev	.00016	.00161	.00008	.00000	.00293	.00031	.00005
%RSD	11.945	9.3136	173.21	.00000	71.604	159.48	173.21
#1	-.00129	.01814	.00014	.00457	.00657	.00046	.00008
#2	-.00157	.01829	.00000	.00457	.00486	.00029	.00000
#3	-.00129	.01543	.00000	.00457	.00086	-.00015	.00000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Avge	.00162	.00170	.07562	.02714	.00072	.01343	.03190
SDev	.00157	.00014	.00016	.00234	.00062	.00000	.00162
%RSD	97.192	8.3971	.21814	8.6162	86.697	.00000	5.0922
#1	.00314	.00170	.07571	.02914	.00105	.01343	.03371
#2	.00171	.00185	.07571	.02771	.00111	.01343	.03143
#3	.00000	.00156	.07543	.02457	.00000	.01343	.03057

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Avge	.00051	.00016	.00005	.00143	-.00010	.00019	.01057
SDev	.00321	.00734	.00058	.00000	.00016	.00033	.00072
%RSD	630.97	4610.1	1212.4	.00000	173.21	173.21	6.7950
#1	.00414	-.00827	.00014	.00143	.00000	.00000	.01048
#2	-.00067	.00516	.00057	.00143	.00000	.00057	.01132
#3	-.00195	.00358	-.00057	.00143	-.00029	.00000	.00989

Standardization Rpt. Wed 12-23-92 02:18:41 PM page 1

ethod: CLP Standard: STD1

Elem	Ag	Al	Ba	Be	Ca	Co	Cr
Avge	.82050	2.9411	3.0984	.49110	29.648	.62799	.97686
SDev	.00074	.0043	.0054	.00425	.154	.00313	.00675
%RSD	.09030	.14506	.17294	.86506	.52103	.49766	.69152
#1	.82105	2.9429	3.1039	.49171	29.684	.62929	.97971
#2	.81966	2.9443	3.0983	.49500	29.782	.63025	.98171
#3	.82080	2.9363	3.0932	.48657	29.479	.62442	.96914

Elem	Cu	Fe	K	Mg	Mn	Na	Ni
Avge	.63694	3.3208	.39010	4.7486	1.4757	4.2331	1.6965
SDev	.00088	.0106	.00305	.0121	.0067	.0076	.0058
%RSD	.13827	.31800	.78315	.25558	.45116	.17986	.34128
#1	.63667	3.3236	.39200	4.7536	1.4777	4.2417	1.6984
#2	.63793	3.3297	.39171	4.7574	1.4811	4.2303	1.7011
#3	.63623	3.3091	.38657	4.7347	1.4683	4.2273	1.6900

Elem	Sb	V	Zn
Avge	.40743	1.2847	1.0906
SDev	.00351	.0038	.0045
%RSD	.86172	.29617	.41268
#1	.40343	1.2837	1.0919
#2	.40886	1.2889	1.0944
#3	.41000	1.2814	1.0856

Standardization Rpt. Wed 12-23-92 02:21:46 PM

Method: CLP Standard: STD4

Elem	Cd
Avge	.10473
SDev	.00047
%RSD	.44974
#1	.10484
#2	.10422
#3	.10514

Standardization Rpt. Wed 12-23-92 02:24:51 PM page 1

Method: CLP Standard: STD2

Elem	Pb	As
Avge	1.2397	.27326
SDev	.0158	.00347
%RSD	1.2760	1.2680
#1	1.2475	.27634
#2	1.2501	.27394
#3	1.2215	.26951

Standardization Rpt. Wed 12-23-92 02:27:35 PM

Method: CLP Standard: STD3

Elem	Ti
Avge	3.2931
SDev	.0148
%RSD	.44929
#1	3.2763
#2	3.3041
#3	3.2989

Analysis Report QC Standard Wed 12-23-92 02:30:41 PM page 1

Method: CLP Sample Name: ICV wrong check Table Operator:
Run Time: 12/23/92 14:27:40
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	Q511.20	Q1886.6	Q1998.8	Q469.95	Q49675.	Q520.11	Q498.42
SDev	1.28	9.9	19.5	8.31	534.	3.32	5.16
%RSD	.25073	.52293	.97537	1.7684	1.0748	.63851	1.0347
#1	Q511.87	Q1892.3	Q2011.4	Q475.35	Q50039.	Q519.45	Q495.79
#2	Q509.72	Q1875.2	Q1976.4	Q460.38	Q49062.	Q517.17	Q495.11
#3	Q512.00	Q1892.2	Q2008.7	Q474.13	Q49924.	Q523.71	Q504.36
Errors	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail	QC Fail
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	Q510.09	Q515.84	Q1991.7	Q51233.	24543.	Q501.61	Q50152.
SDev	7.09	3.23	18.9	353.	192.	4.81	466.
%RSD	1.3890	.62689	.94737	.68857	.78261	.95902	.92906
#1	Q512.63	Q517.71	Q2000.8	Q51050.	24664.	Q504.86	Q50582.
#2	Q502.09	Q512.11	Q1970.0	Q51010.	24321.	Q496.08	Q49657.
#3	Q515.56	Q517.70	Q2004.3	Q51640.	24643.	Q503.88	Q50218.
Errors	QC Fail	QC Fail	QC Fail	QC Fail	QC Pass	QC Fail	QC Fail
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	Q517.54	Q4976.9	Q1019.8	-3.1720	Q504.37	Q3017.8	-18.934
SDev	13.88	17.1	37.1	1.3024	5.90	17.8	25.906
%RSD	2.6828	.34445	3.6409	41.059	1.1692	.58942	136.82
#1	Q522.64	Q4986.1	Q977.64	-1.8707	Q502.15	Q3031.8	-23.944
#2	Q501.83	Q4957.1	Q1033.9	-3.1699	Q499.90	Q2997.8	9.1108
#3	Q528.16	Q4987.5	Q1047.7	-4.4754	Q511.05	Q3023.9	-41.970
Errors	QC Fail	QC Fail	QC Fail	NOCHECK	QC Fail	QC Fail	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

Analysis Report QC Standard Wed 12-23-92 02:33:47 PM page 1

thod: CLP Sample Name: ICB Operator:
Run Time: 12/23/92 14:30:46
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.85124	-7.4962	-.30724	.29191	20.570	-.56689	.22851
SDev	.67647	7.9181	.00005	.00530	4.122	.95542	2.8921
%RSD	79.469	105.63	.01577	1.8160	20.037	168.54	1265.6
#1	-1.4504	-2.9098	-.30724	.29721	20.086	.16355	-2.5010
#2	-.98568	-16.639	-.30719	.28660	24.913	-1.6481	-.07295
#3	-.11764	-2.9395	-.30729	.29192	16.712	-.21610	3.2595
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.9531	-1.6522	-2.4910	-78.719	2.6284	.00113	5.6680
SDev	.8943	.5629	.9170	297.159	7.3102	.00110	3.9261
%RSD	45.788	34.070	36.811	377.49	278.12	97.601	69.267
#1	-2.7337	-1.6753	-1.4630	-393.60	-5.3138	.00079	7.9353
#2	-.97733	-2.2032	-3.2245	-39.359	4.1240	.00236	7.9342
#3	-2.1482	-1.0781	-2.7855	196.80	9.0751	.00024	1.1346
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.9297	-7.5860	-.59339	-.57815	.36726	1.1829	-3.4846
SDev	10.947	8.7380	7.06927	.50091	1.1121	.7007	22.4333
%RSD	567.28	115.19	1191.3	86.641	302.80	59.234	643.78
#1	-6.1069	-17.437	6.4648	-.86727	-.74484	1.7706	.06221
#2	14.397	-4.5521	-7.6737	.00026	1.4793	.40747	-27.480
#3	-2.5012	-.76930	-.57127	-.86743	.36733	1.3706	16.964
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

Analysis Report Wed 12-23-92 02:36:54 PM page 1

thod: CLP Sample Name: ICSAI Operator:
Run Time: 12/23/92 14:33:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-7.1906	505090.	15.061	.21476	486910.	-2.2349	-18.451
SDev	1.3528	676.	1.067	.15241	936.	2.3199	1.075
%RSD	18.813	.13391	7.0828	70.964	.19218	103.80	5.8280
#1	-6.3784	505390.	16.293	.30511	487380.	-3.1654	-17.361
#2	-6.4412	505560.	14.445	.30038	487520.	.40576	-18.482
#3	-8.7522	504310.	14.445	.03880	485830.	-3.9450	-19.511
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.8087	21.105	183380.	-255.84	494710.	9.8219	1154.0
SDev	1.4602	1.049	294.	534.99	890.	.8811	12.3
%RSD	80.729	4.9692	.16020	209.11	.17982	8.9704	1.0625
#1	1.9976	21.709	183690.	334.56	494680.	10.752	1167.6
#2	3.1652	21.712	183330.	-393.60	495620.	9.7132	1150.6
#3	.26331	19.894	183110.	-708.48	493840.	9.0002	1143.8
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	5.3561	67.224	63.485	-65.971	-3.3645	71.235	-244.28
SDev	7.9527	19.440	14.850	.000	3.6432	1.433	79.78
%RSD	148.48	28.917	23.392	.00059	108.28	2.0120	32.660
#1	-2.5195	74.707	68.102	-65.971	-1.7784	72.217	-157.85
#2	5.2040	81.811	46.875	-65.971	-.78328	71.898	-315.10
#3	13.384	45.156	75.478	-65.970	-7.5319	69.591	-259.89
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report Wed 12-23-92 02:39:59 PM

Method: CLP Sample Name: ICSABI Operator:
Run Time: 12/23/92 14:36:58
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	939.86	503650.	486.43	445.69	484460.	929.95	455.14
SDev	1.87	1168.	3.19	4.11	2786.	3.05	3.41
%RSD	.19857	.23193	.65669	.92271	.57513	.32838	.74962
#1	941.03	504920.	490.11	449.98	487200.	927.96	458.86
#2	940.86	503400.	484.58	445.30	484550.	933.47	454.40
#3	937.71	502620.	484.58	441.78	481630.	928.43	452.15
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	453.57	507.64	182890.	-157.44	493950.	460.44	1168.7
SDev	2.66	1.17	841.	432.96	1352.	1.72	13.7
%RSD	.58677	.23046	.45987	275.00	.27373	.37399	1.1759
#1	455.89	508.99	183830.	275.52	495350.	462.14	1181.2
#2	454.16	507.02	182640.	-157.44	493830.	460.49	1171.0
#3	450.66	506.92	182210.	-590.40	492660.	458.70	1154.0
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	885.74	4597.1	89.974	-66.665	462.65	963.74	-289.62
SDev	8.58	6.3	8.278	.501	2.84	3.06	83.55
%RSD	.96922	.13683	9.2008	.75093	.61328	.31759	28.847
#1	885.38	4590.2	97.574	-66.087	465.93	967.21	-275.78
#2	894.50	4602.5	91.195	-66.955	461.09	962.58	-213.86
#3	877.34	4598.7	81.153	-66.954	460.94	961.43	-379.23
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report Wed 12-23-92 02:43:04 PM page 1

Method: CLP Sample Name: CRII Operator:
Run Time: 12/23/92 14:40:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	7.3499	617.18	397.03	9.7105	10070.	9.1153	97.927
SDev	.2827	33.21	2.42	.1680	44.	.7162	1.663
%RSD	3.8460	5.3804	.60905	1.7306	.43625	7.8575	1.6986
#1	7.5129	650.37	395.23	9.8101	10099.	9.2368	96.607
#2	7.0235	617.21	396.09	9.5164	10020.	8.3461	99.795
#3	7.5132	583.95	399.78	9.8048	10093.	9.7630	97.380
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	18.505	50.268	246.66	10430.	10237.	32.748	10507.
SDev	1.691	.629	16.60	297.	19.	.006	43.
%RSD	9.1378	1.2521	6.7317	2.8490	.18169	.01703	.40841
#1	19.481	49.942	264.84	10745.	10254.	32.742	10459.
#2	19.482	50.993	242.84	10155.	10217.	32.749	10519.
#3	16.553	49.868	232.29	10391.	10241.	32.753	10542.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	72.101	123.49	124.94	-1.4515	98.698	41.433	119.49
SDev	6.928	11.37	10.17	1.0025	.635	1.727	9.53
%RSD	9.6093	9.2040	8.1408	69.065	.64360	4.1680	7.9778
#1	80.095	135.91	113.20	-2.6091	98.336	40.741	108.50
#2	67.829	120.95	130.81	-.87311	98.328	40.158	125.59
#3	68.380	113.61	130.82	-.87234	99.432	43.398	124.37
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report QC Standard Wed 12-23-92 02:46:10 PM page 1

ethod: CLP Sample Name: CCV Operator:
Run Time: 12/23/92 14:43:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1254.5	9919.1	10001.	237.39	24921.	125.74	2508.6
SDev	1.7	22.5	13.	.85	46.	2.42	9.7
%RSD	.13676	.22677	.13479	.35772	.18562	1.9262	.38583
#1	1252.8	9901.6	9997.5	236.54	24893.	128.53	2507.6
#2	1256.2	9944.5	10016.	237.40	24895.	124.33	2499.5
#3	1254.5	9911.2	9989.7	238.23	24974.	124.34	2518.8
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	994.98	1258.1	5002.2	24980.	24942.	2500.1	25154.
SDev	3.51	2.6	11.6	492.	45.	5.4	131.
%RSD	.35305	.20643	.23249	1.9701	.18239	.21527	.52182
#1	991.47	1255.1	4993.4	25466.	24897.	2497.5	25065.
#2	994.98	1259.6	4997.8	24993.	24988.	2496.5	25305.
#3	998.49	1259.6	5015.4	24482.	24942.	2506.3	25093.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2496.9	944.38	2451.1	-3.4440	2567.6	2484.7	968.06
SDev	7.3	2.95	45.8	.5003	7.0	5.4	12.25
%RSD	.29425	.31207	1.8694	14.528	.27077	.21660	1.2657
#1	2491.8	943.08	2398.5	-3.7324	2562.0	2478.6	974.62
#2	2493.6	942.31	2482.7	-3.7334	2565.4	2489.0	975.63
#3	2505.3	947.75	2472.1	-2.8663	2575.4	2486.3	953.92
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

Analysis Report QC Standard Wed 12-23-92 02:49:15 PM page 1

..ethod: CLP Sample Name: CCB Operator:
Run Time: 12/23/92 14:46:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.0161	9.4193	3.9960	.08385	17.505	-.64567	.53342
SDev	1.5580	4.0382	1.0646	.18036	7.018	.55145	1.3164
%RSD	153.32	42.872	26.642	215.09	40.093	85.407	246.78
#1	.71072	10.667	5.2253	-.02810	25.372	-.10578	-.22360
#2	-1.4428	12.686	3.3813	-.01225	15.259	-.62325	2.0534
#3	-2.3163	4.9044	3.3813	.29191	11.885	-1.2080	-.22955
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-1.7586	-.55217	.28682	-144.32	5.3284	.97538	6.8022
SDev	2.4393	1.94705	2.6348	330.09	17.777	.97587	8.5575
%RSD	138.71	352.62	918.64	228.72	333.63	100.05	125.80
#1	.19348	1.6961	2.9225	236.16	25.523	1.9514	7.9364
#2	-4.4932	-1.6767	.28521	-354.24	-1.5801	.97503	14.736
#3	-.97614	-1.6759	-2.3472	-314.88	-7.9572	-.00032	-2.2658
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-4.3891	8.5241	-1.7370	-1.1569	2.9638	1.9441	-7.9611
SDev	5.4660	13.511	11.2389	.5016	2.8006	.6684	15.0457
%RSD	124.53	158.50	647.04	43.357	94.495	34.380	188.99
#1	-2.6891	-.28402	6.4292	-1.7360	5.9331	2.6776	-7.5096
#2	.02483	1.7764	2.9148	-.86681	2.5887	1.3695	-23.227
#3	-10.503	Q24.080	-14.555	-.86774	.36964	1.7851	6.8538
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

Analysis Report Wed 12-23-92 02:52:20 PM page 1

Method: CLP Sample Name: 15701A Operator:
Run Time: 12/23/92 14:49:19
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.39547	1293.8	56.983	-.04839	20182.	1.2233	1.9534
SDev	.88348	9.6	.686	.07712	91.	.7721	4.6549
%RSD	223.40	.74245	1.2036	159.38	.45158	63.118	238.30
#1	-.92812	1304.0	57.722	.04061	20287.	.34080	3.4237
#2	-.88264	1292.5	56.858	-.09551	20125.	1.7744	-3.2591
#3	.62434	1284.9	56.368	-.09026	20134.	1.5545	5.6957
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	10.678	86.945	2375.9	32655.	48911.	140.00	72814.
SDev	2.111	1.397	11.0	256.	177.	1.13	361.
%RSD	19.774	1.6066	.46301	.78422	.36274	.80601	.49556
#1	13.020	86.730	2387.1	32669.	49078.	140.65	73089.
#2	8.9204	85.668	2365.1	32905.	48930.	138.70	72948.
#3	10.093	88.437	2375.6	32393.	48725.	140.66	72406.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	22.958	.39557	1.3657	129.91	19.235	84.307	-1.8237
SDev	9.394	15.987	7.3615	1.00	1.702	1.088	6.6557
%RSD	40.919	4041.6	539.03	.77113	8.8498	1.2900	364.95
#1	33.277	18.557	-6.8980	131.06	21.094	85.562	4.0459
#2	20.695	-11.550	7.2224	129.33	18.859	83.678	-9.0549
#3	14.902	-5.8203	3.7727	129.33	17.753	83.679	-.46217
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

^nalysis Report Wed 12-23-92 02:55:26 PM page 1

Method: CLP Sample Name: 11148A DISS Operator:
Run Time: 12/23/92 14:52:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	23.892	72.965	49.141	.18172	44680.	13.904	-1.0061
SDev	.489	5.054	.499	.16354	161.	.876	2.4407
%RSD	2.0461	6.9273	1.0156	89.996	.36049	6.2995	242.59
#1	23.329	72.217	48.565	-.00702	44723.	14.296	-.47999
#2	24.204	78.352	49.429	.27086	44502.	14.515	-3.6669
#3	24.144	68.326	49.429	.28133	44816.	12.901	1.1286
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.99750	12.760	89.287	8199.9	25624.	266.75	28908.
SDev	1.17243	.632	.508	394.3	141.	1.95	129.
%RSD	117.54	4.9502	.56913	4.8080	.54925	.73123	.44729
#1	.17507	12.403	89.583	7793.2	25721.	266.75	29041.
#2	-2.1698	12.389	88.701	8580.4	25462.	264.80	28782.
#3	-.99780	13.490	89.578	8226.2	25687.	268.70	28903.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.0695	9.8364	-13.003	-5.7864	3.0104	11.061	5.3713
SDev	6.3046	5.8791	7.271	1.0020	1.6971	.999	5.3627
%RSD	589.52	59.769	55.916	17.317	56.376	9.0326	99.839
#1	-5.6060	15.505	-21.158	-5.2080	1.5296	10.178	2.9553
#2	1.8919	10.237	-10.654	-6.9434	4.8624	10.859	1.6417
#3	6.9225	3.7674	-7.1969	-5.2077	2.6392	12.146	11.517
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report Wed 12-23-92 02:58:30 PM

Method: CLP Sample Name: MESN38A Operator:
Run Time: 12/23/92 14:55:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.31429	89.458	15.349	.17435	37983.	13.291	-1.1708
SDev	.43110	9.263	.923	.16212	156.	1.013	2.0721
%RSD	137.17	10.355	6.0116	92.982	.41182	7.6192	176.98
#1	.29177	99.921	16.291	-.01262	37817.	13.164	-.32778
#2	-.10511	86.153	14.446	.25988	38005.	14.360	.34691
#3	.75621	82.301	15.311	.27579	38128.	12.347	-3.5316
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	65.622	6.3999	17.254	564.16	8901.1	4.5503	4376.3
SDev	.895	.3042	1.018	181.79	21.1	.0011	34.4
%RSD	1.3633	4.7538	5.9027	32.224	.23748	.02370	.78599
#1	64.645	6.5758	17.837	354.24	8878.3	4.5494	4394.5
#2	66.402	6.5754	16.078	669.12	8920.0	4.5501	4397.9
#3	65.818	6.0486	17.847	669.12	8905.0	4.5515	4336.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.76412	10.399	.71618	-4.9359	4.5543	7.1613	12.643
SDev	6.92636	9.335	7.2928	1.0023	2.3152	.3903	24.319
%RSD	906.46	89.762	1018.3	20.307	50.836	5.4503	192.35
#1	3.0107	18.341	8.8796	-4.3569	2.6992	7.6110	5.6563
#2	3.4549	.11721	-5.1557	-4.3574	7.1489	6.9613	39.690
#3	-8.7579	12.740	-1.5754	-6.0932	3.8147	6.9115	-7.4177
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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Method: CLP Sample Name: 7655-F16 1:9 Operator:
Run Time: 12/23/92 14:58:34
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-3.2489	83137.	.27554	11.360	48763.	69.002	1287.7
SDev	.8231	376.	1.0668	.220	488.	2.863	14.3
%RSD	25.334	.45285	387.17	1.9385	1.0016	4.1490	1.1118
#1	-2.3230	83464.	.88055	11.597	49308.	71.055	1302.8
#2	-3.5262	82726.	.90234	11.320	48365.	65.731	1274.4
#3	-3.8976	83221.	-.95626	11.162	48617.	70.218	1285.8
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-9.4072	28930.	731.82	1298.9	135630.	H59550.	10888.
SDev	1.1784	129.	2.24	78.7	512.	547.	50.
%RSD	12.527	.44463	.30553	6.0606	.37734	.91814	.45722
#1	-8.4849	29043.	733.75	1377.6	136150.	H60175.	10933.
#2	L-10.735	28790.	729.37	1220.2	135130.	H59156.	10835.
#3	-9.0019	28957.	732.34	1298.9	135620.	H59320.	10896.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	439.01	L-43.957	4.4123	-5.4948	-1.2645	11920.	-139.72
SDev	21.17	7.890	5.2930	.5012	1.7231	87.	21.59
%RSD	4.8221	17.949	119.96	9.1218	136.27	.73278	15.455
#1	461.25	L-35.424	2.6427	-5.2057	.24988	12020.	-114.79
#2	419.10	L-45.459	.23087	-5.2051	-3.1393	11861.	-151.84
#3	436.70	L-50.988	10.363	-6.0736	-.90403	11878.	-152.52
Errors	LC Pass	LC Low	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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ethod: CLP Sample Name: 7655-F14 1:9 Operator:
Run Time: 12/23/92 15:01:40
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.38710	91.878	4.9168	.08597	82854.	-.72104	1.5808
SDev	1.29118	9.465	1.9198	.16946	3334.	1.10465	.6968
%RSD	333.55	10.302	39.045	197.11	4.0239	153.20	44.080
#1	-.75912	91.560	4.3017	-.01187	85277.	-1.8788	1.9809
#2	-1.4514	101.50	3.3799	-.01186	84234.	.32143	1.9854
#3	1.0493	82.576	7.0687	.28165	79052.	-.60573	.77621
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-2.0542	15.203	28.962	1285.8	9090.1	28.316	8001.1
SDev	3.7331	3.129	1.004	256.1	352.7	7.885	249.0
%RSD	181.73	20.584	3.4677	19.918	3.8797	27.846	3.1115
#1	-4.4960	18.435	30.122	1535.0	9358.7	36.773	8179.1
#2	-3.9098	14.986	28.374	1298.9	9220.8	27.007	8107.7
#3	2.2431	12.188	28.391	1023.4	8690.7	21.167	7716.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	3.5029	3.0804	5.3361	-10.705	2.6100	330.18	4.5713
SDev	2.9171	23.033	10.549	1.001	.0042	12.07	12.839
%RSD	83.275	747.74	197.69	9.3538	.16149	3.6564	280.86
#1	.13901	L-20.618	-5.2003	-11.283	2.6078	340.45	7.0027
#2	5.0354	4.4752	5.3108	-11.283	2.6074	333.20	-9.3095
#3	5.3344	25.384	15.898	-9.5485	2.6149	316.88	16.021
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Method: CLP Sample Name: ICSAF Operator:
Run Time: 12/23/92 15:04:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-8.4313	501900.	15.676	.01452	484100.	-.23834	-19.130
SDev	.6177	3540.	1.066	.00562	4708.	1.15486	.610
%RSD	7.3262	.70542	6.7988	38.731	.97251	484.54	3.1879
#1	-8.4302	504570.	16.293	.01025	488500.	-.35612	-19.604
#2	-7.8142	503250.	14.445	.01242	484650.	.97089	-18.442
#3	-9.0496	497880.	16.290	.02090	479140.	-1.3298	-19.343
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1.6799	20.190	182910.	-209.92	491460.	13.706	1184.0
SDev	.8981	2.054	1738.	163.87	3322.	.951	12.8
%RSD	53.462	10.172	.95040	78.063	.67601	6.9395	1.0777
#1	.84250	22.376	184530.	-393.60	494320.	14.804	1171.0
#2	2.6284	19.892	183110.	-78.719	492230.	13.137	1196.5
#3	1.5689	18.301	181080.	-157.44	487810.	13.177	1184.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-6.5628	55.235	67.816	-67.417	-2.4054	71.444	-267.73
SDev	6.4431	28.543	24.092	.501	1.1830	1.037	103.68
%RSD	98.177	51.675	35.525	.74300	49.181	1.4517	38.724
#1	.80493	73.922	50.801	-67.706	-1.5033	72.080	-149.19
#2	-9.3512	69.403	95.383	-66.839	-1.9681	70.247	-341.48
#3	-11.142	22.380	57.263	-67.707	-3.7448	72.005	-312.53
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

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Method: CLP Sample Name: ICSABF Operator:
Run Time: 12/23/92 15:07:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	932.63	501560.	482.99	446.03	483490.	921.82	450.71
SDev	2.40	680.	1.06	3.44	1590.	4.54	2.69
%RSD	.25724	.13566	.22044	.77042	.32889	.49199	.59627
#1	930.84	501010.	483.60	443.82	482440.	918.13	447.88
#2	931.69	501340.	481.76	444.28	482710.	920.44	451.04
#3	935.36	502320.	483.60	449.99	485320.	926.88	453.23
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	455.66	505.27	182880.	-209.92	491040.	459.25	1199.3
SDev	3.80	2.04	634.	120.25	854.	1.37	19.9
%RSD	.83496	.40337	.34682	57.282	.17389	.29909	1.6613
#1	458.02	504.13	182660.	-236.16	491240.	459.01	1191.4
#2	451.27	504.05	182390.	-78.719	490100.	458.02	1222.0
#3	457.70	507.62	183600.	-314.88	491770.	460.73	1184.6
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	887.27	4570.4	96.768	-67.244	462.65	962.84	-207.22
SDev	5.23	20.5	22.516	.502	1.44	3.14	73.11
%RSD	.58939	.44872	23.268	.74604	.31071	.32631	35.282
#1	885.09	4564.9	95.761	-67.824	463.32	960.71	-127.72
#2	883.49	4593.1	74.773	-66.954	461.00	961.37	-222.37
#3	893.24	4553.2	119.77	-66.956	463.63	966.45	-271.56
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report Wed 12-23-92 03:13:56 PM page 1

Method: CLP Sample Name: CRIF Operator:
Run Time: 12/23/92 15:10:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	8.3648	621.63	388.77	9.6134	9940.9	8.9197	95.951
SDev	1.5888	37.69	3.32	.1751	56.4	1.1144	1.743
%RSD	18.993	6.0625	.85524	1.8212	.56771	12.493	1.8170
#1	10.129	663.33	385.08	9.5058	9915.4	8.8379	97.669
#2	7.9197	611.55	389.70	9.5191	9901.7	10.073	94.183
#3	7.0460	590.00	391.54	9.8154	10006.	7.8485	96.000
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	1000000.	100000.	50000.	650000.	100000.	50000.
Low	-10.000	-200.00	-200.00	-5.0000	-5000.0	-5.0000	-50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	20.068	50.261	255.75	10325.	10047.	32.754	10530.
SDev	4.223	1.433	14.21	335.	41.	.005	67.
%RSD	21.046	2.8513	5.5567	3.2420	.40989	.01474	.63914
#1	24.753	51.584	270.99	10706.	10009.	32.749	10461.
#2	18.896	50.460	253.41	10194.	10041.	32.756	10536.
#3	16.553	48.738	242.86	10076.	10091.	32.758	10595.
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	50000.	50000.	400000.	1000000.	900000.	50000.	900000.
Low	-10.000	-25.000	-100.00	-5000.0	-5000.0	-15.000	-5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	75.031	120.13	123.78	-1.1626	98.518	39.908	131.99
SDev	6.685	17.22	12.60	1.3249	1.797	.316	24.85
%RSD	8.9099	14.333	10.180	113.96	1.8238	.79103	18.827
#1	82.700	135.06	137.75	-.00650	100.57	40.115	158.99
#2	71.960	124.05	113.28	-.87296	97.774	40.065	126.89
#3	70.433	101.30	120.30	-2.6083	97.213	39.545	110.08
Errors	LC Pass	LC Pass	LC Pass	NOCHECK	LC Pass	LC Pass	NOCHECK
High	50000.	50000.	50000.		50000.	50000.	
Low	-40.000	-14.000	-60.000		-50.000	-20.000	

Analysis Report QC Standard Wed 12-23-92 03:17:02 PM page 1

.thod: CLP Sample Name: CCV Operator:
Run Time: 12/23/92 15:14:00
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	1237.0	9753.3	9788.1	233.56	24545.	122.57	2467.7
SDev	6.2	32.0	38.0	2.80	264.	2.10	21.3
%RSD	.50091	.32855	.38817	1.2007	1.0773	1.7134	.86340
#1	1232.3	9750.0	9779.9	234.10	24577.	123.34	2471.1
#2	1244.0	9786.8	9829.6	236.06	24792.	124.18	2487.1
#3	1234.7	9723.0	9754.9	230.53	24266.	120.20	2444.9
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1250.0	10000.	10000.	250.00	25000.	125.00	2500.0
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	982.60	1235.5	4926.1	24941.	24557.	2452.6	24801.
SDev	12.66	5.5	38.7	150.	64.	19.8	17.
%RSD	1.2884	.44890	.78619	.60266	.25867	.80822	.06902
#1	984.16	1233.8	4942.6	24974.	24584.	2456.5	24783.
#2	994.41	1241.7	4953.9	25072.	24603.	2470.2	24817.
#3	969.23	1231.0	4881.9	24777.	24485.	2431.1	24804.
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	1000.0	1250.0	5000.0	25000.	25000.	2500.0	25000.
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	2477.5	942.85	2405.8	-3.0068	2517.9	2465.5	1021.3
SDev	53.2	8.36	39.7	.6648	20.6	17.6	22.1
%RSD	2.1472	.88615	1.6504	22.111	.81825	.71367	2.1642
#1	2442.1	942.42	2360.4	-2.4285	2517.5	2464.3	1030.7
#2	2538.7	951.41	2422.9	-3.7332	2538.7	2483.6	1037.1
#3	2451.7	934.71	2434.0	-2.8586	2497.5	2448.5	996.01
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK
Value	2500.0	1000.0	2500.0		2500.0	2500.0	
Range	10.000	10.000	10.000		10.000	10.000	

Analysis Report QC Standard Wed 12-23-92 03:20:07 PM page 1

Method: CLP Sample Name: CCB Operator:
Run Time: 12/23/92 15:17:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag	Al	Ba	Be	Ca	Cd	Co
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	.02356	10.051	5.2254	-.01231	20.394	-.76800	2.1018
SDev	.69736	15.813	1.8442	.00527	7.034	1.69731	1.1026
%RSD	2960.1	157.33	35.293	42.813	34.489	221.00	52.460
#1	-.05523	-6.8994	7.0696	-.01756	28.279	.22137	2.1259
#2	.75697	12.646	5.2254	-.01233	18.140	.20248	.98738
#3	-.63106	24.405	3.3812	-.00702	14.764	-2.7279	3.1922
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	200.00	200.00	5.0000	5000.0	5.0000	50.000

Elem	Cr	Cu	Fe	K	Mg	Mn	Na
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	-.58734	.68455	2.3364	78.720	14.423	1.9517	17.002
SDev	1.78997	.64588	1.8383	157.44	8.336	.0024	8.557
%RSD	304.76	94.351	78.682	200.00	57.794	.12322	50.328
#1	-.97781	1.2404	3.8110	78.720	17.091	1.9544	7.9353
#2	1.3656	.83731	2.9214	236.16	21.098	1.9510	18.135
#3	-2.1498	-.02401	.27674	-78.719	5.0799	1.9497	24.936
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000	.00000	.00000	.00000	.00000
Range	10.000	25.000	100.00	5000.0	5000.0	15.000	5000.0

Elem	Ni	Pb	Sb	Ti	V	Zn	As
Units	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Avge	6.1230	-5.1340	13.400	-.28918	2.5944	1.7304	-4.7036
SDev	1.3441	15.7655	7.011	.50105	1.1138	.0037	10.5772
%RSD	21.952	307.08	52.320	173.27	42.929	.21452	224.88
#1	4.6821	Q-23.042	13.411	-.86774	3.7067	1.7333	-.43081
#2	7.3429	.98502	20.405	-.00036	2.5972	1.7262	3.0689
#3	6.3440	6.6547	6.3836	.00056	1.4792	1.7317	-16.749
Errors	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Pass
Value	.00000	.00000	.00000		.00000	.00000	.00000
Range	40.000	20.000	60.000		50.000	20.000	80.000

SAMPLE MANAGEMENT OFFICE

Operated by Viar & Company
a subsidiary of DynCorp
under contract # 68-D9-0135
to the U.S. Environmental Protection Agency

FAX COMMUNICATION

12/10/92
Called Rhonda & left message on voice mail that the lab should proceed w/analysis, per Dr. Potter's instructions. MP

Date: 12-10-92

To: **Fax Number:**

Name: Myra Perez

Company: Region VI

From: Rhonda Holder
SAS Coordinator
(703) 519-1447

Subject: SAS 7655-F-01 Whitewater + Hawker Creeks

Number of Pages, Including This Page: 1

Comments or Special Instructions: Samples received today were outside of holding times for NO_2/NO_3. Lab will run them tomorrow unless otherwise instructed.

SMO FAX NUMBER - (703) 683-0378
P.O. Box 818, Alexandria, Virginia 22313. Phone: (703) 684-5678

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

FACSIMILE REQUEST AND COVER SHEET			
TO	Rhonda Holder		
OFFICE/PHONE	Region VI Coordinator		
REGION/LAB	SMO,Viar & Co.		
FROM	Mahmoud E. El-Feky, Data Coordinator , Region VI		
PHONE	(713)983-2128	MAIL CODE	6E-HO
OFFICE	USEPA,Region VI,Houston Branch		
DATE	12-16-1992	NUMBER OF PAGES	1

INFORMATION FOR SENDING FASCIMILE MESSAGES TO EPA,HOUSTON BRANCH		
EQUIPMENT	FASCIMILE NUMBER	VERIFICATION NUMBER
P NAFAX	713-983-2248	713-983-2128
XEROX	713-983-2124	713-983-2128

COMMENTS: In reference to SAS# 7665F-01, wet Chemistry, raising the detection limit by a factor of 10 is acceptable.

SAMPLE MANAGEMENT OFFICE

Operated by Viar & Company
a subsidiary of DynCorp
under contract # 68-D9-0135
to the U.S. Environmental Protection Agency

FAX COMMUNICATION

Date: 12/16/92

To: **Fax Number:**

Name: Mel Ritter / Mahmoud El-Feky

Company: Reg VI

From: Rhonda Holder
SAS Coordinator
(703) 519-1447

Subject: SAS 7655-F-01 Whitewater + Hanover Creeks Wet Chem

Number of Pages, Including This Page: 1

Comments or Special Instructions: The detection limits are low for the EC parameter. However, some samples are at a high level for Cl + SO4. The lab recommends increasing the detection limits by a factor of 10. Is this acceptable?

AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

March 01, 1993

Christy Macdowell
USEPA-Region VI
10625 Fallstone Road
Houston, TX 77099

SUBJECT: SAS 7655-F-01, SDG 7655-F-1

Ms. Macdowell:

The following is in response to the issues needing clarification and items needing corrections and omissions for the above mentioned SAS.

A. The analyst did miscalculate the number of samples, thus the number of duplicates and matrix spikes required. We have analyzed the duplicate and the matrix spike for these parameters. The forms and raw data are submitted.

B. Sample IDs on the Cover Page have been corrected to reflect the sample IDs listed in alpha-numberic order. Cover Page is resubmitted.

C. Form I's have been re-numbered so the the forms are arranged in alpha-numberic order. Form I's are resubmitted.

D. Raw data for the ion chromatograph have been re-numbered so that each page is in the same order as the samples were ran. Raw data is resubmitted.

E. A better copy of page 146 is resubmitted.

F. We do not have documentation for using higher IDLs. We did receive verbal authorization from both Mr. ElFeky and SMO.

1700 West Albany • Broken Arrow, OK 74012 • Office (918) 251-2858 • Fax (918) 251-2599

G. The TDS results for listed samples exceeded the character limitation of results in our CLP software. Results are corrected on Forms I & VI and these forms are resubmitted.

H. Bicarbonate results were corrected on Form I & VI. Both of these forms are resubmitted.

I. The Bicarbonate results for sample 7655-F-1 has been corrected on Form I and the form is resubmitted.

J. Even though this is not a SAS requirement, the sulfuric acid standardization is submitted as page 147F.

K. See response to issue #D.

L. The standard prep log for the ion chromatograph is submitted.

M. The spike added values [illegible] for Ca, Mg, K, and Na was 25,000.00 and [illegible] lab clerk overlooked the spiking solution values. Spike added values are corrected and Form VA for sample 7655-F-5 is resubmitted.

N. Form 10 for instrument DX100 has been created. IDLs for Chloride, Fluoride, Nitrite, and Sulfate are reported on the Form 10 is submitted.

If you should have any other questions, please feel free to contact me at (918) 251-2858.

Sincerely,

Steve L. Markham
Inorganic Program Manager

CC: SMO
EMSL/LV
File

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

SOW No.: 3/90_

EPA Sample No.	Lab Sample ID
_7655F1_____	__1199201_____
_7655F1D_____	__1199201D____
_7655F1S_____	__1199201S____
_7655F1SD_____	__1199201SD___
_7655F5_____	__1199202_____
_7655F5S_____	__1199202S____
_7655F13_____	__1199204_____
_7655F14_____	__1199205_____
_7655F15_____	__1199206_____
_7655F16_____	__1199207_____
_7655F17_____	__1199208_____
_7655F18_____	__1199209_____
_7655F19_____	__1199210_____
_7655F19D_____	__1199210D____
_7655F19S_____	__1199210S____
_7655F20_____	__1199211_____
_7655F21_____	__1199212_____
_7655F21D_____	__1199212D____
_7655F22_____	__1199203_____
_____	_____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES
If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

_____

_____

_____

_____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

002

7655F1

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199201___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	21000			AK
	Carbonate	162000			AK
	Chloride	4090			I
	Fluoride	1190			I
	Nitrate	100	U		I
	Sulfate	16100			I
	TDS	250000			T
7440-70-2	Calcium	3850	B	N	P
7439-95-4	Magnesium	293	B		P
7440-09-7	Potassium	22600			P
7440-23-5	Sodium	74200			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

003

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F13

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199204___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	51800			I_
	Fluoride_	6440			I_
	Nitrate__	100	U		I_
	Sulfate__	3360000			I_
	TDS_____	511000			T_
7440-70-2	Calcium__	520000		N	P_
7439-95-4	Magnesium	147000			P_
7440-09-7	Potassium	26400			P_
7440-23-5	Sodium___	114000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F14

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199205___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	266000			AK
	Carbonate	20000	U		AK
	Chloride_	92500			I_
	Fluoride_	50.0	U		I_
	Nitrate__	2210			I_
	Sulfate__	2000000			I_
	TDS_____	350000			T_
7440-70-2	Calcium__	829000		N	P_
7439-95-4	Magnesium	79300			P_
7440-09-7	Potassium	5460			P_
7440-23-5	Sodium___	64100			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO. 005

7655F15

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199206___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	49800			I_
	Fluoride_	9750			I_
	Nitrate__	100	U		I_
	Sulfate__	3670000			I_
	TDS_____	287000			T_
7440-70-2	Calcium__	436000		N	P_
7439-95-4	Magnesium	459000			P_
7440-09-7	Potassium	17900			P_
7440-23-5	Sodium___	106000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

006

EPA SAMPLE NO.

7655F16

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Lab Sample ID: 1199207___

Level (low/med): LOW__ Date Received: 12/12/92

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	41800			I_
	Fluoride_	68100			I_
	Nitrate__	2110			I_
	Sulfate__	12600000			I_
	TDS_____	1760000			T_
7440-70-2	Calcium__	392000		N	P_
7439-95-4	Magnesium	1360000			P_
7440-09-7	Potassium	7490			P_
7440-23-5	Sodium___	84500			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F17

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199208___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	5770			I_
	Fluoride_	50.0	U		I_
	Nitrate__	100	U		I_
	Sulfate__	74400			I_
	TDS_____	177000			T_
7440-70-2	Calcium__	18200		N	P_
7439-95-4	Magnesium	6260			P_
7440-09-7	Potassium	1460	B		P_
7440-23-5	Sodium___	10700			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F18

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199209___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	175000			AK
	Carbonate	20000	U		AK
	Chloride_	78800			I_
	Fluoride_	50.0	U		I_
	Nitrate__	100	U		I_
	Sulfate__	1700000			I_
	TDS_____	265000			T_
7440-70-2	Calcium__	437000		N	P_
7439-95-4	Magnesium	164000			P_
7440-09-7	Potassium	5790			P_
7440-23-5	Sodium___	80900			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

009
EPA SAMPLE NO.

7655F19

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199210___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	110000			AK
	Carbonate	20000	U		AK
	Chloride_	56600			I_
	Fluoride_	50.0	U		I_
	Nitrate__	2240			I_
	Sulfate__	1260000			I_
	TDS_____	1990000			T_
7440-70-2	Calcium__	353000		N	P_
7439-95-4	Magnesium	93800			P_
7440-09-7	Potassium	4180	B		P_
7440-23-5	Sodium___	101000			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F20

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199211___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	20000	U		AK
	Carbonate	20000	U		AK
	Chloride_	76300			I_
	Fluoride_	1460			I_
	Nitrate__	5360			I_
	Sulfate__	2770000			I_
	TDS_____	409000			T_
7440-70-2	Calcium__	508000		N	P_
7439-95-4	Magnesium	198000			P_
7440-09-7	Potassium	1230	B		P_
7440-23-5	Sodium___	62900			P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F21

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199212___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	87000			AK
	Carbonate	20000	U		AK
	Chloride	66400			I
	Fluoride	50.0	U		I
	Nitrate	100	U		I
	Sulfate	1520000			I
	TDS	230000			T
7440-70-2	Calcium	426000		N	P
7439-95-4	Magnesium	105000			P
7440-09-7	Potassium	3860	B		P
7440-23-5	Sodium	78200			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

012

EPA SAMPLE NO.

7655F22

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Lab Sample ID: 1199203___

Level (low/med): LOW__ Date Received: 12/12/92

% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	59000			AK
	Carbonate	20000	U		AK
	Chloride	54000			I
	Fluoride	7050			I
	Nitrate	100	U		I
	Sulfate	3270000			I
	TDS	521000			T
7440-70-2	Calcium	506000		N	P
7439-95-4	Magnesium	408000			P
7440-09-7	Potassium	3150	B		P
7440-23-5	Sodium	59000			P

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

U.S. EPA - CLP

013

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

7655F5

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix (soil/water): WATER Lab Sample ID: 1199202___
Level (low/med): LOW__ Date Received: 12/12/92
% Solids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	469000			AK
	Carbonate	20000	U		AK
	Chloride_	9620			I_
	Fluoride_	723			I_
	Nitrate__	2070			I_
	Sulfate__	205000			I_
	TDS_____	702000			T_
7440-70-2	Calcium__	70100		N	P_
7439-95-4	Magnesium	99600			P_
7440-09-7	Potassium	4020	B		P_
7440-23-5	Sodium___	4360	B		P_

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____
Color After: COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_	50000.0	48468.00	96.9	50000.0	47901.00	95.8			I_
Fluoride_	5000.0	4839.00	96.8	5000.0	4751.00	95.0			I_
Nitrate__	25000.0	24028.00	96.1	25000.0	23742.00	95.0			I_
Sulfate__	50000.0	47621.00	95.2	50000.0	47159.00	94.3			I_
TDS_____									NR
Calcium__	51382.0	49674.93	96.7	25000.0	24920.76	99.7	24544.70	98.2	P_
Magnesium	25587.0	24542.60	95.9	25000.0	24942.25	99.8	24557.27	98.2	P_
Potassium									NR
Sodium___									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

3
BLANKS

020

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Bicarbona									20000.000	U	AK
Carbonate									20000.000	U	AK
Chloride	150.0	U	150.0	U							I
Fluoride	50.0	U	50.0	U							I
Nitrate	100.0	U	100.0	U							I
Sulfate	200.0	U	200.0	U							I
TDS											NR
Calcium	596.0	U	596.0	U	596.0	U					P
Magnesium	6.0	U	6.0	U	14.4	B					P
Potassium											NR
Sodium											NR

FORM III - IN

ILM02.1

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

023A
EPA SAMPLE NO.

7655F1S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix: __WATER_____ Level (low/med): _LOW____
% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona									NR
Carbonate									NR
Chloride_	75-125_	25454.0000		4089.0000		20000.00	106.8		I
Fluoride_	75-125_	1796.0000		1187.0000		500.00	121.8		I
Nitrate__	75-125_	1660.0000		100.0000	U	1500.00	110.7		I
Sulfate__	75-125_	38136.0000		16139.0000		20000.00	110.0		I
TDS_____									NR
Calcium__									NR
Magnesium									NR
Potassium									NR
Sodium___									NR

Comments:

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

023B

EPA SAMPLE NO.

7655F5S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix: __WATER_____ Level (low/med): _LOW____
% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona									NR
Carbonate									NR
Chloride_									NR
Fluoride_									NR
Nitrate__									NR
Sulfate__									NR
TDS_____									NR
Calcium__	75-125_	102469.0310		70082.2970		25000.00	129.5	N	P_
Magnesium	75-125_	136430.5780		99581.0940		25000.00	147.4	N	P_
Potassium	75-125_	25095.3690		4019.0740	B	25000.00	84.3		P_
Sodium___	75-125_	25103.9900		4355.1840	B	25000.00	83.0		P_

Comments:

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

023c

EPA SAMPLE NO.

7655F19S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
Matrix: __WATER_____ Level (low/med): _LOW____
% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona		131000.0000		110000.0000		20000.00	105.0		AK
Carbonate									NR
Chloride									NR
Fluoride									NR
Nitrate									NR
Sulfate									NR
TDS									NR
Calcium									NR
Magnesium									NR
Potassium									NR
Sodium									NR

Comments:

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

7655F1SD

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona								NR
Carbonate								NR
Chloride_		25454.0000		25374.0000		0.3		I
Fluoride_		1796.0000		1807.0000		0.6		I
Nitrate__		1660.0000		1711.0000		3.0		I
Sulfate__		38136.0000		38076.0000		0.2		I
TDS_____								NR
Calcium__								NR
Magnesium								NR
Potassium								NR
Sodium___								NR

FORM VI - IN

ILM02.1

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO. 025

7655F19D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona		110000.0000		110000.0000		0.0		AK
Carbonate		20000.0000	U	20000.0000	U			AK
Chloride								NR
Fluoride								NR
Nitrate								NR
Sulfate								NR
TDS								NR
Calcium								NR
Magnesium								NR
Potassium								NR
Sodium								NR

FORM VI - IN

ILM02.1

U.S. EPA - CLP

6
DUPLICATES

00.026 ~~024~~

EPA SAMPLE NO.

7655F21D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona								NR
Carbonate								NR
Chloride_								NR
Fluoride_								NR
Nitrate__								NR
Sulfate__								NR
TDS_____		__2299000.0000		__2324000.0000		___1.1_		T_
Calcium__								NR
Magnesium								NR
Potassium								NR
Sodium___								NR

FORM VI - IN

ILM02.1

7

LABORATORY CONTROL SAMPLE

00027B

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1

Solid LCS Source: _____

Aqueous LCS Source: EPA-LV_____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Bicarbona	50000.0	57900.00	115.8						
Carbonate	20000.0	20000.00	100.0						
Chloride									
Fluoride									
Nitrate									
Sulfate									
TDS									
Calcium									
Magnesium									
Potassium									
Sodium									

FORM VII - IN

ILM02.1

030A

10
Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.: 7655F1
ICP ID Number: _____ Date: 12/01/92
Flame AA ID Number : DX100_____
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000		
Carbonate			20000		
Chloride			150	150.0	T
Fluoride			50	50.0	T
Nitrate			100	100.0	T
Sulfate			200	200.0	T
TDS			10000		
Calcium			5000		
Magnesium			5000		
Potassium			5000		
Sodium			5000		

Comments:

U.S. EPA - CLP

13
PREPARATION LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.:_____ SAS No.: 7655-F SDG No.:7655F1

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
7655F1___	_12/16/92__	_____	___100__
7655F1D__	_12/16/92__	_____	___100__
7655F5___	_12/16/92__	_____	___100__
7655F5S__	_12/16/92__	_____	___100__
7655F13__	_12/16/92__	_____	___100__
7655F14__	_12/16/92__	_____	___100__
7655F15__	_12/16/92__	_____	___100__
7655F16__	_12/16/92__	_____	___100__
7655F17__	_12/16/92__	_____	___100__
7655F18__	_12/16/92__	_____	___100__
7655F19__	_12/16/92__	_____	___100__
7655F20__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F22__	_12/16/92__	_____	___100__
LCSW_____	_12/16/92__	_____	___100__
PBW_____	_12/16/92__	_____	___100__

FORM XIII - IN ILM02.1

13
PREPARATION LOG

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.:_____ SAS No.: 7655-F SDG No.:7655F1

Method: T_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
7655F1___	_12/16/92__	_____	___100__
7655F5___	_12/16/92__	_____	___100__
7655F13__	_12/16/92__	_____	___100__
7655F14__	_12/16/92__	_____	___100__
7655F15__	_12/16/92__	_____	___100__
7655F16__	_12/16/92__	_____	___100__
7655F17__	_12/16/92__	_____	___100__
7655F18__	_12/16/92__	_____	___100__
7655F19__	_12/16/92__	_____	___100__
7655F20__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F21__	_12/16/92__	_____	___100__
7655F22__	_12/16/92__	_____	___100__

FORM XIII - IN ILM02.1

U.S. EPA - CLP

14
ANALYSIS RUN LOG

00·042B

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: DX100_____ Method: I_

Start Date: 02/17/93 End Date: 02/17/93

EPA Sample No.	D/F	Time	% R	Analytes																					
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA											
S0	1.00	0819				X	X	X	X																
S	1.00	0830				X	X	X	X																
S	1.00	0841				X	X	X	X																
ICV	1.00	1033				X	X	X	X																
LCSW	1.00	1044				X	X	X	X																
ICB	1.00	1055				X	X	X	X																
7655F1S	1.00	1106				X	X	X	X																
7655F1SD	1.00	1117				X	X	X	X																
CCV	1.00	1128				X	X	X	X																
CCB	1.00	1139				X	X	X	X																

FORM XIV - IN ILM02.1

U.S. EPA - CLP

14

ANALYSIS RUN LOG

0446

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: BICARBONATE__ Method: AK

Start Date: 02/16/93 End Date: 02/16/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA												
PBW2	1.00	1000		X																						
LCSW2	1.00	1005		X																						
7655F19S	1.00	1010		X																						

FORM XIV - IN ILM02.1

U.S. EPA - CLP

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ANALYSIS RUN LOG

0458

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655-F SDG No.:7655F1

Instrument ID Number: CARBONATE____ Method: AK

Start Date: 02/16/93 End Date: 02/16/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
PBW2	1.00	1000			X																						
LCSW2	1.00	1005			X																						
7655F19S	1.00	1010																									

FORM XIV - IN ILM02.1

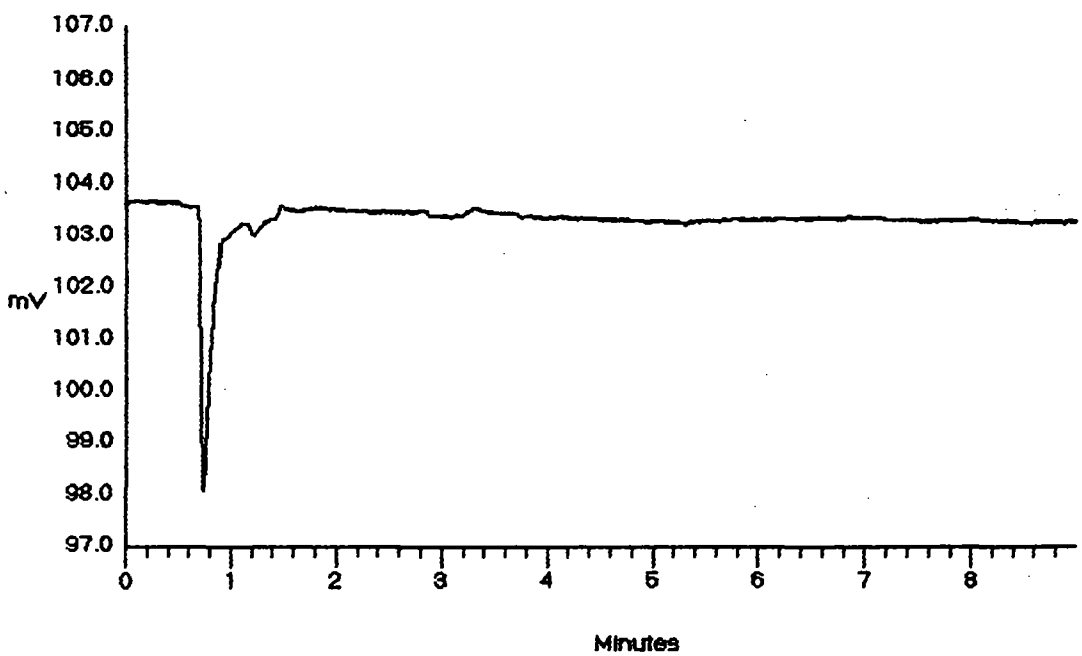
Sample Name: ICB Date: 12/12/1992 16:53:16
Data File : C:\DX\DATA\W2121291.D02
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 2 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D02 Sample: ICB



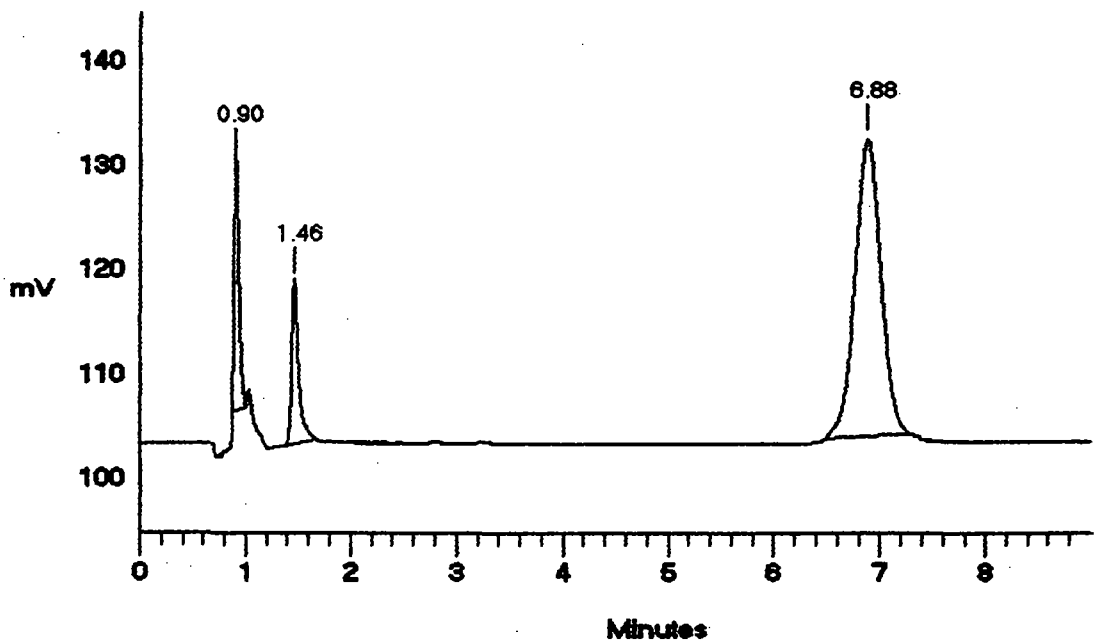
Sample Name: 11992.01 7655-F-1 dab 12/17/92 Date: 12/12/1992 17:04:13
Data File : C:\DX\DATA\W2121291.D03
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 3 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	1.187	23713	76637	1	0.00
2	1.46	CHLORIDE	4.089	15459	72957	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.88	SULFATE	16.139	28588	483882	1	0.29
		Totals	21.415	67760	633476		

File: W2121291.D03 Sample: 11992.01



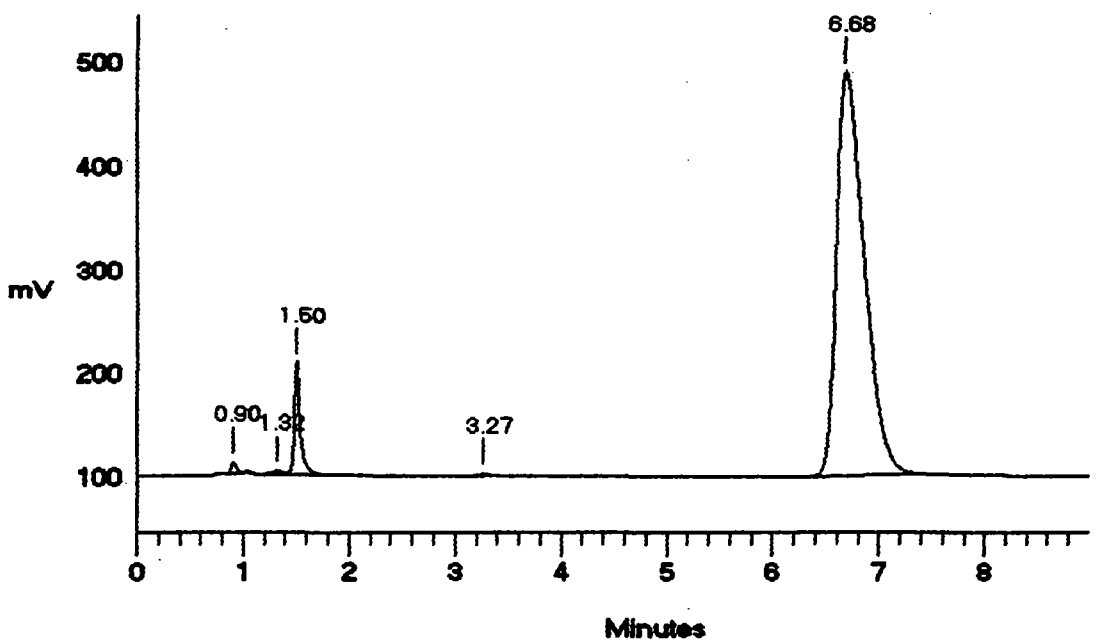
Sample Name: 11992.02 7655-F-5 Date: 12/12/1992 17:15:11
Data File : C:\DX\DATA\W2121291.D04
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 4 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	0.723	10343	37080	1	0.00
3	1.50	CHLORIDE	9.618	106643	424580	2	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.27	NITRATE	2.068	1896	13199	1	10.10
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.68	SULFATE	191.234	387649	7103161	1	-2.62
		Totals	203.644	506530	7578020		

File: W2121291.D04 Sample: 11992.02



118

~~131~~

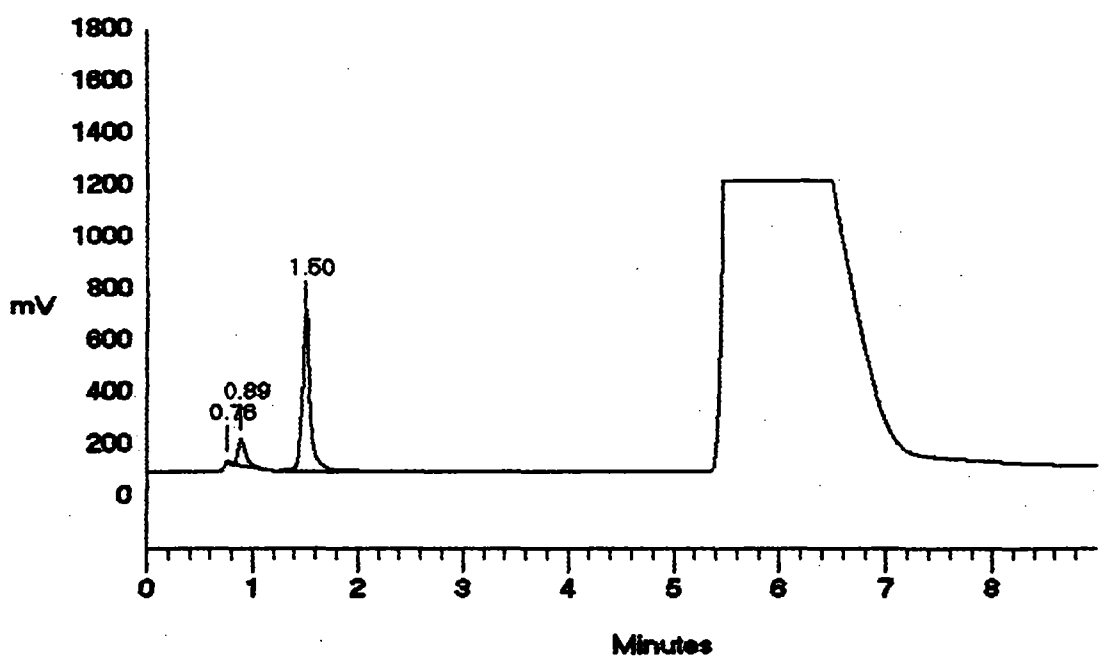
Sample Name: 11992.03 7655-F-22 Date: 12/12/1992 17:26:08
Data File : C:\DX\DATA\W2121291.D05 12/12/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 5 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	7.049	101242	576545	2	-1.11
3	1.50	CHLORIDE	54.007	594089	3247292	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	61.056	695331	3823837		

File: W2121291.D05 Sample: 11992.03



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132

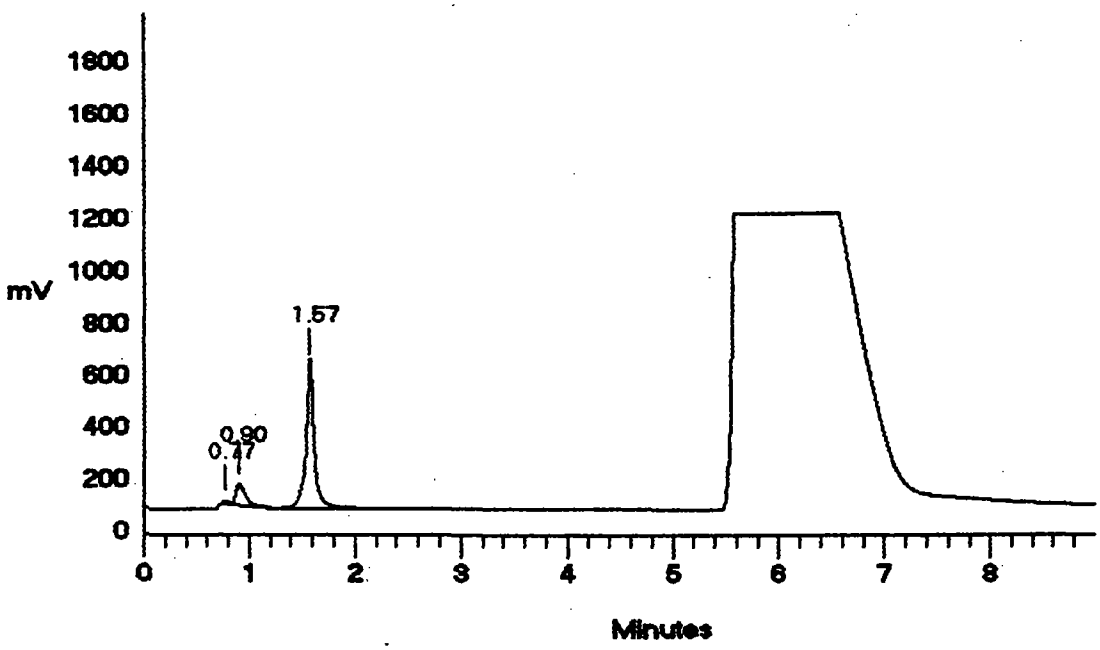
Sample Name: 11992.04 7655-F-13 Date: 12/12/1992 17:37:09
Data File : C:\DX\DATA\W2121291.D06
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 6 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	6.440	82265	524569	2	0.00
3	1.57	CHLORIDE	51.750	551185	3103775	1	3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	58.189	633450	3628343		

File: W2121291.D06 Sample: 11992.04



120

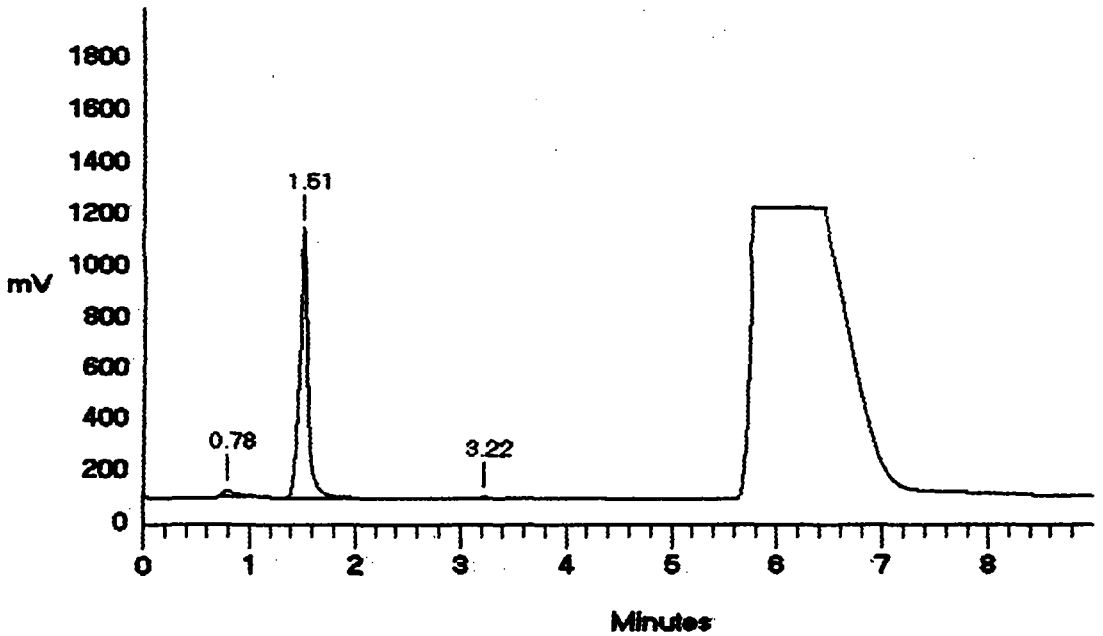
Sample Name: 11992.05 7655-F-14 dnB 12/14/92 Date: 12/12/1992 17:48:09
Data File : C:\DX\DATA\W2121291.D07
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 7 Vial: Detector:COND ~~133~~
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.51	CHLORIDE	92.461	1041991	5692625	1	-0.66
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.22	NITRATE	2.212	4555	34603	1	8.42
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	94.673	1046545	5727228		

File: W2121291.D07 Sample: 11992.05



121
~~134~~

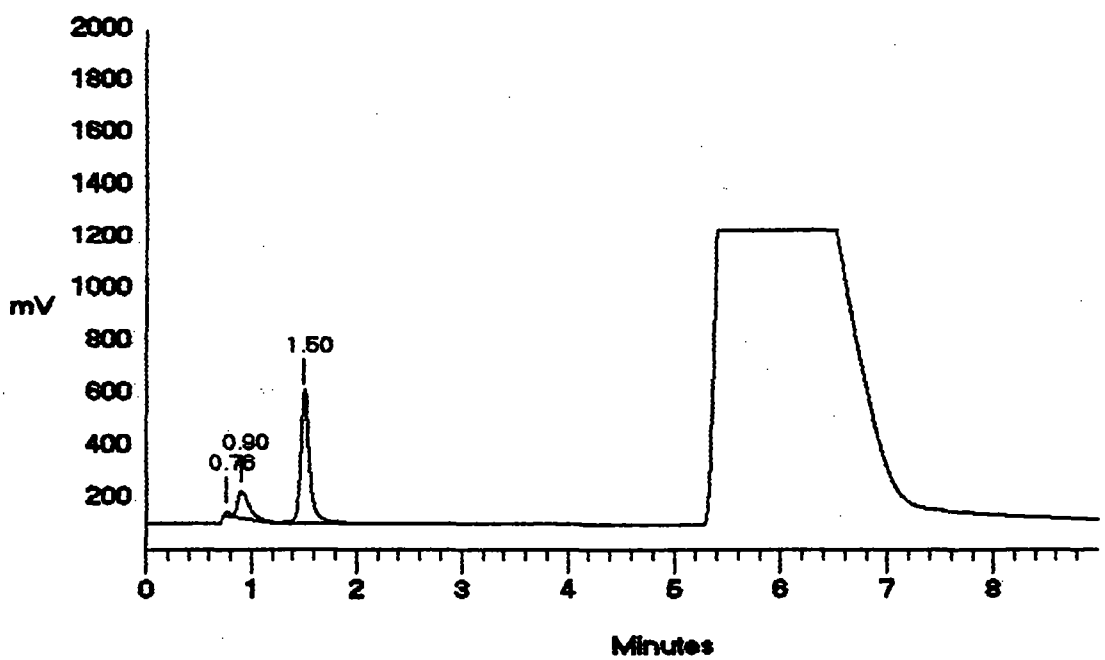
Sample Name: 11992.06 7655-F-15 dab Date: 12/12/1992 17:59:09
Data File : C:\DX\DATA\W2121291.D08 12/17/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 8 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	9.752	104513	807099	2	0.00
3	1.50	CHLORIDE	49.762	495588	2977343	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	59.514	600101	3784442		

File: W2121291.D08 Sample: 11992.06



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~~135~~

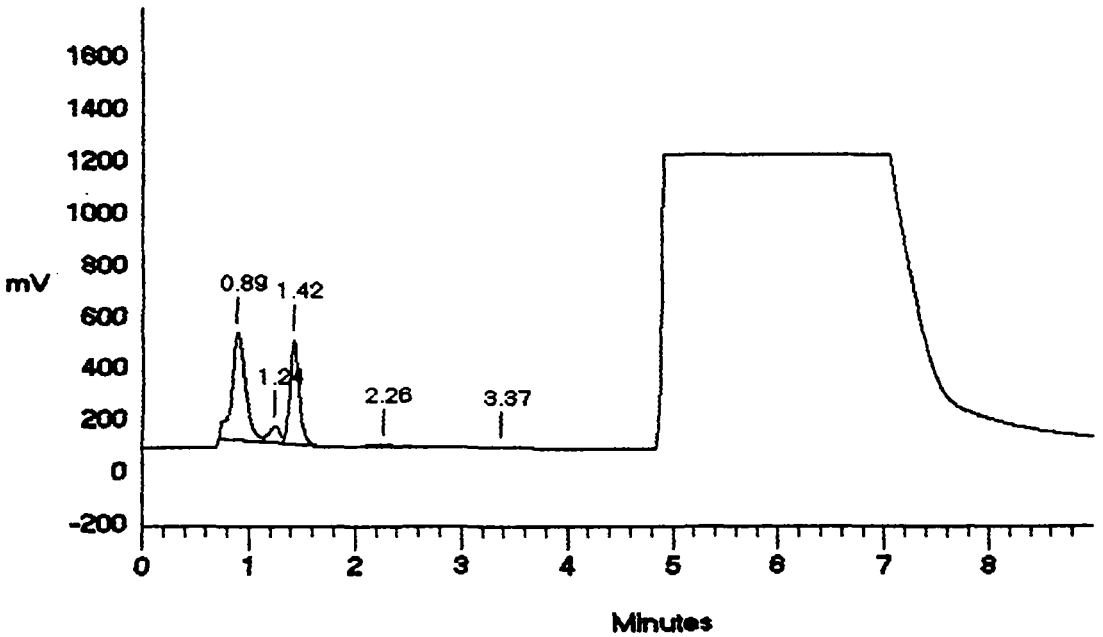
Sample Name: 11992.07 7655-F-16 Date: 12/12/1992 18:10:07
Data File : C:\DX\DATA\W2121291.D09
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 9 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.89	FLUORIDE	43.848	414836	3714843	2	-1.11
3	1.42	CHLORIDE	41.844	404254	2473874	2	-6.58
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
5	3.37	NITRATE	2.113	2596	19837	1	13.47
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	87.806	821685	6208554		

File: W2121291.D09 Sample: 11992.07



123

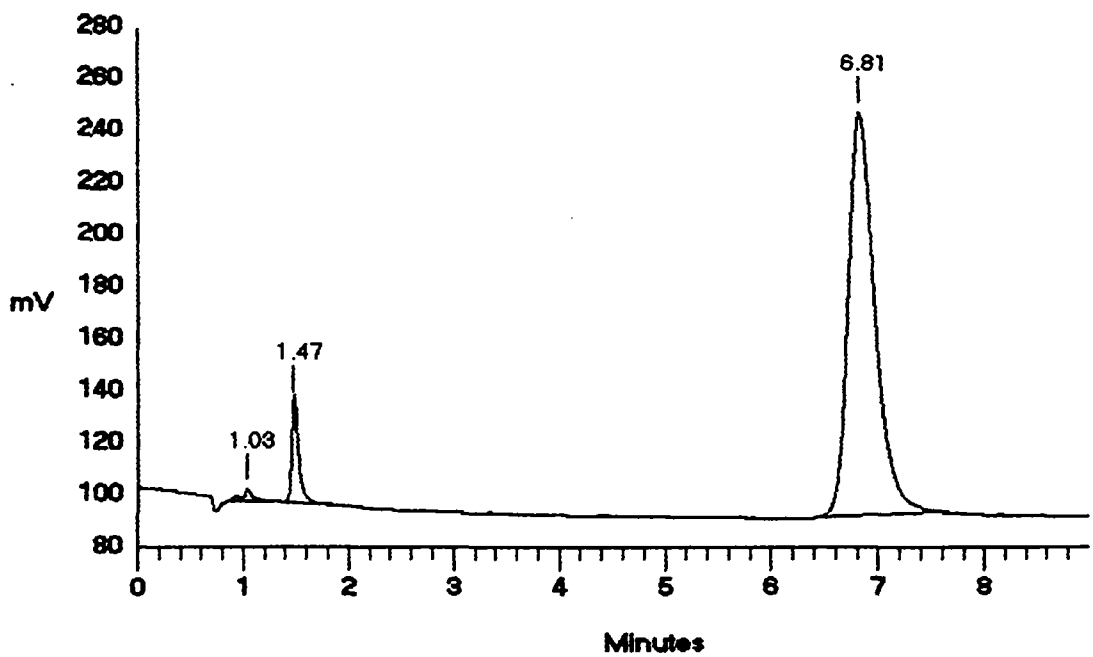
Sample Name: 11992.08 7655-F-17 Date: 12/12/1992 18:21:07
Data File : C:\DX\DATA\W2121291.D10
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 10 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.47	CHLORIDE	5.772	39321	179974	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.81	SULFATE	74.396	155079	2686222	1	-0.73
		Totals	80.167	194400	2866196		

File: W2121291.D10 Sample: 11992.08



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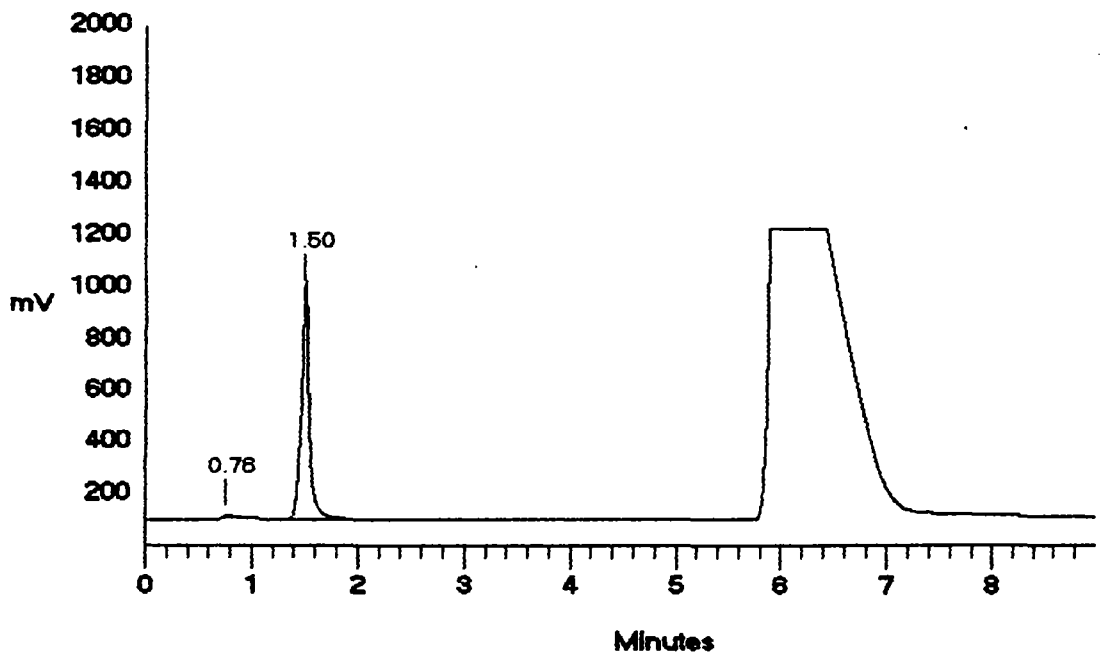
Sample Name: 11992.09 7655-F-18 dnB 12/17/92 Date: 12/12/1992 18:32:03
Data File : C:\DX\DATA\W2121291.D11
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 11 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	78.831	885322	4825937	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	78.831	885322	4825937		

File: W2121291.D11 Sample: 11992.09



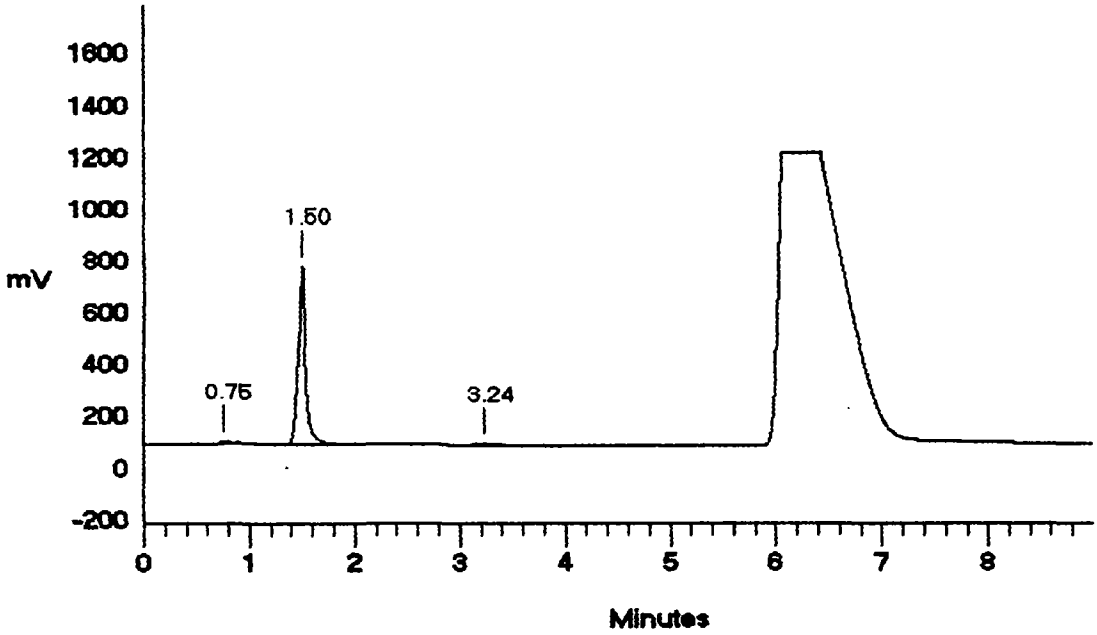
Sample Name: 11992.10 7655-F-19 dab 12/17/92 Date: 12/12/1992 18:43:01 117
Data File : C:\DX\DATA\W2121291.D12
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 12 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	56.561	690068	3409757	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.24	NITRATE	2.244	5049	39236	1	9.09
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	58.805	695117	3448994		

File: W2121291.D12 Sample: 11992.10



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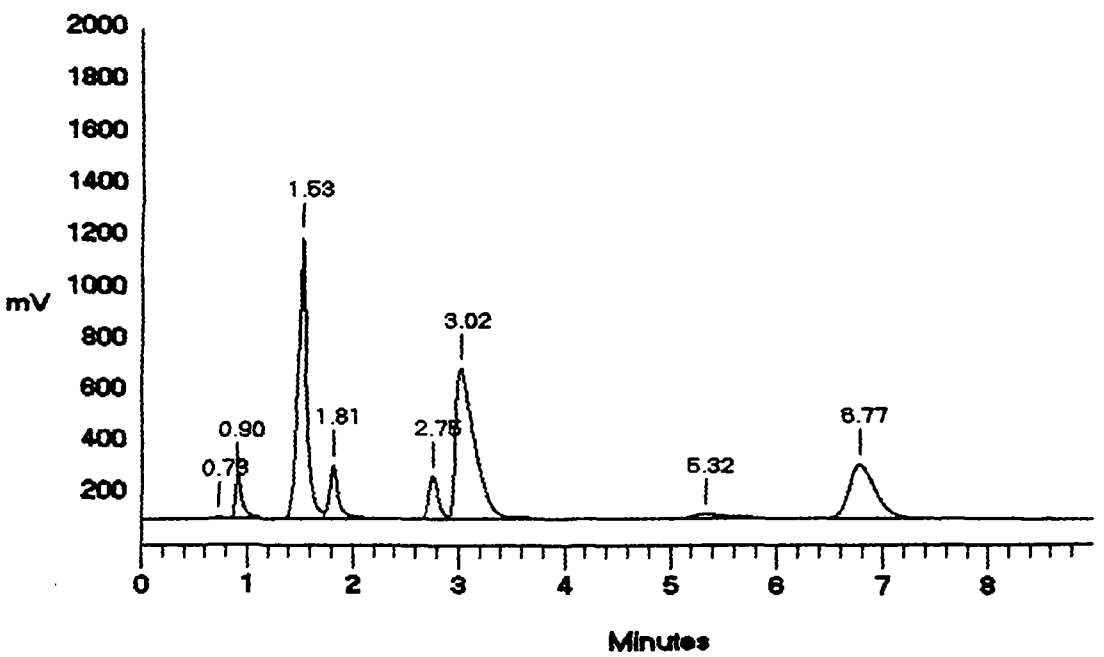
Sample Name: CCV Date: 12/12/1992 18:54:01
Data File : C:\DX\DATA\W2121291.D13
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 13 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	8.814	155972	727072	2	0.00
3	1.53	CHLORIDE	100.655	1089183	6213698	2	0.66
4	1.81	NITRITE	10.112	207125	1217891	2	0.56
5	2.75	BROMIDE	50.604	166173	1050423	2	1.48
6	3.02	NITRATE	50.086	585202	7153945	2	1.68
7	5.32	ORTHO-PHOSPHATE	9.360	17090	372595	1	3.50
8	6.77	SULFATE	101.005	215064	3692148	1	-1.31
		Totals	330.635	2435809	20427773		

File: W2121291.D13 Sample: CCV



127
~~119~~

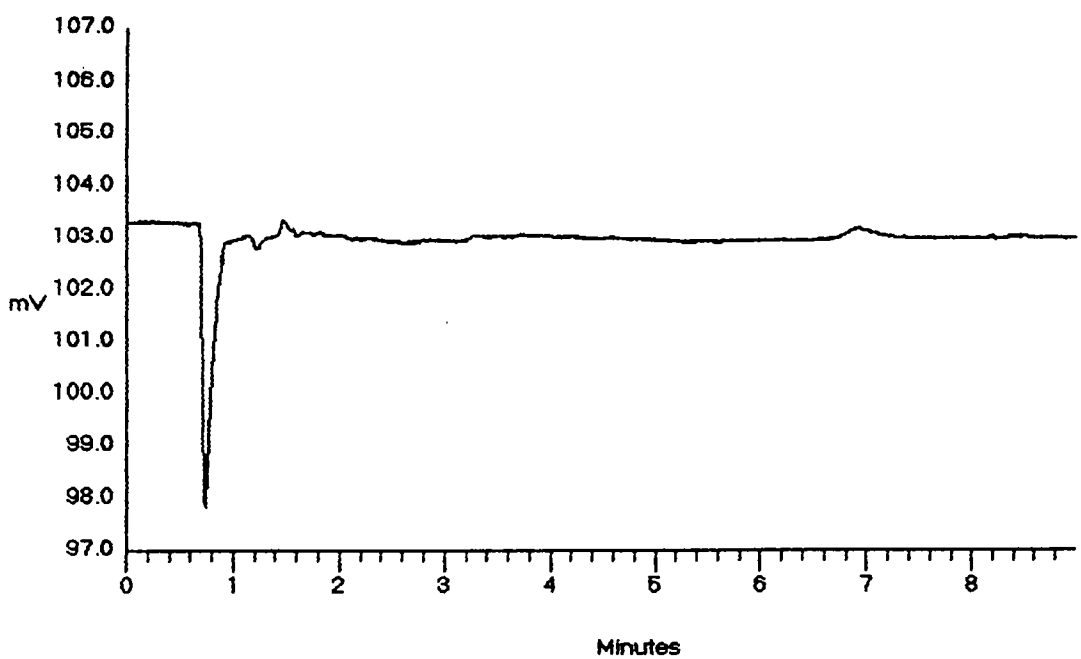
Sample Name: CCB		Date: 12/12/1992 19:05:00	
Data File : C:\DX\DATA\W2121291.D14			
Method : C:\DX\METHOD\AUTO.met			
ACI Address: 1 System: 1	Inject#: 14 Vial:		Detector:COND
Analyst : D. BURNS	Column: AS4A-SC SN.1857		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D14 Sample: CCB



128

120

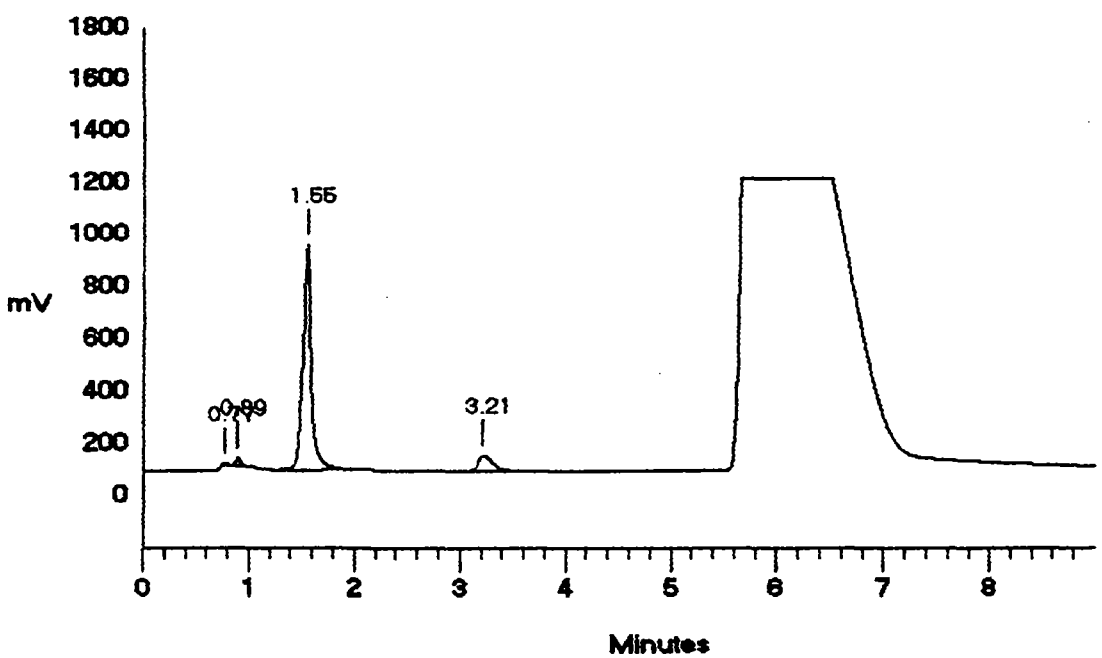
Sample Name: 11992.11 7655-F-20 Date: 12/12/1992 19:15:59
Data File : C:\DX\DATA\W2121291.D15 12/17/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 15 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	1.457	34348	99611	2	-1.11
3	1.55	CHLORIDE	76.291	864643	4664378	1	1.97
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.21	NITRATE	5.357	58434	502252	1	8.08
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	83.105	957425	5266240		

File: W2121291.D15 Sample: 11992.11



129

121

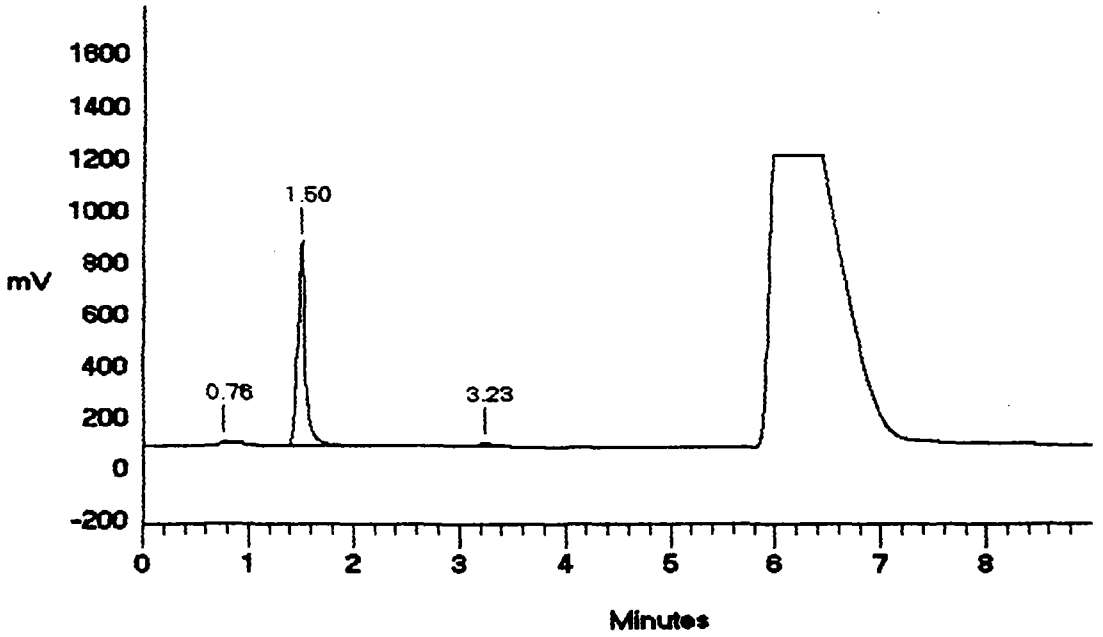
Sample Name: 11992.12 7655-F-21 Date: 12/12/1992 19:27:00
Data File : C:\DX\DATA\W2121291.D16
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 16 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	66.432	786654	4037423	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.23	NITRATE	2.694	13245	106236	1	8.75
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	69.126	799899	4143659		

File: W2121291.D16 Sample: 11992.12



130

122

Sample Name: 11992.02 7655-F-5 1:9 Date: 12/12/1992 19:38:00

Data File : C:\DX\DATA\W2121291.D17 AMB 12/17/92

Method : C:\DX\METHOD\AUTO.met

ACI Address: 1 System: 1 Inject#: 17 Vial: Detector:COND

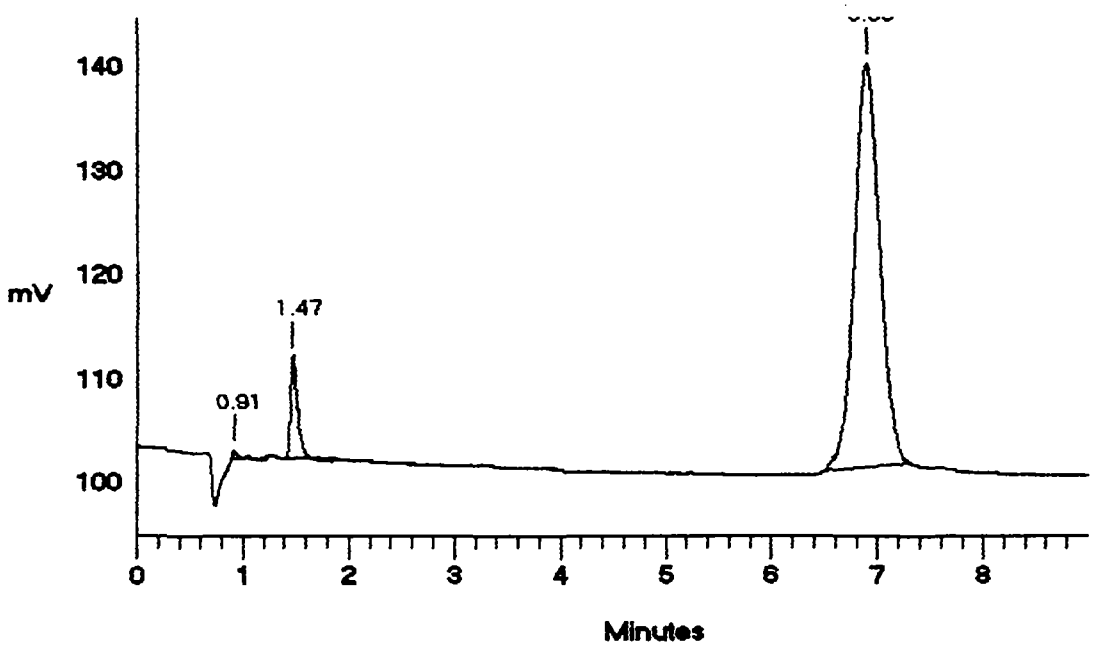
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	3.128	739	2072	1	1.11
2	1.47	CHLORIDE	36.190	9784	43084	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.89	SULFATE	205.365	38899	650125	1	0.44
		Totals	244.684	49422	695281		

File: W2121291.D17 Sample: 11992.02



131
123

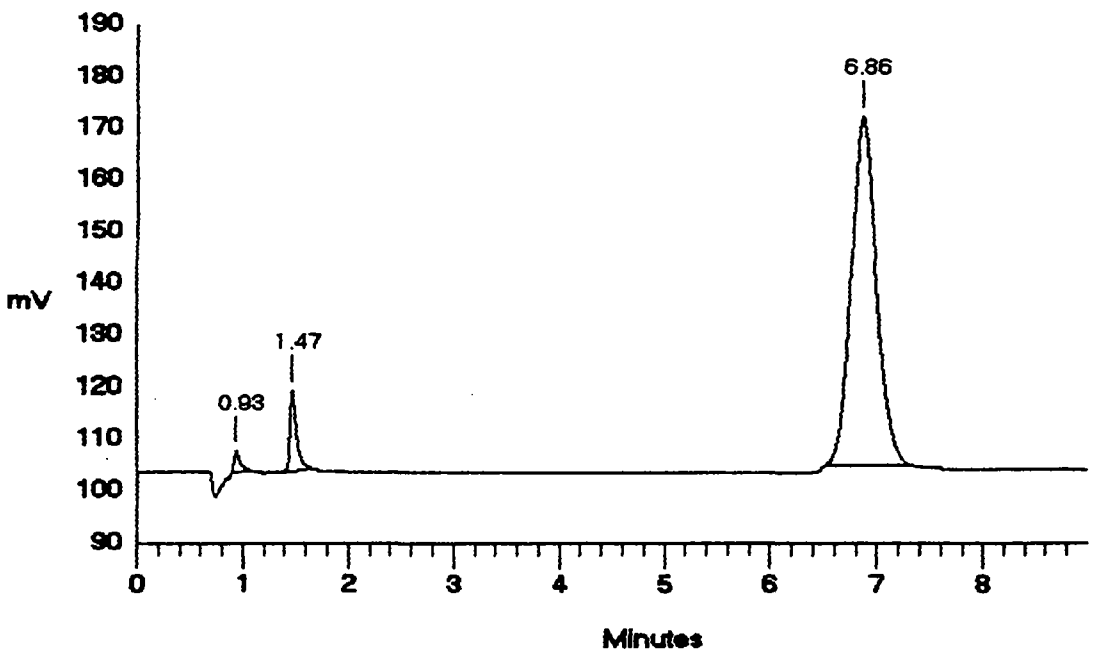
Sample Name: 11992.03 7655-F-22 1:99 Date: 12/12/1992 19:49:00
Data File : C:\DX\DATA\W2121291.D18
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 18 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	47.629	3879	16011	1	3.33
2	1.47	CHLORIDE	397.102	15374	65468	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.86	SULFATE	3265.243	67449	1108156	1	0.00
		Totals	3709.975	86702	1189636		

File: W2121291.D18 Sample: 11992.03



132
124

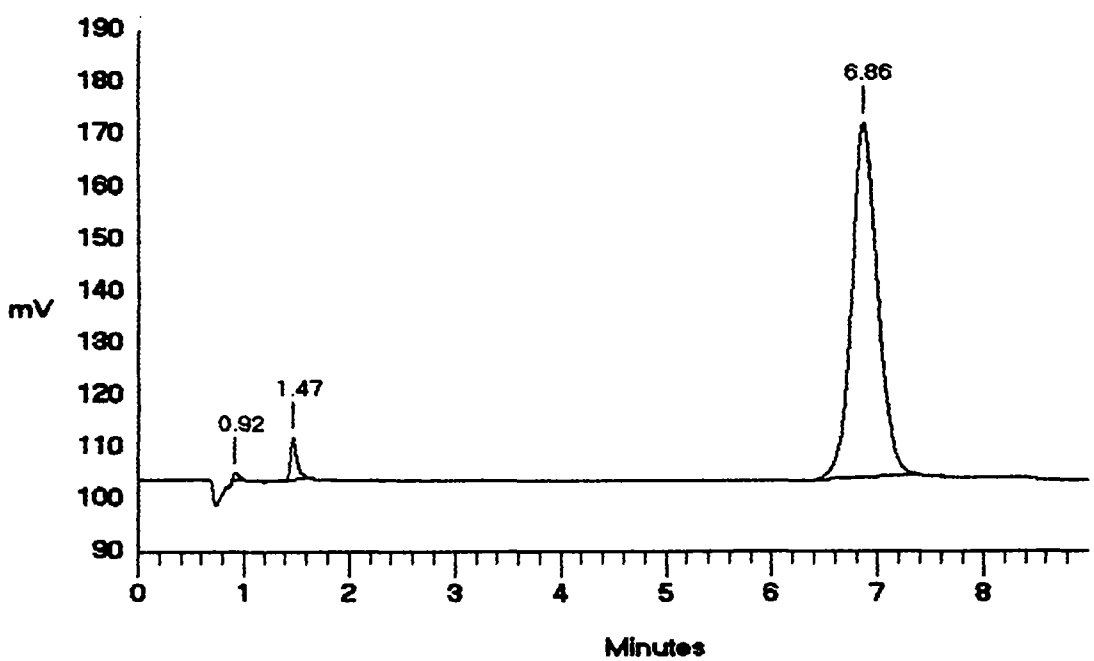
Sample Name: 11992.04 7655-F-13 1:99 Date: 12/12/1992 20:00:01
Data File : W2121291.D19
Method : C:\DX\METHOD\AUTO.met dab 12/17/92
ACI Address: 1 System: 1 Inject#: 19 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.92	FLUORIDE	35.692	1556	5831	1	2.22
2	1.47	CHLORIDE	347.595	7959	33986	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.86	SULFATE	3358.752	67959	1143506	1	0.00
		Totals	3742.040	77474	1183324		

File: W2121291.D19 Sample: 11992.04



133

125

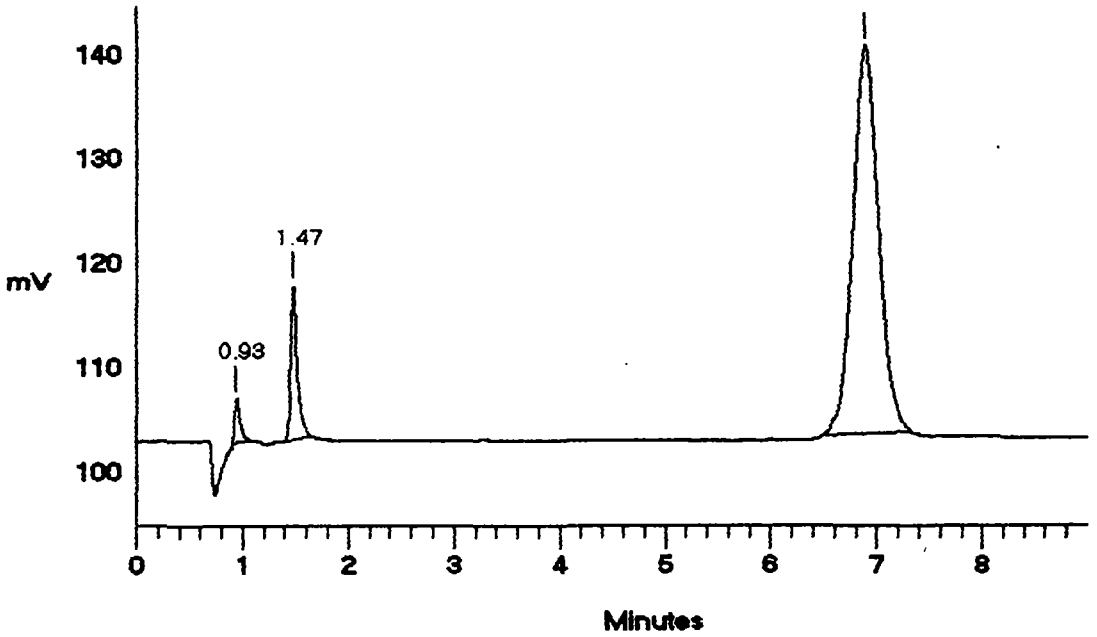
Sample Name: 11992.05 7655-F-14 1:99 Date: 12/12/1992 20:11:01
Data File : W2121291.D20
Method : C:\DX\METHOD\AUTO.met AAB 12/17/92
ACI Address: 1 System: 1 Inject#: 20 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	47.572	4094	15962	1	3.33
2	1.47	CHLORIDE	394.321	14722	63699	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.88	SULFATE	2004.056	37167	631377	1	0.29
		Totals	2445.949	55983	711039		

File: W2121291.D20 Sample: 11992.05



134

126

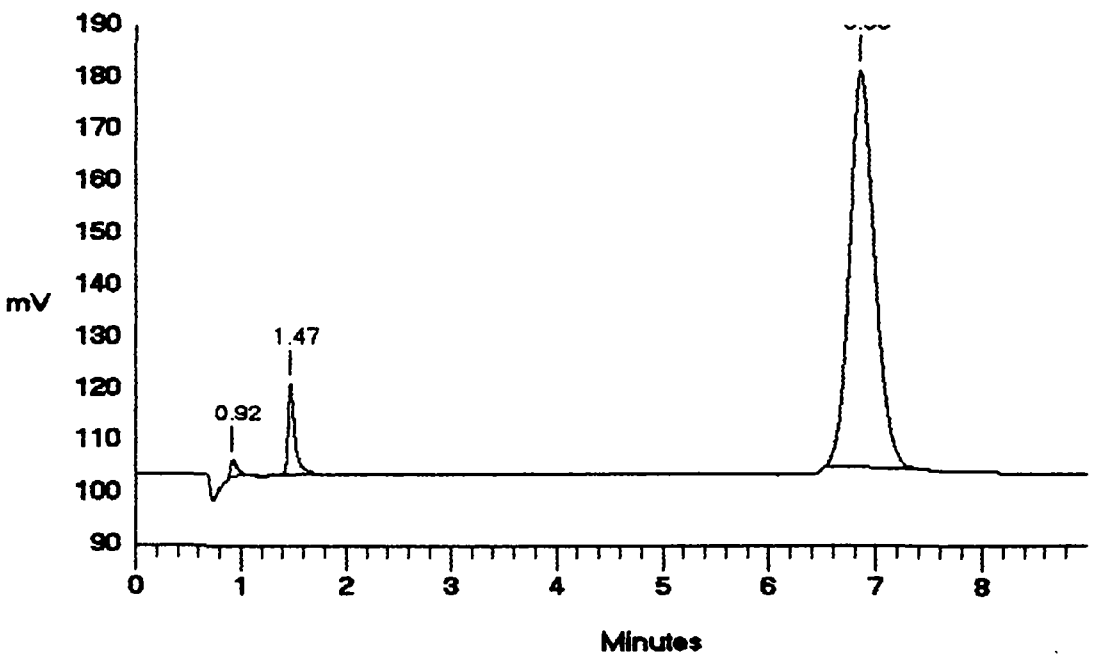
Sample Name: 11992.06 7655-F-15 1:99 Date: 12/12/1992 20:21:59
Data File : W2121291.D21
Method : C:\DX\METHOD\AUTO.met dab 12/17/92
ACI Address: 1 System: 1 Inject#: 21 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.92	FLUORIDE	43.705	2758	12664	1	2.22
2	1.47	CHLORIDE	418.025	17527	78773	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.85	SULFATE	3666.977	76205	1260028	1	-0.15
		Totals	4128.706	96490	1351465		

File: W2121291.D21 Sample: 11992.06



135

127

Sample Name: 11992.07 7655-F-16 1:99 Date: 12/12/1992 20:33:00

Data File : W2121291.D22

Method : C:\DX\METHOD\AUTO.met dab 12/17/92

ACI Address: 1 System: 1 Inject#: 22 Vial: Detector:COND

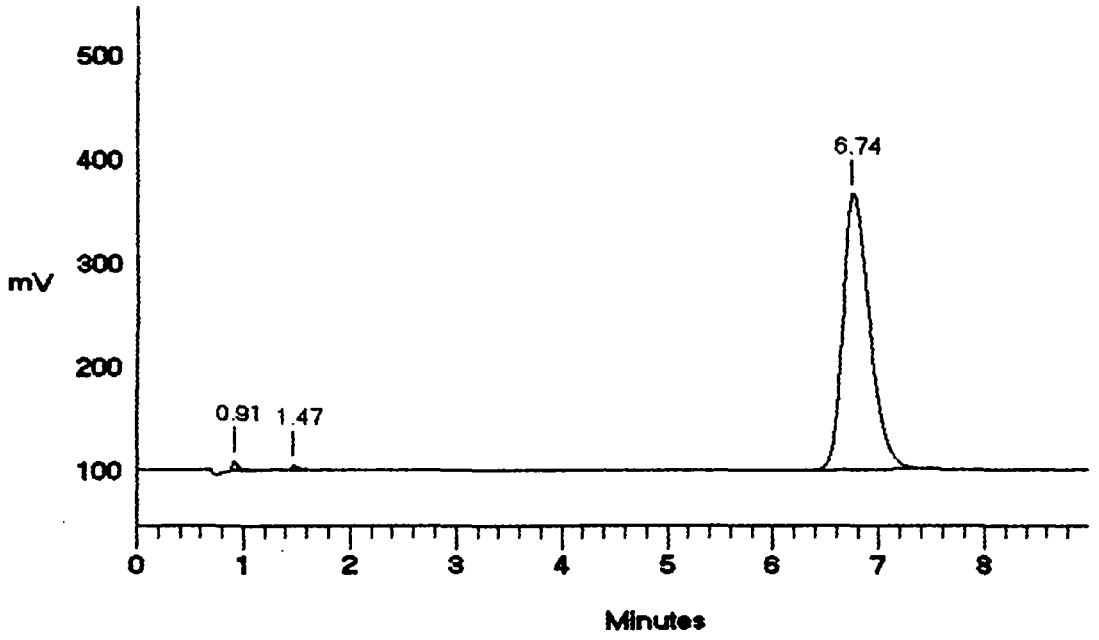
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	68.101	8227	33470	1	1.11
2	1.47	CHLORIDE	326.322	4341	20458	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.74	SULFATE	12626.585	265282	4647118	1	-1.75
		Totals	13021.008	277851	4701046		

File: W2121291.D22 Sample: 11992.07



********** AUTOMATIC CALIBRATION UPDATE **********

143A

Sample Name: AUTOCAL1 Date: Wed Feb 17 08:19:19 1993

Raw File : C:\DX\DATA\W0217931.D01

Method : C:\DX\METHOD\AUTO.met Calibration Level: 1

ACI Address: 1 System : 1 Inject#: 1 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.86	0.87	0.87	7.284e+004	7.877e+004	7.877e+004
2	CHLORIDE	1.48	1.44	1.44	4.862e+005	4.819e+005	4.819e+005
3	NITRITE	1.74	1.77	1.77	2.858e+004	2.824e+004	2.824e+004
4	BROMIDE	2.83	2.80	2.80	8.970e+004	9.243e+004	9.243e+004
5	NITRATE	3.25	3.24	3.24	1.138e+005	1.159e+005	1.159e+005
6	ORTHO-PHOSPHATE	4.93	4.91	4.91	2.356e+004	2.183e+004	2.183e+004
7	SULFATE	6.47	6.51	6.51	3.037e+005	3.179e+005	3.179e+005

143B

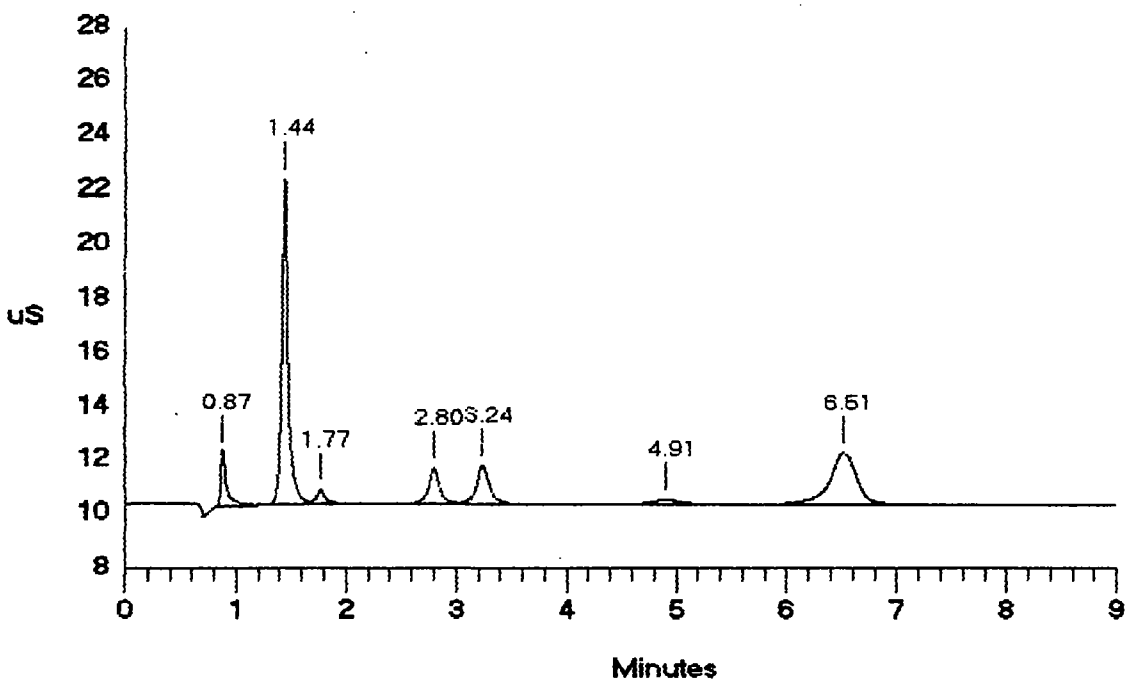
Sample Name: AUTOCAL1		Date: 02/17/1993 08:19:19	
Data File : C:\DX\DATA\W0217931.D01			
Method : C:\DX\METHOD\AUTO.met			
˙˙I Address: 1 System: 1 Inject#: 1			Detector:COND
. .alyst : D. BURNS	Column: AS4A-SC SN.2673		

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.87	FLUORIDE	1.000	20081	76773	1	1.16
2	1.44	CHLORIDE	10.000	120782	481891	2	-2.70
3	1.77	NITRITE	1.000	5325	28236	2	4.55
4	2.80	BROMIDE	5.000	13208	92428	2	-1.06
5	3.24	NITRATE	5.000	14191	115922	2	-0.31
6	4.91	ORTHO-PHOSPHATE	2.000	1487	21828	1	-0.41
7	6.51	SULFATE	10.000	19026	317919	1	0.62
		Totals	34.000	194101	1134997		

File: W0217931.D01 Sample: AUTOCAL1



********** AUTOMATIC CALIBRATION UPDATE **********

143c

Sample Name: AUTOCAL2 Date: Wed Feb 17 08:30:25 1993
w File : C:\DX\DATA\W0217931.D02
thod : C:\DX\METHOD\AUTO.met Calibration Level: 2
ACI Address: 1 System : 1 Inject#: 2 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.87	0.87	0.87	3.731e+005	3.914e+005	3.914e+005
2	CHLORIDE	1.44	1.46	1.46	2.786e+006	2.931e+006	2.931e+006
3	NITRITE	1.77	1.76	1.76	1.429e+005	1.460e+005	1.460e+005
4	BROMIDE	2.80	2.75	2.75	4.740e+005	4.886e+005	4.886e+005
5	NITRATE	3.24	3.15	3.15	6.099e+005	6.296e+005	6.296e+005
6	ORTHO-PHOSPHATE	4.91	4.89	4.89	1.192e+005	1.282e+005	1.282e+005
7	SULFATE	6.51	6.45	6.45	1.663e+006	1.745e+006	1.745e+006

143D

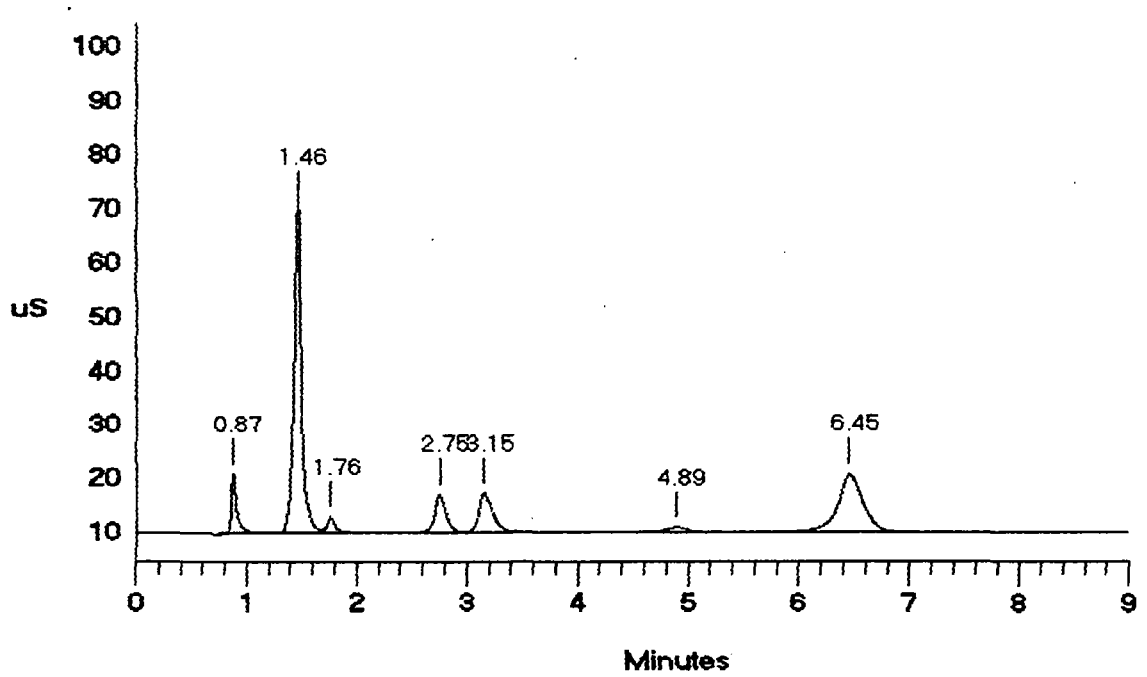
Sample Name: AUTOCAL2 Date: 02/17/1993 08:30:25
Data File : C:\DX\DATA\W0217931.D02
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 2 Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.87	FLUORIDE	5.000	108941	391439	1	0.00
2	1.46	CHLORIDE	50.000	601911	2930713	2	1.39
3	1.76	NITRITE	5.000	28577	146050	2	-1.93
4	2.75	BROMIDE	25.000	71335	488575	2	-1.79
5	3.15	NITRATE	25.000	72428	629608	2	-2.78
6	4.89	ORTHO-PHOSPHATE	10.000	8966	128226	1	-0.41
7	6.45	SULFATE	50.000	108821	1744701	1	-0.92
		Totals	170.000	1000979	6459312		

File: W0217931.D02 Sample: AUTOCAL2



143E

********** AUTOMATIC CALIBRATION UPDATE **********

Sample Name: AUTOCAL3	Date: Wed Feb 17 08:41:27 1993
~ w File : C:\DX\DATA\W0217931.D03	
. .thod : C:\DX\METHOD\AUTO.met	Calibration Level: 3
ACI Address: 1 System : 1 Inject#: 3	Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.87	0.87	0.87	7.464e+005	7.838e+005	7.838e+005
2	CHLORIDE	1.46	1.48	1.48	5.898e+006	6.155e+006	6.155e+006
3	NITRITE	1.76	1.75	1.75	3.020e+005	3.061e+005	3.061e+005
4	BROMIDE	2.75	2.71	2.71	1.012e+006	1.058e+006	1.058e+006
5	NITRATE	3.15	3.08	3.08	1.295e+006	1.356e+006	1.356e+006
6	ORTHO-PHOSPHATE	4.89	4.87	4.87	2.420e+005	2.542e+005	2.542e+005
7	SULFATE	6.45	6.37	6.37	3.603e+006	3.754e+006	3.754e+006

143F

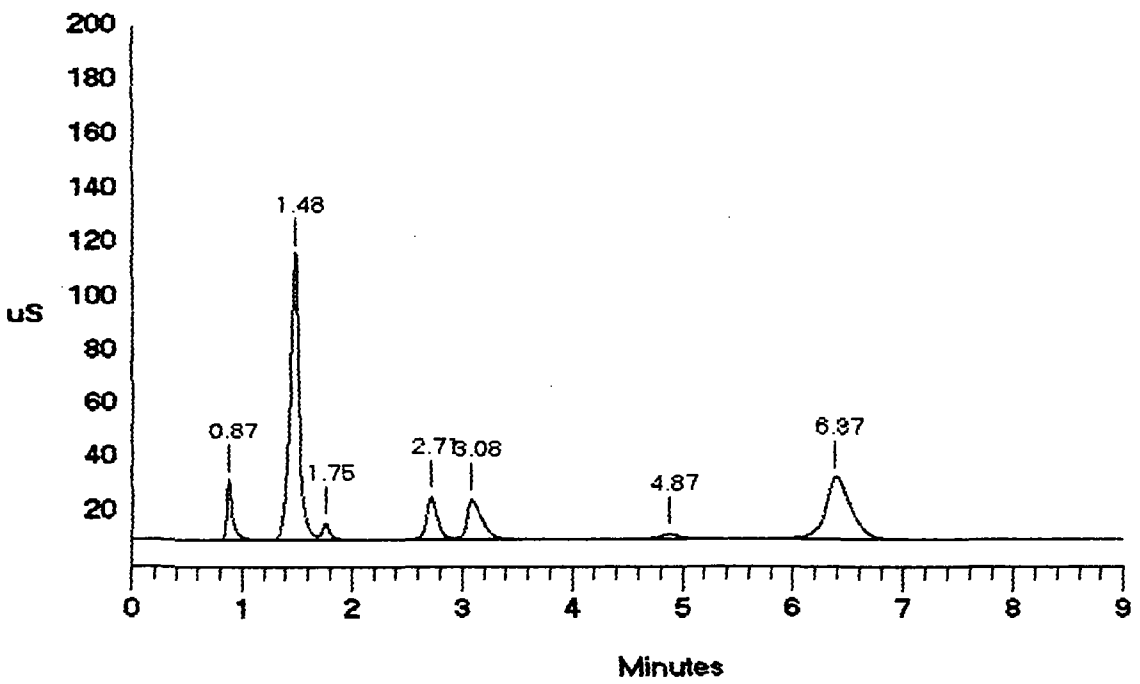
Sample Name: AUTOCAL3 Date: 02/17/1993 08:41:27
Data File : C:\DX\DATA\W0217931.D03
Method : C:\DX\METHOD\AUTO.met
GPI Address: 1 System: 1 Inject#: 3 Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.87	FLUORIDE	10.000	211777	783810	1	0.00
2	1.48	CHLORIDE	100.000	1053280	6155484	2	1.37
3	1.75	NITRITE	10.000	59198	306118	2	-1.91
4	2.71	BROMIDE	50.000	156018	1058339	2	-1.45
5	3.08	NITRATE	50.000	143653	1356250	2	-2.22
6	4.87	ORTHO-PHOSPHATE	20.000	18684	254208	1	-0.41
7	6.37	SULFATE	100.000	226343	3754078	1	-1.24
		Totals	340.000	1868953	13668287		

File: W0217931.D03 Sample: AUTOCAL3



DIONEX SCHEDULE - C:\DX\SCHEDULE\W3021793.SCH

1434

Inj#	Sample Name	Method	Data File	Vol.	Dil.	Int.Std.
1	ICV	..\AUTO.met	W3021793	1	1	1
2	CHECK STD	..\AUTO.met	W3021793	1	1	1
3	ICB	..\AUTO.met	W3021793	1	1	1
4	7566-F1 MS	..\AUTO.met	W3021793	1	1	1
5	7566-F1 MSD	..\AUTO.met	W3021793	1	1	1
6	CCV	..\AUTO.met	W3021793	1	1	1
7	CCB	..\AUTO.met	W3021793	1	1	1

Comment:
F,CL,NO3,SO4. MS AND MSD SPIKED WITH 25 PPM CL , 0.5 PPM F , 0.5 PPM NO3 , AND 25 PPM SO4 .

143A

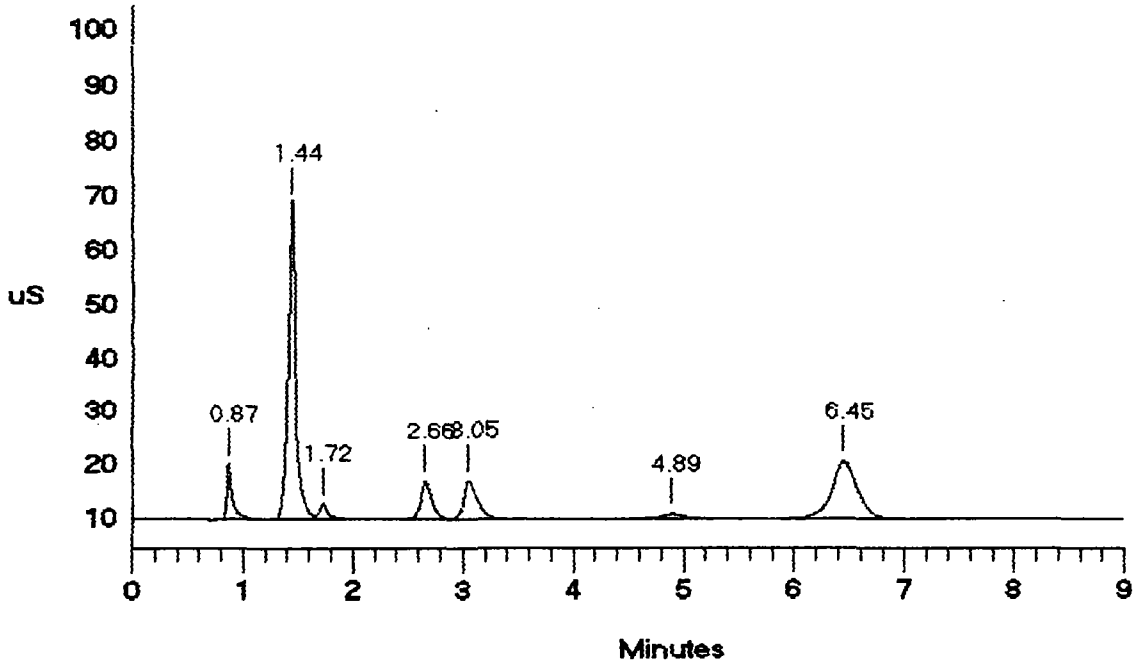
Sample Name: ICV Date: 02/17/1993 10:33:08
Data File : C:\DX\DATA\W3021791.D01
Method : C:\DX\METHOD\AUTO.met
GPIB Address: 1 System: 1 Inject#: 1 Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.87	FLUORIDE	4.839	100660	378475	1	0.00
2	1.44	CHLORIDE	48.468	585888	2882324	2	-2.70
3	1.72	NITRITE	5.103	27006	152993	2	1.02
4	2.66	BROMIDE	23.854	70087	485838	2	-1.85
5	3.05	NITRATE	24.028	71202	627623	2	-0.97
6	4.89	ORTHO-PHOSPHATE	9.760	8434	123060	1	0.41
7	6.45	SULFATE	47.621	106481	1720094	1	1.26
		Totals	163.674	969757	6370409		

File: W3021791.D01 Sample: ICV



143I

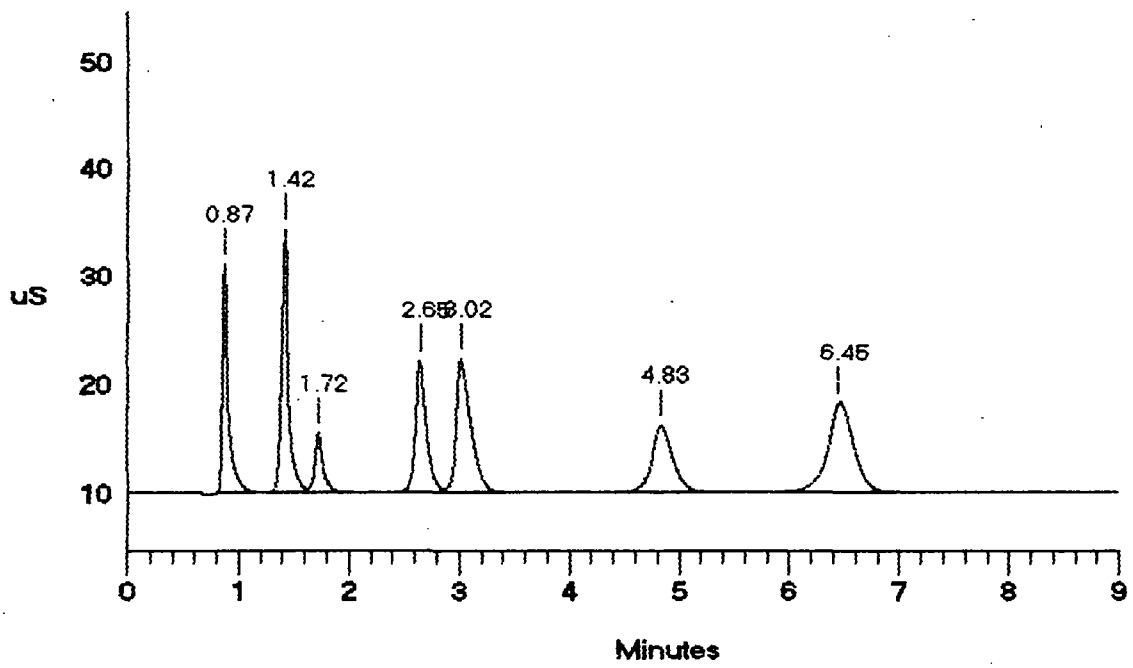
Sample Name: CHECK STD	Date: 02/17/1993 10:44:11
Data File : C:\DX\DATA\W3021791.D02	
Method : C:\DX\METHOD\AUTO.met	
⁻I Address: 1 System: 1 Inject#: 2	Detector:COND
.alyst : D. BURNS Column: AS4A-SC SN.2673	

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.87	FLUORIDE	9.946	209739	779676	1	0.00
2	1.42	CHLORIDE	19.245	242727	1037965	2	-4.05
3	1.72	NITRITE	9.538	53518	290221	2	2.44
4	2.65	BROMIDE	39.740	120156	828201	2	-2.21
5	3.02	NITRATE	41.638	121681	1114655	2	-1.95
6	4.83	ORTHO-PHOSPHATE	63.945	60721	822058	1	-0.82
7	6.45	SULFATE	37.949	81568	1349588	1	1.26
		Totals	222.000	890110	6222363		

File: W3021791.D02 Sample: CHECK STD



143J

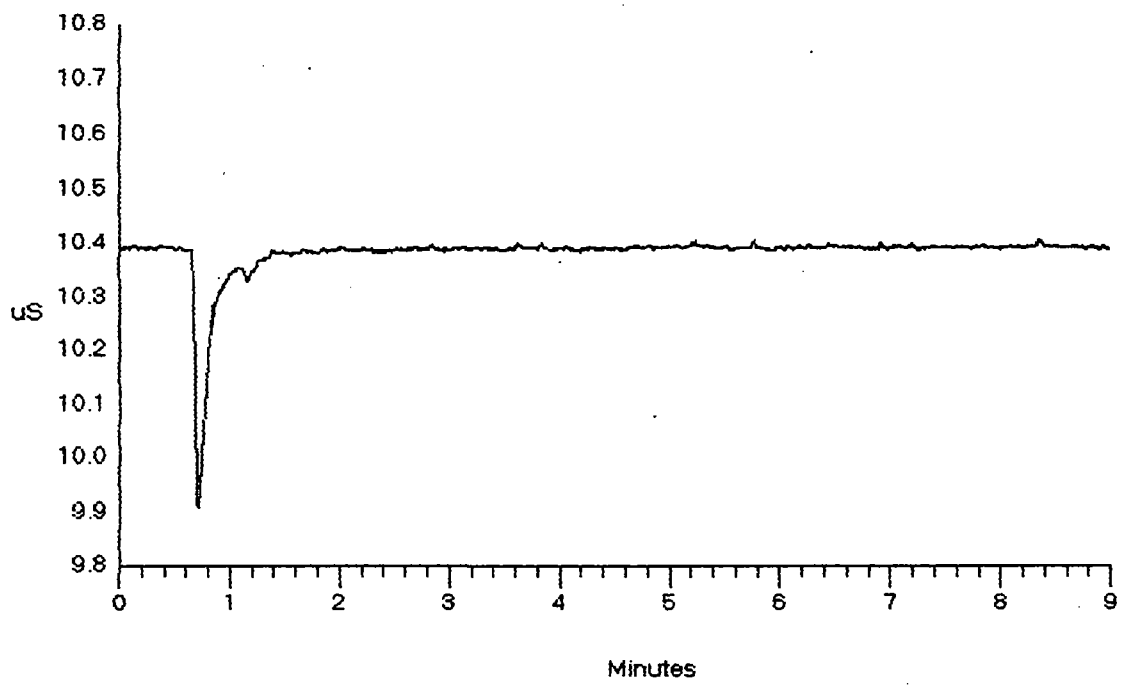
Sample Name: ICB Date: 02/17/1993 10:55:13
Data File : C:\DX\DATA\W3021791.D03
Method : C:\DX\METHOD\AUTO.met
^^I Address: 1 System: 1 Inject#: 3 Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W3021791.D03 Sample: ICB



143K

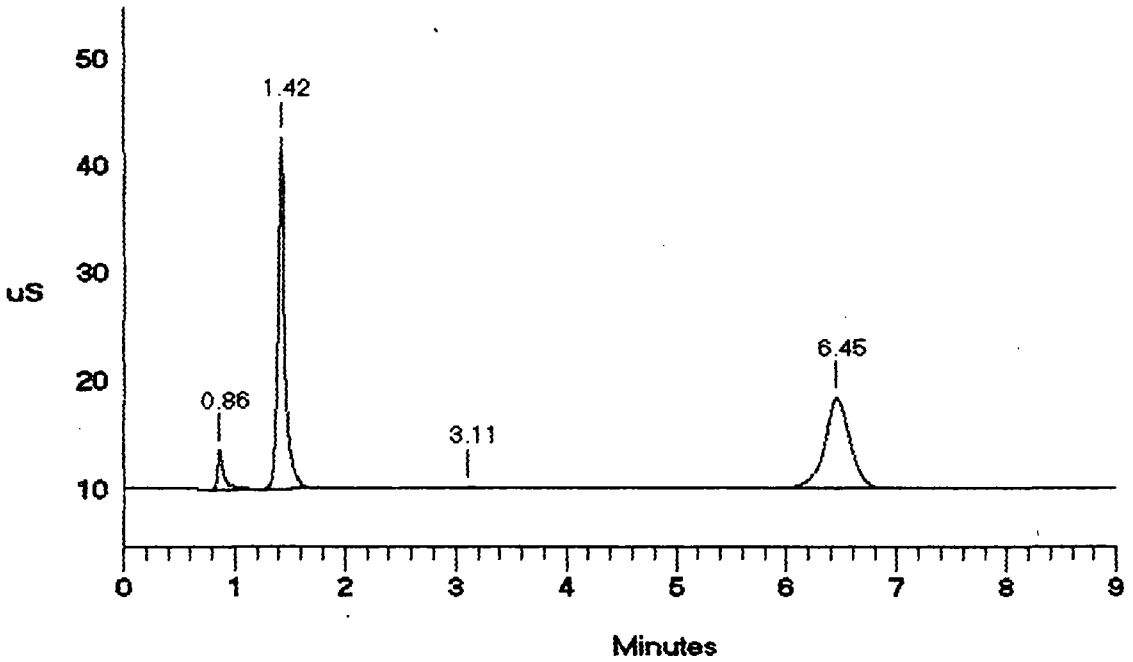
Sample Name: 7566-F1 MS Date: 02/17/1993 11:06:14
Data File : C:\DX\DATA\W3021791.D04
Method : C:\DX\METHOD\AUTO.met
ICI Address: 1 System: 1 Inject#: 4 Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.86	FLUORIDE	1.796	34931	139487	1	-1.15
2	1.42	CHLORIDE	25.454	325457	1429809	1	-4.05
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.11	NITRATE	1.660	1423	8956	1	0.97
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
4	6.45	SULFATE	38.136	83280	1356758	1	1.26
		Totals	67.046	445091	2935010		

File: W3021791.D04 Sample: 7566-F1 MS



143L

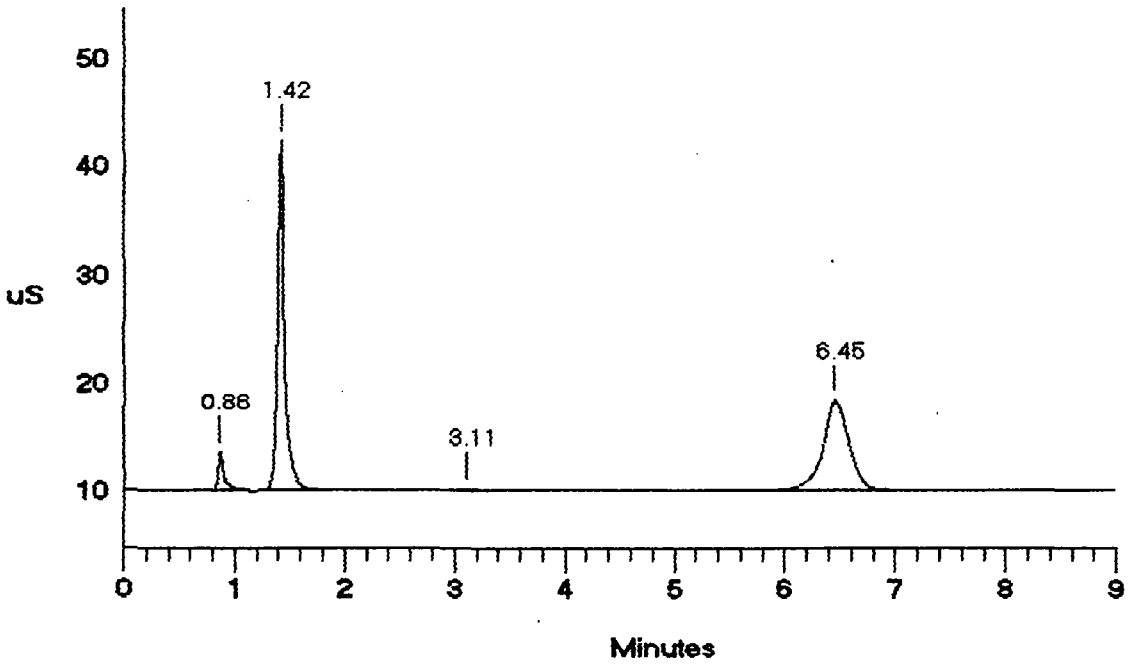
Sample Name: 7566-F1 MSD Date: 02/17/1993 11:17:17
Data File : C:\DX\DATA\W3021791.D05
Method : C:\DX\METHOD\AUTO.met
GPI Address: 1 System: 1 Inject#: 5 Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.86	FLUORIDE	1.807	34711	140352	1	-1.15
2	1.42	CHLORIDE	25.374	323857	1424767	1	-4.05
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.11	NITRATE	1.711	1364	10375	1	0.97
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
4	6.45	SULFATE	38.076	82684	1354484	1	1.26
		Totals	66.969	442615	2929979		

File: W3021791.D05 Sample: 7566-F1 MSD



143M

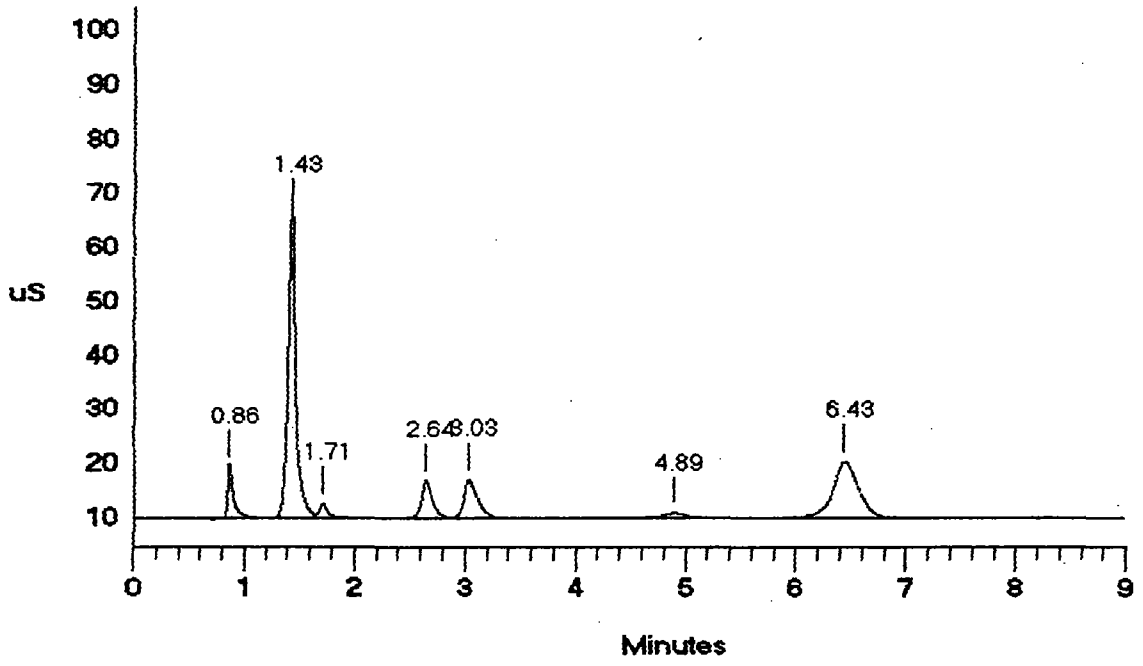
Sample Name: CCV	Date: 02/17/1993 11:28:19
Data File : C:\DX\DATA\W3021791.D06	
Method : C:\DX\METHOD\AUTO.met	
^^I Address: 1 System: 1 Inject#: 6	Detector:COND
.alyst : D. BURNS Column: AS4A-SC SN.2673	

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.86	FLUORIDE	4.751	93241	371573	1	-1.15
2	1.43	CHLORIDE	47.901	561158	2846518	2	-3.38
3	1.71	NITRITE	4.973	26593	148974	2	1.13
4	2.64	BROMIDE	23.684	68453	482164	2	-2.58
5	3.03	NITRATE	23.742	70542	619710	2	-1.62
6	4.89	ORTHO-PHOSPHATE	8.917	8201	112178	1	0.41
7	6.43	SULFATE	47.159	104206	1702374	1	0.94
		Totals	161.126	932395	6283491		

File: W3021791.D06 Sample: CCV



143d

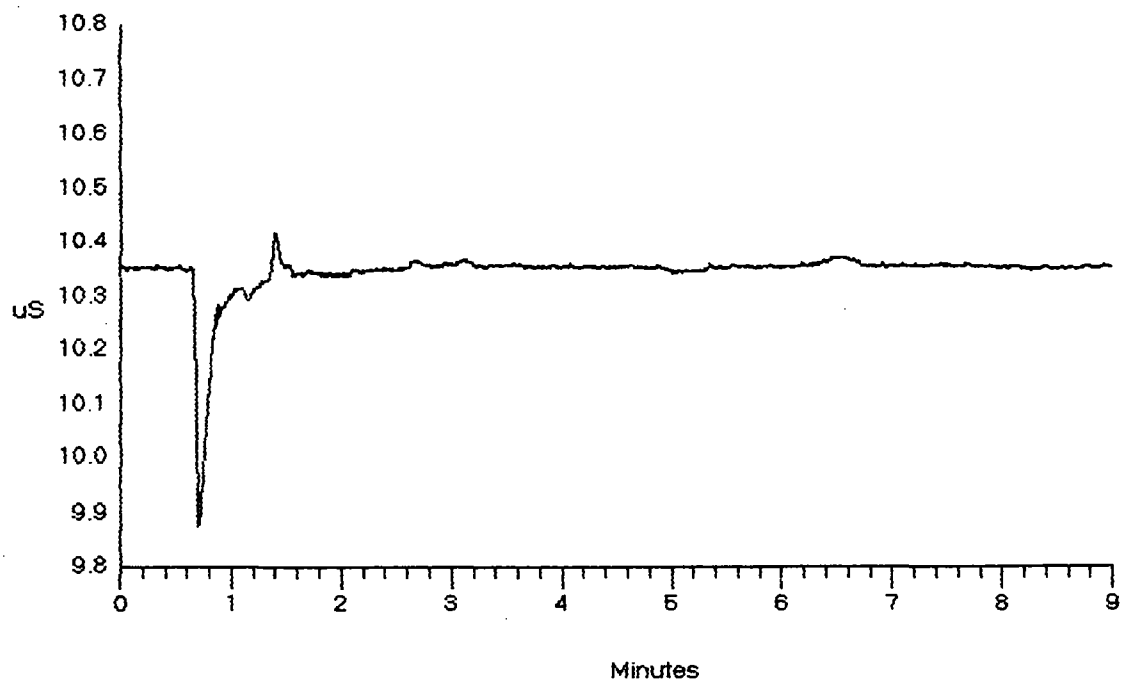
Sample Name: CCB Date: 02/17/1993 11:39:22
Data File : C:\DX\DATA\W3021791.D07
Method : C:\DX\METHOD\AUTO.met
GPI Address: 1 System: 1 Inject#: 7 Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.2673

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W3021791.D07 Sample: CCB



Alkalinity 12-17-92 15:30

146 LAB 2/10/93

Sample	Vol	begin pH	end pH	mls 0.0203N H_2SO_4			Alk. $CaCO_3$ mg/l
11967.10	50mls	9.99	8.3	26.25 - 25.8 = 0.45	P=9.1	Total	114
			4.5	31.4 - 25.8 = 5.6		BiCarb	96
						Carb	18 : <20
11992.101	50mls	10.63	8.3	35.5 - 31.5 = 4.0	P=81	Total	183
			4.5	40.5 - 31.5 = 9.0		BiCarb	21
						Carb	162

Carb = 2P Bi Carb = T - 2P Total = $\frac{\text{mls acid} \times N_{acid} \times 50{,}000}{\text{sample mls}}$

$P = \frac{0.45 \times 0.0203N \times 50000}{50} = 9.1$, BC = 114-18 = 96 $T = \frac{5.6 \times 0.0203 \times 50000}{50} = 113.7$

Carbonate = 18.2 , BiCarb = 96 Total = 114

ORION PH METER SLOPE = 99.6% * ACID = H_2SO_4 @ 0.0211N

Notebook No. 5

1746A

PROJECT ALKALINITY 2-16-93 (MATRIX SPIKE)

Continued From Page N/A

SAMPLE	VOL	beg. pH	mls ACID=8.3	P	mls ACID=4.5	K	TOTAL ALK. PPM	Det limit PPM
BLANK	500ml	5.79	0	0	0.05	1.0	1.0	1.0
100 ppm STD		10.48	2.1	44.3	2.6		99.2	
7655-F-19 **		8.41	0.1	2.1	6.1		131	
100 ppm STD		10.49	2.2	46.4	2.6		101	
BLANK		5.65	0	0	0.05		1.0	

** 7655-F-19 SPIKED w/ 20.0 PPM (400 ml OF 2500 ppm)

STD RECOVERIES WERE 99.2% and 101%

MATRIX SPIKE RECOVERY WAS 105%

2-16-93

Continued on Page

Read and Understood By

Signed Date Signed Date

PROJECT COD's @ 620nm 9-29-92

Notebook No. 147F

Continued From Page

Sample	Vol	Dil	Block Temp °C	ABS	K	mg/L	Det
ICB	2.0	1/1	150±5.0°C	0	1.0	0	16.0
ICV				0.041		99.6	
11181.01				0.014		34.1	
02				0.017		41.4	
03				0.008		19.5	
04				0.016		39.0	
05				0.014		34.1	
06				0.000		ND	

H_2SO_4 NORM 9-28-92

Sample	mls 0.05N Na_2CO_3	pH START	mls Acid ⇒ 5.00	mls Acid ⇒ 4.50 (After 5 min boil)
1	20.0	11.30	48.10	1.0
2		11.24	48.10	1.3
3		11.22	48.10	1.3

Norm

1 0.0204

2 0.0202 AVG = 0.0203

3 0.0202

COD's @ 620nm 9-30-92

Sample	Vol	Dil	Block Temp °C	ABS	K	mg/L	Det
ICB	2.0	1/1	150±5.0°C	0	1.0	0	16.0
ICV				0.042		102	
11191.01				0.138		335	
11192.01				0.108		262	
02				0.122		296	
03				0.099		240	
04				0.083		202	

H_2SO_4 = 0.0203N

10-2-92 ALK + pH

Sample	Vol	Dil	Beg pH	End pH	mls H_2SO_4*	K	mg/L	Det
11218.01	50ml	1/1	7.00	4.50±0.05	12.0	1.0	244	1.0
02			7.63		11.5		233	
03			6.84		11.0		223	
04			6.35		8.9		181	
05			6.05		0.05		1.0	
06			6.91		13.2		268	

Continued on Page

Read and Understood By

Signed Date Signed

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# Auto IC STD
Date/Analyst 12-10-92 DB

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
IC STD #1 Auto Meth.	4-89AS	1000 ug/ml	100 ul	100 ml	Water	F; 1.0	mg/l
"	4-88CL	"	1.0 ml	"	"	Cl; 10.0	"
"	4-92AS	"	100 ul	"	"	NO_2; 1.0	"
"	4-90AS	"	500 ul	"	"	Br; 5.0	"
"	4-91AS	"	500 ul	"	"	NO_3; 5.0	"
"	4-94AS	"	200 ul	"	"	OPO4; 2.0	"
"	4-93AS	"	1.0 ml	"	"	SO_4; 10.0	"
IC STD #2 Auto Meth.	4-89AS	1000 ug/ml	500 ul	100 ml	Water	F; 5.0	mg/l
"	4-88Cl	"	5.0 ml	"	"	Cl; 50.0	"
"	4-92AS	"	500 ul	"	"	NO_2; 5.0	"
"	4-90AS	"	2.5 ml	"	"	Br; 25.0	"
"	4-91AS	"	2.5 ml	"	"	NO_3; 25.0	"
"	4-94AS	"	1.0 ml	"	"	OPO4; 10.0	"
"	4-93AS	"	5.0 ml	"	"	SO_4; 50.0	"
IC STD #3 Auto Meth	4-89AS	1000 ug/ml	1.0 ml	100 ml	Water	F; 10.0	mg/l
"	4-88Cl	"	10.0 ml	"	"	Cl; 100	"
"	4-92AS	"	1.0 ml	"	"	NO_2; 10.0	"

200

14/35

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# Auto IC STD
Date/Analyst 12-10-92 DB

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
IC STD#3 Auto Meth.	4-90AS	1000 ug/ml	5.0 ml	100 ml	water	Br; 50.0	mg/l
"	4-91AS	"	5.0 ml	"	"	NO_3; 50.0	"
"	4-94AS	"	2.0 ml	"	"	OPO_4; 20.0	"
"	4-93AS	"	10.0 ml	"	"	SO_4; 100	"

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HEH

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# Auto IC STD
Date/Analyst 2-17-93 DB

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
IC STD #1 Auto METH	4-89AS	1000 ug/ml	100 ul	100 ml	Water	F; 1.0	mg/l
"	4-88CL	"	1.0 ml	"	"	Cl; 10.0	"
"	4-92AS	"	100 ul	"	"	NO_2; 1.0	"
"	4-90AS	"	500 ul	"	"	Br; 5.0	"
"	4-91AS	"	500 ul	"	"	NO_3; 5.0	"
"	4-94AS	"	200 ul	"	"	OPO4; 2.0	"
"	4-93AS	"	1.0 ml	"	"	SO_4; 10.0	"
IC STD #2 Auto METH	4-89AS	1000 ug/ml	500 ul	100 ml	Water	F; 5.0	mg/l
"	4-88CL	"	5.0 ml	"	"	Cl; 50.0	"
"	4-92AS	"	500 ul	"	"	NO_2; 5.0	"
"	4-90AS	"	2.5 ml	"	"	Br; 25.0	"
"	4-91AS	"	2.5 ml	"	"	NO_3; 25.0	"
"	4-94AS	"	1.0 ml	"	"	OPO4; 10.0	"
"	4-93AS	"	5.0 ml	"	"	SO4; 50.0	"
IC STD #3 Auto METH	4-89AS	1000 ug/ml	1.0 ml	100 ml	Water	F; 10.0	mg/l
"	4-88CL	"	10.0 ml	"	"	Cl; 100	"
"	4-92AS	"	1.0 ml	"	"	NO_2; 10.0	"

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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# Auto FC STD
Date/Analyst 2-17-93 DB

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
IC STD#3 Auto Meth	4-90AS	1000 ug/ml	5.0 ml	100 ml	Water	Br; 50.0	mg/l
"	4-91AS	"	5.0 ml	"	"	NO_3; 50.0	"
"	4-94AS	"	2.0 ml	"	"	OPO_4; 20.0	"
"	4-93AS	"	10.0 ml	"	"	SO_4; 100	"

2/2/93 TS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

Site Name Whitewater

Case # SAS 7655F

SDG# 7655-F2

Date : 1-27-1993

Subject: **CLP Data Review**

From: Dr Melvin Ritter , Chemist , Region VI M.L. Ritter

To : K. Hill , 6H-MA , Region VI

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section. Samples were:

INORGANIC: 7655-F2
7655-F3
7655-F4
7655-F6 TO
7655-F12

ORGANIC:

The data was found:

( ) Acceptable

(X) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HO
Mike Hiatt, EMSL/Las Vegas
Regional TPO
Mitzie Dovel,Mantech ENV, VA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: 1-27-1993

Subject: CLP Data Review

From: Mahmoud El-Feky, Data Coordinator , Region VI

To: Dr. Melvin Ritter , Chemist , Region VI

Attached is the data review summary for Site Whitewater
Case # SAS 7655f
SDG # 7655-F2

Data was found: ( ) Acceptable

(X) Provisional

( ) Unacceptable

Action required by TPO: ( ) Yes

(X) No

COMMENTS:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS7655F
LABORATORY American Analy. (OK)
CONTRACT # SAS7655F
SDG # 7655-F2
SOW # ILM02.0 & Methods 160.1, 300.0, and 2320B
ACCT # 3TGBDN78 SF # TGBUZZ

SITE Whitewater
NO. OF SAMPLES/
MATRIX 10/waters
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Youree Holloway
COMPLETION DATE January 24, 1993

SAMPLE NO.: 7655-F2 7655-F3 7655-F4 7655-F6 7655-F7 7655-F8 7655-F9 7655-F10 7655-F11 7655-F12

DATA ASSESSMENT SUMMARY

	ICP	IC	ALK	TITRATE
1. HOLDING TIMES	O	O	O	O
2. CALIBRATIONS	O	O	O	O
3. BLANKS	X	O	O	O
4. ICS	O			
5. LCS	O	O		
6. DUPLICATE ANALYSIS	O	O	O	O
7. MATRIX SPIKE	O	X	O	O
8. MSA		N/A		
9. SERIAL DILUTION	X			
10. SAMPLE VERIFICATION	X	X	O	X
11. OTHER QC	X	X	X	X
12. OVERALL ASSESSMENT	X	X	X	X

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
N/A = Not applicable

ACTION ITEMS: Blank concentrations were above the instrument detection limits; matrix spike recoveries were outside of quality control limits, and a serial dilution difference exceeded the quality control limit.

AREAS OF CONCERN: Spiking levels were not compliant with the SAS contract.

NOTABLE PERFORMANCE:

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F2 Site Whitewater Lab American (OK)

Comments: Ten water samples were analyzed at low concentrations for bicarbonate, carbonate, chloride, fluoride, nitrate, sulfate, TDS, calcium, magnesium, potassium, and sodium. The data package is provisional because: spiking levels were not compliant with the SAS contract; blank concentrations were above the instrument detection limits; matrix spike recoveries were outside of quality control limits; field blank concentrations exceeded the instrument detection limits and the contract required detection limits, and a serial dilution difference exceeded the quality control limit.

1. Holding Times

All holding time criteria were met.

2. Calibrations

All calibrations were acceptable.

3. Blanks

A. Calibration Blanks

The concentrations of sodium in the calibration blanks were above the instrument detection limit (IDL) but less than the contract required detection limit (CRDL). Sodium sample result for 7655-F7 is qualified as undetected (U) because the reported concentration was greater less than five times the calibration blank result.

B. Preparation Blank

The concentrations of bicarbonate and total dissolved solids (TDS) in the preparation blank were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). All sample results for bicarbonate and total dissolved solids (TDS) are biased high.

C. All other blank results were acceptable.

4. ICS

Interference check sample criteria were met.

5. LCS

All laboratory control sample results were acceptable.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F2 Site Whitewater Lab American (OK)

6. Duplicate Analysis

All duplicate results met technical quality control criteria.

7. Matrix Spike

Matrix Spike Recovery

A. The fluoride and nitrate results above the IDL are qualified as estimated (J) due to pre-digestion matrix spike recoveries of 131.3% and 273.5%, respectively. Physical or chemical interference may exist in the samples. The amount of the fluoride and nitrate spikes (1000 ug/L) were twice the amount requested by the SAS request (500 ug/L).

B. All other analytes had acceptable matrix spike recoveries.

8. MSA

Not applicable.

9. Serial Dilutions

A. The sodium results are qualified as estimated (J) due to a 23.4% serial dilution difference. Physical or chemical interference may exist in the sample matrix.

B. All other serial dilution results met quality control criteria.

10. Sample Verification

A. Form X is missing.

B. The total dissolved solids (TDS) result for 7655-F10S should be 1331000 ug/L, not 1337000 ug/L (page 123). The spike added should be 102000 ug/L. The matrix spike recovery should be 98.0%.

C. The spiking levels for some analytes were not compliant with the Special Analytical Service Request.

D. The data reviewer confirmed the laboratory's permission to use elevated detection limits for chloride, fluoride, and nitrate. However, the telephone log documenting this authorization was not included in the data package.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case SAS7655F SDG 7655-F2 Site Whitewater Lab American (OK)

11. Other QC

Field Blanks

The concentration of calcium in the field blank, 7655-F2, was above the instrument detection limit (IDL) but less than the contract required detection limit (CRDL). Calcium sample results for 7655-F7 and 7655-F12 are qualified as undetected (U) because the reported concentrations are less than five times the field blank concentrations.

The concentrations of bicarbonate, chloride, nitrate, TDS, and sodium in the field blank, 7655-F2 were above the contract required detection limit (CRDL). TDS results were unaffected by the field blank. The analytes in the following samples are qualified as undetected because the reported concentrations are less than five times the field blank concentrations:

- bicarbonate in 7655-F7
- chloride in 7655-F6 and 7655-F7
- nitrate in 7655-F4 and 7655-F6
- sodium in 7655-F7

12. Overall Assessment

The data package is provisional for the following reasons:

A. Blank concentrations were above the instrument detection limit for sodium, bicarbonate, and total dissolved solids.

B. Fluoride and nitrate matrix spike recoveries were outside of quality control limits .

C. The zinc serial dilution difference exceeded the quality control limit.

D. The spiking levels for some analytes were not compliant with the Special Analytical Service Request.

All other technical requirements were met.

MEMORANDUM

Bill Blanton

To:	**M. Ritter**	**From:**	**W. E. Blanton**
Subject:	**SAS7655F SDG 7655-F2 Laboratory Resubmissions**	**Date:**	**January 26, 1993**
Copies:	**M. El Feky** **File**	**Ref:**	**MEM441** **I-981**

Attached is a list of issues needing clarification and items needing corrections and omissions for SAS case SAS7655F SDG 7655-F2.
The samples in this case were analyzed by:

Name of Laboratory	American Analytical & Technical Services
Address	1700 West Albany, Suite A Broken Arrow, OK 74012
Attention:	Jason Ruckman

These laboratory resubmissions are necessary to enable the Environmental Protection Agency to maximize the usability of the laboratory results in this data package. The laboratory resubmissions should be submitted to:

Ms. Christy Macdowell
ManTech Environmental Technology, Inc.
c/o US EPA
10625 Fallstone Rd.
Houston, TX 77099

Ms. Macdowell will then distribute the laboratory resubmission to the appropriate data reviewer who will prepare the resubmission report for this case.

In Reference to Case
SAS No.: SAS7655F
SDG No.: 7655-F2
Laboratory: AATS

In reference to data for the following sample numbers:

7655-F2 7655-F3 7655-F4 7655-F6 7655-F7 7655-F8 7655-F9 7655-F10 7655-F11 7655-F12

Summary of Questions/Issues:

A. Form X (IDL) is missing. Please submit.

B. The total dissolved solids (TDS) result for 7655-F10S should be 1331000 ug/L, not 1337000 ug/L (page 123). The spike added should be 102000 ug/L. The matrix spike recovery should be 98.0%. Please correct and resubmit.

C. The spiking levels used by the laboratory for fluoride and nitrate, 1000 ug/L for both analytes, were not compliant with the Special Analytical Service Request (pages 19 and 132). The correct spiking levels were 500 ug/L for both. Please submit any documentation explaining why the SAS request spiking levels were not used.

D. The data reviewer confirmed the laboratory's permission to use elevated detection limits for chloride, fluoride, and nitrate. Please submit documentation (i.e. telephone log) that authorized the 10x raising of the detection limits for these analytes.

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case SDG No. 7655F2 SDG Nos. To Follow SAS No. 7655F Date Rec 1/15/93

EPA Lab ID: AATS

Lab Location: Broken Arrow, OK

Region: 6 Audit No.: SAS7655F/F2

Re_Submitted CSF? Yes ____ No X

Box No(s): 1

COMMENTS:

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?	X		
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?	X		
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?	X		
20a. If "No", does the copy indicate where original documents are located?			

Audited by: Youree L. Holloway ESAT YOUREE HOLLOWAY/DATA REVIEWER Date 1/15/93

Audited by: ____ ____ Date ____

Audited by: ____ ____ Date ____

Signiture Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____

Entered by: ____ ____

Reviewed by: ____ ____

Signature Printed Name/Title

RECEIVED FEB 1993

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
EPA HOUSTON LABORATORY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

93 FEB 18 AM 11:20

RESUBMITTED DATA REVIEW REPORT

DATE: February 15, 1993

CASE #: _____

SAS #: SAS7655F

TO: K. Hill 6H-MA

SDG #: 7655-F2

USEPA Region 6

Site Name: Whitewater

Lab Name: American Analy. (OK)

From: Youree Holloway

ESAT

EFFECTS OF RESUBMITTED INFORMATION ON THE ORIGINAL DATA:

A. The resubmitted information does not affect the original data review.

B. Form X is submitted.

C. Permission was given to the laboratory by Mr. El-Feky to increase the spiking levels and detection limits.

D. Please replace original pages with the resubmitted pages.

981

Key.

AMERICAN ANALYTICAL & TECHNICAL SERVICES, INC.

January 29, 1993

YH
RCVD
2/3/93
Request
981 cm

Christy Macdowell
USEPA-Region VI
10625 Fallstone Road
Houston, TX 77099

SUBJECT: SAS 7655-F, SDG 7655-F-2

Ms. Macdowell:

The following is in response to the issues needing clarification and items needing corrections and omissions for the above mentioned SAS.

A. Please find attached the submitted Form X's for this SAS. Sorry for the oversite.

B. Please find attached a revised Form VA with the corrected spike sample results and spike added for the total dissolved solids.

C. On approximately December 10, 1992, the laboratory contacted Mr. El Feky with the EPA Region VI. We explained that the chloride and sulfate concentrations were to high in the sample to run by our low level method. The chloride peaks were overlapping the fluoride peaks and the sulfate peaks were overlapping the nitrate peaks. Mr. El Feky said he did not have a problem if we increased the detection limit 10-fold. We then called the SMO SAS Coordinator so they could call the region and verify the use of elevated detection limits.

1700 West Albany • Broken Arrow, OK 74012 • Office (918) 251-2858 • Fax (918) 251-2599

D. Due to the high levels of chloride and sulfate in the samples, we analyzed using a less sensitive method. Thus, we increased our spiking concentration for the fluoride and nitrate to an appropriate level to match the method we used for analysis.

If you should have any other questions, please feel free to contact me at (918) 251-2858.

Sincerely,

Steve L. Markham
Inorganic Program Manager

CC: SMO
EMSL/LV
File

U.S. EPA - CLP

5A
SPIKE SAMPLE RECOVERY

019

EPA SAMPLE NO.

F10S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F
Matrix: __WATER_____ Level (low/med): _LOW____
% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona		232400.0000		210100.0000		20000.00	111.5		AK
Carbonate									NR
Chloride	75-125	28297.0000		20535.0000		10000.00	77.6		I
Fluoride	75-125	1313.0000		50.0000	U	1000.00	131.3	N	I
Nitrate	75-125	2735.0000		100.0000	U	1000.00	273.5	N	I
Sulfate		664960.0000		657200.0000		100000.00	7.8		I
TDS		1331000.0000		1231000.0000		102000.00	98.0		T
Calcium		192738.2610		176107.9820		20000.00	83.2		P
Magnesium	75-125	87730.0060		71076.5070		20000.00	83.3		P
Potassium	75-125	25740.4240		6686.9570		20000.00	95.3		P
Sodium	75-125	52945.5970		34329.2780		20000.00	93.1		P

Comments:

FORM V (Part 1) - IN ILM02.1

10

023A

Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F
ICP ID Number: ARL3560_____ Date: 09/16/92
Flame AA ID Number : _____
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000		
Carbonate			20000		
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium	317.92		5000	202.0	P
Magnesium	279.08		5000	195.0	P
Potassium	776.49		5000	271.0	P
Sodium	589.00		5000	269.0	P

Comments:

10
Instrument Detection Limits (Quarterly)

0238

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F
ICP ID Number: _____ Date: 12/01/92
Flame AA ID Number : BICARBONATE_
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000	20000.0	AK
Carbonate			20000		
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium			5000		
Magnesium			5000		
Potassium			5000		
Sodium			5000		

Comments:

023c

10
Instrument Detection Limits (Quarterly)

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024
Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F
ICP ID Number: _____ Date: 12/01/92
Flame AA ID Number : CARBONATE___
Furnace AA ID Number : _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Bicarbona			20000		
Carbonate			20000	20000.0	AK
Chloride			150		
Fluoride			50		
Nitrate			100		
Sulfate			200		
TDS			10000		
Calcium			5000		
Magnesium			5000		
Potassium			5000		
Sodium			5000		

Comments:

I-981

SAMPLE MANAGEMENT OFFICE

Operated by Viar & Company
a subsidiary of DynCorp
under contract # 68-D9-0135
to the U.S. Environmental Protection Agency

FAX COMMUNICATION

Date: 12/16/92

To: **Fax Number:**

Name: Mel Ritter / Mahmoud El-Feky

Company: Reg VI

From: Rhonda Holder
SAS Coordinator
(703) 519-1447

Subject: SAS 7655-F-01 Whitewater + Hanover Creeks Wet Chem

Number of Pages, Including This Page: 1

Comments or Special Instructions: The detection limits are low for the EC parameters. However, some samples are at a high level for Cl + SO4. The lab recommends increasing the detection limits by a factor of 10. Is this acceptable?

SMO FAX NUMBER - (703) 683-0378
P.O. Box 818, Alexandria, Virginia 22313. Phone: (703) 684-5678

C21-001-73

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

FACSIMILE REQUEST AND COVER SHEET			
TO	Rhonda Holder		
OFFICE/PHONE	Region VI Coordinator		
REGION/LAB	SMO,Viar & Co.		
FROM	Mahmoud E. El-Feky , Data Coordinator , Region VI		
PHONE	(713)983-2128	MAIL CODE	6E-HO
OFFICE	USEPA,Region VI,Houston Branch		
DATE	12-16-1992	NUMBER OF PAGES	1

INFORMATION FOR SENDING FASCIMILE MESSAGES TO EPA,HOUSTON BRANCH		
EQUIPMENT	FASCIMILE NUMBER	VERIFICATION NUMBER
P NAFAX	713-983-2248	713-983-2128
XEROX	713-983-2124	713-983-2128

COMMENTS: In reference to SAS# 7665F-01, wet Chemistry, raising the detection limit by a factor of 10 is acceptable.

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No. 7655-F

1. Project Code: 5157/149-173	Account Code:	2. Region No.: VI	Sampling Co.:
4. Date Shipped: 12-9-92	Carrier: Fed Ex	Regional Information:	Sampler (Name): STEPHEN WUST
Airbill Number: 6159041545	Non-Superfund Program:	Sampler Signature: [signature]	Site Name: WHITEWATER AND HANOVER CREEKS
City, State: BAYARD, NM	Site Spill ID:	5. Ship To: AATS 1700 WEST ALBANY SUITE A BROKEN ARROW, OK 74012	

3. Type of Activity

	Lead	Pre-Remedial	Remedial	Removal
SF			RIFS	CLEM
PRP		PA	RD	REMA
ST		SSI	RA	REM
FED		LSI ✓	O&M	OIL
			NPLD	UST

6. Sample Description (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil
7. Waste
8. Other (Specify)

7. Preservative (Enter in Column C)
1. HCl
2. HNO_3
3. $NAHSO_4$
4. H_2SO_4
5. NAOH
6. Other (SAS) (Specify)
7. Ice only
N. Not preserved

Sample Numbers	A Matrix Enter from Box 6	B Conc Low Med High	C Preservative Used from Box 7	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Designated Field QC
1. 7655-F7	1	LOW	7	General Chem		005468	C092W-HCBG	12/8/92 9:50	SSW	—
2. 7655-F9	1	LOW	7	General Chem		005392	C092W-HCUH	12/8/92 10:10	SSW	—
3. 7655-F12	2	LOW	7	General Chem		039920	C092W-MW2	12/8/92 16:00	SSW	—
4. 7655-F6	2	LOW	7	General Chem		005449	C092W-SPR	12/8/92 9:40	SSW	—
5. 7655-F8	2	LOW	7	General Chem		005390	C092W-ESC	12/8/92 9:50	SSW	—
6. 7655-F10	2	LOW	7	General Chem	✓	039916-17	C092W-MW3	12/8/92 12:35	SSW	—
7. 7655-F11	2	LOW	7	General Chem		005378	C092W-MW3	12/8/92 12:35	SSW	—
8. 7655-F3	1	LOW	7	General Chem		005443	C092W-MT1	12/7/92 15:30	SSW	—
9. 7655-F4	1	LOW	7	General Chem		005197	C092W-MT2	12/7/92 15:35	SSW	—
10. 7655-F2	2	LOW	7	General Chem		005445	C092W-B	12/7/92 13:25	SSW	B

Shipment for SAS complete? (Y/N) N

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-3 (4-91)

DISTRIBUTION:
White - Region Copy Yellow - SMO Copy Pink - Lab Copy for Return to SMO Gold - Lab Copy

225

S 001014

COPY 107

********** AUTOMATIC CALIBRATION UPDATE **********

Sample Name: AUTOCAL1 Date: Thu Dec 10 12:46:55 1992
Raw File : C:\DX\DATA\AUTO0001.D01
Method : C:\DX\METHOD\AUTO.met Calibration Level: 1
ACI Address: 1 System : 1 Inject#: 1 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	6.117e+004	6.707e+004	6.707e+004
2	CHLORIDE	1.53	1.47	1.47	4.584e+005	4.897e+005	4.897e+005
3	NITRITE	1.81	1.79	1.79	8.761e+004	1.001e+005	1.001e+005
4	BROMIDE	2.77	2.76	2.76	8.333e+004	8.906e+004	8.906e+004
5	NITRATE	3.05	3.16	3.16	5.148e+005	5.413e+005	5.413e+005
6	ORTHO-PHOSPHATE	5.16	5.20	5.20	6.580e+004	6.760e+004	6.760e+004
7	SULFATE	6.84	6.99	6.99	2.920e+005	3.027e+005	3.027e+005

ORIGINALS FILED WITH CSF
~~7655-E-01~~ 7655-F-01
dab 12/16/92
7655-F-2

COPY 108

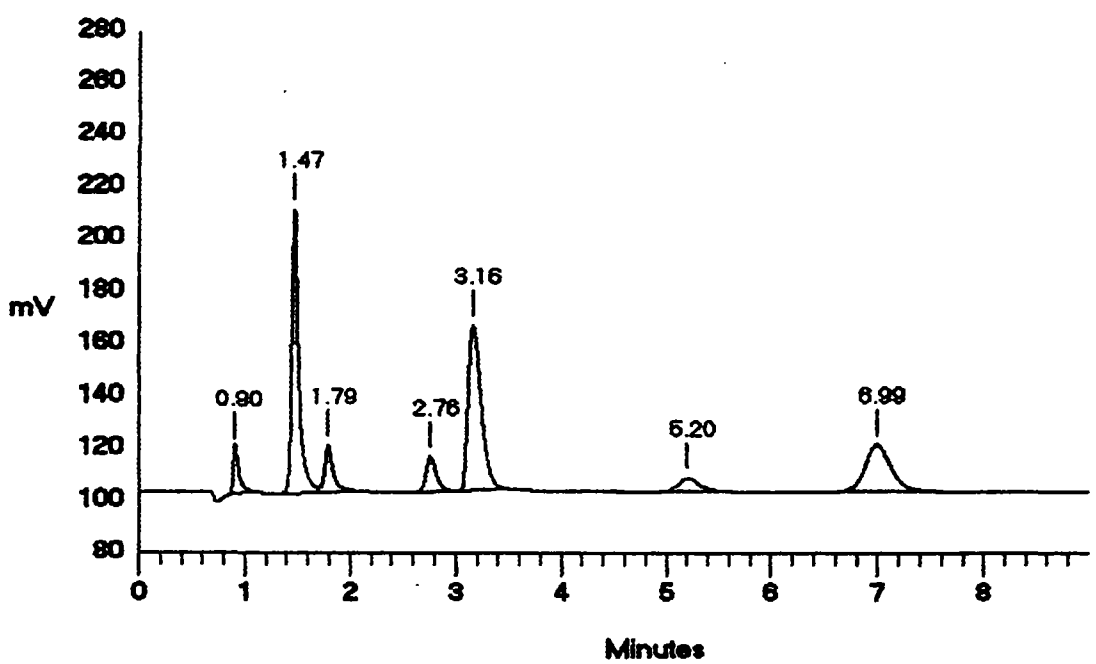
Sample Name: AUTOCAL1	Date: 12/10/1992 12:46:55
ata File : C:\DX\DATA\AUTO0001.D01	
.ethod : C:\DX\METHOD\AUTO.met	
'I Address: 1 System: 1 Inject#: 1 Vial:	Detector:COND
nnalyst : D. BURNS Column: AS4A-SC SN.1857	

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	1.000	17115	67071	1	0.00
2	1.47	CHLORIDE	10.000	108392	489658	2	-3.92
3	1.79	NITRITE	1.000	17610	100090	2	-1.10
4	2.76	BROMIDE	5.000	13146	89061	1	-0.36
5	3.16	NITRATE	5.000	63253	541250	1	3.61
6	5.20	ORTHO-PHOSPHATE	2.000	5094	67596	1	0.78
7	6.99	SULFATE	10.000	17726	302742	1	2.19
		Totals	34.000	242336	1657469		

File: AUTO0001.D01 Sample: AUTOCAL1



COPY

109

********** AUTOMATIC CALIBRATION UPDATE **********

```
==========================================================================
 ample Name: AUTOCAL2                          Date: Thu Dec 10 12:57:54 1992
 w File    : C:\DX\DATA\AUTO0001.D02
 ethod     : C:\DX\METHOD\AUTO.met                    Calibration Level: 2
 ACI Address: 1        System : 1        Inject#:  2        Detector: COND
==========================================================================
```

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	3.706e+005	3.907e+005	3.907e+005
2	CHLORIDE	1.47	1.50	1.50	2.761e+006	2.921e+006	2.921e+006
3	NITRITE	1.79	1.79	1.79	5.217e+005	5.620e+005	5.620e+005
4	BROMIDE	2.76	2.73	2.73	4.501e+005	4.841e+005	4.841e+005
5	NITRATE	3.16	3.05	3.05	3.051e+006	3.267e+006	3.267e+006
6	ORTHO-PHOSPHATE	5.20	5.17	5.17	3.633e+005	3.814e+005	3.814e+005
7	SULFATE	6.99	6.93	6.93	1.580e+006	1.678e+006	1.678e+006

COPY 110

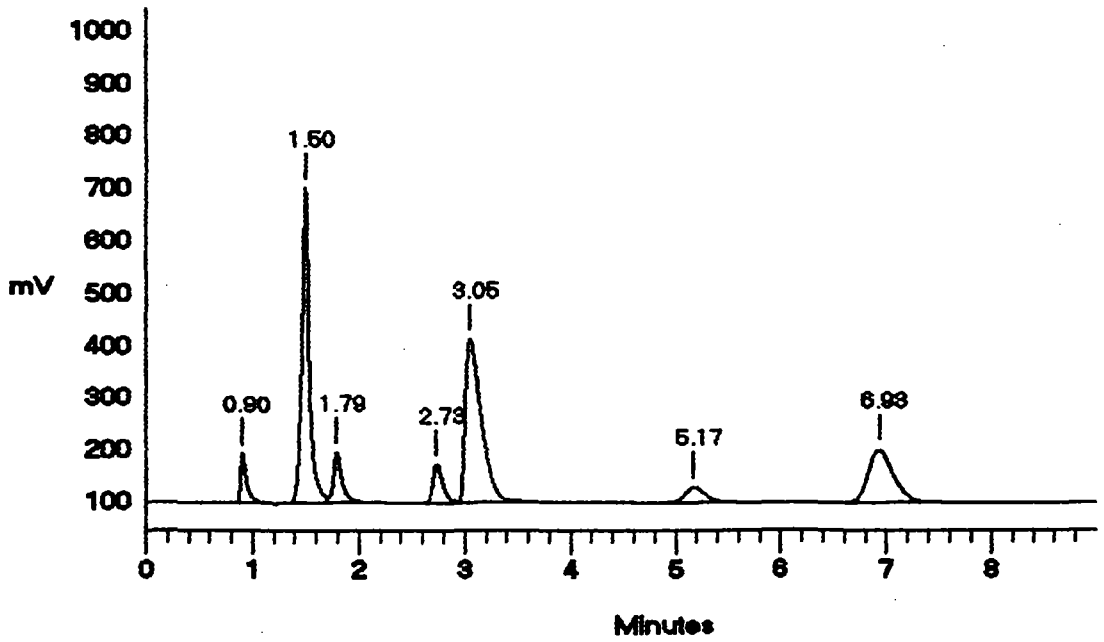
Sample Name: AUTOCAL2	Date: 12/10/1992 12:57:54
ata File : C:\DX\DATA\AUTO0001.D02	
ethod : C:\DX\METHOD\AUTO.met	
I Address: 1 System: 1 Inject#: 2 Vial:	Detector:COND
nalyst : D. BURNS Column: AS4A-SC SN.1857	

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	5.000	93915	390720	1	0.00
2	1.50	CHLORIDE	50.000	600832	2921465	2	2.04
3	1.79	NITRITE	5.000	96396	562033	2	0.00
4	2.73	BROMIDE	25.000	72037	484088	2	-1.09
5	3.05	NITRATE	25.000	310127	3267464	2	-3.48
6	5.17	ORTHO-PHOSPHATE	10.000	28564	381409	1	-0.58
7	6.93	SULFATE	50.000	100489	1678183	1	-0.86
		Totals	170.000	1302360	9685362		

File: AUTO0001.D02 Sample: AUTOCAL2



COPY 111

********** AUTOMATIC CALIBRATION UPDATE **********

Sample Name: AUTOCAL3 Date: Thu Dec 10 13:08:55 1992
Raw File : C:\DX\DATA\AUTO0001.D03
Method : C:\DX\METHOD\AUTO.met Calibration Level: 3
ACI Address: 1 System : 1 Inject#: 3 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	8.043e+005	8.329e+005	8.329e+005
2	CHLORIDE	1.50	1.52	1.52	5.986e+006	6.202e+006	6.202e+006
3	NITRITE	1.79	1.80	1.80	1.185e+006	1.213e+006	1.213e+006
4	BROMIDE	2.73	2.71	2.71	9.929e+005	1.046e+006	1.046e+006
5	NITRATE	3.05	2.97	2.97	6.831e+006	7.205e+006	7.205e+006
6	ORTHO-PHOSPHATE	5.17	5.14	5.14	8.152e+005	8.371e+005	8.371e+005
7	SULFATE	6.93	6.86	6.86	3.545e+006	3.689e+006	3.689e+006

COPY 112

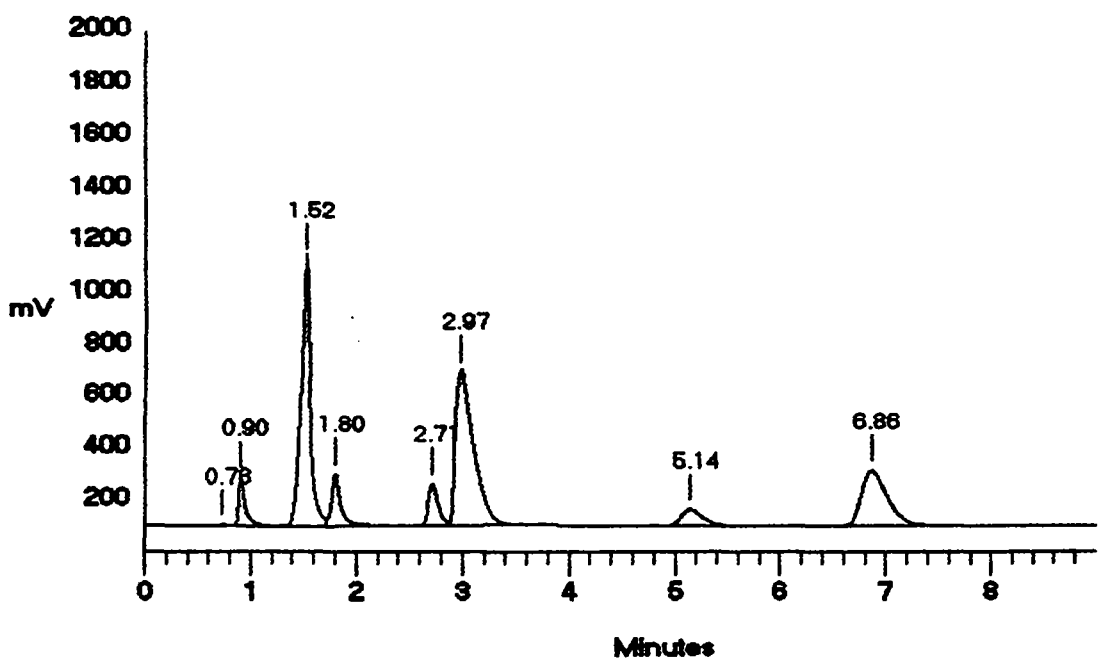
```
==========================================================================
| Sample Name: AUTOCAL3                        Date: 12/10/1992 13:08:55
  ata File   : C:\DX\DATA\AUTO0001.D03
 .ethod      : C:\DX\METHOD\AUTO.met
|  :I Address: 1  System: 1  Inject#: 3   Vial:          Detector:COND
| Analyst     : D. BURNS       Column: AS4A-SC SN.1857
==========================================================================
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.000	189834	832891	2	0.00
3	1.52	CHLORIDE	100.000	1026108	6202310	2	1.33
4	1.80	NITRITE	10.000	202485	1212986	2	0.56
5	2.71	BROMIDE	50.000	162819	1045795	2	-0.73
6	2.97	NITRATE	50.000	596961	7204873	2	-2.62
7	5.14	ORTHO-PHOSPHATE	20.000	61986	837141	1	-0.58
8	6.86	SULFATE	100.000	213894	3689007	1	-1.01
		Totals	340.000	2454086	21025004		

File: AUTO0001.D03 Sample: AUTOCAL3



DIONEX SCHEDULE - C:\DX\SCHEDULE\W2121292.SCH

Inj#	Sample Name	Method	Data File	Vol.	Dil.	Int.Std.
1	ICV 12/7/92	..\AUTO.met	..\W2121291	1	1	1
2	ICB	..\AUTO.met	..\W2121291	1	1	1
3	11992.01 7655-F-1	..\AUTO.met	..\W2121291	1	1	1
4	11992.02 7655-F-5	..\AUTO.met	..\W2121291	1	1	1
5	11992.03 7655-F-22	..\AUTO.met	..\W2121291	1	1	1
6	11992.04 7655-F-13	..\AUTO.met	..\W2121291	1	1	1
7	11992.05 7655-F-14	..\AUTO.met	..\W2121291	1	1	1
8	11992.06 7655-F-15	..\AUTO.met	..\W2121291	1	1	1
9	11992.07 7655-F-16	..\AUTO.met	..\W2121291	1	1	1
10	11992.08 7655-F-17	..\AUTO.met	..\W2121292	1	1	1
11	11992.09 7655-F-18	..\AUTO.met	..\W2121292	1	1	1
12	11992.10 7655-F-19	..\AUTO.met	..\W2121292	1	1	1
13	CCV	..\AUTO.met	..\W2121292	1	1	1
14	CCB	..\AUTO.met	..\W2121292	1	1	1
15	11992.11 7655-F-20	..\AUTO.met	..\W2121292	1	1	1
16	11992.12 7655F-21	..\AUTO.met	..\W2121292	1	1	1
17	11992.02 7655-F-5	..\AUTO.met	..\W2121292	1	10	1
18	11992.03 7655-F-22	..\AUTO.met	..\W2121292	1	100	1
19	11992.04 7655-F-13	..\AUTO.met	W2121292	1	100	1
20	11992.05 7655-F-14	..\AUTO.met	W2121292	1	100	1
21	11992.06 7655-F-15	..\AUTO.met	W2121292	1	100	1
22	11992.07 7655-F-16	..\AUTO.met	W2121292	1	100	1
23	11992.09 7655-F-18	..\AUTO.met	W2121292	1	100	1
24	11992.10 7655-F-19	..\AUTO.met	W2121291	1	100	1
25	CCV	..\AUTO.met	W2121291	1	1	1
26	CCB	..\AUTO.met	W2121291	1	1	1
27	11992.11 7655-F-20	..\AUTO.met	W2121291	1	100	1
28	11992.12 7655-F-21	..\AUTO.met	W2121292	1	100	1
29	CCV	..\AUTO.met	W2121292	1	1	1
30	CCB	..\AUTO.met	W2121292	1	1	1

Comment:
CL,F,NO3,SO4

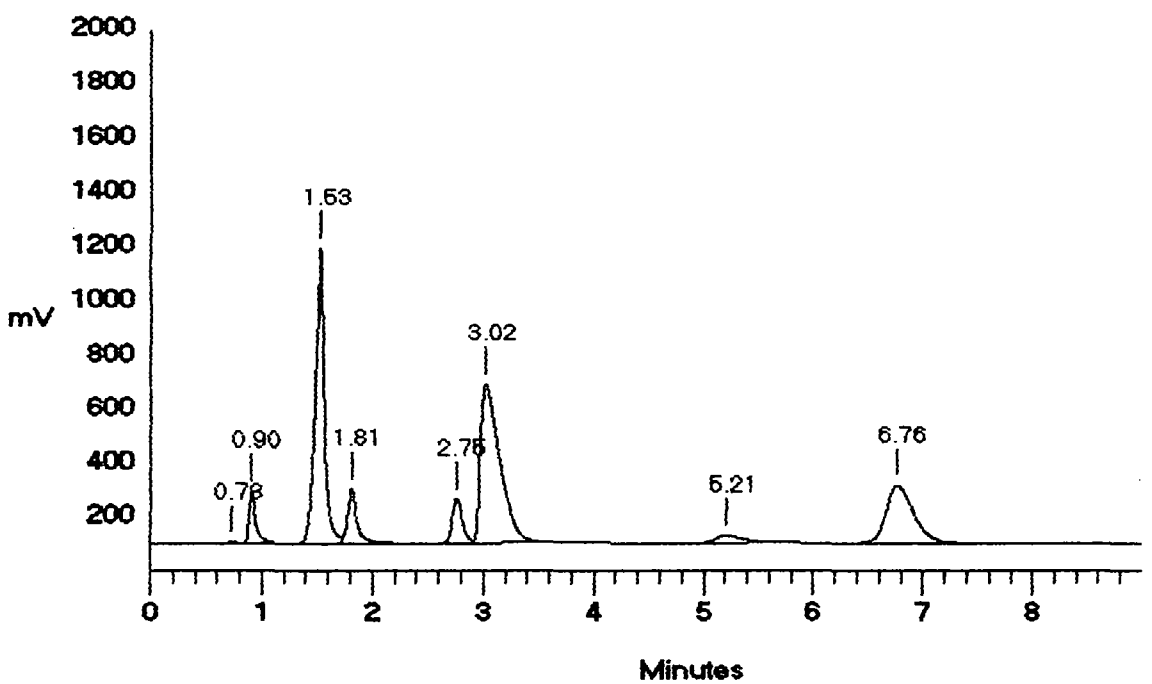
Sample Name: ICV Date: 12/12/1992 16:42:18
Data File : C:\DX\DATA\W2121291.D01 114
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.161	196502	841941	2	0.00
3	1.53	CHLORIDE	101.090	1092870	6241352	2	0.66
4	1.81	NITRITE	10.127	206893	1219721	2	0.56
5	2.75	BROMIDE	50.705	166630	1052591	2	1.48
6	3.02	NITRATE	50.343	589824	7192139	2	1.68
7	5.21	ORTHO-PHOSPHATE	12.908	29402	524985	1	1.36
8	6.76	SULFATE	101.522	215852	3711699	1	-1.46
		Totals	336.856	2497973	20784427		

File: W2121291.D01 Sample: ICV



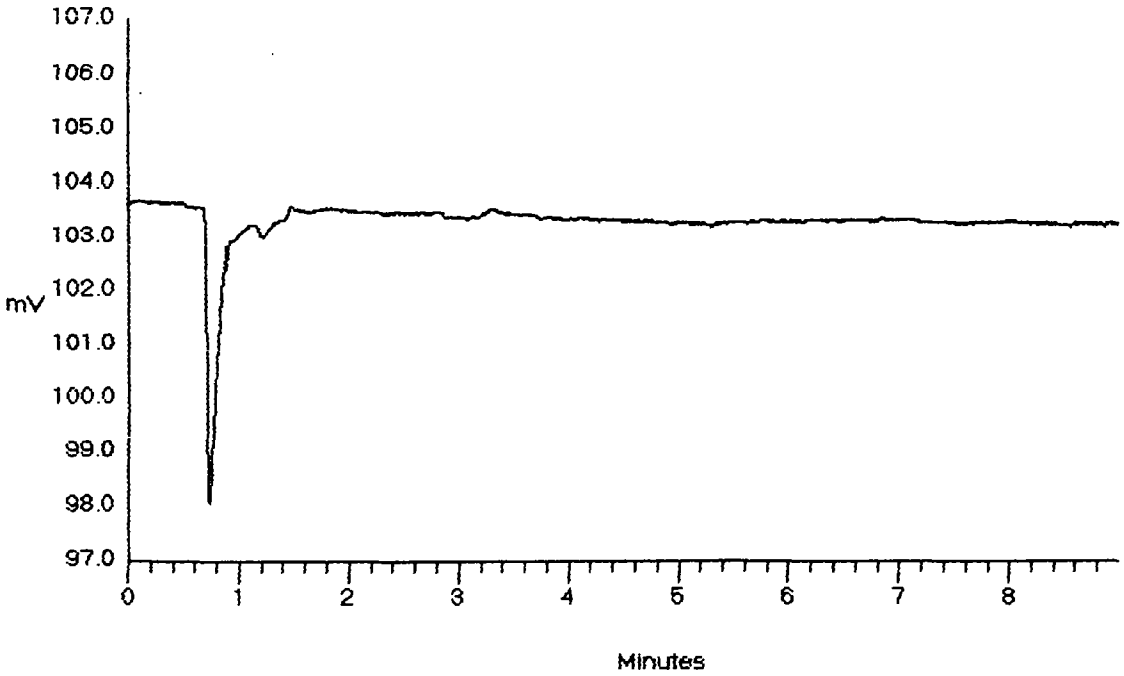
Sample Name: ICB Date: 12/12/1992 16:53:16 128
Data File : C:\DX\DATA\W2121291.D02
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 2 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D02 Sample: ICB



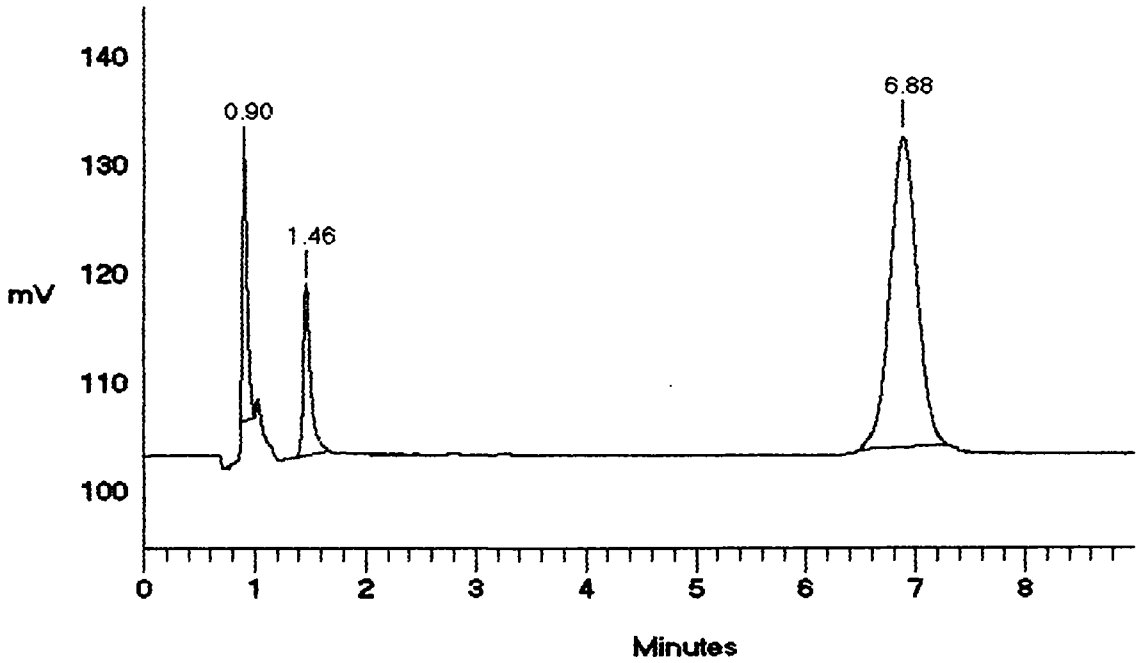
Sample Name: 11992.01 7655-F-1 AMB 12/7/92 Date: 12/12/1992 17:04:13 129
Data File : C:\DX\DATA\W2121291.D03
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 3 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	1.187	23713	76637	1	0.00
2	1.46	CHLORIDE	4.089	15459	72957	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.88	SULFATE	16.139	28588	483882	1	0.29
		Totals	21.415	67760	633476		

File: W2121291.D03 Sample: 11992.01



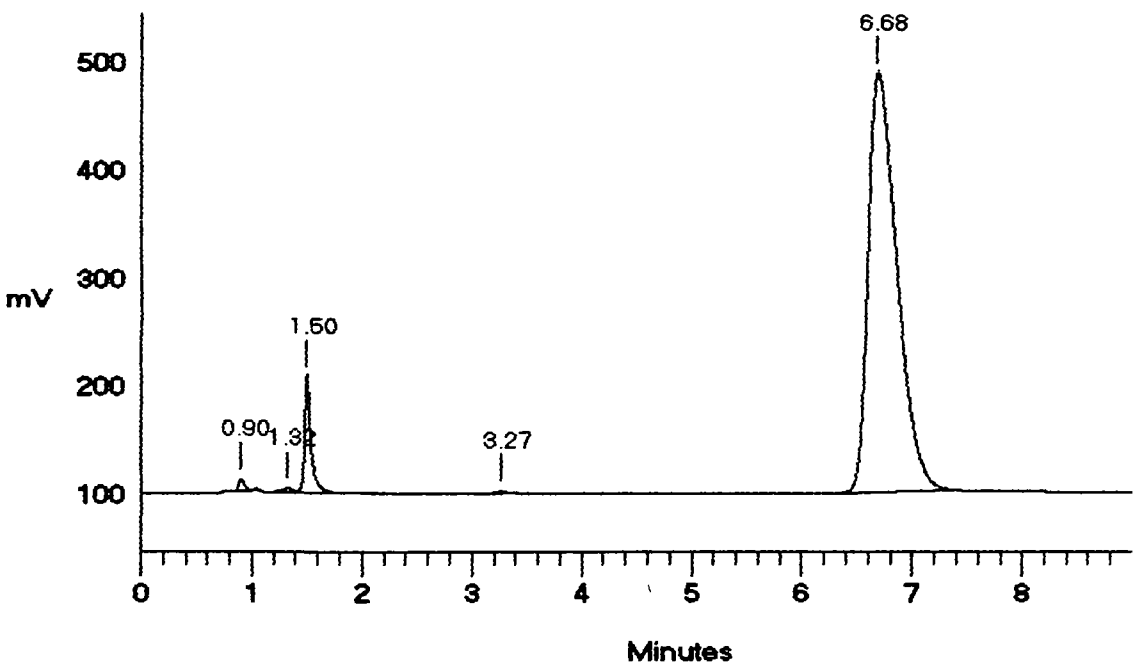
Sample Name: 11992.02 7655-F-5 Date: 12/12/1992 17:15:11 130
Data File : C:\DX\DATA\W2121291.D04
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 4 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	0.723	10343	37080	1	0.00
3	1.50	CHLORIDE	9.618	106643	424580	2	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.27	NITRATE	2.068	1896	13199	1	10.10
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.68	SULFATE	191.234	387649	7103161	1	-2.62
		Totals	203.644	506530	7578020		

File: W2121291.D04 Sample: 11992.02



Sample Name: 11992.03 7655-F-22 Date: 12/12/1992 17:26:08
Data File : C:\DX\DATA\W2121291.D05 12/12/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 5 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

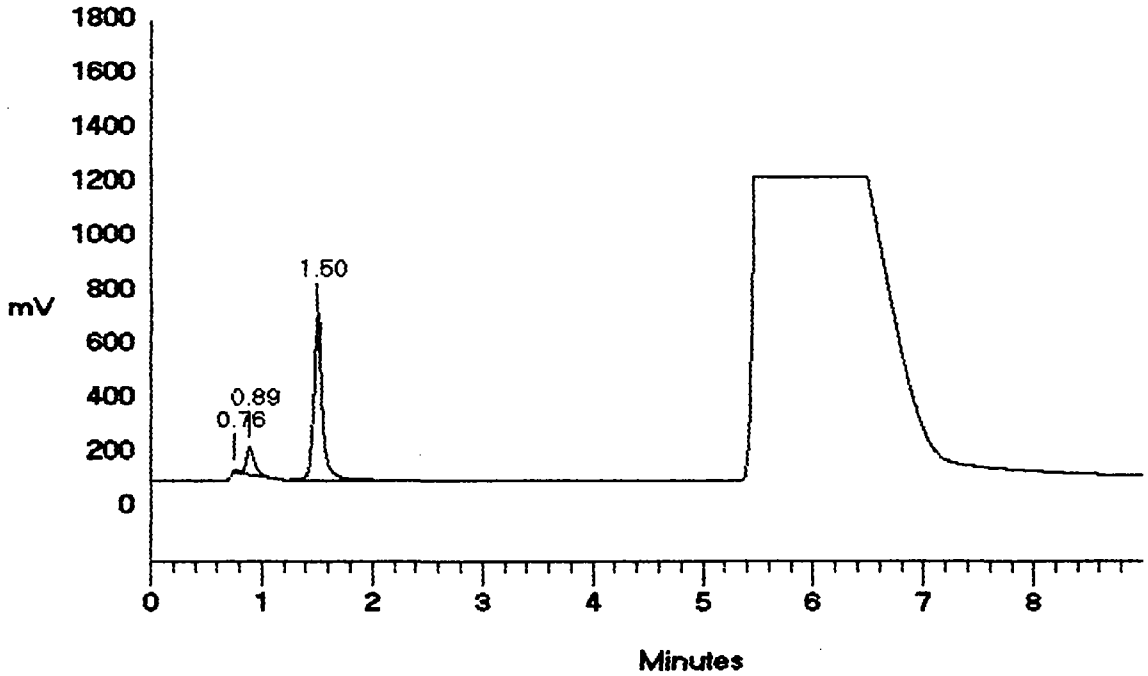
131

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	7.049	101242	576545	2	-1.11
3	1.50	CHLORIDE	54.007	594089	3247292	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	61.056	695331	3823837		

File: W2121291.D05 Sample: 11992.03



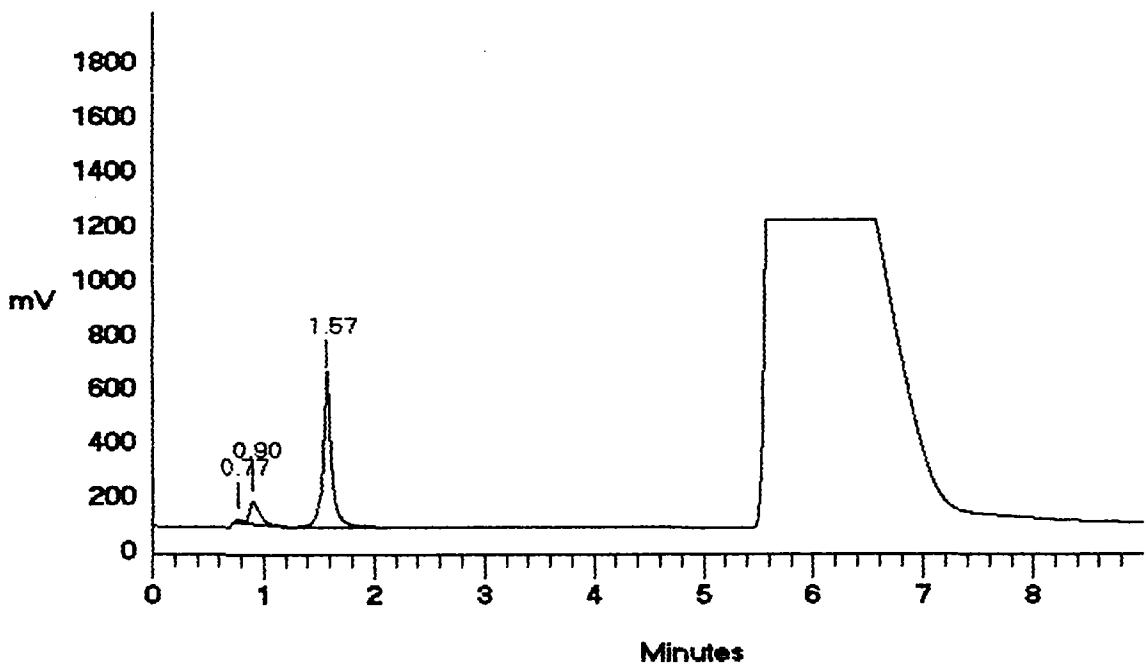
Sample Name: 11992.04 7655-F-13 Date: 12/12/1992 17:37:09 132
Data File : C:\DX\DATA\W2121291.D06
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 6 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	6.440	82265	524569	2	0.00
3	1.57	CHLORIDE	51.750	551185	3103775	1	3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	58.189	633450	3628343		

File: W2121291.D06 Sample: 11992.04



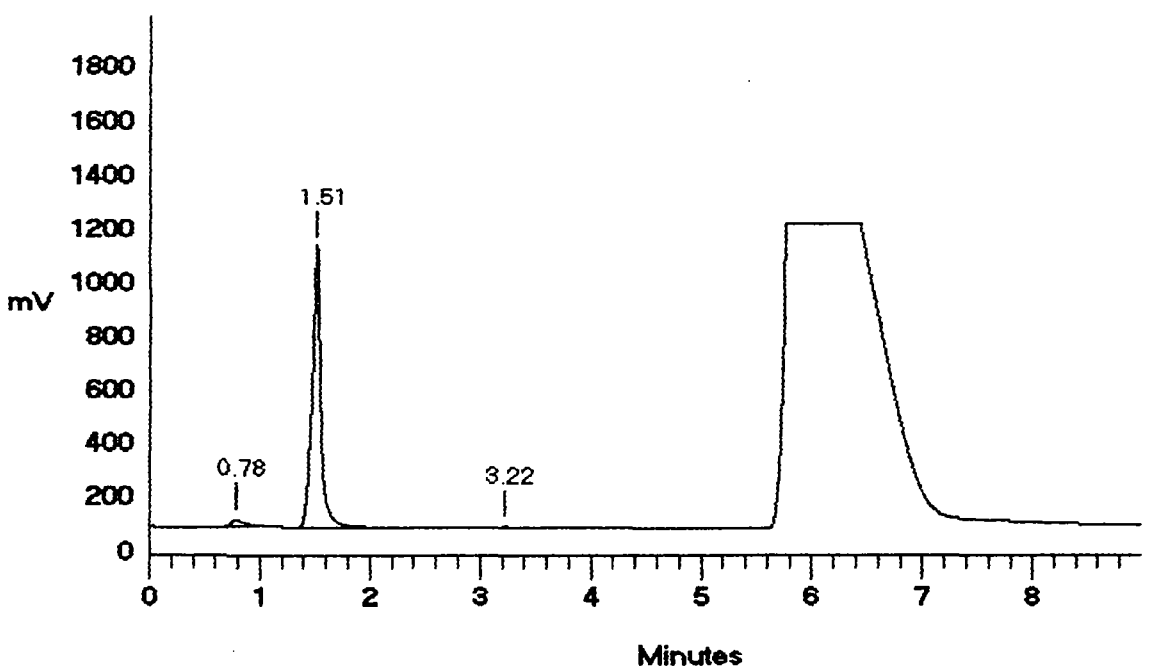
Sample Name: 11992.05 7655-F-14 dnB 12/17/92 Date: 12/12/1992 17:48:09
Data File : C:\DX\DATA\W2121291.D07
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 7 Vial: Detector:COND 133
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.51	CHLORIDE	92.461	1041991	5692625	1	-0.66
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.22	NITRATE	2.212	4555	34603	1	8.42
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	94.673	1046545	5727228		

File: W2121291.D07 Sample: 11992.05



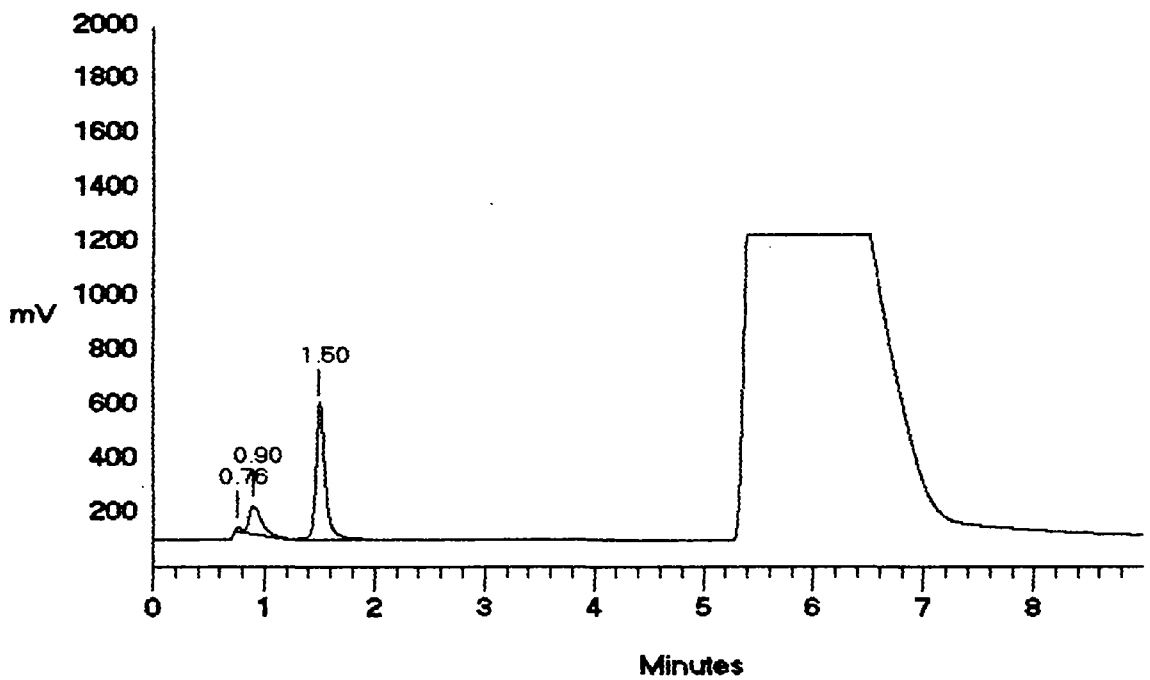
Sample Name: 11992.06 7655-F-15 dab 12/17/92 Date: 12/12/1992 17:59:09 134
Data File : C:\DX\DATA\W2121291.D08
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 8 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	9.752	104513	807099	2	0.00
3	1.50	CHLORIDE	49.762	495588	2977343	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	59.514	600101	3784442		

File: W2121291.D08 Sample: 11992.06



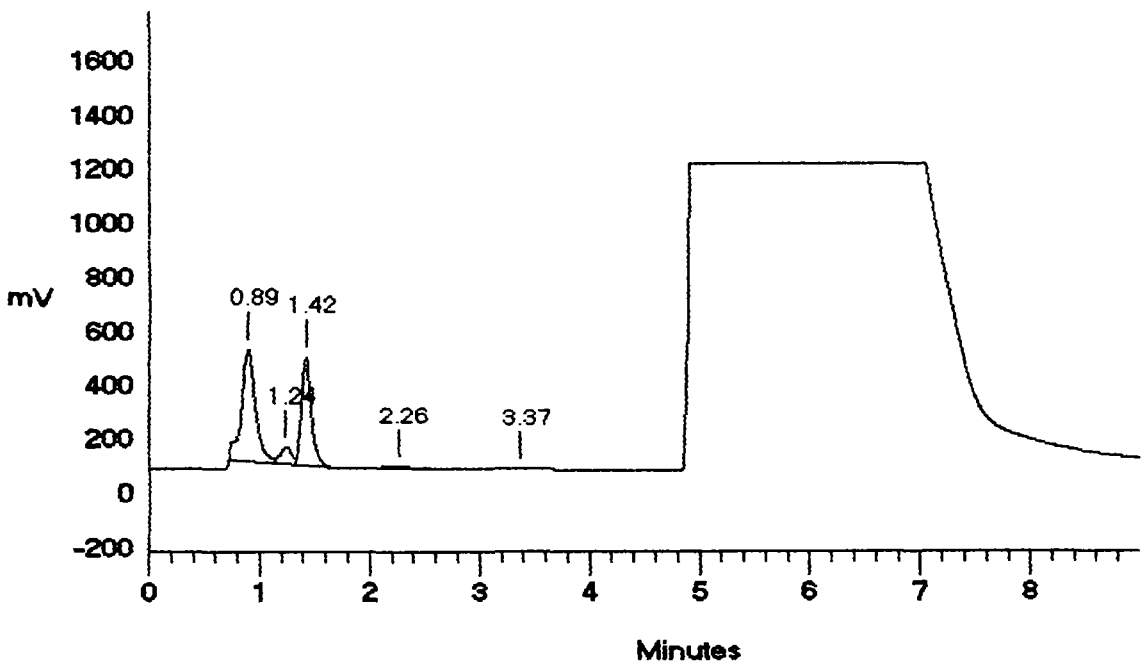
Sample Name: 11992.07 7655-F-16 dab 12/17/92 Date: 12/12/1992 18:10:07 135
Data File : C:\DX\DATA\W2121291.D09
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 9 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.89	FLUORIDE	43.848	414836	3714843	2	-1.11
3	1.42	CHLORIDE	41.844	404254	2473874	2	-6.58
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
5	3.37	NITRATE	2.113	2596	19837	1	13.47
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	87.806	821685	6208554		

File: W2121291.D09 Sample: 11992.07



Sample Name: 11992.08 7655-F-17 Date: 12/12/1992 18:21:07
Data File : C:\DX\DATA\W2121291.D10
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 10 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

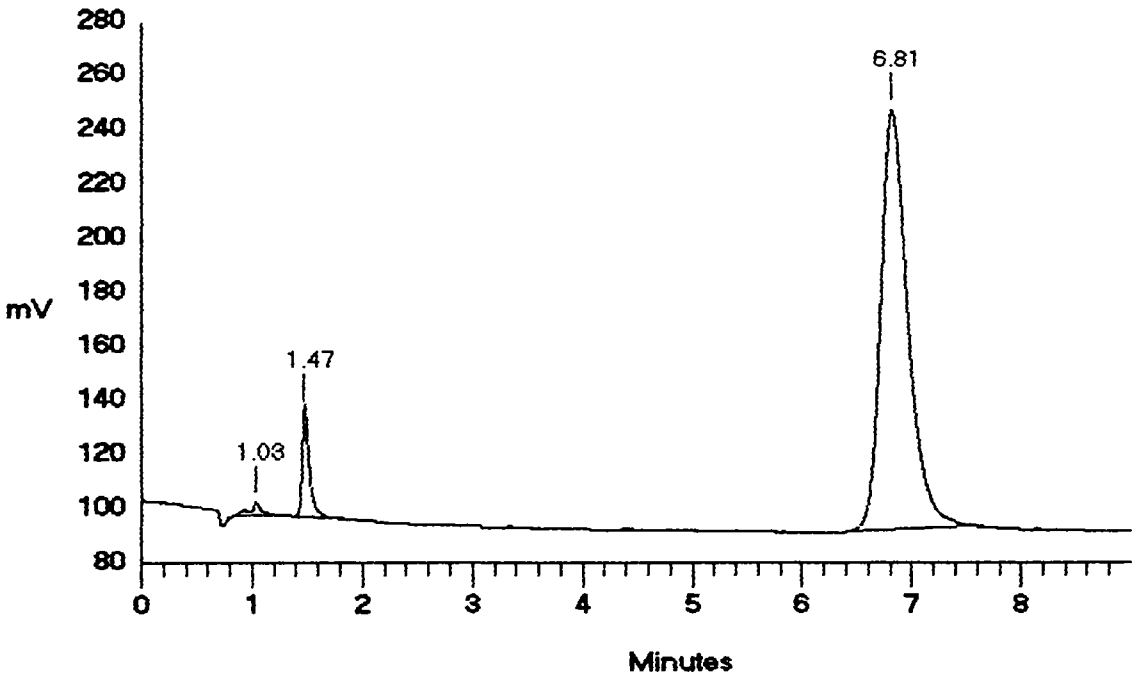
115

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.47	CHLORIDE	5.772	39321	179974	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.81	SULFATE	74.396	155079	2686222	1	-0.73
		Totals	80.167	194400	2866196		

File: W2121291.D10 Sample: 11992.08



Sample Name: 11992.09 7655-F-18 dab Date: 12/12/1992 18:32:03
Data File : C:\DX\DATA\W2121291.D11 12/17/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 11 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

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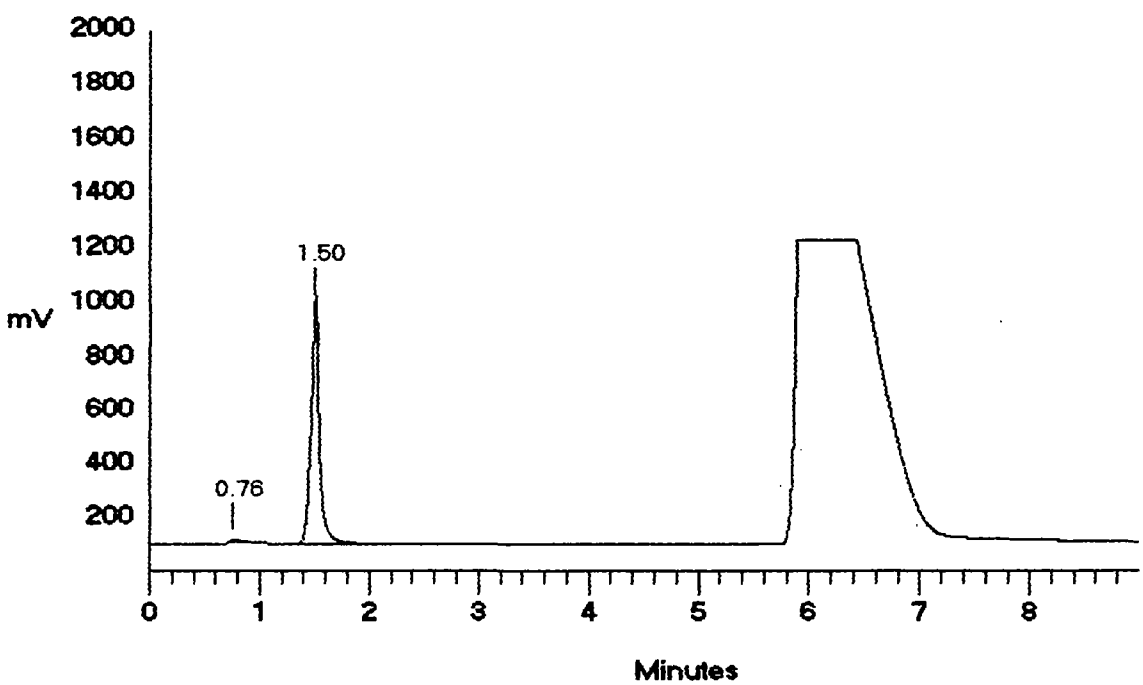
Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	78.831	885322	4825937	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	78.831	885322	4825937		

File: W2121291.D11 Sample: 11992.09



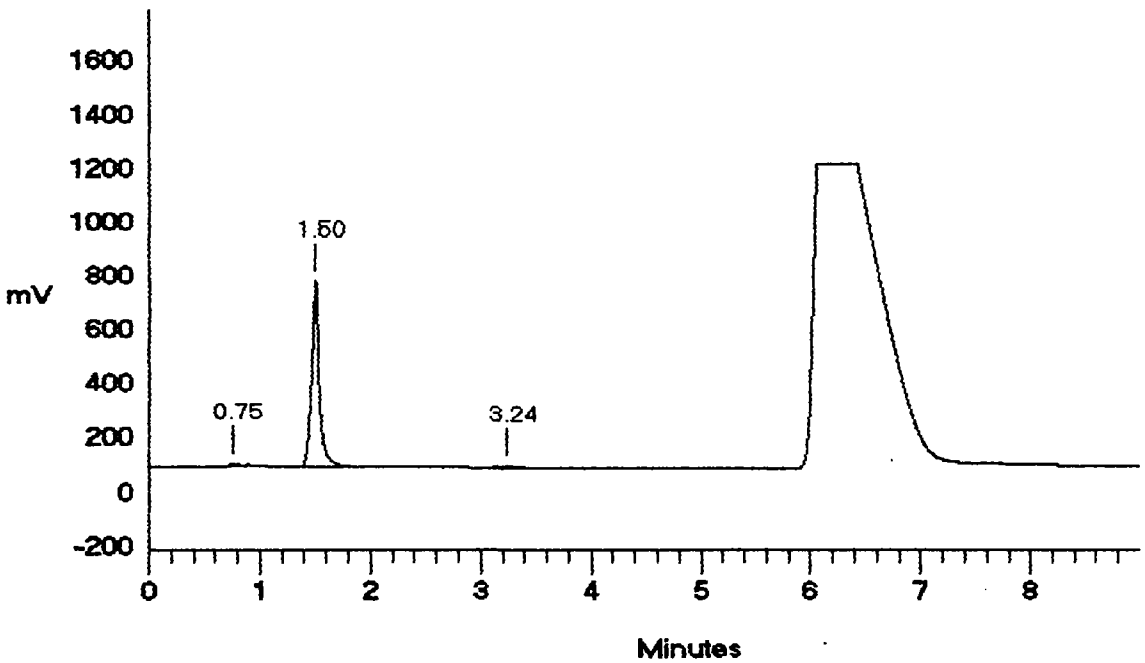
Sample Name: 11992.10 7655-F-19 dab Date: 12/12/1992 18:43:01 117
Data File : C:\DX\DATA\W2121291.D12 12/17/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 12 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	56.561	690068	3409757	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.24	NITRATE	2.244	5049	39236	1	9.09
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	58.805	695117	3448994		

File: W2121291.D12 Sample: 11992.10



Sample Name: CCV Date: 12/12/1992 18:54:01
Data File : C:\DX\DATA\W2121291.D13
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 13 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

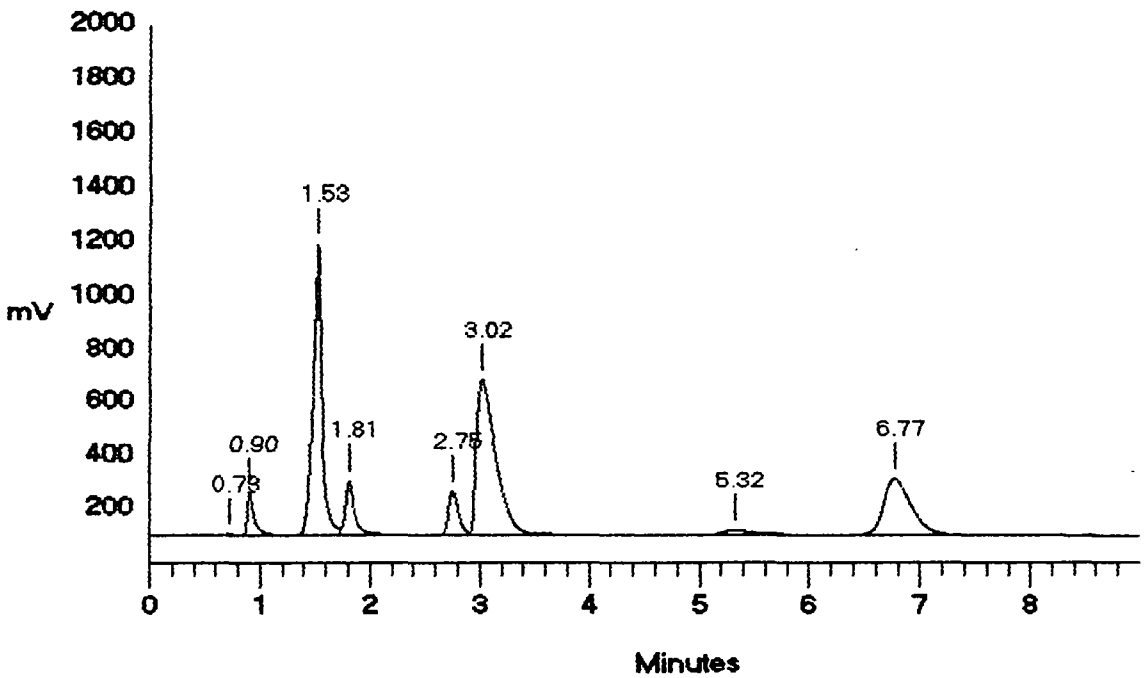
118

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	8.814	155972	727072	2	0.00
3	1.53	CHLORIDE	100.655	1089183	6213698	2	0.66
4	1.81	NITRITE	10.112	207125	1217891	2	0.56
5	2.75	BROMIDE	50.604	166173	1050423	2	1.48
6	3.02	NITRATE	50.086	585202	7153945	2	1.68
7	5.32	ORTHO-PHOSPHATE	9.360	17090	372595	1	3.50
8	6.77	SULFATE	101.005	215064	3692148	1	-1.31
		Totals	330.635	2435809	20427773		

File: W2121291.D13 Sample: CCV



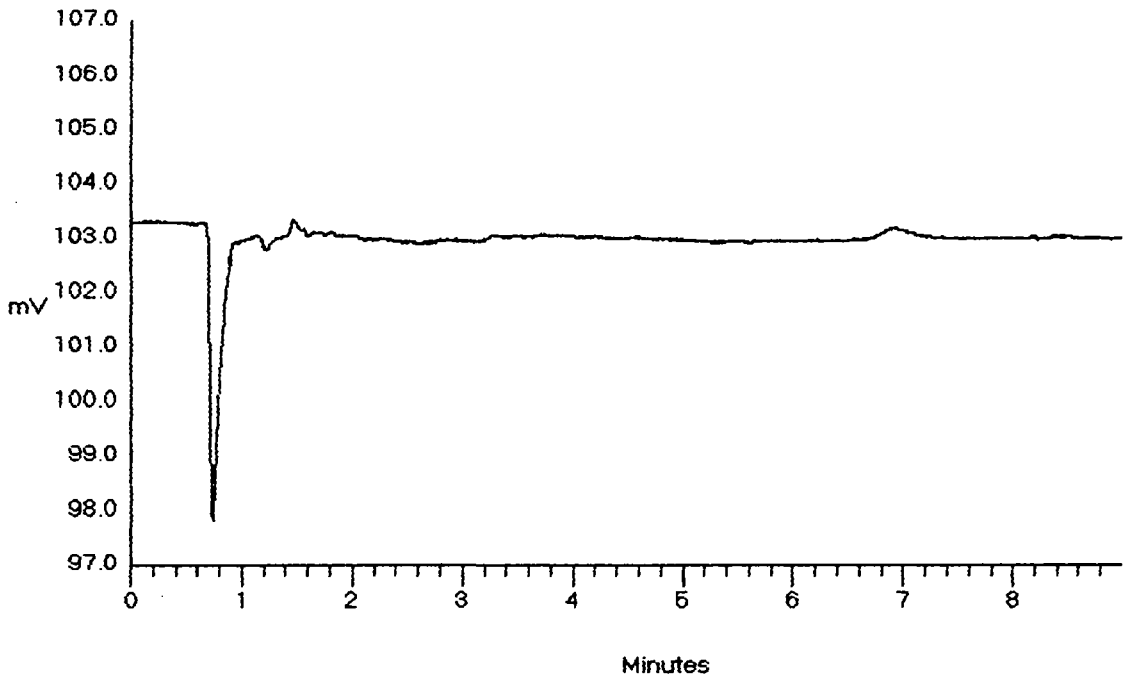
Sample Name: CCB Date: 12/12/1992 19:05:00 119
Data File : C:\DX\DATA\W2121291.D14
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 14 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D14 Sample: CCB



Sample Name: 11992.11 7655-F-20 dab Date: 12/12/1992 19:15:59
Data File : C:\DX\DATA\W2121291.D15 12/17/92
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 15 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

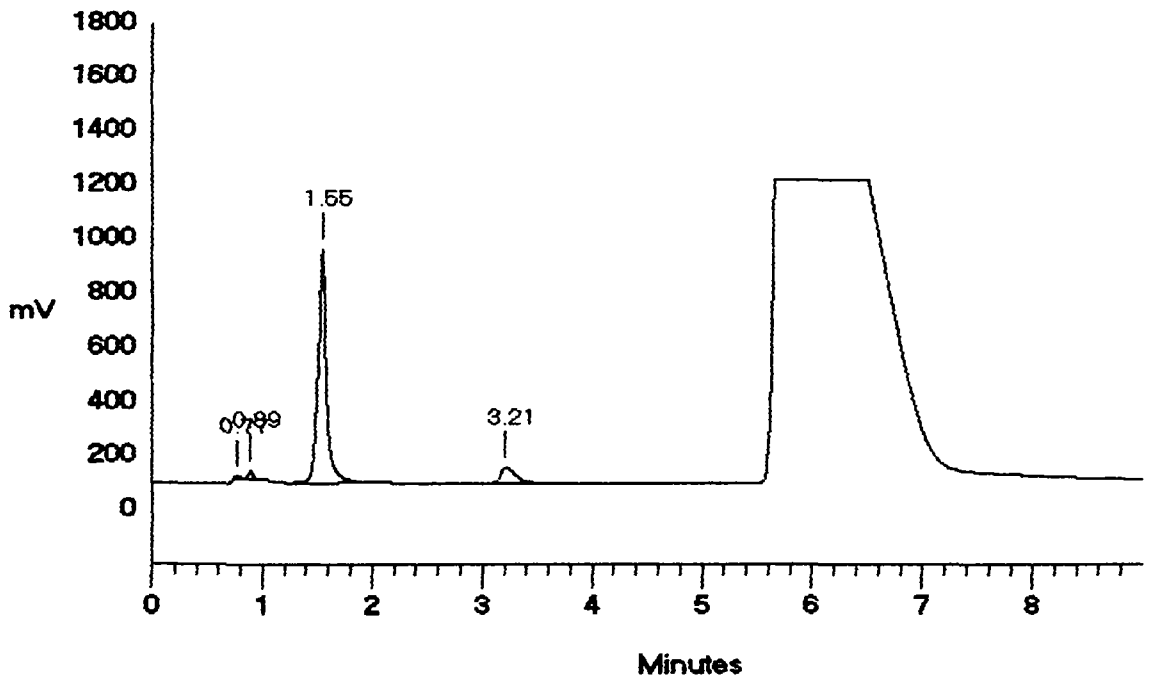
120

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	1.457	34348	99611	2	-1.11
3	1.55	CHLORIDE	76.291	864643	4664378	1	1.97
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.21	NITRATE	5.357	58434	502252	1	8.08
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	83.105	957425	5266240		

File: W2121291.D15 Sample: 11992.11



Sample Name: 11992.12 7655-F-21 dB 12/17/92 Date: 12/12/1992 19:27:00
Data File : C:\DX\DATA\W2121291.D16
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 16 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

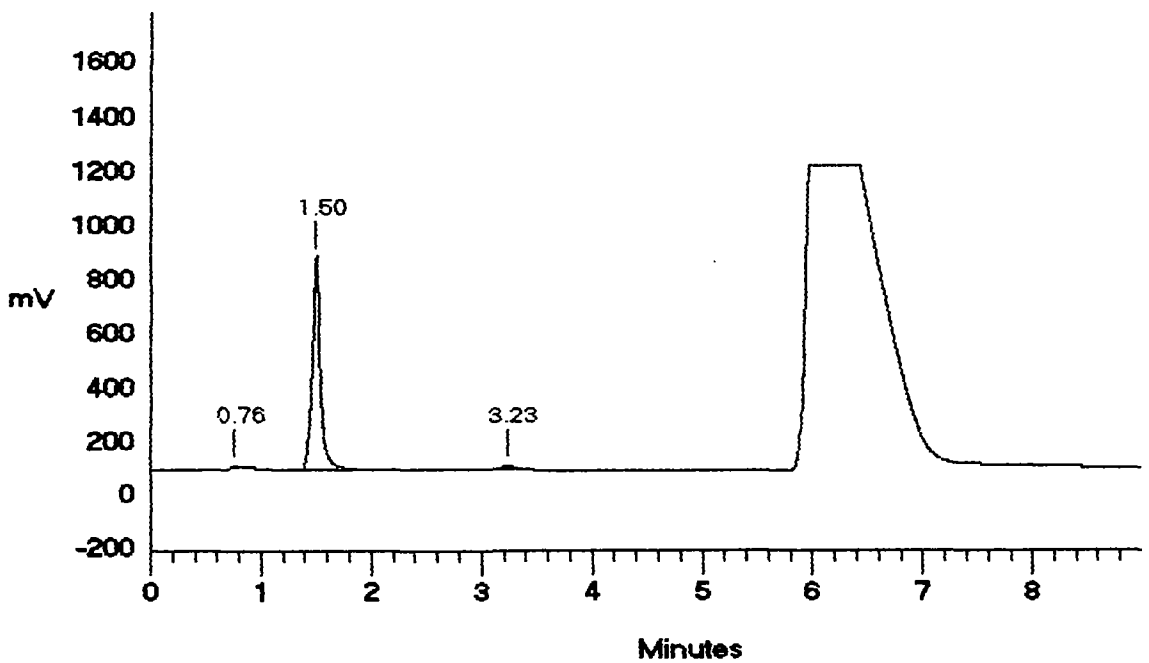
121

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.50	CHLORIDE	66.432	786654	4037423	1	-1.32
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.23	NITRATE	2.694	13245	106236	1	8.75
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	69.126	799899	4143659		

File: W2121291.D16 Sample: 11992.12



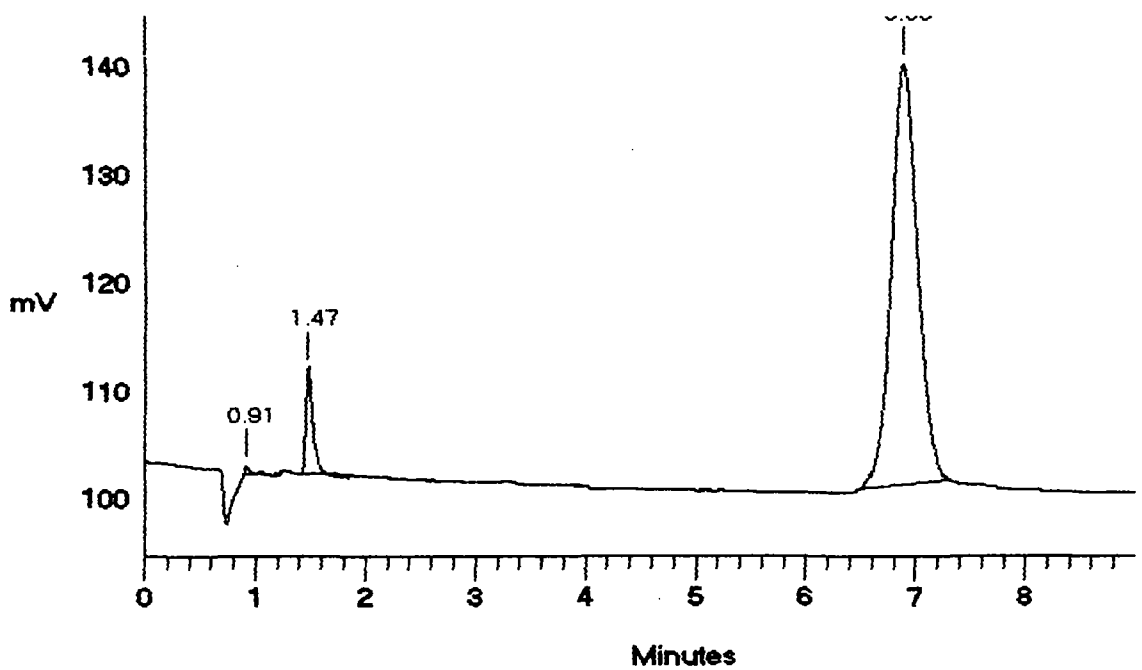
Sample Name: 11992.02 7655-F-5 1:9 Date: 12/12/1992 19:38:00 122
Data File : C:\DX\DATA\W2121291.D17
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 17 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	3.128	739	2072	1	1.11
2	1.47	CHLORIDE	36.190	9784	43084	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.89	SULFATE	205.365	38899	650125	1	0.44
		Totals	244.684	49422	695281		

File: W2121291.D17 Sample: 11992.02



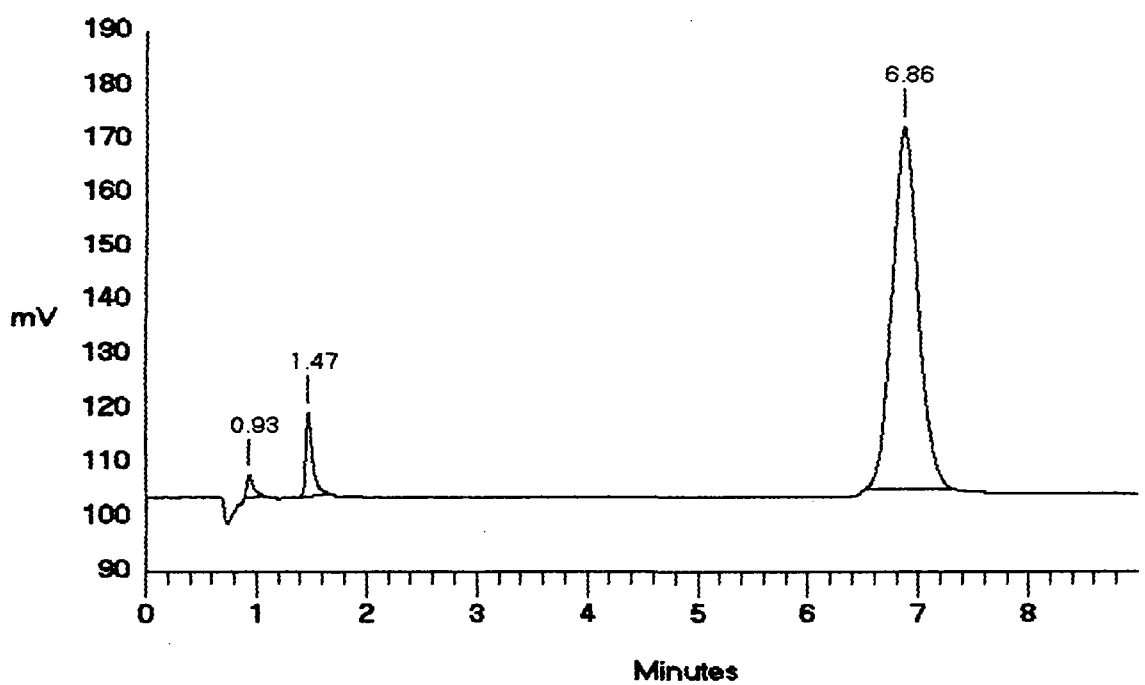
Sample Name: 11992.03 7655-F-22 1:99 Date: 12/12/1992 19:49:00 123
Data File : C:\DX\DATA\W2121291.D18
Method : C:\DX\METHOD\AUTO.met DAB 12/17/92
ACI Address: 1 System: 1 Inject#: 18 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	47.629	3879	16011	1	3.33
2	1.47	CHLORIDE	397.102	15374	65468	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.86	SULFATE	3265.243	67449	1108156	1	0.00
		Totals	3709.975	86702	1189636		

File: W2121291.D18 Sample: 11992.03



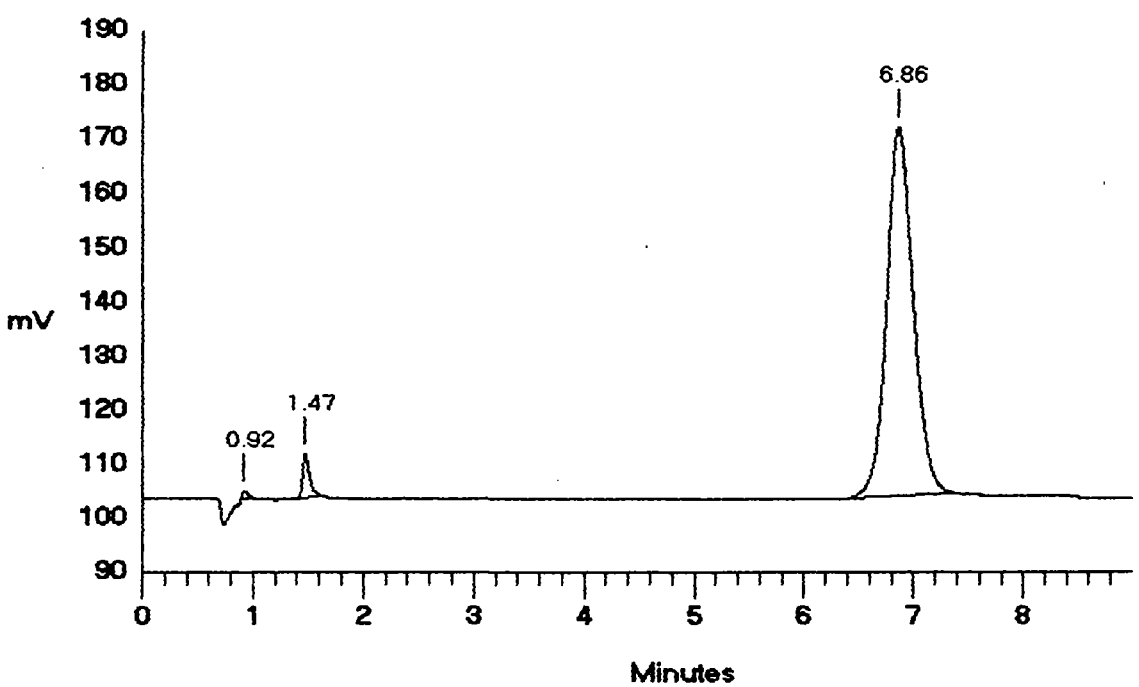
Sample Name: 11992.04 7655-F-13 1:99 Date: 12/12/1992 20:00:01 124
Data File : W2121291.D19
Method : C:\DX\METHOD\AUTO.met dnB 12/17/92
ACI Address: 1 System: 1 Inject#: 19 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.92	FLUORIDE	35.692	1556	5831	1	2.22
2	1.47	CHLORIDE	347.595	7959	33986	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.86	SULFATE	3358.752	67959	1143506	1	0.00
		Totals	3742.040	77474	1183324		

File: W2121291.D19 Sample: 11992.04



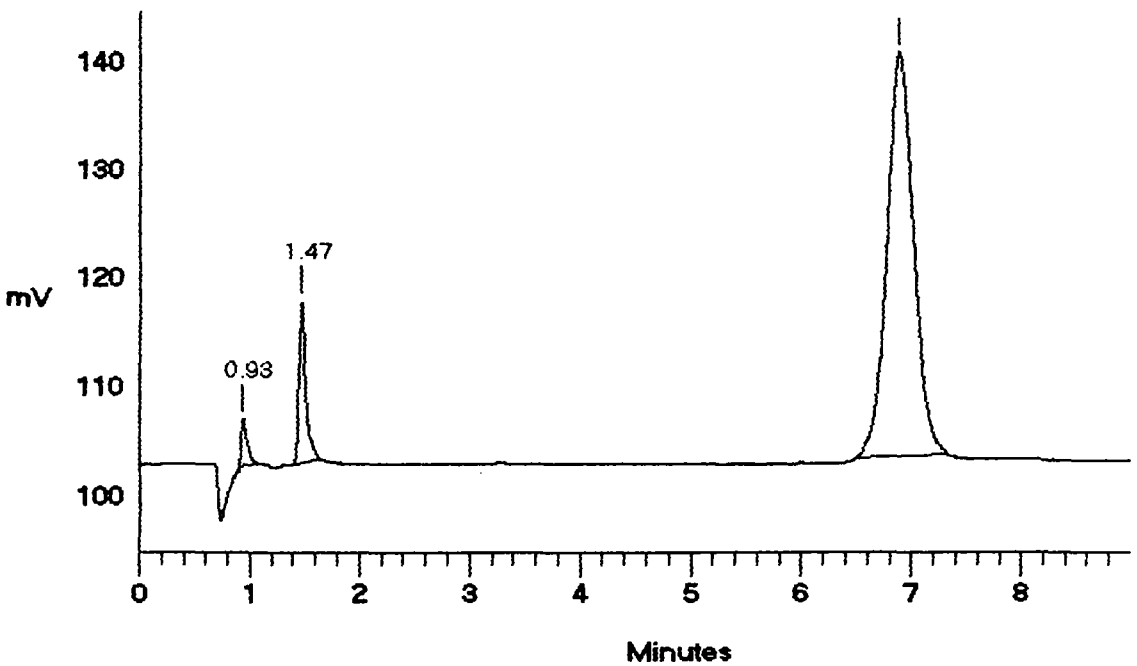
Sample Name: 11992.05 7655-F-14 1:99 Date: 12/12/1992 20:11:01
Data File : W2121291.D20 125
Method : C:\DX\METHOD\AUTO.met AAB 12/17/92
ACI Address: 1 System: 1 Inject#: 20 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	47.572	4094	15962	1	3.33
2	1.47	CHLORIDE	394.321	14722	63699	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.88	SULFATE	2004.056	37167	631377	1	0.29
		Totals	2445.949	55983	711039		

File: W2121291.D20 Sample: 11992.05



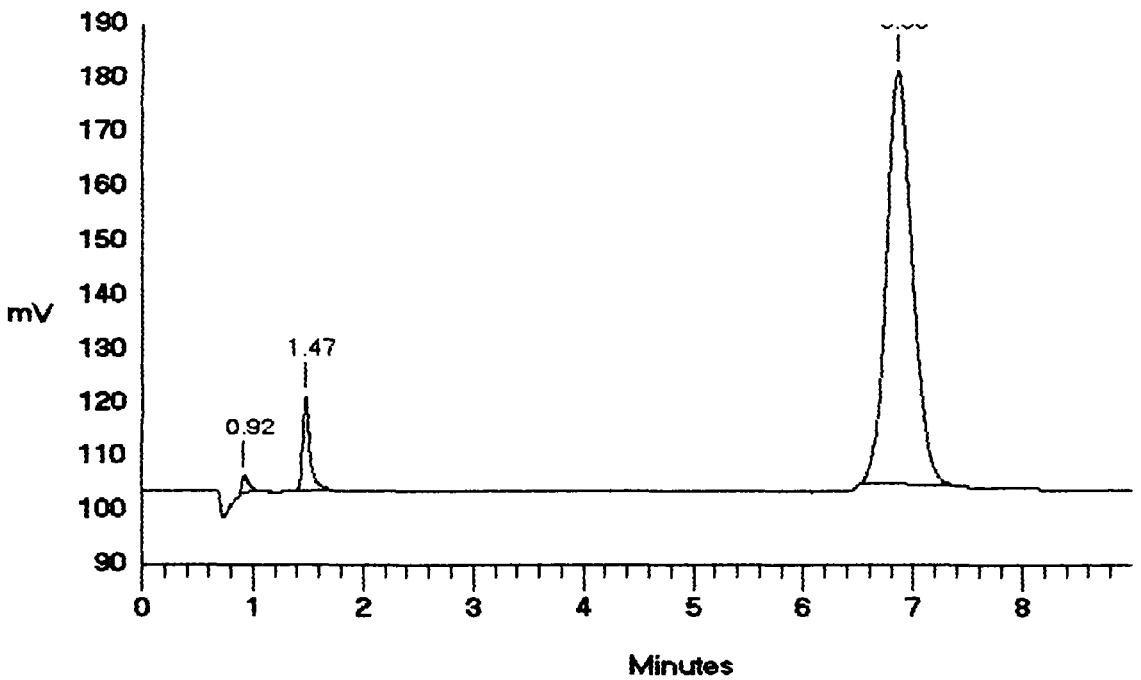
Sample Name: 11992.06 7655-F-15 1:99 Date: 12/12/1992 20:21:59 126
Data File : W2121291.D21
Method : C:\DX\METHOD\AUTO.met 12/17/92
ACI Address: 1 System: 1 Inject#: 21 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.92	FLUORIDE	43.705	2758	12664	1	2.22
2	1.47	CHLORIDE	418.025	17527	78773	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.85	SULFATE	3666.977	76205	1260028	1	-0.15
		Totals	4128.706	96490	1351465		

File: W2121291.D21 Sample: 11992.06



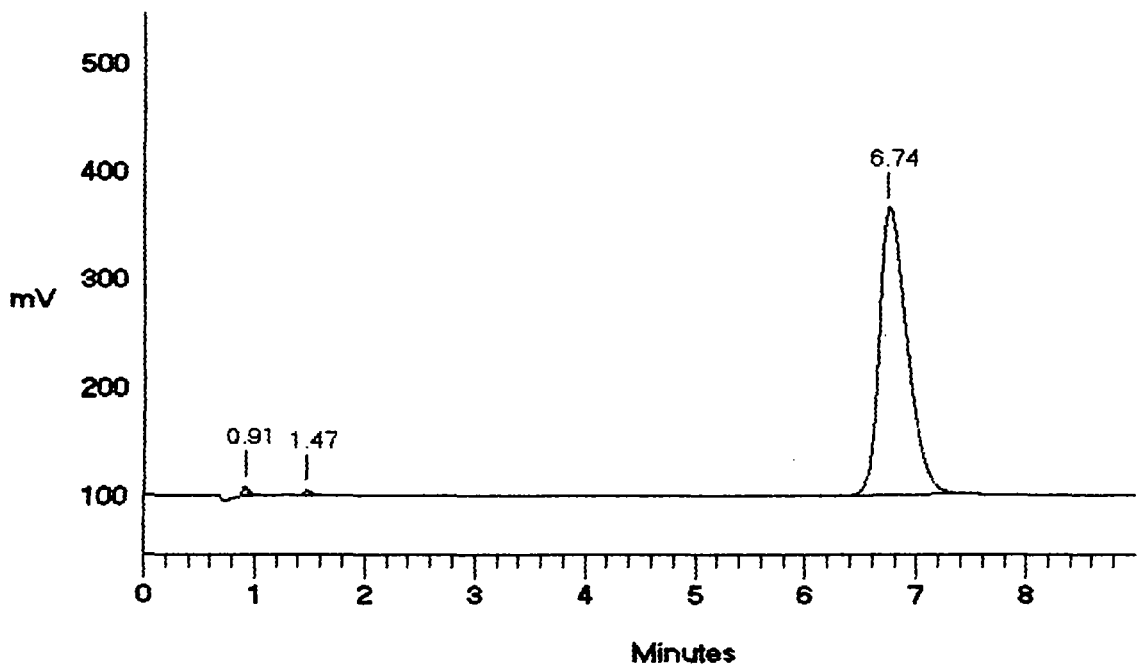
Sample Name: 11992.07 7655-F-16 1:99 Date: 12/12/1992 20:33:09 127
Data File : W2121291.D22
Method : C:\DX\METHOD\AUTO.met dAB 12/17/92
ACI Address: 1 System: 1 Inject#: 22 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	68.101	8227	33470	1	1.11
2	1.47	CHLORIDE	326.322	4341	20458	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.74	SULFATE	12626.585	265282	4647118	1	-1.75
		Totals	13021.008	277851	4701046		

File: W2121291.D22 Sample: 11992.07



Sample Name: 11992.09 7655-F-18 1:99 Date: 12/12/1992 20:43:57
Data File : W2121291.D23
Method : C:\DX\METHOD\AUTO.met dab 12/17/92
ACI Address: 1 System: 1 Inject#: 23 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

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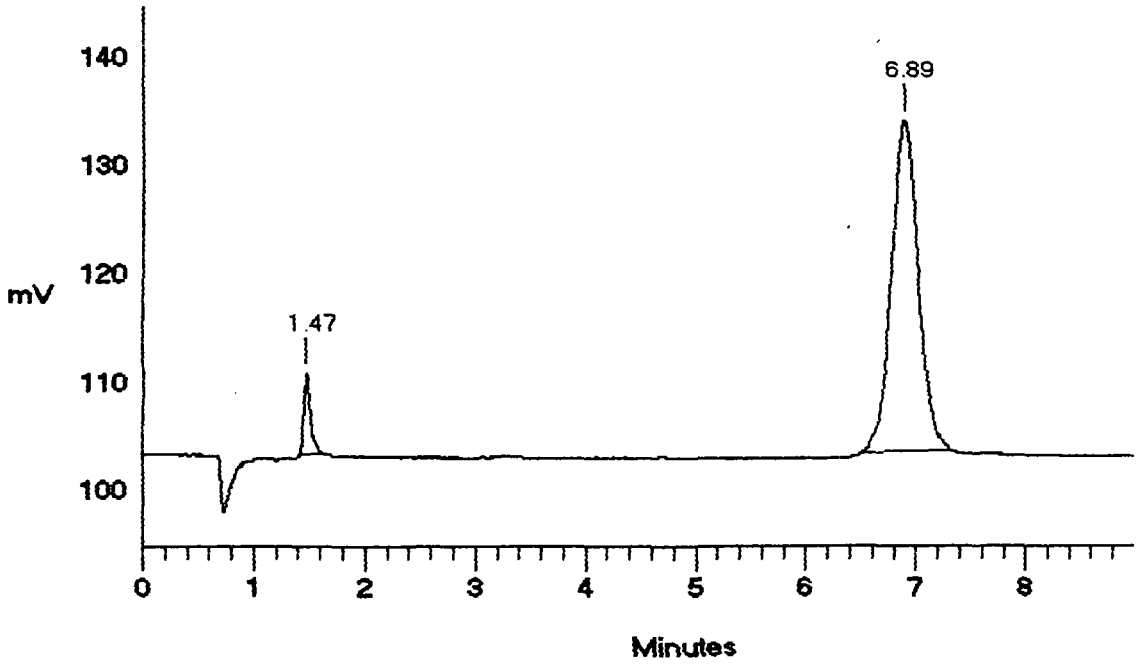
Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.47	CHLORIDE	342.342	7452	30645	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.89	SULFATE	1704.625	30558	518180	1	0.44
		Totals	2046.967	38010	548825		

File: W2121291.D23 Sample: 11992.09



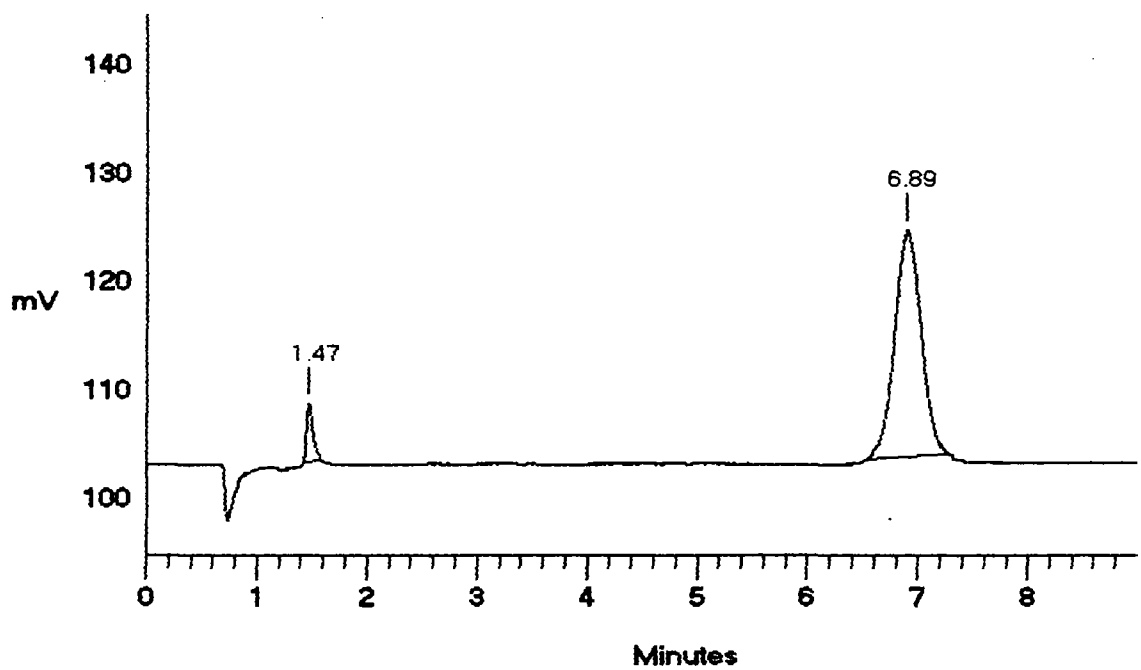
Sample Name: 11992.10 7655-F-19 1:99 Date: 12/12/1992 20:54:56 137
Data File : W2121291.D24
Method : C:\DX\METHOD\AUTO.met DAB 12/17/92
ACI Address: 1 System: 1 Inject#: 24 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.47	CHLORIDE	328.189	5267	21645	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.89	SULFATE	1256.988	20923	348955	1	0.44
		Totals	1585.177	26191	370601		

File: W2121291.D24 Sample: 11992.10



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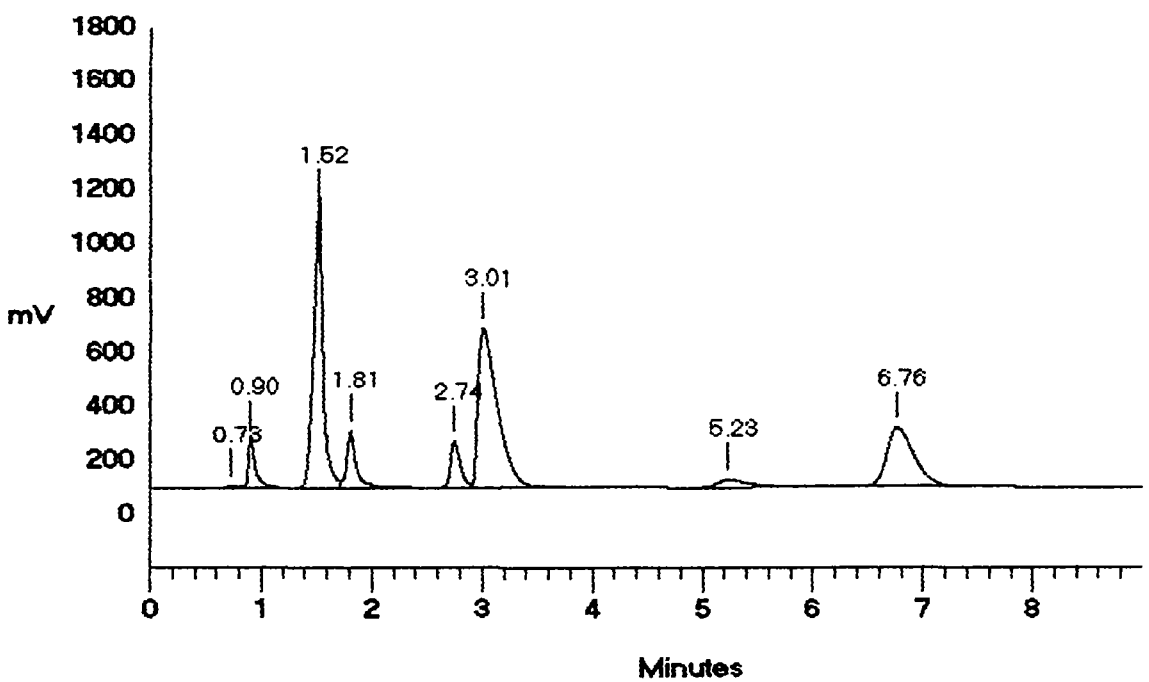
Sample Name: CCV Date: 12/12/1992 21:05:58
Data File : W2121291.D25
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 25 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	9.977	186065	826231	2	0.00
3	1.52	CHLORIDE	101.065	1044660	6239765	2	0.00
4	1.81	NITRITE	10.230	208707	1232493	2	0.56
5	2.74	BROMIDE	50.614	165872	1050649	2	1.11
6	3.01	NITRATE	50.275	586727	7182054	2	1.35
7	5.23	ORTHO-PHOSPHATE	12.622	27042	512691	1	1.75
8	6.76	SULFATE	101.280	215924	3702570	1	-1.46
		Totals	336.063	2434998	20746454		

File: W2121291.D25 Sample: CCV



139

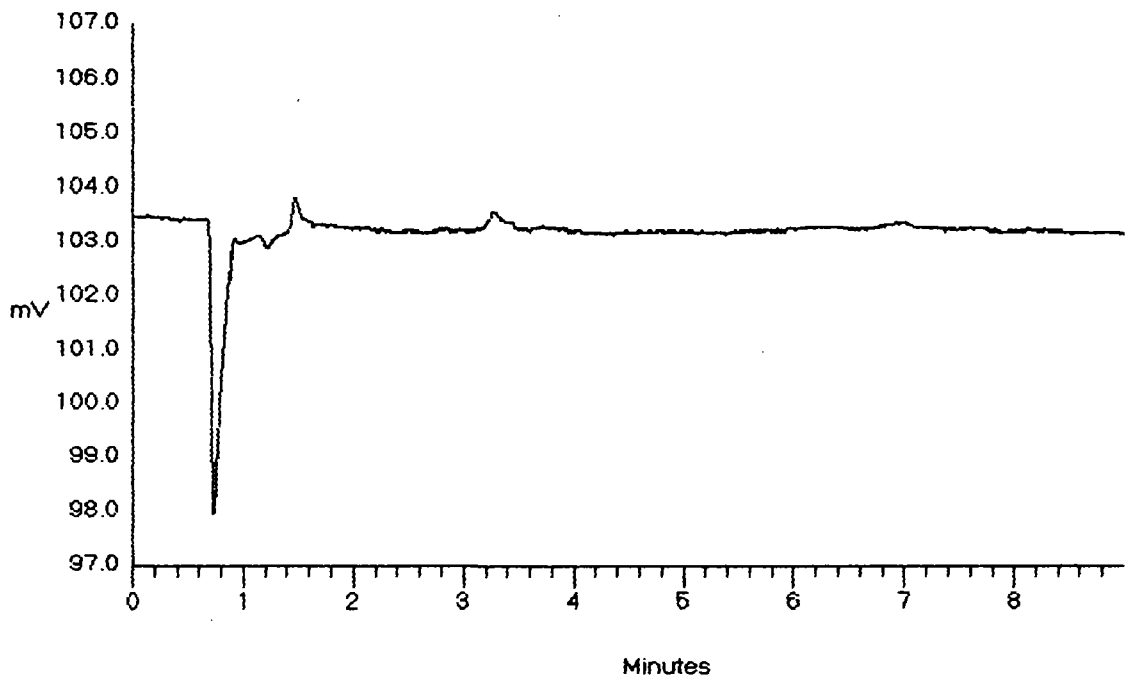
Sample Name: CCB Date: 12/12/1992 21:16:57
Data File : W2121291.D26
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 26 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D26 Sample: CCB



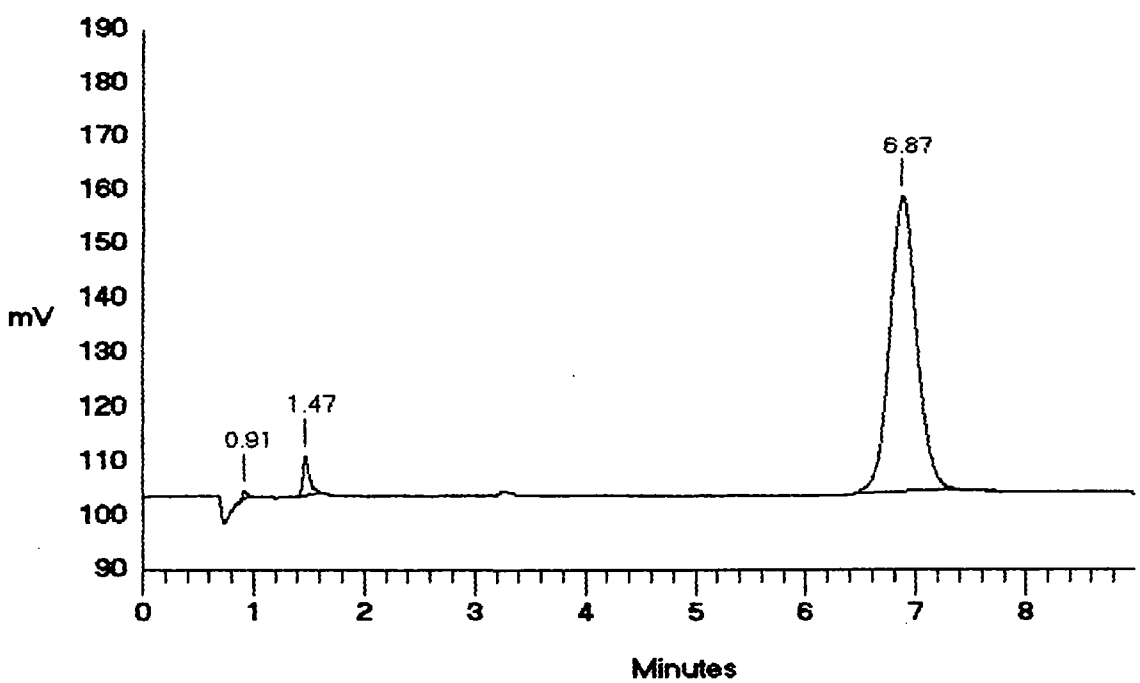
Sample Name: 11992.11 7655-F-20 1.99 Date: 12/12/1992 21:27:54 140
Data File : W2121291.D27
Method : C:\DX\METHOD\AUTO.met 12/17/92
ACI Address: 1 System: 1 Inject#: 27 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	33.142	1262	3656	1	1.11
2	1.47	CHLORIDE	339.868	7196	29072	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.87	SULFATE	2766.067	54626	919448	1	0.15
		Totals	3139.077	63084	952176		

File: W2121291.D27 Sample: 11992.11



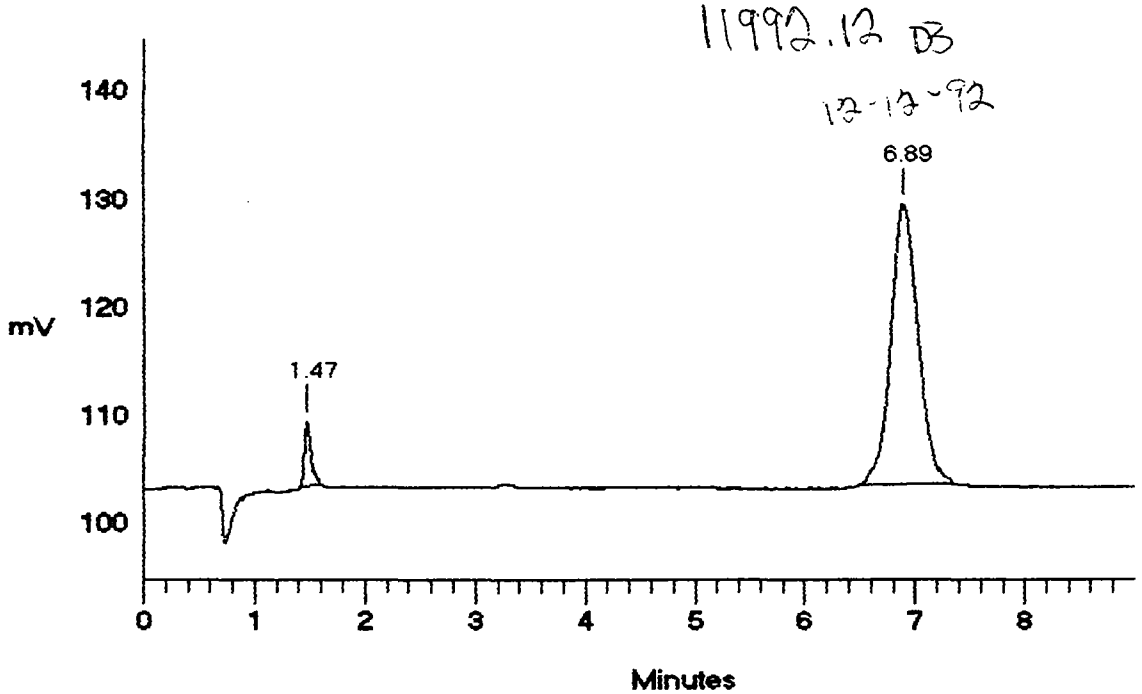
Sample Name: 11992.11 7655-F-21 1:99 Date: 12/12/1992 21:42:16 141
Data File : W2121291.D28
Method : C:\DX\METHOD\AUTO.met DB 12/17/92
ACI Address: 1 System: 1 Inject#: 28 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.47	CHLORIDE	333.030	5900	24723	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.89	SULFATE	1516.084	25927	446904	1	0.44
		Totals	1849.114	31827	471628		

File: W2121291.D28 Sample: ~~11992.11~~
11992.12 DB
12-17-92



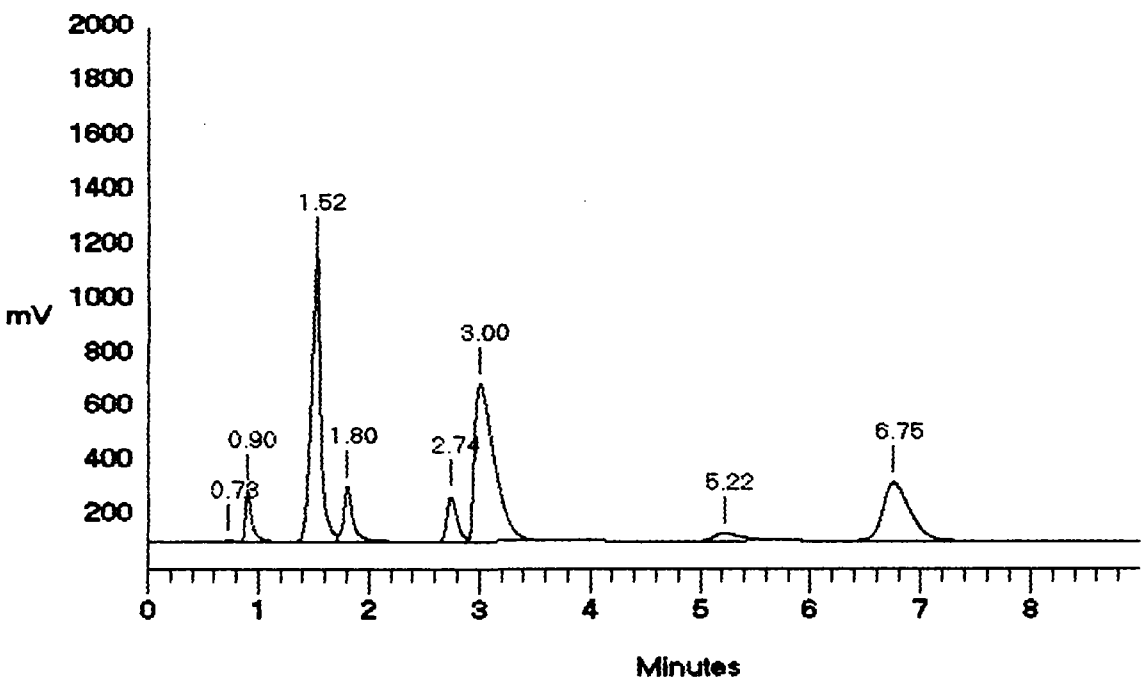
Sample Name: CCV Date: 12/12/1992 21:53:17
Data File : W2121291.D29 142
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 29 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.055	190434	832879	2	0.00
3	1.52	CHLORIDE	101.060	1061854	6239466	2	0.00
4	1.80	NITRITE	10.233	202688	1232916	2	0.00
5	2.74	BROMIDE	50.611	167376	1050583	2	1.11
6	3.00	NITRATE	50.174	581939	7166997	2	1.01
7	5.22	ORTHO-PHOSPHATE	12.778	28188	519394	1	1.56
8	6.75	SULFATE	101.366	216110	3705811	1	-1.60
		Totals	336.278	2448588	20748046		

File: W2121291.D29 Sample: CCV



```
==============================================================================
| Sample Name: CCB                                Date: 12/12/1992 22:04:18    |
| Data File  : W2121291.D30                                                    |
| Method     : C:\DX\METHOD\AUTO.met                                           |
| ^CI Address: 1  System: 1  Inject#: 30  Vial:            Detector:COND       |
|  alyst     : D. BURNS        Column: AS4A-SC SN.1857                        |
==============================================================================
```

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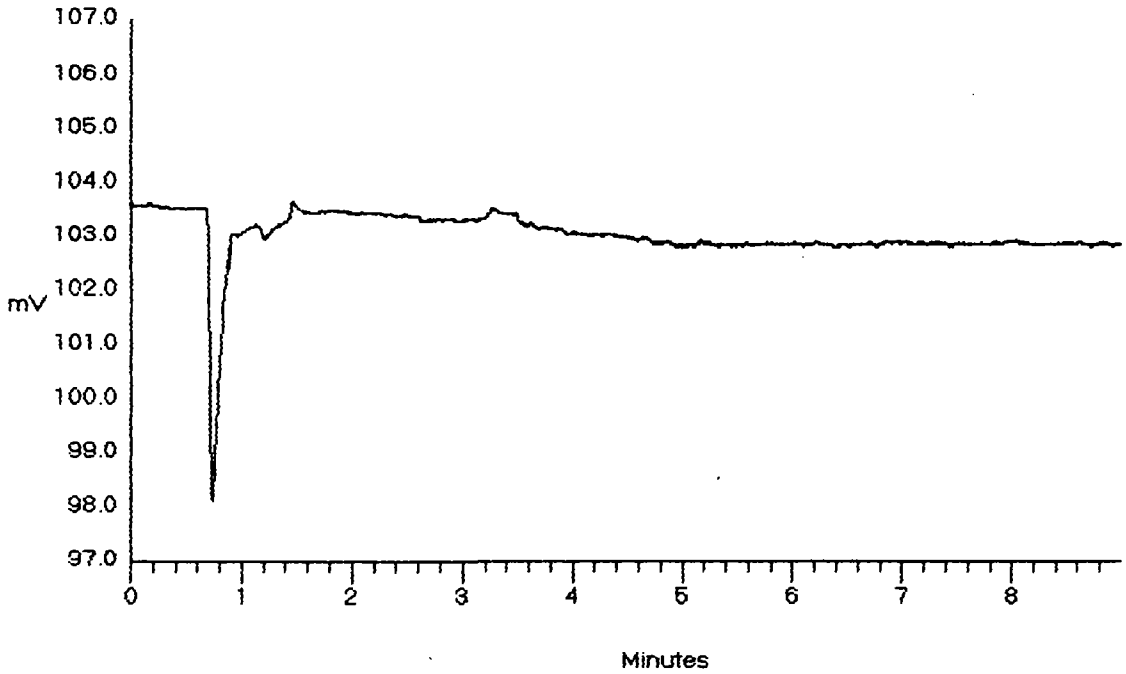
Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121291.D30 Sample: CCB



T.D.S. 12-16-92

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1/12/93

	7655-F-1 ~~7655-F-7~~	7655-F-5	7655-F-22	7655-F-13	7655-F-14
Sample #	11992.01(37)	11992.02(A)	11992.03(H)	11992.04(1)	11992.05(D)
	10:00	10:05	10:10	10:15	10:20
Dish	72.8649	73.1569	70.0859	71.7003	71.4569
Dish	72.8524g	73.1218	69.5650	71.1886	71.1070
Residue	0.0125	0.0351	0.5209	0.5117	0.3499
Vol	50 ml	50	100	100	100
TDS mg/l	250	702	5209	5117	3499
	7655-F-15	7655-F-16	7655-F-17	7655-F-18	7655-F-19
Sample #	11992.06(L)	11992.07(35)	11992.08(23)	11992.09(5)	11992.10(9)
	10:25	10:30	10:35	10:40	10:45
Dish	71.3402	72.2106	69.6829	70.1720	63.7571
Dish	71.0533g	70.4547	69.6652	69.9070	63.5583
Residue	0.2869	1.7559	0.0177	0.2650	0.1988
Vol	50 ml	100	100	100	100
TDS mg/l	5738	17,559	177	2650	1988
	7655-F-20	7655-F-21	7655-F-21D (DUP)		
Sample #	11992.11(32)	11992.12(R)	11992.12 (3)	11997.16(21)	11997.21(30)
	10:50	10:55	11:00		
Dish	69.4092	74.3119	71.7946	70.1887	72.4549
Dish	69.0000 ~~68.99~~ g	74.0820	71.5622	70.1455	72.4245
Residue	0.4092	0.2299	0.2324	0.0432	0.0304
Vol	100 ml	100	100	100	100
TDS mg/l	4092	2.299	2.324	35 → 2311.5 (1.19%)	432	304

Sample #	11997.26(34)	11997.31(24)	11997.31 (18) (DUP)	
Dish	69.4564	70.5480	78.2484	
Dish	69.3848g	70.4714	78.1723	
Residue	0.0716	0.0766	0.0761	
Vol	100	100	100	
TDS mg/l	716	766	761	0.7% RPD

Alkalinity 12-16-92
010/023/024

IR 145

HB 1/13/93 11:30 chemicals added.

So	Vol	begin pH	end pH	mls 0.0203 N H_2SO_4		Alk $CaCO_3$ mg/l
Blank	50 mls	6.3	4.5	0.10 - 0.0 = 0.10	2	< 20
Std 50 mg/l	1.0 ml of 2500 ppm 50	10.35	4.5	37.4 - 34.8 = 2.6	52.8	106 %
7655-F-1 1	50 mls	10.60	4.5	8.65 - 0.10 = 8.55	173.6	174
7655-F-5 2	50	7.60	"	31.8 - 8.70 = 23.1	468.9	Total & BiCarb 469
7655-F-22 3	50	5.66	"	34.7 - 31.8 = 2.9	58.9	59
7655-F-13 4	50	4.26	"	~~0~~		<1 = <20
7655-F-14 5	50	7.28	"	13.1 - 0.0 = 13.1	265.9	266
7655-F-15 6	50	3.36		~~0~~ ~~13.1~~ =		<1 = <20
7655-F-16 7	50	3.30		~~0~~ ~~13.2~~ =		<1 = <20
7655-F-17 8	50	6.86	"	14.0 - 13.2 = 0.8	16.2	16 = <20
7655-F-18 9	50	8.01	"	22.6 - 14.0 = 8.6	174.6	175
7655-F-19 10	50	7.51	"	28.0 - 22.6 = 5.4	109.6	110
7655-F-19D 10 Dup	50	7.5	"	33.5 - 28.1 = 5.4	109.6	0 %
7655-F-20 11	50	3.76		~~0~~		<1 = <20
7655-F-21 12	50	6.92	4.5	37.8 - 33.5 = 4.3		Total & BiCarb. 87
11992 12/17	50	7.54	4.5	37.4 - 0.0 = 37.4		Total & BiCarb. 759
	50	7.41		34.7 + (50 - 37.4) = 37.3 (12.6)		757

Alkalinity 12-17-92 15:30

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S...	Vol	begin pH	end pH	ml 0.0203N H_2SO_4		Alk. $CaCO_3$ mg/l	
11967.10	50 mls	9.99	8.3	26.25 − 25.8 = 0.15	P = 9.1	Total	114
			4.5	31.4 − 25.8 = 5.6		BiCarb	96
						Carb	18 = < 20
T655-F-1 11992#01	50 mls	10.63	8.3	35.5 − 31.5 = 4.0	P = 8.1	Total	183
			4.5	40.5 − 31.5 = 9.0		BiCarb	21
						Carb	162

Carb = 2P Bi Carb = T − 2P Total = $\frac{\text{mls acid} \times N_{acid} \times 50{,}000}{\text{sample mls}}$

P = $\frac{0.0203N \times 50000}{50}$ = 9.1 , BC = 114 − 18 = 96 T = $\frac{5.6 \times 0.0203 \times 50000}{50}$ = 113.7

Carbonate = 18.2 , BiCarb = 96 Total = 114

SWLO / AATS

SAMPLE DIGESTION RECORD

Digestion Date 12-16-92
Type of Analysis Tap only

Digestion Batch No. _____
Client AATS-V

Analyst SMN
Matrix H2O
11:00

Sample ID	Client ID	Beaker No.	Initial wt/vol g/ml	Final vol (ml)	Description Water-Color, Clarity Soil-Color, Texture Artifacts	pH <2>	Comments (Spiking Sol)	Soil Preparation Pan wt(g)	Wet wt(g)	Dry wt(g)	Solid %
PBW			100ml	100ml							
LCSW							10ml ICV1 10ml ICV3	195 397	Lot		
11992.01	7655-F1				Clear Cloudy / Clear no color	8					
D .01	-F1					8					
1 .02	-F5					6					
S .02	-F5					6	1.0ml MS #5				
.03	~~F12~~	7655-F-22	AB 1/14/93			1					
.04	-F13										
.05	-F14										
.06	-F15										
.07	-F16										
.08	-F17										
.09	-F18										
.10	-F19										
.11	-F20										
.12	-F21										

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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# STB #1
Date/Analyst 11-5-92 / Bu

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
Ca	CLPA-Cal-1 H-MEB080 92	5000	~~1/5 5000~~ 2 ml	200 ml	2% HNO_3	50.0	mg/l
Mg							
K							
Na							
Al		2000	~~1/5 2000~~			20.0	
Ba							
Fe		1000				10.0	
Ag		250				2.5	
Co		500				5.0	
Mn							
Ni							
V							
Zn							
Cu		250				2.5	
Cr		200				2.0	
Be		50				0.5	
Sb	CLPA Cal 2 H-SB0141	1000	1.0 ml			5.0	

SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# STD #2
Date/Analyst 11-5-92 / [illegible]

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
As	Fluoride I	20.0	20.0 ml	200 ml	2% HNO_3	2.0	mg/l
Pb							
Se							
Tl		5.0				0.5	
Cd		2.5				0.25	

[illegible] 11/5/92

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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# Intermediate I
Date/Analyst 11-5-92 / [illegible]

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
As	CLP Cal 3 G-ME808039	1000	1.0 ml	200 ml	$2\%\ HNO_3$	5.0	mg/L
Pb	↓	↓	↓	↓	↓	5.0	↓
Se	↓	↓	↓	↓	↓	5.0	↓
Tl	↓	↓	↓	↓	↓	5.0	↓
Cd	↓	500	↓	↓	↓	2.5	↓
As	Plasma Chem SIM33N1H	1000	3 ml	↓	↓	75.0	↓
Pb	Plasma Chem SIM82N1H	↓	↓	↓	↓	↓	↓
Se	Plasma Chem SIM34N1PG	↓	↓	↓	↓	↓	↓

[illegible] 11-5-92

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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# STD #3
Date/Analyst 10-05-92 /B

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
Ti	Plasma Chem JOM22W01EP	1000	2.0 ml	200 ml	2% HNO_3	10.0	mg/l
Mo	SØMY2W1E						
B	NØNØSWA						
Sn	VOMSOW1						

B 10-13-92

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SOUTHWEST LABORATORY OF OKLAHOMA, INC.

PREPARATION OF STOCK MIXTURE SOLUTION (MULTI-COMPONENT)

Mixture I.D.# STD #4
Date/Analyst 11-5-92

Approved _____

Component Compound	Parent I.D.#	Conc. of Parent Soln.	Vol.of Parent	Total Vol. of Mixture	Matrix	Component Concentration	Unit
Cd	Alpha Chem SIM48N/PF	1000	50 ml	200 ml	2% HNO3	0.25	mg/l

Jm 11-5-92

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1473 E

SAMPLE DELIVERY GROUP (SDG)
TRAFFIC REPORT (TR) COVER SHEET

LAB NAME: AMERICAN ANALYTICAL & TECHNICAL SERVICES, Inc.

LAB CODE: AATS CONTRACT No.: 68-D1-0024

RAS No.: _____ SAS No.: 7655-F-01

SDG No./First Sample in SDG: 7655-F-1
(Lowest EPA Sample Number
in first shipment of samples) Receipt Date: 12/12/92

Last Sample in SDG: 7655-F-22
(Highest EPA Sample Number
in last shipment of samples) Receipt Date: 12/12/92

EPA Sample Numbers in the SDG (listed in alphanumeric order)

1.	7655-F-1	11992.01	11.	7655-F-21	11992.12
2.	7655-F-5	.02	12.	7655-F-22	.03
3.	7655-F-13	.04	13.		
4.	7655-F-14	.05	14.		
5.	7655-F-15	.06	15.		
6.	7655-F-16	.07	16.		
7.	7655-F-17	.08	17.		
8.	7655-F-18	.09	18.		
9.	7655-F-19	.10	19.		
10.	7655-F-20	.11	20.		

Note: There are a maximum of 20 field samples in SDG.

Attach Traffic Reports to this form in alphanumberic order (i.e., the order listed on this form).

Missy Hamby AMB 12-12-92
Sample Custodian Date

SMART/AATSMT1.DOC

Post-it™ brand fax transmittal memo 7671 | # of pages ▸

To Chuck Hoover	From Rhonda Holder
Co. AATS	Co. VIAR/SMO
Dept.	Phone # 149
Fax #	Fax #

SAS/Case No.: 7655-F-01

TELEPHONE

Date: 12/15/92

Initial Contact: Chuck Hoover, with AATS

Secondary Contact: Myra Perez, with Reg VI

Other Contact: _____, with _____

QUESTION/ISSUE DISCUSSED: A sample labelled 7655-F-12 was received on 12/10 and 12/12. The sample received on 12/10 had a station location of C092W-MW2. The sample received on 12/12 had a station location of CH92W-CB6D.
12/16/92 Lab should send ~~all~~ packing lists to Region VI.

RESOLUTION: 12/17/92
Lab should use 7655-F-22 as the sample id for the sample received on 12/12 labelled 7655-F-12 and note the situation in the narrative.

Coordinator: Rhonda Holder Date: 12/17/92

11/18/1992 14:23 FROM U.S. E.P.A.-HOUSTON,TEX. ++ 713 983 2248 P.02
NOV 18 '92 03:42PM

U.S.ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
300 North Lee St., Suite 200
Alexandria, Va. 22314
Phone: (703) 557-2490

Case # _____

SAS # 7655-F-01

SPECIAL ANALYTICAL SERVICES
CLIENT REQUEST FORM

A. EPA Region/Client : Region 6

B. RSCC Representative : [redacted]

C. Telephone : [redacted]

D. Date of Request : [redacted]

E. Site Name : [redacted]

F. CERCLIS # : [redacted]

Please provide below description of your request for SAS under the CLP. In order to most efficiently obtain laboratory capability for your request, please address the following consideration if applicable. Incomplete or erroneous information may result in a delay in processing your request.

1. General description of analytical service requested:

   Ca, Mg, K, Na, Cl, F, N, SO4, HCO3, CO3, TDS.

2. Definition and number of work units involved.

   37 low conc. waters for the analysis of analytes in item # 1.

3. Purpose of analysis. Site spill ID number, if any.

   [redacted]

4. Estimated date(s) of collection:

   Week of December 7, 1992.

5. Estimated date(s) and method of shipment:

   Same as above. Overnight carrier.

To: Rhonda Holder

Page 2

6. Number of days analysis and data required after laboratory receipt of samples:

   The data package is due thirty five days after receipt of samples.

   Technical holding times indicated in the methods, must not be exceeded. Data will be regarded as unusable if these technical holding times are exceeded.

   The lab(s) awarded this contract must notify SMO immediately of any problems encountered during analysis that will delay submission of the data. SMO will contact the TPO to request instructions.

7. Analytical protocol required (attach copy if other than a protocol currently used in the program).

Analyte	Analytical Protocol	Method
Bicarbonate	Alkalinity titrimetric	2320B
Carbonate	" " " "	2320B
Chloride	Ion chromatography	300.0
Fluoride	" " "	300.0
Nitrate (N)	" " "	300.0
Sulfate	" " "	300.0
Calcium	CLP SOW	ILM02.0
Magnesium	CLP SOW	"
Potasium	CLP SOW	"
Sodium	CLP SOW	"
TDS		160.1

8. Special Technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits)

   Lab(s) awarded this contract will hold the samples/extracts for 180 days after the data package has been forwarded to the Region, unless authorization for disposal is received from the Regional RSCC.

   For Method 2320 B for Carbonate and Bicarbonate analysis, report concentrations for both the Carbonate and the Bicarbonate.

To: Rhonda Holder
[redacted]
Page 3

9. Analytical results required.

Analytical results must be reported in a format consistent and equivalent to the SOW ILMO2.0. Submit all raw data.

All CSF Files (documentation files) must be submitted in original copies in compliance with CLP SOW OLMO2.0 per each SDG.

The Laboratory will include an example calculation with the formula and all definitions of parameters in the formula in sufficient detail to allow an independent third party reconstruction of the results from the data, for all analytes.

Each data package (SDG) must contain a narrative summary of all procedures actually used for sample preparation, cleanup and analysis including:

a. specific identification of all instruments used.

b. discussion of all factors affecting the analysis and of all corrective actions taken.

c. justification for dilution(s) of samples and/or extracts.

10. Other information required:

Submit copy of SAS Request Form (by SDG) and of any record of communication, generated during analyses, between the lab, SMO and/or TPO. Include copies of phone log communication. Report any inconsistencies and/or problems with CLP paperwork, shipping, and packaging of samples.

The lab(s) should forward the regional data package(s) to:

Data Reviewer
US EPA - Houston Branch
10625 Fallstone Rd.
Houston, Tx. 77099

11. Name of sampling/shipping contact:

[redacted]

To: Rhonda Holder

[redacted]

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12. Data requirements:

PARAMETER	DETECTION LIMITS		PRECISION
Ca	5,000	ppb	< 20 % RPD
Mg	5,000	ppb	" "
K	5,000	ppb	" "
Na	5,000	ppb	" "
Cl	15	ppb	" "
F	5	ppb	" "
N	10	ppb	" "
SO4	200	ppb	" "
HCO3	20,000	ppb	" "
CO3	20,000	ppb	" "
TDS	10,000	ppb	" "

13. QC requirement:

AUDITS REQUIRED	** FREQUENCY	LIMITS
Lab Method Blank	1/20 samples	below detection limits
Sample Dup	1/20 " "	< 20% RPD
Matrix Spike	" " " "	75 - 125 % Rec.
Lab Control STD	" " " "	75 - 125 % Rec.

** The frequency is per parameter per matrix.

See Table 4 for Spiking Levels

14. Actions required if limits are exceeded:

Contact Rhonda Holder from SMO immediately. SMO will contact the TPO and request instructions.

Reviewed by: M. Elfeky, Chemist Date: 11-18-92

whitehan

TABLE 4.

SPIKING LEVELS FOR SPIKE SAMPLE ANALYSIS

Parameter	Required Spiking Limits Waters (µg/L)	Required Spiking Limits Soils (µg/L)
Physical		
Acidity (Acd)	10000	20000
Alkalinity (Alk)	20000	40000
Cation-Exchange Capacity (CEC)	NA	NA
Chemical Oxygen Demand (COD)	10000	62500
Moisture Content (Moc)	NA	NA
Oil and Grease (O&G)	25000	12500
pH	NA	NA
Residue		
Filterable	100000	NA
Non-Filterable	20000	NA
Total	100000	NA
Volatile	20000	NA
Specific Conductance (SC)	NA	NA
Specific Gravity (SG)	NA	NA
Turbidity (Tur)	NA	NA
Non-metallic		
Ammonia, Nitrogen (NH_3)	5000	50000
Chloride (Cl)	25000	12500
Cyanide (CN)	500	500
Fluoride (F)	500	500
Kjeldahl Nitrogen (TKN)	500	500
Nitrate-Nitrite (NO_3-NO_2)	500	500
Organic Carbon, Total (TOC)	250	300
Organic Halide, Total (TOX)	250	250
Phosphorus, All Forms (TP)	5000	10000
Sulfate (SO_4)	25000	25000
Sulfide (S_2)	5000	10000
Metallic		
Aluminum (Al)	2000	10000
Calcium (Ca)	25000	50000
Chromium (Cr)	200	200
Hexavalent Chromium (Cr^{6+})	100	100
Iron (Fe)	1000	500
Magnesium (Mg)	25000	50000
Potassium (K)	25000	50000
Silicon (Silica)	200	200
Sodium (Na)	25000	50000

NA - Not applicable.

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER

6159041560

6159041560

RECIPIENT'S COPY

1 Date

From (Your Name) Please Print: STEPHEN [illegible]

Your Phone Number (Very Important): ([illegible])

Company: [illegible]

Department/Floor No.:

Street Address: [illegible]

City: [illegible] State: [illegible] ZIP Required: [illegible]

2 To (Recipient's Name) Please Print: MISSY HARMBY

Recipient's Phone Number (Very Important): (918) 251-0545

Company: AMERICAN ANALYTICAL & TECH SERVICES

Department/Floor No.:

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 1700 WEST ALBANY, SUITE A

City: BROKEN ARROW State: OK ZIP Required: 74012

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on Invoice.): 5137149/103

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card
5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [X] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 [X] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOV'T LETTER
41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas. *Declared Value Limit $500 **Call for delivery schedule

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill in Box H) 1 [ ] WEEKDAY or 31 [ ] SATURDAY

DELIVER 2 [ ] WEEKDAY or 3 [ ] SATURDAY (Extra charge) (Not available to all locations)

4 [ ] DANGEROUS GOODS (Extra charge)

5 [ ]

6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845 ..... X ..... kg. III

7 [ ] OTHER SPECIAL SERVICE

9 [ ] SATURDAY PICK-UP (Extra charge)

[ ]

12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	10	0
Total 1	Total 10	Total 0

DIM SHIPMENT (Chargeable Weight) [ ] lbs.
L x W x H

Received At
1 [ ] Regular Stop 3 [ ] Drop Box
2 [ ] On-Call Stop 4 [ ] B.S.C. 5 [ ] Station

Emp. No. Date

[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold

Street Address

City State Zip

Received By: X Y Hamby

Date/Time Received: 12/12/92 FedEx Employee Number: 0900

7 Release Signature:

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #136
136
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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No. 7655-F

1. Sample Description (Enter in Column A)	2. Preservative (Enter in Column C)	3. Region No.	Sampling Co.	5. Date Shipped	Carrier	7. Date Received -- Received by
1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (Specify)	1. HCl 2. HNO3 3. $NaHSO_4$ 4. H_2SO_4 5. NaOH 6. Other (SAS) (Specify) 7. Ice only N. Not preserved	6		12-11-92	FED EX	12/12/92 M Hamby
		Sampler (Name): STEPHEN WUST		Airbill Number: 6159041560		Laboratory: American Analytical
		Sampler Signature: [signature]		6. Ship To: AATS 1700 WEST ALBANY SUITE A BROKEN ARROW OK 74012		8. Transfer to / Date Received
		4. Type of Activity				Received by
						Laboratory

4. Type of Activity

	Lead	Pre-Remedial	Remedial		Removal
SF			RIFS		CLEM
PRP		PA	RD		REMA
ST		SSI	RA		REM
FED		LSI	O&M		OIL
			NPLD ✓		UST

Sample Numbers	A Matrix Enter from Box 1	B Conc Low Med High	C Preservative Used from Box 2	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Sample Condition On Receipt
1. 7655-F1	2	LOW	7	General Chem		6-005298	C092W-MW1	12/7/92 13:25	SJW	Intact
2. 7655-F5	2	LOW	7	General Chem		6-005441	C092W-MW4	12/7/92 17:00	SJW	
3. ~~7655-F12~~ 7655-F-22	2	LOW	7	General Chem		6-039939	CH92W-CB16D	12/9/92 16:05	SJW	* Final sample received in SDG. dAB 12/12/92
4. 7655-F13	2	LOW	7	General Chem		6-039938	CH92W-16S	12/9/92 11:30	SJW	
5. 7655-F14	2	LOW	7	General Chem		6-039941	CH92W-7GS	12/9/92 13:40	SJW	
6. 7655-F15	2	LOW	7	General Chem		6-039958	CH92W-WD10	12/9/92 15:20	SJW	
7. 7655-F16	2	LOW	7	General Chem		6-039956	CH92W-WD4	12/9/92 16:45	SJW	
8. 7655-F17	1	LOW	7	GEN CHEM		6-039962	CH92W-LB	12/10/92 15:35	SJW	
9. 7655-F18	1	LOW	7	GEN CHEM		6-005386	CH92W-HCBU	12/10/92 12:18	SJW	
10. 7655-F19	1	LOW	7	GEN CHEM		6-005384	CH92W-HCBH	12/10/92 11:50	SJW	* Final sample received in SDG. dAB 12/12/92

dAB 12/12/92 see yes

Shipment for SAS complete? (Y/N) Y

PAGE 1 of 2

No dAB 12/12/92

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-11-92 2:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	
		M Hamby	12/12/92 0900		

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-3 (4-91)

DISTRIBUTION:
White - Region Copy Yellow - SMO Copy Pink - Lab Copy for Return to SMO Gold - Lab Copy

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United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service

Packing List/Chain of Custody

SAS No. 7655-F

1. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (Specify)	2. Preservative (Enter in Column C) 1. HCl 2. HNO3 3. NAHSO4 4. H2SO4 5. NAOH 6. Other (SAS) (Specify) 7. Ice only N. Not preserved	3. Region No. 6	Sampling Co.	5. Date Shipped 12-11-92	Carrier FED EX
		Sampler (Name) STEPHEN WUST		Airbill Number 615904 1560	
		Sampler Signature Stephen Wust		6. Ship To AATS 1700 WEST ALBANY SUITE A BROKEN ARROW OK 74012	

4. Type of Activity: Lead: SF, PRP, ST, FED. Pre-Remedial: PA, SSI, LSI. Remedial: RIFS, RD, RA, O&M, NPLD (✓). Removal: CLEM, REMA, REM, OIL, UST.

7. Date Received -- Received by: 12/12/92 M Hamby

Laboratory: American Analytical

8. Transfer to: | Date Received:

Received by:

Laboratory:

Sample Numbers	A Matrix Enter from Box 1	B Conc Low Med High	C Preservative Used from Box 2	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Sample Condition On Receipt
1. 7655-F20	2	Low	7	GEN CHEM		6-005382	CH92W-JW	12/10/92 15:10	SDW	Intact
2. 7655-F21	1	Low	7	GEN CHEM		6-039586	CH92W-HCNO	12/10/92 11:20	SDW	↓
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Shipment for SAS complete? (Y/N) Y

PAGE 2 OF 2

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Stephen Wust	12-11-92 2:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature) M Hamby	Date / Time 12/12/92 0900	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-3 (4-91)

DISTRIBUTION:
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S 001016

SAMPLE LOG-IN SHEET

Lab Name: American Analytical + Technical Services Page 1 of 1

Received By (Print Name): M Hamby Log-in Date: 12/12/92

Received By: (Signature): M Hamby

Case Number: 7655-F-1 ~~7655-F-2~~ 12/12/92

Sample Delivery Group No:

SAS Number: 7655-F

REMARKS:

1. Custody Seal(s) Present/Absent* Intact/Broken
2. Custody Seal Nos.: N/A
3. Chain-of-Custody Records Present/Absent*
4. Traffic Reports or Packing List Present/Absent*
5. Airbill Airbill/Sticker Present/Absent*
5. Airbill No: 6159041560
7. Sample Tags Present/Absent
   Sample Tag Numbers Listed/Not Listed on Chain-of-Custody
8. Sample Condition: Intact/Broken*/Leaking
9. Does information on custody records, traffic reports, and sample tags agree? Yes/No*
10. Date Received at Lab: 12/12/92
11. Time Received 0900

Sample Transfer

Fraction:

Area #:

By: MAH MAH

On:

EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC.
7655-F1	6-005298	11992.01	Intact
7655-F5	6-005441	11992.02	
7655-F12	6-039939	11992.03	
7655-F13	6-039938	11992.04	
7655-F14	6-039941	11992.05	
7655-F15	6-039958	11992.06	
7655-F16	6-039956	11992.07	
7655-F17	6-039962	11992.08	
7655-F18	6-005386	11992.09	
7655-F19	6-005384	11992.10	
7655-F20	6-005382	11992.11	
7655-F21	6-039586	11992.12	

* Contact SMO and attach record of resolution

Received By:

Date:

Logbook No:

Logbook Page No:

FORM DC-1

3/90

AMERICAN ANALYTICAL & TECHNICAL SERVICES, Inc.
Sample Tag Summary

RAS #_____

SAS #7655-F-01

SDG #7655-F-1

Samples are listed here as samples are listed on the Sample Delivery Group Traffic Report Cover Sheet.

	Sample ID	Assigned #		Sample ID	Assigned #
1.	7655-F-1	159	21.		
2.	7655-F-5	160	22.		
3.	7655-F-22	161	23.		
4.	7655-F-13	162	24.		
5.	7655-F-14	163	25.		
6.	7655-F-15	164	26.		
7.	7655-F-16	165	27.		
8.	7655-F-17	166	28.		
9.	7655-F-18	167	29.		
10.	7655-F-19	168	30.		
11.	7655-F-20	169	31.		
12.	7655-F-21	170	32.		
13.			33.		
14.			34.		
15.			35.		
16.			36.		
17.			37.		
18.			38.		
19.			39.		
20.			40.		

\SDGTAGS.DOC

DOCUMENT INVENTORY
Form DC-2

CASE 7655-F-01

SDG 7655-F-2

CLERK [illegible]
1/13/93

DOCUMENT	FROM PAGE	TO PAGE
Case File Inventory Sheet (Do not number)		
Hard Copy Data Package	001	035
RUN LOGS/RAW DATA		
ICP	036	070
DX100	071	122
TDS	123	123
Alkalinity	124	125
DIGESTION SHEETS		
ICP Sample Prep	126	126
SHIPPING MANIFEST		
SDG TR Cover Sheet	127	127
SAS Client Request	128	132
Airbill	133	133
Traffic Report	134	134
Chain of Custody Records	134	134
Sample Log-in (DC-1)	135	135
Sample Tags	136	146

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

001

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

SOW No.: 3/90_

EPA Sample No.	Lab Sample ID
F10	1196708
F10D	1196708D
F10S	1196708S
F10SD	1196708SD
F11	1196709
F12	1196710
F2	1196701
F3	1196702
F4	1196703
F6	1196704
F7	1196705
F8	1196706
F9	1196707

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: Jason D. Ruckman

Date: January 13, 1993 Title: Assistant Inorganic Program Manager

COVER PAGE - IN ILM02.1

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G: 002

F10

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196708

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	210000			AK
	Carbonate	20000	U		AK
	Chloride	20500			I
	Fluoride	50.0	U	N	I
	Nitrate	100	U	N	I
	Sulfate	657000			I
	TDS	1230000			T
7440-70-2	Calcium	176000			P
7439-95-4	Magnesium	71100			P
7440-09-7	Potassium	6690			P
7440-23-5	Sodium	34300		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

003

F11

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196709

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	212000			AK
	Carbonate	20000	U		AK
	Chloride	20500			T
	Fluoride	50.0	U	N	T
	Nitrate	100	U	N	T
	Sulfate	654000			T
	TDS	1240000			T
7440-70-2	Calcium	183000			P
7439-95-4	Magnesium	74200			P
7440-09-7	Potassium	7180			P
7440-23-5	Sodium	36100		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G: 004

F12

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196710

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	96000			AK
	Carbonate	20000	U		AK
	Chloride	22200			I
	Fluoride	566		N	I
	Nitrate	100	U	N	I
	Sulfate	958000			I
	TDS	1250000			T
7440-70-2	Calcium	209000			P
7439-95-4	Magnesium	66500			P
7440-09-7	Potassium	16500			P
7440-23-5	Sodium	73800		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

G: 005

F2

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196701

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	22300			AK
	Carbonate	20000	U		AK
	Chloride	3340			I
	Fluoride	50.0	U	N	I
	Nitrate	2110		N	I
	Sulfate	200	U		I
	TDS	38000			T
7440-70-2	Calcium	761	B		P
7439-95-4	Magnesium	195	U		P
7440-09-7	Potassium	271	U		P
7440-23-5	Sodium	10500		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

F3 006

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024
Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F
Matrix (soil/water): WATER Lab Sample ID: 1196702
Level (low/med): LOW Date Received: 12/12/92
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	197000			AK
	Carbonate	20000	U		AK
	Chloride	72400			I
	Fluoride	50.0	U	N	I
	Nitrate	100	U	N	I
	Sulfate	1840000			I
	TDS	3080000			T
7440-70-2	Calcium	508000			P
7439-95-4	Magnesium	147000			P
7440-09-7	Potassium	3720	B		P
7440-23-5	Sodium	86000		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

007

F4

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196703

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	212000			AK
	Carbonate	20000	U		AK
	Chloride	156000			I
	Fluoride	50.0	U	N	I
	Nitrate	2180		N	I
	Sulfate	1700000			I
	TDS	3030000			I
7440-70-2	Calcium	476000			P
7439-95-4	Magnesium	127000			P
7440-09-7	Potassium	11300			P
7440-23-5	Sodium	131000		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

F6

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024
Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F
Matrix (soil/water): WATER Lab Sample ID: 1196704
Level (low/med): LOW Date Received: 12/12/92
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	229000			AK
	Carbonate	20000	U		AK
	Chloride	10700			I
	Fluoride	420		N	I
	Nitrate	2270		N	I
	Sulfate	40900			I
	TDS	324000			T
7440-70-2	Calcium	55500			P
7439-95-4	Magnesium	23100			P
7440-09-7	Potassium	2130	B		P
7440-23-5	Sodium	21500		E	P

Color Before: BROWN Clarity Before: CLOUDY Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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U.S. EPA - CLP

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

F7 009

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024

Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Lab Sample ID: 1196705

Level (low/med): LOW Date Received: 12/12/92

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	25400			AK
	Carbonate	20000	U		AK
	Chloride	3850			I
	Fluoride	379		N	I
	Nitrate	100	U	N	I
	Sulfate	22000			I
	TDS	225000			T
7440-70-2	Calcium	12300			P
7439-95-4	Magnesium	4440	B		P
7440-09-7	Potassium	534	B		P
7440-23-5	Sodium	3830	B	E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

F8 010

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024
Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F
Matrix (soil/water): WATER Lab Sample ID: 1196706
Level (low/med): LOW Date Received: 12/12/92
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	242000			AK
	Carbonate	20000	U		AK
	Chloride	59500			I
	Fluoride	556		N	I
	Nitrate	100	U	N	I
	Sulfate	1260000			I
	TDS	2090000			T
7440-70-2	Calcium	315000			P
7439-95-4	Magnesium	134000			P
7440-09-7	Potassium	4450	B		P
7440-23-5	Sodium	61700		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILM02.1

U.S. EPA - CLP

1

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

F9 011

Lab Name: AMERICAN_ANALYTICAL Contract: 68-D1-0024
Lab Code: AATS Case No.: SAS No.: 7655F- SDG No.: 7655-F
Matrix (soil/water): WATER Lab Sample ID: 1196707
Level (low/med): LOW Date Received: 12/12/92
% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
	Bicarbona	162000			AK
	Carbonate	20000	U		AK
	Chloride	92600			I
	Fluoride	50.0	U	N	I
	Nitrate	2240		N	I
	Sulfate	1580000			I
	TDS	2660000			T
7440-70-2	Calcium	379000			P
7439-95-4	Magnesium	142000			P
7440-09-7	Potassium	5690			P
7440-23-5	Sodium	81500		E	P

Color Before: COLORLESS Clarity Before: CLEAR Texture:
Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ILM02.1

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

0: 012

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_	100000.0	103220.0	103.2	100000.0	100490.0	100.5	102054.0	102.1	I_
Fluoride_	10000.0	10303.00	103.0	10000.0	10041.00	100.4	10250.00	102.5	I_
Nitrate__	50000.0	51480.00	103.0	50000.0	50365.00	100.7	50677.00	101.4	I_
Sulfate__	100000.0	104057.0	104.1	100000.0	100006.0	100.0	101900.0	101.9	I_
TDS									NR
Calcium__	51382.0	49469.58	96.3	25000.0	25337.59	101.4	23351.98	93.4	P_
Magnesium	25587.0	24479.06	95.7	25000.0	25018.27	100.1	23547.46	94.2	P_
Potassium	50563.0	50610.49	100.1	25000.0	25891.71	103.6	23332.26	93.3	P_
Sodium___	52348.0	50148.11	95.8	25000.0	26582.43	106.3	25379.01	101.5	P_

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

ILM02.1

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

013

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_				100000.0	101958.0	102.0			I
Fluoride_				10000.0	10238.00	102.4			I
Nitrate__				50000.0	50939.00	101.9			I
Sulfate__				100000.0	102082.0	102.1			I
TDS_____									NR
Calcium__				25000.0	24030.07	96.1			P
Magnesium				25000.0	24354.37	97.4			P
Potassium				25000.0	23780.79	95.1			P
Sodium___				25000.0	25118.99	100.5			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

ILM02.1

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

014

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Initial Calibration Source: SPEX_____

Continuing Calibration Source: IN. VEN. ICV

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Bicarbona									NR
Carbonate									NR
Chloride_	100000.0	100017.0	100.0	100000.0	99911.00	99.9			I
Fluoride_	10000.0	10023.00	100.2	10000.0	9971.00	99.7			I
Nitrate__	50000.0	50219.00	100.4	50000.0	50239.00	100.5			I
Sulfate__	100000.0	100544.0	100.5	100000.0	100394.0	100.4			I
TDS_____									NR
Calcium__									NR
Magnesium									NR
Potassium									NR
Sodium___									NR

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

FORM II (PART 1) - IN

ILM02.1

U.S. EPA - CLP

CRDL STANDARD 2B FOR AA AND ICP

015

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

AA CRDL Standard Source: _____

ICP CRDL Standard Source: IN. VEN._____

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS____								
Calcium__				10000.0	10351.63	103.5	9696.77	97.0
Magnesium				10000.0	10360.93	103.6	9929.71	99.3
Potassium				10000.0	10470.95	104.7	9488.47	94.9
Sodium___				10000.0	11010.07	110.1	10994.46	109.9

FORM II (PART 2) - IN

ILM02.1

U.S. EPA - CLP

3
BLANKS

016

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L_

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Bicarbona									2000.000	B	AK
Carbonate	20000.0	U							20000.000	U	AK
Chloride	150.0	U	150.0	U	150.0	U	150.0	U			I
Fluoride	50.0	U	50.0	U	50.0	U	50.0	U			I
Nitrate	100.0	U	100.0	U	100.0	U	100.0	U			I
Sulfate	200.0	U	200.0	U	200.0	U	200.0	U			I
TDS									5000.000	B	T
Calcium	202.0	U	202.0	U	202.0	U	202.0	U	202.000	U	P
Magnesium	195.0	U	195.0	U	195.0	U	195.0	U	195.000	U	P
Potassium	271.0	U	271.0	U	271.0	U	271.0	U	271.000	U	P
Sodium	269.0	U	269.0	U	1943.5	B	1243.4	B	269.000	U	P

FORM III - IN

ILM02.1

U.S. EPA - CLP

3
BLANKS

017

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Preparation Blank Matrix (soil/water): _____

Preparation Blank Concentration Units (ug/L or mg/kg): _____

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Bicarbona											NR
Carbonate											NR
Chloride	150.0	U	150.0	U							I
Fluoride	50.0	U	50.0	U							I
Nitrate	100.0	U	100.0	U							I
Sulfate	200.0	U	200.0	U							I
TDS											NR
Calcium											NR
Magnesium											NR
Potassium											NR
Sodium											NR

FORM III - IN

ILM02.1

U.S. EPA - CLP

ICP INTERFERENCE CHECK SAMPLE

018

ıb Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No: 7655F- SDG No.: 7655-F

ICP ID Number: ARL3560_____ ICS Source: EPA-LV87____

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Bicarbona								
Carbonate								
Chloride_								
Fluoride_								
Nitrate__								
Sulfate__								
TDS____								
Calcium__	529351	525385	494344	496722.4	94.5	480454	472445.9	89.9
Magnesium	543610	533685	495734	496610.6	93.1	485794	477789.2	89.5
Potassium	0	0	57	24.9		98	46.3	
Sodium___	0	0	954	937.0		2155	1787.0	

FORM IV - IN

ILM02.1

U.S. EPA - CLP

5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE No. F10S

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Matrix: __WATER_____ Level (low/med): _LOW_____

% Solids for Sample: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Bicarbona		232400.0000		210100.0000		20000.00	111.5		AK
Carbonate									NR
Chloride	75-125	28297.0000		20535.0000		10000.00	77.6		I
Fluoride	75-125	1313.0000		50.0000	U	1000.00	131.3	N	I
Nitrate	75-125	2735.0000		100.0000	U	1000.00	273.5	N	I
Sulfate		664960.0000		657200.0000			7.8		I
TDS		1337000.0000		1231000.0000			103.9		T
Calcium		192738.2610		176107.9820		20000.00	83.2		P
Magnesium	75-125	87730.0060		71076.5070		20000.00	83.3		P
Potassium	75-125	25740.4240		6686.9570		20000.00	95.3		P
Sodium	75-125	52945.5970		34329.2780		20000.00	93.1		P

Comments:

FORM V (Part 1) - IN ILM02.1

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.
020
F10D

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona		210100.0000		210100.0000		0.0		AK
Carbonate		20000.0000	U	20000.0000	U			AK
Chloride								NR
Fluoride								NR
Nitrate								NR
Sulfate								NR
TDS		1231000.0000		1248000.0000		1.4		T
Calcium		176107.9820		174268.0330		1.1		P
Magnesium		71076.5070		70443.0750		0.9		P
Potassium	5000.0	6686.9570		6994.8740		4.5		P
Sodium		34329.2780		34205.0230		0.4		P

FORM VI - IN

ILM02.1

U.S. EPA - CLP

6

DUPLICATES

EPA SAMPLE NO.

F10SD 021

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Level (low/med): _LOW__

% Solids for Sample: __0.0 % Solids for Duplicate: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Bicarbona								NR
Carbonate								NR
Chloride_		28297.0000		28563.0000		0.9		I
Fluoride_		1313.0000		1349.0000		2.7		I
Nitrate__		2735.0000		2766.0000		1.1		I
Sulfate__		664960.0000		670970.0000		0.9		I
TDS								NR
Calcium__								NR
Magnesium								NR
Potassium								NR
Sodium___								NR

FORM VI - IN

ILM02.1

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

022

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Solid LCS Source: _____

Aqueous LCS Source: EPA-LV_____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Bicarbona	50000.0	49700.00	99.4						
Carbonate	50000.0	49700.00	99.4						
Chloride									
Fluoride									
Nitrate									
Sulfate									
TDS	287000	305000.0	106.3						
Calcium	51382.0	50752.97	98.8						
Magnesium	25587.0	24783.20	96.9						
Potassium	50563.0	53492.10	105.8						
Sodium	52348.0	53439.59	102.1						

FORM VII - IN

ILM02.1

U.S. EPA - CLP

9

ICP SERIAL DILUTION

EPA SAMPLE NO.

F10L 023 L

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

Matrix (soil/water): WATER Level (low/med): LOW__

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Bicarbona							
Carbonate							
Chloride							
Fluoride							
Nitrate							
Sulfate							
TDS							
Calcium	176107.98		175830.24		0.2		P
Magnesium	71076.51		71328.05		0.4		P
Potassium	6686.96		7395.34	B	10.6		P
Sodium	34329.28		42349.96		23.4	E	P

FORM IX - IN

ILM02.1

U.S. EPA - CLP

11A

ICP Interelement Correction Factors (Annually) 024

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

ICP ID Number: ARL3560_____ Date: 03/24/92

Analyte	Wave-length (nm)	Interelement Correction Factors for : Al	Ca	Fe	Mg	CR_
Bicarbona						
Carbonate						
Chloride_						
Fluoride_						
Nitrate__						
Sulfate__						
TDS						
Calcium__	317.92	0.0000000	0.0000000	0.0000000	-0.0000224	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	-0.0000581	-0.0000890
Potassium	776.49	0.0000000	0.0002074	-0.0001806	0.0000000	0.0000000
Sodium___	589.00	0.0003457	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

FORM XI (Part 1) - IN ILM02.1

U.S. EPA - CLP

11B

ICP Interelement Correction Factors (Annually) 025

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

ICP ID Number: ARL3560_____ Date: 03/24/92

Analyte	Wave-length (nm)	Interelement Correction Factors for : CU_	MN_	NI_	V__	___
Bicarbona						
Carbonate						
Chloride_						
Fluoride_						
Nitrate__						
Sulfate__						
TDS						
Calcium__	317.92	0.0000000	0.0001715	0.0000000	0.0000000	
Magnesium	279.08	0.0000000	0.0000000	0.0003057	0.0000000	
Potassium	776.49	0.0000000	0.0000000	0.0000000	-0.0001831	
Sodium___	589.00	0.0003021	0.0000000	0.0000000	0.0010334	

Comments:

FORM XI (Part 2) - IN ILM02.1

U.S. EPA - CLP

12

ICP Linear Ranges (Quarterly)

026

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.: 7655-F

ICP ID Number: ARL3560_____ Date: 09/21/92

Analyte	Integ. Time (sec.)	Concentration (ug/L)	M
Bicarbona			NR
Carbonate			NR
Chloride_			NR
Fluoride_			NR
Nitrate__			NR
Sulfate__			NR
TDS_____			NR
Calcium__	7.00	650000.0	P
Magnesium	7.00	900000.0	P
Potassium	7.00	1000000.0	P
Sodium___	7.00	900000.0	P

Comments:

FORM XII - IN ILM02.1

U.S. EPA - CLP

13

PREPARATION LOG

027

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.:_____ SAS No.: 7655F- SDG No.:7655-F

Method: P_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
F10	12/14/92		100
F10DD	12/14/92		100
F10SS	12/14/92		100
F11	12/14/92		100
F12	12/14/92		100
F2	12/14/92		100
F3	12/14/92		100
F4	12/14/92		100
F6	12/14/92		100
F7	12/14/92		100
F8	12/14/92		100
F9	12/14/92		100
LCSW	12/14/92		100
PBW	12/14/92		100

FORM XIII - IN ILM02.1

U.S. EPA - CLP

13

PREPARATION LOG

028

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.:_____ SAS No.: 7655F- SDG No.:7655-F

Method: T_

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
F10	12/11/92		100
F10DD	12/11/92		100
F10SS	12/11/92		100
F11	12/11/92		100
F12	12/11/92		100
F2	12/11/92		100
F3	12/11/92		100
F4	12/11/92		100
F6	12/11/92		100
F7	12/11/92		100
F8	12/11/92		100
F9	12/11/92		100
LCSW	12/11/92		100
PBW	12/11/92		100

FORM XIII - IN ILM02.1

U.S. EPA - CLP

ANALYSIS RUN LOG

029

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: ARL3560_____ Method: P_

Start Date: 12/16/92 End Date: 12/16/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA												
S	1.00	1306									X	X	X	X												
S	1.00	1310									X	X	X	X												
ICV	1.00	1316									X	X	X	X												
ICB	1.00	1321									X	X	X	X												
ICSA	1.00	1325									X	X	X	X												
ICSAB	1.00	1329									X	X	X	X												
CRI	1.00	1333									X	X	X	X												
CCV	1.00	1337									X	X	X	X												
CCB	1.00	1341									X	X	X	X												
PBW	1.00	1346									X	X	X	X												
LCSW	1.00	1350									X	X	X	X												
F2	1.00	1354									X	X	X	X												
F3	1.00	1358									X	X	X	X												
F4	1.00	1402									X	X	X	X												
F6	1.00	1406									X	X	X	X												
F7	1.00	1411									X	X	X	X												
F8	1.00	1415									X	X	X	X												
F9	1.00	1419									X	X	X	X												
F10	1.00	1423									X	X	X	X												
CCV	1.00	1427									X	X	X	X												
CCB	1.00	1431									X	X	X	X												
F10D	1.00	1436									X	X	X	X												
F10S	1.00	1440									X	X	X	X												
F10L	5.00	1444									X	X	X	X												
F11	1.00	1448									X	X	X	X												
F12	1.00	1452									X	X	X	X												
CSA	1.00	1456									X	X	X	X												
ICSAB	1.00	1501									X	X	X	X												
CRI	1.00	1505									X	X	X	X												
CCV	1.00	1509									X	X	X	X												
CCB	1.00	1513									X	X	X	X												

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS[14] RUN LOG

030

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: DX100_____ Method: I_

Start Date: 12/10/92 End Date: 12/11/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA												
S	1.00	1246		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1.00	1257		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1.00	1308		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ICV	1.00	1046		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ICB	1.00	1057		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F2	1.00	1108		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F3	1.00	1119		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F4	1.00	1130		–	–		X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F6	1.00	1141		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F7	1.00	1152		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F8	1.00	1203		–	–	X	X	X		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F9	1.00	1214		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10	1.00	1225		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F11	1.00	1236		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F12	1.00	1247		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCV	1.00	1258		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCB	1.00	1309		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F3	100.00	1319		–	–				X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F4	10.00	1331		–	–	X	–	–		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F4	100.00	1342		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F8	100.00	1428		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F9	100.00	1439		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10	10.00	1450		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F11	10.00	1501		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F12	100.00	1512		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10S	1.00	1523		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10SD	1.00	1534		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCV	1.00	1545		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCB	1.00	1556		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10S	10.00	1607		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10SD	10.00	1618		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCV	1.00	1713		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS RUN LOG

031

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: DX100_____ Method: I_

Start Date: 12/10/92 End Date: 12/11/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
CCB	1.00	1724				X	X	X	X																		

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS RUN LOG

14

032

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: DX100_____ Method: I_

Start Date: 12/14/92 End Date: 12/14/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
S	1.00	1331		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1.00	1342		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
S	1.00	1353		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ICV	1.00	1405		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ICB	1.00	1416		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10S	1.00	1427		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10SD	1.00	1438		–	–	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10S	10.00	1449		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
F10SD	10.00	1500		–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCV	1.00	1511		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
CCB	1.00	1522		–	–	X	X	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS RUN LOG

033

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: TDS_____ Method: T_

Start Date: 12/11/92 End Date: 12/11/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
PBW	1.00	1000								X																	
LCSW	1.00	1005								X																	
F2	1.00	1010								X																	
F3	1.00	1015								X																	
F4	1.00	1020								X																	
F5	1.00	1025								X																	
F6	1.00	1030								X																	
F7	1.00	1035								X																	
F8	1.00	1040								X																	
F9	1.00	1045								X																	
F10	1.00	1050								X																	
F11	1.00	1055								X																	
F12	1.00	1100								X																	
F10D	1.00	1105								X																	
F10S	1.00																										

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS[14] RUN LOG

034

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: BICARBONATE__ Method: AK

Start Date: 12/15/92 End Date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
PBW	1.00	1030		X																							
LCSW	1.00	1035		X																							
F2	1.00	1040		X																							
F3	1.00	1045		X																							
F4	1.00	1050		X																							
F6	1.00	1055		X																							
F7	1.00	1100		X																							
F8	1.00	1105		X																							
F9	1.00	1110		X																							
F10	1.00	1115		X																							
F10D	1.00	1120		X																							
F10S	1.00	1125																									
F11	1.00	1130		X																							
F12	1.00	1135																									
F12	1.00	1530		X																							

FORM XIV - IN ILM02.1

U.S. EPA - CLP

ANALYSIS RUN LOG

035

Lab Name: AMERICAN_ANALYTICAL_____ Contract: 68-D1-0024

Lab Code: AATS__ Case No.: _____ SAS No.: 7655F- SDG No.:7655-F

Instrument ID Number: CARBONATE____ Method: AK

Start Date: 12/15/92 End Date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																							
				BI	CB	CL	F	N	SO	TD	CA	MG	K	NA													
PBW	1.00	1030			X																						
LCSW	1.00	1035			X																						
F2	1.00	1040			X																						
F3	1.00	1045			X																						
F4	1.00	1050			X																						
F5	1.00	1055			X																						
F6	1.00	1100			X																						
F7	1.00	1105			X																						
F8	1.00	1110			X																						
F9	1.00	1115			X																						
F10	1.00	1120			X																						
F10D	1.00	1125			X																						
F10S	1.00	1130			X																						
F11	1.00	1135			X																						
F12	1.00	1530			X																						

FORM XIV - IN ILM02.1

ICP RUN LOG

SWOK/AATS

036

File : 1196701

ANALYST: JHW/KS

DATE 12-16-92

INSTRUMENT: ARL 3560

CALIBRATION STD: SOURCE

Reviewed BY SLM 12/16/92

Client ID	LAB ID	Time	Dilution Factor	Analytes
	Std 0	1306		Ca, Mg, Na, V
	Std 1	1310		
	ICV	1316		
	~~Blank~~ ICB 12/16/92	1321		
	ICSAI	1325		
	ICSABI	1329		
	CRII	1333		
	CCV	1337		
	~~Blank~~ CCB 12/16/92	1341		
11967.01	PBW	1346		
11967.01	LCSW	1350		
7655-F2 AATS-V	11967.01	1354		CA, Mg, Na, K
7655-F3	11967.02	1358		
7655-F4	11967.03	1402		
7655-F6	11967.04	1406		
7655-F7	11967.05	1411		
7655-F8	11967.06	1415		
7655-F9	11967.07	1419		
7655-F10	11967.08	1423		
	CCV	1427		"
	CCB	1431		"
7655-F10D AATS-V	11967.08D	1436		Ca, Mg, Na, K

ICP RUN LOG

SWOK / AATS

037

ANALYST: JHU

DATE 12-16-92

INSTRUMENT: ARL 3560

CALIBRATION STD: —

SOURCE

Client ID	LAB ID	Time	Dilution Factor	Analytes
7655-F10S AATS-V	11967.08S	1440		Ca, Mg, K, Na
7655-F10L	11967.08L	1444		
7655-F11	11961.01	1448		
7655-F12	11967.10	1452		
	ICSAF	1456		
	ICSABF	1501		
	CRIF	1505		
	CCV	1509		
	CCB	1513		

DDB 12-17-92

Sequence File Details 12:50 PM December 16, 1992

h Name : CLPBATCH

Result File : 1196701

Task Name : EPA

Autosampler Control File : CLPBATCH
Matrix : WATER
Sample Delivery Group : SC1414
Special Analytical Service :
Case Number :

Tube	Lab. Id.	EPA Id.	EPA Code	Weight	Volume	Spike Solution
1	ICV	ICV	ICV	1.0000	1.0	
2	BLANK	BLANK	BLANK	1.0000	1.0	
3	ICSAI	ICSA	ICSA	1.0000	1.0	
4	ICSABI	ICSAB	ICSAB	1.0000	1.0	
5	CRII	CRI	CRI	1.0000	1.0	
6	CCV	CCV	CCV	1.0000	1.0	
7	BLANK			1.0000	1.0	
8	PBW	967.01	967.01	1.0000	1.0	
9	LCSW	967.01	967.01	1.0000	1.0	
10	11967.01	7655F2	7655F2	1.0000	1.0	
11	11967.02	7655F3	7655F3	1.0000	1.0	
12	11967.03	7655F4	7655F4	1.0000	1.0	
13	11967.04	7655F6	7655F6	1.0000	1.0	
14	11967.05	7655F7	7655F7	1.0000	1.0	
15	11967.06	7655F8	7655F8	1.0000	1.0	
16	11967.07	7655F9	7655F9	1.0000	1.0	
17	11967.08	655F10	655F10	1.0000	1.0	
18	CCV	CCV	CCV	1.0000	1.0	
19	BLANK	BLANK	BLANK	1.0000	1.0	
20	11967.08D	655F10	655F10	1.0000	1.0	
21	11967.08S	655F10	655F10	1.0000	1.0	
22	11967.08L	655F10		1.0000	1.0	
23	11967.09	655F11	655F11	1.0000	1.0	
24	11967.10	655F12	655F12	1.0000	1.0	
25	ICSAF	ICSA	ICSA	1.0000	1.0	
26	ICSABF	ICSAB	ICSAB	1.0000	1.0	
27	CRIF	CRI	CRI	1.0000	1.0	
28	CCV	CCV	CCV	1.0000	1.0	
29	BLANK	BLANK	BLANK	1.0000	1.0	

On-Peak Counts Output 1:06 PM December 16, 1992
Task name : EPA
le Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.240	4.238	4.238
Al	5	2.677	2.675	2.672
Be	6	3.273	3.278	3.273
Zn	7	3.884	3.896	3.918
Cu	8	3.306	3.301	3.305
Pb	9	8.423	8.457	8.381
Ni	10	5.957	5.937	5.962
K	12	2.498	2.503	2.491
Fe	13	1.611	1.605	1.592
Cr	15	3.347	3.345	3.357
Mg	17	3.642	3.638	3.633
V	19	3.792	3.781	3.784
Na	20	4.081	4.079	4.079
Ca	23	2.963	2.954	2.956
Sb	24	6.721	6.735	6.706
Ag	25	4.206	4.202	4.199
Cd	26	4.035	4.023	4.040
Co	27	4.235	4.209	4.218
Mn	28	6.446	6.441	6.429

Calibration Standard : STD 0 1:06 PM December 16, 1992
Task name : EPA
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ag (KPulses)	Al (KPulses)	Ba (KPulses)	Be (KPulses)	Ca (KPulses)	Cd (KPulses)	Co (KPulses)	Cr (KPulses)
On Peak 1	4.206	2.677	4.240	3.273	2.963	4.035	4.235	3.347
On Peak 2	4.202	2.675	4.238	3.278	2.954	4.023	4.209	3.345
On Peak 3	4.199	2.672	4.238	3.273	2.956	4.040	4.218	3.357
OffPeak1 1	4.342	2.654	4.268		2.956	4.190	4.261	3.320
OffPeak2 1	4.214	3.057	4.211	2.972	2.927	4.040	4.306	3.303
OffPeak1 2	4.338	2.650	4.255		2.950	4.190	4.216	3.332
OffPeak2 2	4.204	3.073	4.200	2.978	2.924	4.074	4.324	3.335
OffPeak1 3	4.335	2.646	4.257		2.948	4.201	4.242	3.348
OffPeak2 3	4.206	3.073	4.203	2.979	2.933	4.065	4.311	3.354
Mean	-0.071	-0.117	0.006	0.298	0.018	-0.094	-0.056	0.018
S.D.	0.004	0.003	0.001	0.003	0.005	0.009	0.013	0.006
% R.S.D.	-4.958	-2.158	18.232	0.968	26.255	-9.295	-23.578	36.391

	Cu (KPulses)	Fe (KPulses)	K (KPulses)	Mg (KPulses)	Mn (KPulses)	Na (KPulses)	Ni (KPulses)	Pb (KPulses)
On Peak 1	3.306	1.611	2.498	3.642	6.446	4.081	5.957	8.423
On Peak 2	3.301	1.605	2.503	3.638	6.441	4.079	5.937	8.457
On Peak 3	3.305	1.592	2.491	3.633	6.429	4.079	5.962	8.381
eak1 1	3.264	1.605	2.545	3.635	6.345	2.427	6.036	8.619
OffPeak2 1	3.299	1.599	2.452	3.651	6.329	8.145	5.845	8.407
OffPeak1 2	3.262	1.600	2.537	3.635	6.397	2.422	6.041	8.718

040

OffPeak2	2	3.300	1.598	2.455	3.647	6.340	8.113	5.861	8.380
OffPeak1	3	3.262	1.586	2.528	3.620	6.398	2.420	6.069	8.373
OffPeak2	3	3.295	1.596	2.447	3.651	6.380	8.157	5.859	8.340
Mean		0.024	0.005	0.003	-0.003	0.074	-0.102	0.000	-0.103
		0.003	0.010	0.006	0.005	0.009	0.001	0.013	0.038
% R.S.D.		11.179	182.110	180.831	-158.069	11.833	-1.133	7937.254	-37.142

		Sb (KPulses)	V (KPulses)	Zn (KPulses)
On Peak 1		6.721	3.792	3.884
On Peak 2		6.735	3.781	3.896
On Peak 3		6.706	3.784	3.918
OffPeak1	1	6.740		3.641
OffPeak2	1	6.702	3.773	3.770
OffPeak1	2	6.772		3.610
OffPeak2	2	6.681	3.772	3.751
OffPeak1	3	6.809		3.633
OffPeak2	3	6.674	3.777	3.777
Mean		-0.009	0.012	0.202
S.D.		0.015	0.006	0.017
% R.S.D.		-161.143	48.739	8.522

On-Peak Counts Output 1:10 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	294.104	291.457	292.034
Al	5	10.425	10.355	10.358
Be	6	59.814	59.136	59.238
Zn	7	166.600	165.219	165.503
Cu	8	11.365	11.284	11.297
Pb	9	52.730	52.389	52.611
Ni	10	54.585	54.055	54.243
K	12	7.288	7.236	7.224
Fe	13	54.847	54.252	54.364
Cr	15	19.935	19.796	19.763
Mg	17	40.431	40.039	40.094
V	19	32.220	31.960	32.002
Na	20	19.956	19.793	19.807
Ca	23	132.604	131.297	131.413
Sb	24	33.537	33.353	33.395
Ag	25	13.323	13.226	13.228
Cd	26	124.633	123.421	123.536
Co	27	68.891	68.099	68.212
Mn	28	487.116	482.254	483.056

Calibration Standard : STD 1 1:10 PM December 16, 1992
Task name : EPA
On-Peak Integrations : 3 Off-Peak Integrations : 3

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	Ag (KPulses)	Al (KPulses)	Ba (KPulses)	Be (KPulses)	Ca (KPulses)	Cd (KPulses)	Co (KPulses)	Cr (KPulses)
On Peak 1	13.323	10.425	294.104	59.814	132.604	124.633	68.891	19.935
On Peak 2	13.226	10.355	291.457	59.136	131.297	123.421	68.099	19.796
eak 3	13.228	10.358	292.034	59.238	131.413	123.536	68.212	19.763
OffPeak1 1	4.624	2.870	6.048		4.358	4.758	4.910	3.552
OffPeak2 1	4.285	3.110	8.531	4.323	5.859	4.880	5.039	3.577
OffPeak1 2	4.614	2.869	6.027		4.352	4.779	4.903	3.565
OffPeak2 2	4.281	3.112	8.542	4.339	5.884	4.836	5.067	3.586
OffPeak1 3	4.621	2.863	6.028		4.346	4.782	4.890	3.550
OffPeak2 3	4.278	3.114	8.507	4.332	5.858	4.854	5.073	3.581
Mean	8.808	7.429	285.251	55.065	126.662	119.048	63.420	16.263
S.D.	0.055	0.040	1.392	0.366	0.723	0.669	0.428	0.091
% R.S.D.	0.629	0.533	0.488	0.664	0.571	0.562	0.675	0.561

	Cu (KPulses)	Fe (KPulses)	K (KPulses)	Mg (KPulses)	Mn (KPulses)	Na (KPulses)	Ni (KPulses)	Pb (KPulses)
On Peak 1	11.365	54.847	7.288	40.431	487.116	19.956	54.585	52.730
On Peak 2	11.284	54.252	7.236	40.039	482.254	19.793	54.055	52.389
On Peak 3	11.297	54.364	7.224	40.094	483.056	19.807	54.243	52.611
OffPeak1 1	3.294	1.906	2.586	4.410	9.154	2.514	6.363	9.267
OffPeak2 1	3.384	2.068	2.547	4.659	11.131	8.205	6.401	9.080
OffPeak1 2	3.292	1.905	2.588	4.414	9.110	2.511	6.336	9.213
OffPeak2 2	3.384	2.063	2.541	4.674	11.181	8.180	6.347	9.036
OffPeak1 3	3.299	1.904	2.581	4.414	9.151	2.512	6.332	9.246
OffPeak2 3	3.378	2.063	2.541	4.652	11.136	8.195	6.407	9.005
Mean	7.977	52.503	4.685	35.642	473.998	15.592	47.930	43.435
S.D.	0.044	0.316	0.034	0.212	2.607	0.090	0.269	0.173
% R.S.D.	0.545	0.602	0.726	0.595	0.550	0.579	0.561	0.398

	Sb (KPulses)	V (KPulses)	Zn (KPulses)
On Peak 1	33.537	32.220	166.600
On Peak 2	33.353	31.960	165.219
On Peak 3	33.395	32.002	165.503
OffPeak1 1	7.025		4.568
OffPeak2 1	7.021	4.245	5.132
OffPeak1 2	7.002		4.587
OffPeak2 2	7.051	4.246	5.135
OffPeak1 3	6.989		4.549
OffPeak2 3	6.959	4.238	5.149
Mean	26.420	27.818	160.921
S.D.	0.096	0.140	0.729
% R.S.D.	0.365	0.502	0.453

On-Peak Counts Output 1:16 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
	2	33.230	32.961	32.999
Ai	5	3.395	3.387	3.393
Be	6	59.383	58.896	58.961

Zn	7	102.387	101.717	101.705
Cu	8	4.978	4.963	4.966
Pb	9	30.460	30.301	30.271
Ni	10	10.934	10.889	10.907
	12	7.328	7.288	7.271
Fe	13	12.128	12.041	12.041
Cr	15	7.570	7.519	7.566
Mg	17	21.536	21.392	21.403
V	19	6.618	6.586	6.602
Na	20	19.977	19.831	19.843
Ca	23	131.053	129.983	130.107
Sb	24	9.431	9.358	9.313
Ag	25	6.018	5.998	6.007
Cd	26	16.268	16.135	16.178
Co	27	10.677	10.640	10.680
Mn	28	55.107	54.756	54.527

Lab Identity : ICV EPA Identity : ICV 1:16 PM December 16, 1992
EPA Sample Code : ICV SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	2002.853	1917.476	504.249	3025.888	522.160	5019.355	516.252	50610.494
	10.208	11.167	2.414	12.117	2.449	23.331	2.354	312.507
S.D.	0.510	0.582	0.479	0.400	0.469	0.465	0.456	0.617

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	1979.513	510.541	24479.063	505.670	50148.109	49469.576	1017.427	516.477
S.D.	9.562	3.488	112.431	2.900	258.231	231.068	22.518	2.836
% R.S.D.	0.483	0.683	0.459	0.574	0.515	0.467	2.213	0.549

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	508.247	506.261	506.406
S.D.	2.848	1.758	3.082
% R.S.D.	0.560	0.347	0.609

On-Peak Counts Output 1:20 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.217	4.208	4.207
	5	2.652	2.639	2.644
Be	6	3.261	3.256	3.248
Zn	7	3.938	3.885	3.899

Cu	8	3.266	3.260	3.265
Pb	9	8.385	8.334	8.326
Ni	10	5.894	5.854	5.891
K	12	2.476	2.472	2.469
	13	1.596	1.599	1.598
Cr	15	3.284	3.286	3.276
Mg	17	3.594	3.582	3.588
V	19	3.745	3.737	3.741
Na	20	4.051	4.036	4.043
Ca	23	2.962	2.956	2.953
Sb	24	6.607	6.666	6.583
Ag	25	4.158	4.154	4.155
Cd	26	3.987	3.951	3.979
Co	27	4.184	4.184	4.172
Mn	28	6.396	6.374	6.374

ICB

Lab Identity : BLANK EPA Identity : BLANK 1:21 PM December 16, 1992
EPA Sample Code : BLANK SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	1.402	10.272	0.131	1.875	1.464	12.172	-1.722	-60.515
S.D.	0.386	17.410	0.060	0.845	1.010	7.353	2.324	37.504
% R.S.D.	27.538	169.496	45.729	45.069	69.003	60.408	134.983	61.974

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	1.042	-3.919	5.350	1.170	75.648	14.542	0.438	-0.181
S.D.	0.298	0.652	8.416	0.718	23.913	1.809	16.162	0.590
% R.S.D.	28.583	16.628	157.317	61.408	31.611	12.442	3690.413	324.995

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-1.294	1.536	0.067
S.D.	0.793	0.546	0.134
% R.S.D.	61.307	35.542	200.553

On-Peak Counts Output 1:24 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.233	4.242	4.237
Al	5	201.679	200.772	201.478
	6	3.799	3.795	3.786
Zn	7	7.629	7.593	7.622
Cu	8	3.459	3.466	3.465

Pb	9	11.751	11.765	11.822
Ni	10	5.957	5.957	5.965
K	12	2.401	2.411	2.413
Fe	13	1033.488	1028.846	1032.860
	15	4.319	4.317	4.356
Mg	17	364.164	362.375	363.761
V	19	3.848	3.851	3.850
Na	20	4.145	4.151	4.147
Ca	23	1279.190	1271.770	1274.871
Sb	24	8.764	8.736	8.777
Ag	25	3.994	3.998	3.995
Cd	26	4.775	4.713	4.753
Co	27	4.172	4.150	4.171
Mn	28	11.770	11.841	11.809

Lab Identity : ICSAI EPA Identity : ICSA 1:25 PM December 16, 1992
EPA Sample Code : ICSA SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	15.285	523904.559	5.681	48.134	-10.526	-45.723	3.067	56.956
S.D.	0.316	1262.910	0.061	0.465	1.421	8.658	0.482	68.658
% R.S.D.	2.068	0.241	1.070	0.967	13.502	18.937	15.705	120.546

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	194855.717	0.614	495734.270	-9.131	954.417	494343.619	-42.083	6.683
S.D.	479.288	2.706	1316.358	0.273	9.733	1471.328	7.978	0.533
% R.S.D.	0.246	440.622	0.266	2.995	1.020	0.298	18.958	7.976

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-1.934	0.552	45.612
S.D.	1.281	1.054	0.375
% R.S.D.	66.228	190.837	0.822

On-Peak Counts Output 1:28 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	11.449	11.407	11.444
Al	5	203.188	201.956	202.792
Be	6	60.743	60.369	60.609
	7	38.411	38.229	38.313
Cu	8	5.094	5.080	5.090
Pb	9	32.078	31.909	32.080

045

Ni	10	14.688	14.654	14.666
K	12	2.406	2.404	2.409
Fe	13	1040.979	1034.242	1038.676
Cr	15	8.307	8.278	8.324
	17	364.999	362.574	364.438
V	19	6.565	6.549	6.565
Na	20	4.123	4.125	4.131
Ca	23	1285.490	1276.464	1281.152
Sb	24	8.782	8.789	8.795
Ag	25	7.673	7.642	7.666
Cd	26	26.699	26.633	26.752
Co	27	10.504	10.453	10.450
Mn	28	58.179	57.789	58.093

Lab Identity : ICSABI EPA Identity : ICSAB 1:29 PM December 16, 1992
EPA Sample Code : ICSAB SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	514.984	527465.815	519.298	992.311	496.891	4588.282	902.626	24.918
S.D.	1.609	1667.587	1.730	2.654	2.025	22.727	1.791	26.875
% R.S.D.	0.312	0.316	0.333	0.267	0.408	0.495	0.198	107.855

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	196046.812	489.734	496610.601	472.875	937.016	496722.405	-30.487	1030.914
S.D.	651.683	2.836	1780.760	1.689	13.264	1782.253	2.463	4.660
% R.S.D.	0.332	0.579	0.359	0.357	1.416	0.359	8.079	0.452

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	914.886	494.152	529.654
S.D.	2.465	2.458	2.162
% R.S.D.	0.269	0.497	0.408

On-Peak Counts Output 1:32 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	9.936	9.958	9.916
Al	5	2.924	2.918	2.910
Be	6	4.406	4.400	4.410
Zn	7	5.214	5.193	5.211
	8	3.458	3.457	3.450
Pb	9	8.905	8.896	8.919
Ni	10	6.691	6.686	6.686

K	12	3.495	3.497	3.482
Fe	13	3.086	3.034	3.002
Cr	15	3.517	3.485	3.523
Mo	17	11.157	11.201	11.139
	19	4.325	4.321	4.309
Na	20	7.486	7.505	7.470
Ca	23	29.591	29.667	29.499
Sb	24	6.950	6.961	7.028
Ag	25	4.213	4.208	4.202
Cd	26	4.267	4.256	4.301
Co	27	5.427	5.463	5.425
Mn	28	9.492	9.422	9.435

Lab Identity : CRII EPA Identity : CRI 1:33 PM December 16, 1992
EPA Sample Code : CRI SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	397.109	696.267	10.318	39.879	50.729	123.277	78.582	10470.953
S.D.	1.473	18.678	0.046	0.354	1.366	2.662	0.300	86.977
% R.S.D.	0.371	2.683	0.444	0.888	2.693	2.159	0.381	0.831

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
	269.814	17.668	10360.934	97.895	11010.066	10351.632	116.077	6.551
S.D.	8.068	2.516	44.741	1.490	55.824	33.215	15.977	1.559
% R.S.D.	2.990	14.239	0.432	1.522	0.507	0.321	13.764	23.802

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	10.561	96.389	31.545
S.D.	0.985	1.687	0.393
% R.S.D.	9.326	1.750	1.245

On-Peak Counts Output 1:37 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	150.555	150.316	150.707
Al	5	6.533	6.532	6.539
Be	6	32.141	32.078	32.180
Zn	7	84.959	84.696	84.862
Cu	8	7.295	7.287	7.307
	9	12.767	12.743	12.775
Ni	10	30.224	30.175	30.238
K	12	4.948	4.938	4.951

Fe	13	28.641	28.525	28.644
Cr	15	11.702	11.622	11.699
Mg	17	21.867	21.806	21.863
V	19	17.944	17.914	17.977
	20	12.366	12.361	12.376
Ca	23	68.145	68.006	68.230
Sb	24	13.479	13.297	13.387
Ag	25	9.690	9.682	9.704
Cd	26	28.109	28.005	28.071
Co	27	36.644	36.243	36.525
Mn	28	249.276	248.673	249.510

Lab Identity : CCV EPA Identity : CCV 1:37 PM December 16, 1992
EPA Sample Code : CCV SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	10159.004	10221.361	259.010	2487.421	1254.590	993.658	2507.898	25891.713
S.D.	13.820	10.262	0.470	4.120	3.158	3.829	3.433	72.692
% R.S.D.	0.136	0.100	0.182	0.166	0.252	0.385	0.137	0.281

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	5103.090	1012.771	25018.273	2521.940	26582.430	25337.586	2519.584	1545.973
S.D.	12.917	5.581	47.864	5.701	24.334	44.645	34.429	3.166
% R.S.D.	0.253	0.551	0.191	0.226	0.092	0.176	1.366	0.205

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	1002.758	2522.989	2542.382
S.D.	2.208	16.225	4.556
% R.S.D.	0.220	0.643	0.179

On-Peak Counts Output 1:41 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.272	4.266	4.261
Al	5	2.667	2.671	2.668
Be	6	3.245	3.258	3.252
Zn	7	3.918	3.918	3.922
Cu	8	3.280	3.286	3.279
Pb	9	8.357	8.400	8.370
	10	5.895	5.938	5.913
K	12	2.485	2.493	2.484
Fe	13	1.620	1.629	1.624

Cr	15	3.302	3.305	3.349
Mg	17	3.627	3.627	3.627
V	19	3.759	3.766	3.764
Na	20	4.071	4.081	4.069
	23	2.983	2.978	2.973
Sb	24	6.652	6.675	6.698
Ag	25	4.175	4.180	4.177
Cd	26	4.015	3.998	3.975
Co	27	4.219	4.214	4.197
Mn	28	6.512	6.499	6.482

CCB

Lab Identity : BLANK EPA Identity : 1:41 PM December 16, 1992
EPA Sample Code : SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	3.424	27.127	-0.043	1.897	0.993	16.846	0.865	-103.232
S.D.	0.386	5.539	0.059	0.074	1.190	5.066	2.253	52.679
% R.S.D.	11.278	20.418	139.720	3.915	119.890	30.070	260.485	51.030

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	3.958	-0.965	16.811	0.412	165.428	16.582	10.215	-0.373
[illegible]	0.856	3.239	0.000	0.656	20.483	1.974	8.702	0.712
[illegible].S.D.	21.629	335.683	0.000	158.988	12.382	11.904	85.181	190.949

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.644	2.154	1.095
S.D.	0.842	0.908	0.159
% R.S.D.	130.861	42.171	14.489

On-Peak Counts Output 1:45 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.184	4.204	4.190
Al	5	2.648	2.653	2.651
Be	6	3.228	3.211	3.237
Zn	7	3.850	3.834	3.865
Cu	8	3.249	3.257	3.257
Pb	9	8.252	8.295	8.314
Ni	10	5.836	5.867	5.873
	12	2.463	2.476	2.477
Fe	13	1.594	1.598	1.589
Cr	15	3.279	3.241	3.317

Mg	17	3.581	3.590	3.587
V	19	3.725	3.722	3.726
Na	20	4.023	4.029	4.037
Ca	23	2.906	2.910	2.909
	24	6.616	6.609	6.616
Ag	25	4.134	4.150	4.141
Cd	26	3.984	3.982	3.967
Co	27	4.148	4.200	4.138
Mn	28	6.325	6.342	6.375

Lab Identity : PBW EPA Identity : 967.01 1:46 PM December 16, 1992
EPA Sample Code : 967.01 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	0.678	43.753	-0.006	0.777	0.734	7.966	1.060	-96.113
S.D.	0.720	6.663	0.121	0.481	1.452	7.297	2.071	83.407
% R.S.D.	106.171	15.228	2019.843	61.901	197.764	91.608	195.369	86.781

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	0.523	-2.832	12.179	1.118	122.376	-1.382	12.673	-0.604
S.D.	0.859	4.678	6.428	0.408	22.378	0.822	1.528	2.257
% R.S.D.	164.105	165.205	52.781	36.465	18.286	59.495	12.060	373.563

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	0.014	0.643	0.179
S.D.	0.390	2.622	0.268
% R.S.D.	2792.848	407.464	149.548

On-Peak Counts Output 1:49 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	33.774	33.783	33.722
Al	5	3.428	3.425	3.418
Be	6	61.436	61.446	61.285
Zn	7	103.362	103.676	103.416
Cu	8	4.984	4.991	4.981
Pb	9	30.625	30.583	30.541
Ni	10	10.949	10.953	10.959
K	12	7.578	7.575	7.567
	13	12.440	12.388	12.345
Cr	15	7.649	7.660	7.610
Mg	17	21.667	21.668	21.631

V	19	6.646	6.645	6.634
Na	20	20.863	20.883	20.835
Ca	23	133.670	133.702	133.309
Sb	24	9.335	9.437	9.376
	25	6.052	6.055	6.052
Cd	26	16.371	16.360	16.344
Co	27	10.788	10.817	10.716
Mn	28	55.924	55.952	55.755

Lab Identity : LCSW EPA Identity : 967.01 1:50 PM December 16, 1992
EPA Sample Code : 967.01 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	2052.050	2056.446	525.845	3074.380	526.569	5073.505	522.272	53492.097
S.D.	2.309	13.659	0.824	5.221	1.600	9.650	0.529	60.724
% R.S.D.	0.113	0.664	0.157	0.170	0.304	0.190	0.101	0.114

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	2040.762	519.783	24783.203	511.853	53439.594	50752.970	1026.745	528.764
S.D.	9.056	3.233	29.568	1.220	76.818	86.167	19.418	0.490
% R.S.D.	0.444	0.622	0.119	0.238	0.144	0.170	1.891	0.093

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	515.272	515.782	518.291
S.D.	0.569	4.098	1.124
% R.S.D.	0.110	0.795	0.217

On-Peak Counts Output 1:53 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.248	4.244	4.246
Al	5	2.674	2.668	2.672
Be	6	3.260	3.251	3.245
Zn	7	3.991	3.997	3.979
Cu	8	3.283	3.276	3.274
Pb	9	8.375	8.288	8.300
Ni	10	5.937	5.881	5.882
K	12	2.516	2.517	2.513
Fe	13	1.610	1.611	1.600
	15	3.320	3.271	3.323
Mg	17	3.707	3.702	3.699
V	19	3.746	3.747	3.744

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Na	20	7.334	7.346	7.294
Ca	23	4.901	4.893	4.863
Sb	24	6.630	6.676	6.611
Ag	25	4.158	4.157	4.159
	26	3.985	3.987	3.994
Co	27	4.165	4.173	4.190
Mn	28	6.436	6.415	6.417

Lab Identity : 11967.01 EPA Identity : 7655F2 1:54 PM December 16, 1992
EPA Sample Code : 7655F2 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	2.898	99.664	0.113	4.176	3.353	2.844	1.685	266.980
S.D.	0.140	8.094	0.069	0.282	1.484	10.831	3.343	22.231
% R.S.D.	4.839	8.121	61.172	6.754	44.273	380.907	198.370	8.327

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	0.884	-1.045	157.235	1.011	10543.192	760.798	15.521	-1.543
S.D.	1.159	3.594	5.669	0.254	86.747	7.909	12.645	0.280
% R.S.D.	131.073	344.078	3.605	25.143	0.823	1.040	81.469	18.154

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.238	0.100	0.360
S.D.	0.198	1.006	0.122
% R.S.D.	83.405	1001.999	33.923

On-Peak Counts Output 1:57 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	4.396	4.445	4.440
Al	5	2.782	2.816	2.816
Be	6	3.933	3.969	3.953
Zn	7	7.362	7.422	7.318
Cu	8	3.742	3.788	3.770
Pb	9	8.620	8.688	8.686
Ni	10	6.122	6.195	6.192
K	12	2.897	2.931	2.913
Fe	13	1.949	1.955	1.960
Cr	15	3.724	3.782	3.801
	17	111.327	111.869	108.851
V	19	3.944	3.991	3.996
Na	20	31.415	31.520	30.812

Ca	23	1319.243	1323.342	1286.444
Sb	24	6.844	6.879	6.955
Ag	25	4.271	4.321	4.317
Cd	26	4.160	4.216	4.178
	27	4.320	4.373	4.396
Mn	28	13.733	13.753	13.666

Lab Identity : 11967.02 EPA Identity : 7655F3 1:58 PM December 16, 1992
EPA Sample Code : 7655F3 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	4.850	220.061	4.959	73.188	10.332	-11.965	-1.856	3723.480
S.D.	1.891	52.048	0.165	1.217	7.511	8.897	4.310	181.651
% R.S.D.	38.983	23.652	3.330	1.663	72.696	74.352	232.165	4.879

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	41.749	-14.889	146988.423	-16.533	86034.451	507548.848	-32.508	-4.915
S.D.	1.026	5.058	2256.933	5.195	1217.305	7984.611	21.966	7.850
% R.S.D.	2.459	33.970	1.535	31.425	1.415	1.573	67.571	159.704

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-1.207	-3.441	72.346
S.D.	1.200	2.991	0.481
% R.S.D.	99.444	86.941	0.664

On-Peak Counts Output 2:02 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	5.138	5.059	5.103
Al	5	3.108	3.054	3.082
Be	6	4.168	4.175	4.181
Zn	7	5.719	5.738	5.804
Cu	8	4.021	3.972	4.004
Pb	9	9.704	9.527	9.626
Ni	10	7.070	6.973	6.997
K	12	3.774	3.796	3.823
Fe	13	10.818	11.460	11.427
Cr	15	4.162	4.112	4.116
Mo	17	92.450	98.523	98.312
	19	4.416	4.330	4.366
Na	20	44.001	46.930	46.739
Ca	23	1174.383	1258.055	1253.134

Sb	24	7.731	7.578	7.617
Ag	25	4.773	4.681	4.726
Cd	26	4.638	4.588	4.608
Co	27	5.088	5.040	5.049
	28	577.885	621.080	618.011

Lab Identity : 11967.03 EPA Identity : 7655F4 2:02 PM December 16, 1992
EPA Sample Code : 7655F4 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	27.544	266.416	5.494	14.848	2.820	27.628	5.145	11266.553
S.D.	2.776	69.924	0.059	1.088	11.123	20.385	6.282	262.094
% R.S.D.	10.077	26.246	1.072	7.327	394.423	73.783	122.088	2.326

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	1770.648	-4.984	126824.163	9.577	131382.700	475571.571	9.307	12.171
S.D.	68.894	3.888	4835.114	7.792	5220.953	18537.089	31.118	12.986
% R.S.D.	3.891	78.014	3.812	81.363	3.974	3.898	334.350	106.696

	Cd (ppb)	Co (ppb)	Mn (ppb)
[illegible]	0.924	20.581	6265.358
[illegible]	1.062	1.731	254.277
% R.S.D.	114.860	8.411	4.058

On-Peak Counts Output 2:06 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	4.978	4.979	4.987
Al	5	3.184	3.187	3.187
Be	6	3.759	3.783	3.766
Zn	7	4.863	4.857	4.847
Cu	8	3.888	3.905	3.900
Pb	9	9.949	10.123	10.040
Ni	10	7.101	7.088	7.061
K	12	3.067	3.070	3.070
Fe	13	1.955	1.958	1.955
Cr	15	4.010	4.026	3.984
Mg	17	21.115	21.284	21.191
V	19	4.494	4.502	4.503
	20	11.407	11.471	11.461
Ca	23	145.771	147.165	146.375
Sb	24	8.018	8.020	8.035

Ag	25	4.923	4.944	4.943
Cd	26	4.759	4.769	4.788
Co	27	5.022	5.071	5.079
Mn	28	7.957	7.955	7.980

Lab Identity : 11967.04 EPA Identity : 7655F6 2:06 PM December 16, 1992
EPA Sample Code : 7655F6 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	-1.192	-28.818	0.444	3.575	-13.603	-24.086	-8.094	2125.160
S.D.	0.346	4.648	0.113	0.246	2.692	19.991	2.129	18.497
% R.S.D.	29.017	16.128	25.369	6.877	19.790	82.998	26.306	0.870

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	-0.463	-6.523	23120.816	1.031	21526.381	55496.047	-29.042	-16.419
S.D.	0.328	2.606	118.730	0.883	109.690	275.999	3.514	3.340
% R.S.D.	70.843	39.955	0.514	85.636	0.510	0.497	12.099	20.343

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-3.763	-4.025	2.230
S.D.	0.618	2.437	0.147
% R.S.D.	16.428	60.530	6.574

On-Peak Counts Output 2:10 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	5.356	5.344	5.345
Al	5	3.815	3.807	3.816
Be	6	3.796	3.802	3.793
Zn	7	5.496	5.517	5.520
Cu	8	4.015	4.013	4.004
Pb	9	10.404	10.461	10.354
Ni	10	7.250	7.236	7.232
K	12	2.943	2.932	2.937
Fe	13	11.826	11.717	11.812
Cr	15	4.023	4.044	4.076
Mg	17	7.654	7.609	7.622
V	19	4.604	4.600	4.597
Na	20	5.890	5.887	5.882
	23	35.262	34.864	35.188
Sb	24	8.217	8.235	8.219
Ag	25	5.042	5.040	5.039

Cd	26	4.899	4.911	4.880
Co	27	5.186	5.165	5.183
Mn	28	14.495	14.410	14.400

Lab Identity : 11967.05 EPA Identity : 7655F7 2:11 PM December 16, 1992
EPA Sample Code : 7655F7 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	21.444	1625.242	0.061	24.653	17.023	32.035	-0.505	533.960
S.D.	0.467	13.081	0.042	0.416	1.845	12.294	0.984	58.816
% R.S.D.	2.177	0.805	68.495	1.686	10.836	38.378	194.891	11.015

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	1859.297	-0.670	4439.972	2.298	3826.246	12250.651	13.859	-1.324
S.D.	11.292	3.286	32.485	0.608	12.876	83.574	3.736	0.434
% R.S.D.	0.607	490.520	0.732	26.451	0.337	0.682	26.955	32.740

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	0.749	1.282	69.179
S.D.	0.657	0.896	0.551
% S.D.	87.678	69.902	0.796

On-Peak Counts Output 2:14 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.333	5.347	5.347
Al	5	3.166	3.179	3.187
Be	6	4.060	4.072	4.073
Zn	7	6.730	6.731	6.697
Cu	8	4.079	4.094	4.095
Pb	9	9.927	9.910	10.043
Ni	10	7.024	7.047	7.031
K	12	3.230	3.248	3.243
Fe	13	2.727	2.753	2.736
Cr	15	4.220	4.215	4.225
Mg	17	102.131	101.821	101.328
V	19	4.515	4.527	4.532
Na	20	24.111	24.049	23.974
Ca	23	818.705	815.372	810.838
	24	7.920	7.905	7.959
Hg	25	4.879	4.894	4.902
Cd	26	4.760	4.790	4.785

Co	27	5.012	4.989	5.037
Mn	28	8.392	8.430	8.443

Lab Identity : 11967.06 EPA Identity : 7655F8 2:15 PM December 16, 1992
EPA Sample Code : 7655F8 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	30.722	21.812	3.064	47.527	13.867	8.075	-1.473	4447.886
S.D.	0.567	28.027	0.066	0.515	3.097	16.627	1.229	99.227
% R.S.D.	1.845	128.495	2.161	1.085	22.335	205.908	83.482	2.231

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	148.636	-7.774	133892.378	-5.210	61715.402	315007.542	-25.479	-1.700
S.D.	2.509	0.638	568.047	1.573	218.570	1559.011	10.626	3.296
% R.S.D.	1.688	8.206	0.424	30.184	0.354	0.495	41.706	193.907

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.740	-1.220	7.306
S.D.	0.674	1.871	0.280
% R.S.D.	91.166	153.316	3.827

On-Peak Counts Output 2:18 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	5.154	5.185	5.204
Al	5	3.160	3.181	3.195
Be	6	4.074	4.101	4.120
Zn	7	7.542	7.586	7.578
Cu	8	4.072	4.097	4.113
Pb	9	9.707	9.706	9.902
Ni	10	6.841	6.931	6.965
K	12	3.378	3.384	3.384
Fe	13	3.354	3.384	3.381
Cr	15	4.141	4.169	4.182
Mg	17	107.479	107.353	107.235
V	19	4.408	4.443	4.464
Na	20	30.357	30.300	30.220
Ca	23	983.328	980.534	977.977
Sb	24	7.734	7.770	7.865
	25	4.763	4.799	4.826
Cu	26	4.632	4.691	4.758
Co	27	4.877	4.912	4.943

Mn	28	12.701	12.667	12.642

057

Identity : 11967.07 EPA Identity : 7655F9 2:19 PM December 16, 1992
EPA Sample Code : 7655F9 SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	16.699	132.262	3.464	68.541	-9.800	-69.172	-21.572	5690.232
S.D.	1.770	46.847	0.212	0.746	6.715	25.931	6.685	36.994
% R.S.D.	10.597	35.420	6.107	1.088	68.519	37.487	30.991	0.650

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	264.400	-24.275	141586.228	-17.019	81469.621	379211.123	-106.994	-39.899
S.D.	3.127	2.603	171.163	5.106	219.265	1056.658	25.666	8.926
% R.S.D.	1.183	10.724	0.121	30.004	0.269	0.279	23.988	22.372

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-5.904	-14.527	50.546
S.D.	2.646	2.589	0.312
% R.S.D.	44.806	17.824	0.618

On-Peak Counts Output 2:22 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	5.712	5.709	5.723
Al	5	3.274	3.275	3.287
Be	6	3.931	3.945	3.951
Zn	7	4.870	4.881	4.888
Cu	8	4.001	4.003	4.007
Pb	9	10.173	10.151	10.116
Ni	10	7.135	7.160	7.172
K	12	3.478	3.471	3.476
Fe	13	4.422	4.428	4.404
Cr	15	4.103	4.161	4.139
Mg	17	56.281	56.287	55.649
V	19	4.539	4.541	4.560
Na	20	15.498	15.501	15.374
Ca	23	459.192	459.499	453.164
Sb	24	8.107	8.067	8.085
Ag	25	4.949	4.949	4.970
	26	4.788	4.829	4.836
Co	27	5.108	5.116	5.129
Mn	28	58.488	58.561	57.830

Lab Identity : 11967.08 EPA Identity : 655F10 2:23 PM December 16, 1992
Sample Code : ~~655F10~~ SDG : SC1414
Case No : SAS : 7655F 10 AB 1/6/93
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	53.217	331.170	1.777	-2.009	4.378	16.457	3.431	6686.957
S.D.	0.517	19.117	0.094	0.344	1.237	6.599	1.981	38.504
% R.S.D.	0.971	5.773	5.282	17.102	28.253	40.100	57.746	0.576

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	466.797	-5.183	71076.507	-1.471	34329.278	176107.982	3.453	2.814
S.D.	2.388	3.608	514.279	2.090	230.900	1410.340	7.580	3.424
% R.S.D.	0.512	69.609	0.724	142.150	0.673	0.801	219.500	121.683

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.192	3.311	529.376
S.D.	1.088	0.807	4.248
% R.S.D.	565.835	24.374	0.802

On-Peak Counts Output 2:27 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	131.818	132.894	131.466
Al	5	6.691	6.730	6.683
Be	6	28.739	28.922	28.650
Zn	7	79.279	79.988	79.106
Cu	8	7.450	7.483	7.446
Pb	9	14.554	14.675	14.599
Ni	10	29.368	29.465	29.350
K	12	5.108	5.126	5.098
Fe	13	25.894	26.051	25.794
Cr	15	11.563	11.630	11.510
Mg	17	21.557	21.703	21.505
V	19	17.086	17.211	17.070
Na	20	12.701	12.762	12.677
Ca	23	63.646	64.117	63.475
Sb	24	14.465	14.552	14.550
Ag	25	9.971	10.012	9.943
Cd	26	27.389	27.649	27.397
	27	34.467	34.683	34.315
Mn	28	222.628	224.594	221.748

Lab Identity : CCV EPA Identity : CCV 2:27 PM December 16, 1992
EPA Sample Code : CCV SDG : SC1414
No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	8811.822	9159.202	223.751	2295.736	1086.618	966.182	2277.826	23332.265
S.D.	52.163	67.285	1.268	14.498	6.363	14.057	6.392	151.529
% R.S.D.	0.592	0.735	0.566	0.632	0.586	1.455	0.281	0.649

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	4524.171	909.449	23547.460	2222.612	25379.014	23351.982	2341.693	1370.572
S.D.	24.639	7.398	143.991	13.934	139.616	131.265	18.778	9.843
% R.S.D.	0.545	0.813	0.611	0.627	0.550	0.562	0.802	0.718

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	940.525	2288.901	2252.360
S.D.	6.203	14.573	15.373
% R.S.D.	0.660	0.637	0.683

Peak Counts Output 2:31 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.113	5.089	5.114
Al	5	3.255	3.251	3.262
Be	6	3.784	3.819	3.804
Zn	7	4.746	4.803	4.736
Cu	8	3.972	3.968	3.981
Pb	9	10.346	10.375	10.360
Ni	10	7.308	7.288	7.295
K	12	2.903	2.886	2.894
Fe	13	1.975	1.978	1.987
Cr	15	4.064	4.030	4.073
Mg	17	4.440	4.444	4.460
V	19	4.616	4.609	4.624
Na	20	5.340	5.337	5.356
Ca	23	3.593	3.584	3.596
Sb	24	8.322	8.374	8.346
Ag	25	5.074	5.064	5.079
Cd	26	4.936	4.943	4.959
Co	27	5.191	5.203	5.250
	28	7.976	7.919	7.988

ccb

Lab Identity : BLANK EPA Identity : BLANK 2:31 PM December 16, 1992

060

EPA Sample Code : BLANK SDG : SC1414

Case No : SAS :

. name : EPA Sequence name : CLPBATCH Result File : 1196701

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	2.349	77.758	-0.106	1.457	0.104	-2.481	0.813	-80.094
S.D.	0.992	14.814	0.160	1.128	2.093	3.329	1.058	90.826
% R.S.D.	42.250	19.051	150.613	77.430	2021.759	134.200	130.118	113.399

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	1.401	-2.381	18.442	1.061	1943.472	8.225	28.565	-2.106
S.D.	1.184	2.792	14.845	1.369	32.543	2.466	9.849	2.157
% R.S.D.	84.519	117.275	80.496	128.986	1.674	29.977	34.479	102.448

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	0.748	0.460	1.064
S.D.	0.495	2.457	0.389
% R.S.D.	66.107	534.084	36.560

Peak Counts Output 2:35 PM December 16, 1992

name : EPA

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.722	5.731	5.733
Al	5	3.263	3.270	3.273
Be	6	3.940	3.948	3.948
Zn	7	4.846	4.865	4.843
Cu	8	3.999	4.005	4.012
Pb	9	10.090	10.085	10.131
Ni	10	7.151	7.170	7.153
K	12	3.476	3.474	3.483
Fe	13	3.969	3.962	3.961
Cr	15	4.097	4.112	4.135
Mg	17	55.631	55.596	55.352
V	19	4.542	4.544	4.559
Na	20	15.325	15.342	15.304
Ca	23	453.304	452.983	450.537
Sb	24	8.037	8.072	8.136
Ag	25	4.954	4.956	4.961
Cd	26	4.811	4.830	4.840
Co	27	5.117	5.112	5.128
Mn	28	57.108	57.170	56.812

Lab Identity : 11967.08D EPA Identity : 655F10 2:36 PM December 16, 1992

EPA Sample Code : ~~655F10~~ SDG : SC1414

Case No : SAS : 7655 F10 D AB 1/6/93

Task name : EPA Sequence name : CLPBATCH Result File : 1196701

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

061

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	58.079	483.115	2.766	-1.026	20.363	44.194	10.729	6994.874
S.D.	0.411	13.608	0.042	0.348	2.161	5.799	1.085	50.468
% R.S.D.	0.707	2.817	1.528	33.887	10.614	13.122	10.109	0.721

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	385.816	1.242	70443.075	28.605	34205.023	174268.033	51.158	21.217
S.D.	0.837	2.370	213.197	1.688	60.646	597.506	19.030	1.024
% R.S.D.	0.217	190.803	0.303	5.899	0.177	0.343	37.198	4.825

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	2.836	8.760	517.338
S.D.	0.618	0.634	2.018
% R.S.D.	21.801	7.236	0.390

On-Peak Counts Output 2:39 PM December 16, 1992

Task name : EPA

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.526	5.529	5.540
Al	5	3.143	3.141	3.156
Be	6	3.828	3.818	3.827
Zn	7	4.819	4.823	4.806
Cu	8	3.854	3.852	3.866
Pb	9	9.633	9.657	9.626
Ni	10	6.848	6.822	6.827
K	12	5.193	5.221	5.199
Fe	13	4.317	4.287	4.304
Cr	15	3.998	3.986	4.009
Mg	17	68.124	67.907	67.876
V	19	4.353	4.355	4.361
Na	20	21.168	21.170	21.160
Ca	23	500.937	499.117	498.706
Sb	24	7.695	7.703	7.621
Ag	25	4.741	4.742	4.753
Cd	26	4.640	4.590	4.620
Co	27	4.869	4.883	4.909
Mn	28	57.877	57.667	57.553

Lab Identity : 11967.08S EPA Identity : 655F10 2:40 PM December 16, 1992

EPA Sample Code : ~~655F10~~ SDG : SC1414
Case No : SAS : 7655F10S AnB 1/6/93
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
Peak Integrations : 3 Off-Peak Integrations : 3

062

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	52.984	369.750	1.841	0.507	1.924	4.672	1.356	25740.424
S.D.	0.517	21.587	0.050	0.265	2.434	3.732	1.433	157.435
% R.S.D.	0.975	5.838	2.732	52.323	126.516	79.874	105.706	0.612

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	459.547	-4.023	87730.006	-2.481	52945.597	192738.261	-8.224	-0.383
S.D.	2.864	1.418	189.544	0.756	16.859	468.776	17.091	1.879
% R.S.D.	0.623	35.249	0.216	30.475	0.032	0.243	207.813	490.560

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.094	2.939	526.478
S.D.	1.056	1.590	1.734
% R.S.D.	1125.271	54.097	0.329

On-Peak Counts Output 2:43 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.079	5.067	5.093
Al	5	3.177	3.181	3.184
Be	6	3.735	3.749	3.726
Zn	7	4.631	4.655	4.625
Cu	8	3.874	3.873	3.881
Pb	9	9.955	10.003	9.962
Ni	10	7.028	7.054	7.030
K	12	2.957	2.944	2.964
Fe	13	2.416	2.391	2.398
Cr	15	3.990	3.968	3.963
Mg	17	14.600	14.655	14.666
V	19	4.464	4.463	4.477
Na	20	7.214	7.232	7.246
Ca	23	93.719	94.278	94.189
Sb	24	7.976	7.993	8.004
Ag	25	4.909	4.901	4.921
Cd	26	4.747	4.754	4.765
Co	27	5.009	5.010	5.031
Mn	28	17.762	17.893	17.831

Lab Identity : 11967.08L EPA Identity : 655F10 2:44 PM December 16, 1992
EPA Sample Code : ~~655F~~10 SDG : SC1414
7655F10L AnB 1/6/93

Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

A: 063

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	13.030	257.146	0.653	1.230	7.868	20.664	5.026	1479.069
S.D.	0.912	9.362	0.106	0.483	1.364	5.955	1.507	108.382
% R.S.D.	7.002	3.641	16.197	39.258	17.339	28.819	29.979	7.328

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	95.075	2.961	14265.610	12.490	8469.992	35166.048	31.139	8.429
S.D.	2.459	1.771	49.600	1.397	51.109	118.586	5.328	2.841
% R.S.D.	2.587	59.823	0.348	11.182	0.603	0.337	17.110	33.707

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	1.391	3.282	107.445
S.D.	0.381	0.981	0.691
% R.S.D.	27.382	29.877	0.643

On-Peak Counts Output 2:47 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.577	5.526	5.550
Al	5	3.136	3.095	3.117
Be	6	3.833	3.793	3.821
Zn	7	4.738	4.679	4.721
Cu	8	3.868	3.820	3.847
Pb	9	9.711	9.553	9.678
Ni	10	6.828	6.849	6.842
K	12	3.451	3.434	3.445
Fe	13	3.447	3.468	3.485
Cr	15	4.005	3.959	3.996
Mg	17	57.681	58.276	58.399
V	19	4.379	4.322	4.348
Na	20	15.754	15.870	15.914
Ca	23	471.335	477.882	478.491
Sb	24	7.761	7.678	7.713
Ag	25	4.776	4.712	4.735
Cd	26	4.640	4.573	4.601
Co	27	4.934	4.844	4.906
Mn	28	59.621	60.383	60.393

Identity : 11967.09 EPA Identity : 655F11 2:48 PM December 16, 1992
EPA Sample Code : ~~655F11~~ SDG : SC1414
Case No : SAS : 7655F11 DAB 1/6/93

Task name : EPA Sequence name : CLPBATCH Result File : 1196701

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

064

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	54.199	261.176	1.917	-1.930	-0.796	5.234	0.575	7183.540
S.D.	1.789	54.470	0.188	1.017	7.821	19.151	1.098	92.073
% R.S.D.	3.301	20.856	9.801	52.670	982.989	365.916	191.055	1.282

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	300.971	-4.049	74167.485	0.813	36055.692	183483.785	4.493	-3.293
S.D.	3.640	3.024	538.627	5.152	263.343	1566.380	15.844	9.154
% R.S.D.	1.209	74.695	0.726	633.517	0.730	0.854	352.661	277.981

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-1.396	2.940	552.087
S.D.	1.412	3.609	4.672
% R.S.D.	101.192	122.770	0.846

On-Peak Counts Output 2:52 PM December 16, 1992

Task name : EPA

Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	5.808	5.822	5.852
Al	5	3.115	3.136	3.159
Be	6	3.873	3.891	3.935
Zn	7	4.659	4.656	4.727
Cu	8	3.882	3.903	3.938
Pb	9	9.682	9.862	9.893
Ni	10	6.885	6.950	7.007
K	12	4.350	4.350	4.360
Fe	13	3.043	3.042	3.066
Cr	15	3.984	4.028	4.034
Mg	17	52.891	52.554	52.491
V	19	4.393	4.411	4.448
Na	20	27.862	27.729	27.691
Ca	23	545.322	540.991	539.312
Sb	24	7.777	7.839	7.914
Ag	25	4.778	4.810	4.847
Cd	26	4.643	4.708	4.731
Co	27	4.879	4.920	5.014
Mn	28	10.320	10.352	10.469

Lab Identity : 11967.10 EPA Identity : 655F12 2:52 PM December 16, 1992

Sample Code : ~~655F12~~ SDG : SC1414

Case No : SAS : 7655F12 AB 1/6/93

Task name : EPA Sequence name : CLPBATCH Result File : 1196701

Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	68.713	266.528	1.764	-6.332	-5.167	9.022	3.201	16469.102
S.D.	1.576	58.462	0.292	1.271	9.129	26.176	6.365	61.656
% R.S.D.	2.294	21.935	16.539	20.080	176.687	290.128	198.862	0.374

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	217.234	-6.934	66508.420	-11.796	73777.590	209027.782	-7.033	-2.712
S.D.	2.561	3.389	301.687	5.063	286.074	1224.301	26.026	9.749
% R.S.D.	1.179	48.878	0.454	42.920	0.388	0.586	370.034	359.479

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	0.115	-0.512	29.822
S.D.	1.915	5.436	0.828
% R.S.D.	1665.182	1061.074	2.775

On-Peak Counts Output 2:56 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak	Kpulses	
Ba	2	4.908	4.902	4.899
Al	5	190.973	189.381	189.243
Be	6	4.214	4.213	4.212
Zn	7	8.154	8.137	8.098
Cu	8	4.012	4.010	4.006
Pb	9	13.623	13.616	13.597
Ni	10	7.029	7.042	7.034
K	12	2.742	2.740	2.733
Fe	13	976.750	971.086	970.387
Cr	15	4.893	4.889	4.865
Mg	17	358.976	356.107	355.587
V	19	4.519	4.514	4.510
Na	20	5.120	5.117	5.104
Ca	23	1248.800	1238.439	1236.192
Sb	24	10.090	9.997	10.152
Ag	25	4.717	4.710	4.712
Cd	26	5.491	5.489	5.461
Co	27	5.033	5.032	5.019
Mn	28	12.759	12.664	12.681

Lab Identity : ICSAF EPA Identity : ICSA 2:56 PM December 16, 1992
EPA Sample Code : ICSA SDG : SC1414
No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00

On-Peak Integrations : 3 Off-Peak Integrations : 3

066

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
	14.549	492338.543	5.492	44.326	-10.301	-70.539	4.033	97.893
S.D.	0.321	2549.006	0.009	0.712	0.627	3.317	0.686	50.468
% R.S.D.	2.208	0.518	0.168	1.607	6.083	4.703	17.010	51.554

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	183631.204	0.496	485794.348	-7.005	2155.465	480453.722	-40.151	9.169
S.D.	663.806	1.818	2560.167	0.831	27.097	2655.177	29.531	1.089
% R.S.D.	0.361	366.247	0.527	11.865	1.257	0.553	73.551	11.878

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-1.225	5.633	43.388
S.D.	0.671	0.723	0.534
% R.S.D.	54.753	12.836	1.232

On-Peak Counts Output 3:00 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
	2	11.377	11.362	11.342
Al	5	187.516	187.130	186.839
Be	6	55.583	55.491	55.428
Zn	7	37.120	37.049	36.972
Cu	8	5.429	5.426	5.407
Pb	9	33.333	33.319	33.244
Ni	10	15.154	15.166	15.140
K	12	2.708	2.706	2.698
Fe	13	960.821	960.353	959.888
Cr	15	8.473	8.503	8.556
Mg	17	351.776	351.025	350.272
V	19	6.952	6.950	6.935
Na	20	4.936	4.938	4.928
Ca	23	1223.412	1220.327	1217.269
Sb	24	10.016	9.902	9.951
Ag	25	8.015	8.012	7.997
Cd	26	26.709	26.609	26.610
Co	27	10.892	10.803	10.826
Mn	28	55.364	55.194	55.187

Lab Identity : ICSABF EPA Identity : ICSAB 3:01 PM December 16, 1992
EPA Sample Code : ICSAB SDG : SC1414
Case No : SAS :
name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

067

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	466.722	485357.716	469.613	937.157	450.793	4479.822	854.399	46.277
.	1.231	900.433	0.712	2.210	3.535	11.082	1.357	56.509
% R.S.D.	0.264	0.186	0.152	0.236	0.784	0.247	0.159	122.112

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	181294.401	454.852	477789.159	437.295	1787.030	472445.904	-26.345	948.146
S.D.	88.549	5.203	1054.847	1.635	16.859	1212.680	21.603	2.733
% R.S.D.	0.049	1.144	0.221	0.374	0.943	0.257	82.001	0.288

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	885.543	466.906	490.084
S.D.	2.405	3.683	1.057
% R.S.D.	0.272	0.789	0.216

On-Peak Counts Output 3:04 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
	2	9.966	9.939	10.061
	5	3.329	3.320	3.319
Be	6	4.724	4.690	4.719
Zn	7	5.818	5.745	5.785
Cu	8	3.943	3.944	3.941
Pb	9	10.390	10.313	10.452
Ni	10	7.713	7.660	7.650
K	12	3.692	3.702	3.730
Fe	13	3.208	3.170	3.180
Cr	15	4.034	4.036	4.059
Mg	17	11.452	11.394	11.537
V	19	4.889	4.892	4.901
Na	20	8.023	8.017	8.087
Ca	23	28.357	28.130	28.692
Sb	24	8.147	8.240	8.211
Ag	25	4.853	4.864	4.861
Cd	26	4.925	4.912	4.907
Co	27	6.101	6.098	6.093
Mn	28	10.261	10.272	10.326

Lab Identity : CRIF EPA Identity : CRI 3:05 PM December 16, 1992
EPA Sample Code : CRI SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
le Weight : 1.0000 Solution Volume : 1.00
n-Peak Integrations : 3 Off-Peak Integrations : 3

068

	Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)
Mean	355.601	638.735	9.209	38.696	42.843	122.159	75.079	9488.466
S.D.	4.493	14.559	0.168	1.119	0.503	15.995	3.533	210.356
% R.S.D.	1.264	2.279	1.820	2.893	1.174	13.093	4.706	2.217

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	244.482	15.264	9929.712	86.249	10994.463	9696.768	137.455	1.560
S.D.	3.748	1.708	100.889	1.135	123.613	111.624	18.004	1.603
% R.S.D.	1.533	11.192	1.016	1.316	1.124	1.151	13.098	102.811

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	9.011	89.367	29.177
S.D.	0.390	0.313	0.367
% R.S.D.	4.325	0.350	1.258

On-Peak Counts Output 3:08 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	136.369	136.930	138.316
	5	6.687	6.705	6.741
	6	29.423	29.551	29.820
Zn	7	81.489	81.648	82.314
Cu	8	7.462	7.486	7.521
Pb	9	14.276	14.348	14.298
Ni	10	29.810	29.944	30.148
K	12	5.059	5.075	5.106
Fe	13	26.582	26.697	26.937
Cr	15	11.628	11.671	11.731
Mg	17	21.924	21.990	22.165
V	19	17.394	17.466	17.587
Na	20	12.486	12.532	12.602
Ca	23	64.973	65.252	65.878
Sb	24	14.280	14.395	14.464
Ag	25	9.936	9.969	10.017
Cd	26	27.947	27.862	28.143
Co	27	35.288	35.356	35.663
Mn	28	229.734	230.293	232.738

Lab Identity : CCV EPA Identity : CCV 3:09 PM December 16, 1992
EPA Sample Code : CCV SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
eak Integrations : 3 Off-Peak Integrations : 3

Ba	Al	Be	Zn	Cu	Pb	Ni	K

069

	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)	(ppb)
Mean	9179.857	9450.820	231.730	2372.988	1134.200	962.136	2365.943	23780.792
S.D.	70.270	73.667	1.852	13.513	9.298	8.476	17.689	255.186
% R.S.D.	0.765	0.779	0.799	0.569	0.820	0.881	0.748	1.073

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	4693.620	938.752	24354.373	2314.178	25118.986	24030.068	2385.439	1416.683
S.D.	34.456	6.360	174.696	17.585	186.103	182.977	35.140	11.564
% R.S.D.	0.734	0.678	0.717	0.760	0.741	0.761	1.473	0.816

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	968.832	2376.331	2338.169
S.D.	6.046	15.743	16.855
% R.S.D.	0.624	0.662	0.721

On-Peak Counts Output 3:12 PM December 16, 1992
Task name : EPA
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Analyte	Channel	On Peak		Kpulses
Ba	2	4.926	4.917	4.916
Al	5	3.119	3.120	3.121
	6	3.687	3.690	3.689
	7	4.540	4.531	4.567
Cu	8	3.811	3.814	3.814
Pb	9	9.788	9.857	9.922
Ni	10	6.975	6.955	7.003
K	12	2.810	2.803	2.805
Fe	13	1.915	1.907	1.909
Cr	15	3.896	3.891	3.875
Mg	17	4.247	4.248	4.244
V	19	4.420	4.419	4.429
Na	20	4.986	4.992	4.997
Ca	23	3.445	3.435	3.437
Sb	24	7.907	7.920	7.886
Ag	25	4.864	4.864	4.866
Cd	26	4.725	4.693	4.715
Co	27	5.023	4.968	4.995
Mn	28	7.615	7.570	7.566

CCB

Lab Identity : BLANK EPA Identity : BLANK 3:13 PM December 16, 1992
EPA Sample Code : BLANK SDG : SC1414
Case No : SAS :
Task name : EPA Sequence name : CLPBATCH Result File : 1196701
Sample Weight : 1.0000 Solution Volume : 1.00
On-Peak Integrations : 3 Off-Peak Integrations : 3

Ba (ppb)	Al (ppb)	Be (ppb)	Zn (ppb)	Cu (ppb)	Pb (ppb)	Ni (ppb)	K (ppb)

070

Mean	2.886	41.273	0.018	0.930	0.261	-1.719	2.431	-49.836
S.D.	0.386	2.680	0.014	0.570	0.545	15.391	2.515	38.504
% R.S.D.	13.379	6.492	75.509	61.250	208.380	895.275	103.483	77.262

	Fe (ppb)	Cr (ppb)	Mg (ppb)	V (ppb)	Na (ppb)	Ca (ppb)	Sb (ppb)	Ag (ppb)
Mean	3.984	-2.012	3.784	2.143	1243.365	7.764	13.618	-1.255
S.D.	0.794	1.351	2.920	0.981	17.547	2.089	6.493	0.330
% R.S.D.	19.933	67.153	77.165	45.772	1.411	26.906	47.683	26.305

	Cd (ppb)	Co (ppb)	Mn (ppb)
Mean	-0.301	2.270	0.832
S.D.	0.687	2.166	0.287
% R.S.D.	228.190	95.396	34.515

********** AUTOMATIC CALIBRATION UPDATE **********

071

Sample Name: AUTOCAL1		Date: Thu Dec 10 12:46:55 1992	
w File : C:\DX\DATA\AUTO0001.D01			
chod : C:\DX\METHOD\AUTO.met			Calibration Level: 1
ACI Address: 1	System : 1	Inject#: 1	Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	6.117e+004	6.707e+004	6.707e+004
2	CHLORIDE	1.53	1.47	1.47	4.584e+005	4.897e+005	4.897e+005
3	NITRITE	1.81	1.79	1.79	8.761e+004	1.001e+005	1.001e+005
4	BROMIDE	2.77	2.76	2.76	8.333e+004	8.906e+004	8.906e+004
5	NITRATE	3.05	3.16	3.16	5.148e+005	5.413e+005	5.413e+005
6	ORTHO-PHOSPHATE	5.16	5.20	5.20	6.580e+004	6.760e+004	6.760e+004
7	SULFATE	6.84	6.99	6.99	2.920e+005	3.027e+005	3.027e+005

072

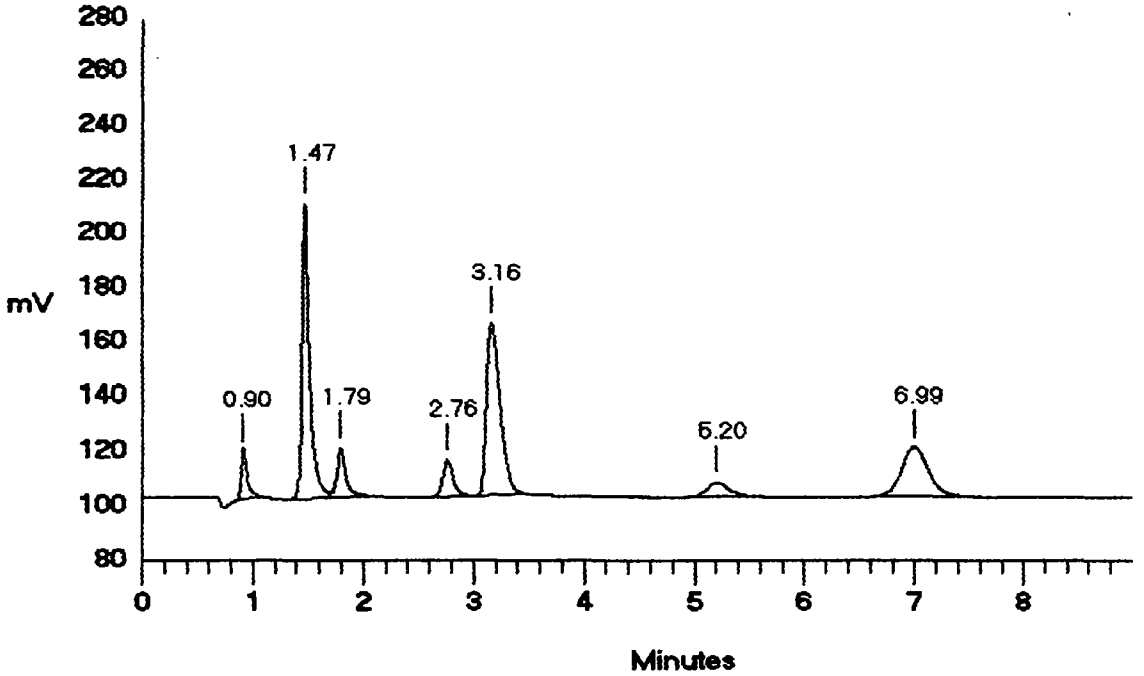
Sample Name: AUTOCAL1 Date: 12/10/1992 12:46:55
Data File : C:\DX\DATA\AUTO0001.D01
Method : C:\DX\METHOD\AUTO.met
'I Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	1.000	17115	67071	1	0.00
2	1.47	CHLORIDE	10.000	108392	489658	2	-3.92
3	1.79	NITRITE	1.000	17610	100090	2	-1.10
4	2.76	BROMIDE	5.000	13146	89061	1	-0.36
5	3.16	NITRATE	5.000	63253	541250	1	3.61
6	5.20	ORTHO-PHOSPHATE	2.000	5094	67596	1	0.78
7	6.99	SULFATE	10.000	17726	302742	1	2.19
		Totals	34.000	242336	1657469		

File: AUTO0001.D01 Sample: AUTOCAL1



********** AUTOMATIC CALIBRATION UPDATE **********

073

```
Sample Name: AUTOCAL2                          Date: Thu Dec 10 12:57:54 1992
  w File   : C:\DX\DATA\AUTO0001.D02
  thod     : C:\DX\METHOD\AUTO.met                      Calibration Level: 2
ACI Address: 1        System : 1        Inject#:  2        Detector: COND
```

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	3.706e+005	3.907e+005	3.907e+005
2	CHLORIDE	1.47	1.50	1.50	2.761e+006	2.921e+006	2.921e+006
3	NITRITE	1.79	1.79	1.79	5.217e+005	5.620e+005	5.620e+005
4	BROMIDE	2.76	2.73	2.73	4.501e+005	4.841e+005	4.841e+005
5	NITRATE	3.16	3.05	3.05	3.051e+006	3.267e+006	3.267e+006
6	ORTHO-PHOSPHATE	5.20	5.17	5.17	3.633e+005	3.814e+005	3.814e+005
7	SULFATE	6.99	6.93	6.93	1.580e+006	1.678e+006	1.678e+006

```
==============================================================================
| Sample Name: AUTOCAL2                          Date: 12/10/1992 12:57:54     |
| Data File  : C:\DX\DATA\AUTO0001.D02                                         |
| Method     : C:\DX\METHOD\AUTO.met                                           |
|  'I Address: 1  System: 1  Inject#: 2   Vial:            Detector:COND      |
|  alyst     : D. BURNS        Column: AS4A-SC SN.1857                        |
==============================================================================
```

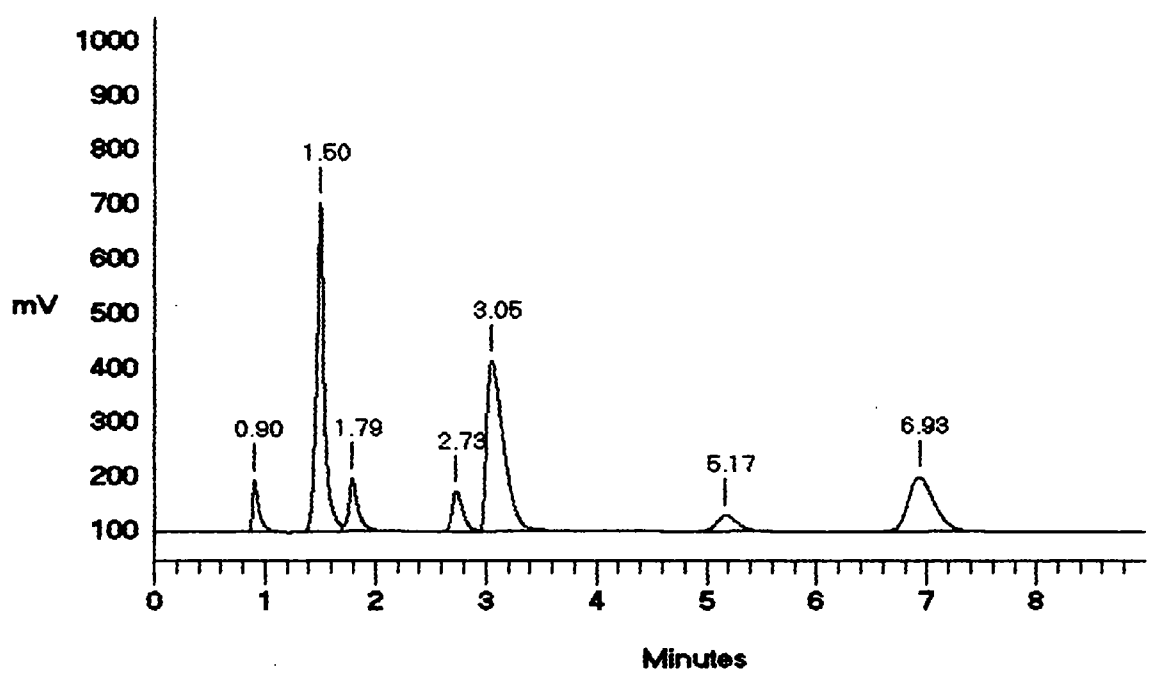
074

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	5.000	93915	390720	1	0.00
2	1.50	CHLORIDE	50.000	600832	2921465	2	2.04
3	1.79	NITRITE	5.000	96396	562033	2	0.00
4	2.73	BROMIDE	25.000	72037	484088	2	-1.09
5	3.05	NITRATE	25.000	310127	3267464	2	-3.48
6	5.17	ORTHO-PHOSPHATE	10.000	28564	381409	1	-0.58
7	6.93	SULFATE	50.000	100489	1678183	1	-0.86
		Totals	170.000	1302360	9685362		

File: AUTO0001.D02 Sample: AUTOCAL2



********** AUTOMATIC CALIBRATION UPDATE **********

075

Sample Name: AUTOCAL3 Date: Thu Dec 10 13:08:55 1992
w File : C:\DX\DATA\AUTO0001.D03
thod : C:\DX\METHOD\AUTO.met Calibration Level: 3
ACI Address: 1 System : 1 Inject#: 3 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	8.043e+005	8.329e+005	8.329e+005
2	CHLORIDE	1.50	1.52	1.52	5.986e+006	6.202e+006	6.202e+006
3	NITRITE	1.79	1.80	1.80	1.185e+006	1.213e+006	1.213e+006
4	BROMIDE	2.73	2.71	2.71	9.929e+005	1.046e+006	1.046e+006
5	NITRATE	3.05	2.97	2.97	6.831e+006	7.205e+006	7.205e+006
6	ORTHO-PHOSPHATE	5.17	5.14	5.14	8.152e+005	8.371e+005	8.371e+005
7	SULFATE	6.93	6.86	6.86	3.545e+006	3.689e+006	3.689e+006

Sample Name: AUTOCAL3 Date: 12/10/1992 13:08:55

Data File : C:\DX\DATA\AUTO0001.D03

Method : C:\DX\METHOD\AUTO.met

'I Address: 1 System: 1 Inject#: 3 Vial: Detector:COND

alyst : D. BURNS Column: AS4A-SC SN.1857

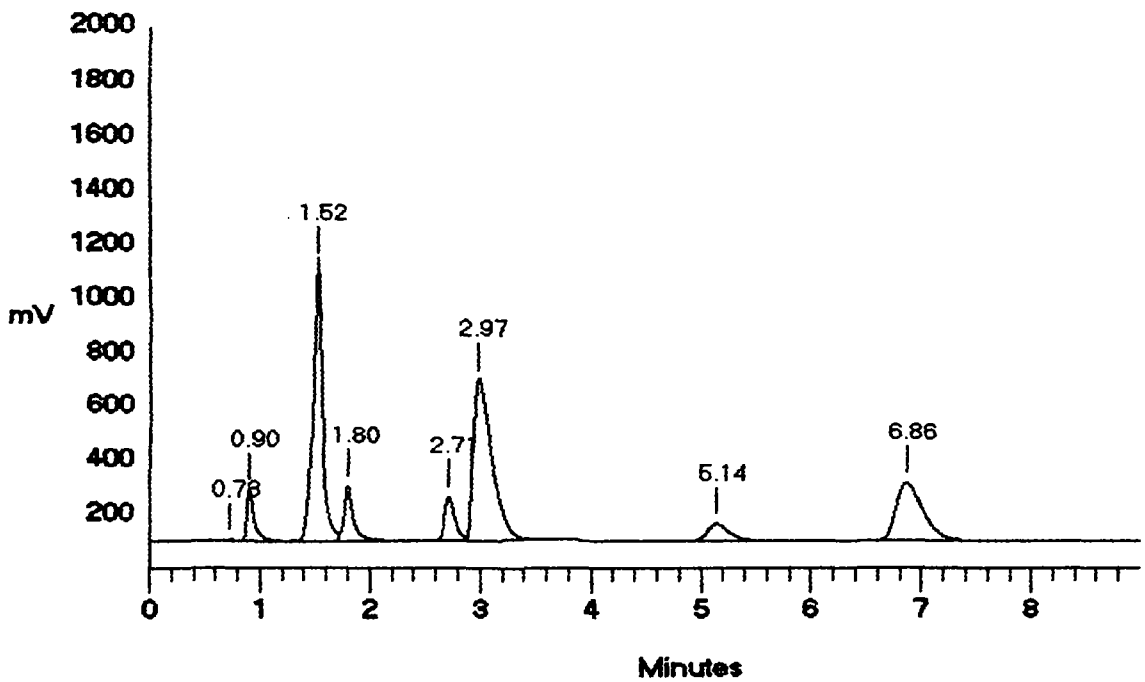
076

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.000	189834	832891	2	0.00
3	1.52	CHLORIDE	100.000	1026108	6202310	2	1.33
4	1.80	NITRITE	10.000	202485	1212986	2	0.56
5	2.71	BROMIDE	50.000	162819	1045795	2	-0.73
6	2.97	NITRATE	50.000	596961	7204873	2	-2.62
7	5.14	ORTHO-PHOSPHATE	20.000	61986	837141	1	-0.58
8	6.86	SULFATE	100.000	213894	3689007	1	-1.01
		Totals	340.000	2454086	21025004		

File: AUTO0001.D03 Sample: AUTOCAL3



DIONEX SCHEDULE - C:\DX\SCHEDULE\W3121192.SCH

077

Inj#	Sample Name	Method	Data File	Vol.	Dil.	Intrstd.
1	ICV DHB 12/7/92	..\AUTO.met	..\W3121191	1	1	1
2	ICB	..\AUTO.met	..\W3121191	1	1	1
3	11967.01 7655-F-2	..\AUTO.met	..\W3121191	1	1	1
4	11967.02 7655-F-3	..\AUTO.met	..\W3121191	1	1	1
5	11967.03 7655-F-4	..\AUTO.met	..\W3121191	1	1	1
6	11967.04 7655-F-6	..\AUTO.met	..\W3121191	1	1	1
7	11967.05 7655-F-7	..\AUTO.met	..\W3121191	1	1	1
8	11967.06 7655-F-8	..\AUTO.met	..\W3121191	1	1	1
9	11967.07 7655-F-9	..\AUTO.met	..\W3121191	1	1	1
10	11967.08 7655-F-10	..\AUTO.met	..\W3121191	1	1	1
11	11967.09 7655-F-11	..\AUTO.met	..\W3121191	1	1	1
12	11967.10 7655-F-12	..\AUTO.met	..\W3121192	1	1	1
13	CCV	..\AUTO.met	..\W3121192	1	1	1
14	CCB	..\AUTO.met	..\W3121192	1	1	1
15	11967.02 7655-F-3	..\AUTO.met	W3121192	1	100	1
16	11967.03 7655-F-4	..\AUTO.met	W3121192	1	10	1
17	11967.03 7655-F-4	..\AUTO.met	W3121192	1	100	1
18	11967.06 7655-F-8	..\AUTO.met	W3121192	1	100	1
19	11967.07 7655-F-9	..\AUTO.met	W3121192	1	100	1
20	11967.08 7655-F-10	..\AUTO.met	W3121192	1	10	1
21	11967.09 7655-F-11	..\AUTO.met	W3121192	1	10	1
22	11967.10 7655-F-12	..\AUTO.met	W3121192	1	100	1
23	11967.08MS 7655-F-10 S	..\AUTO.met	W3121192	1	1	1
24	11967.08DUP 7655-F-10 D	..\AUTO.met	W3121192	1	1	1
25	CCV	..\AUTO.met	W3121192	1	1	1
26	CCB	..\AUTO.met	W3121192	1	1	1
27	11967.08MS 7655-F-10 S	..\AUTO.met	W3121192	1	10	1
28	11967.08DUP 7655-F-10 D	..\AUTO.met	W3121192	1	10	1
29	11985.01	..\AUTO.met	W3121192	1	1	1

Comment:
F,CL,NO3,SO4

DIONEX SCHEDULE - C:\DX\SCHEDULE\W4121192.SCH

078

Inj#	Sample Name	Method	Data File	Vol.	Dil.	Int.Std.
1	11967.06 7655-F-8	..\AUTO.met	W4121192	1	100	1
2	11967.07 7655-F-9	..\AUTO.met	..\W4121191	1	100	1
3	11967.08 7655-F-10	..\AUTO.met	W4121191	1	10	1
4	11967.09 7655-F-11	..\AUTO.met	W4121191	1	10	1
5	11967.10 7655-F-12	..\AUTO.met	W4121191	1	100	1
6	11967.08MS 7655-F-8-10 S	..\AUTO.met	W4121191	1	1	1
7	11967.08MSD 7655-F-10 SD	..\AUTO.met	W4121191	1	1	1
8	CCV	..\AUTO.met	W4121191	1	1	1
9	CCB	..\AUTO.met	W4121191	1	1	1
10	11967.08MS 7655-F-10 S	..\AUTO.met	W4121191	1	10	1
11	11967.08MSD 7655-F-10SD	..\AUTO.met	W4121191	1	10	1
12	11985.01	..\AUTO.met	W4121191	1	1	1
13	11986.01	..\AUTO.met	W4121191	1	1	1
14	11986.05	..\AUTO.met	W4121191	1	1	1
15	11986.09	..\AUTO.met	W4121191	1	1	1
16	CCV	..\AUTO.met	W4121191	1	1	1
17	CCB	..\AUTO.met	W4121191	1	1	1

Comment:
F,CL,NO3,SO4

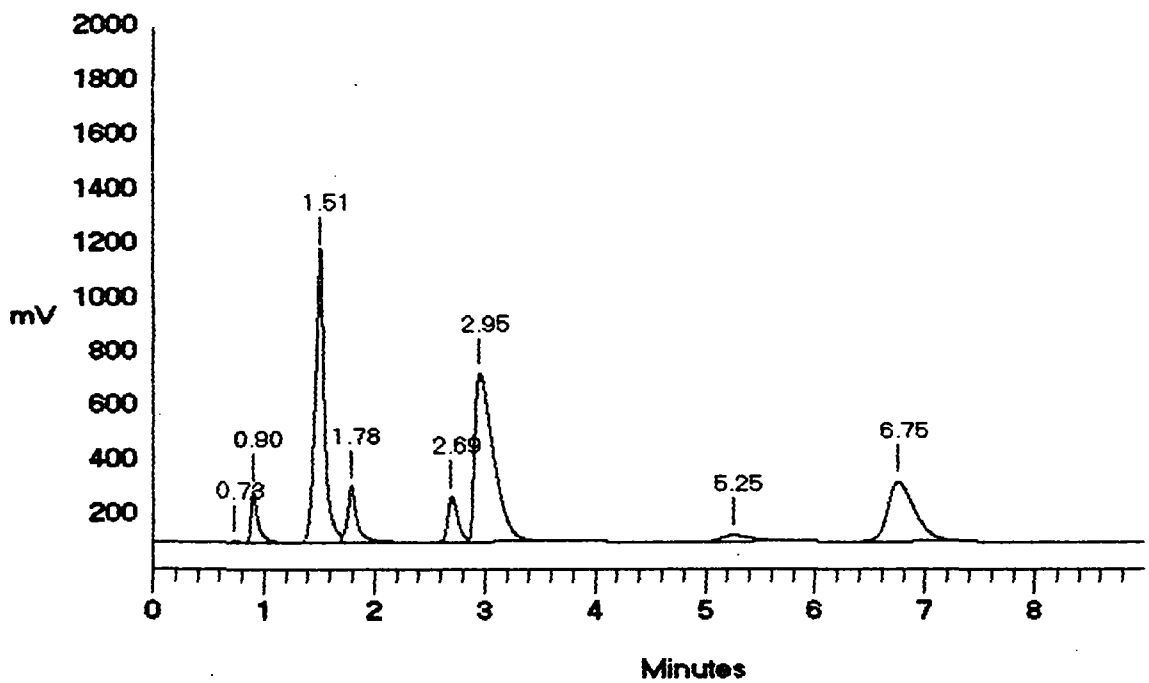
Sample Name: ICV Date: 12/11/1992 10:46:15
Data File : C:\DX\DATA\W3121191.D01
Method : C:\DX\METHOD\AUTO.met 079
ACI Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.303	192244	854038	2	0.00
3	1.51	CHLORIDE	103.220	1068443	6376835	2	-0.66
4	1.78	NITRITE	10.494	202683	1265238	2	-1.11
5	2.69	BROMIDE	51.368	165426	1066735	2	-0.74
6	2.95	NITRATE	51.480	617963	7361262	2	-0.67
7	5.25	ORTHO-PHOSPHATE	11.338	23239	457554	1	2.14
8	6.75	SULFATE	104.057	219727	3807534	1	-1.60
		Totals	342.260	2489725	21189196		

File: W3121191.D01 Sample: ICV



080

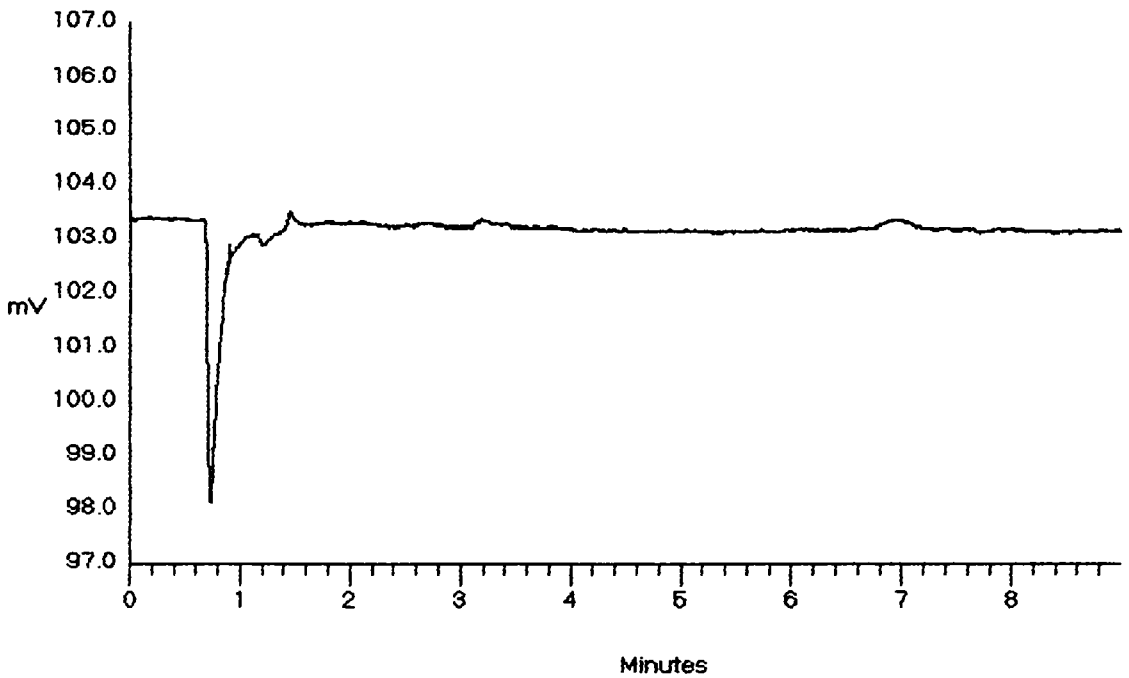
Sample Name: ICB Date: 12/11/1992 10:57:14
Data File : C:\DX\DATA\W3121191.D02
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 2 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W3121191.D02 Sample: ICB



Sample Name: 11967.01 7655-F-2 dab 12/17/92 Date: 12/11/1992 11:08:11

Data File : C:\DX\DATA\W3121191.D03

Method : C:\DX\METHOD\AUTO.met

ACI Address: 1 System: 1 Inject#: 3 Vial: Detector:COND

alyst : D. BURNS Column: AS4A-SC SN.1857

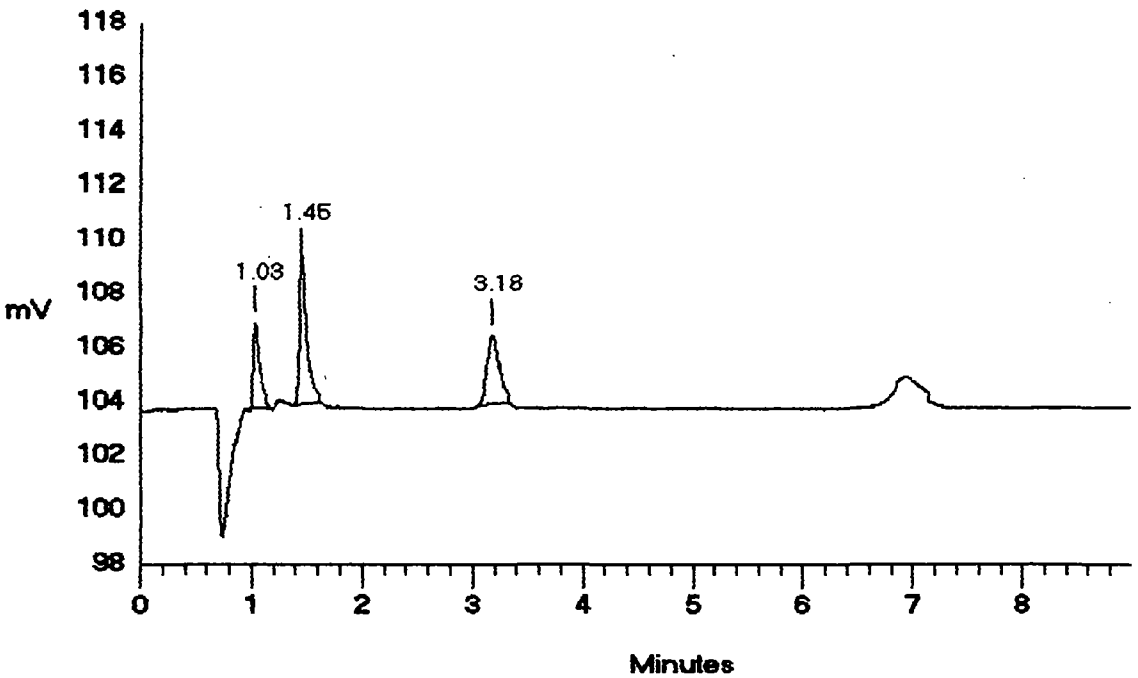
081

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.45	CHLORIDE	3.338	5197	25197	1	-4.61
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.18	NITRATE	2.112	2530	19600	1	7.07
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	5.449	7727	44797		

File: W3121191.D03 Sample: 11967.01



Sample Name: 11967.02 7655-F-3 AB 12/7/92 Date: 12/11/1992 11:19:10
Data File : C:\DX\DATA\W3121191.D04
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 4 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

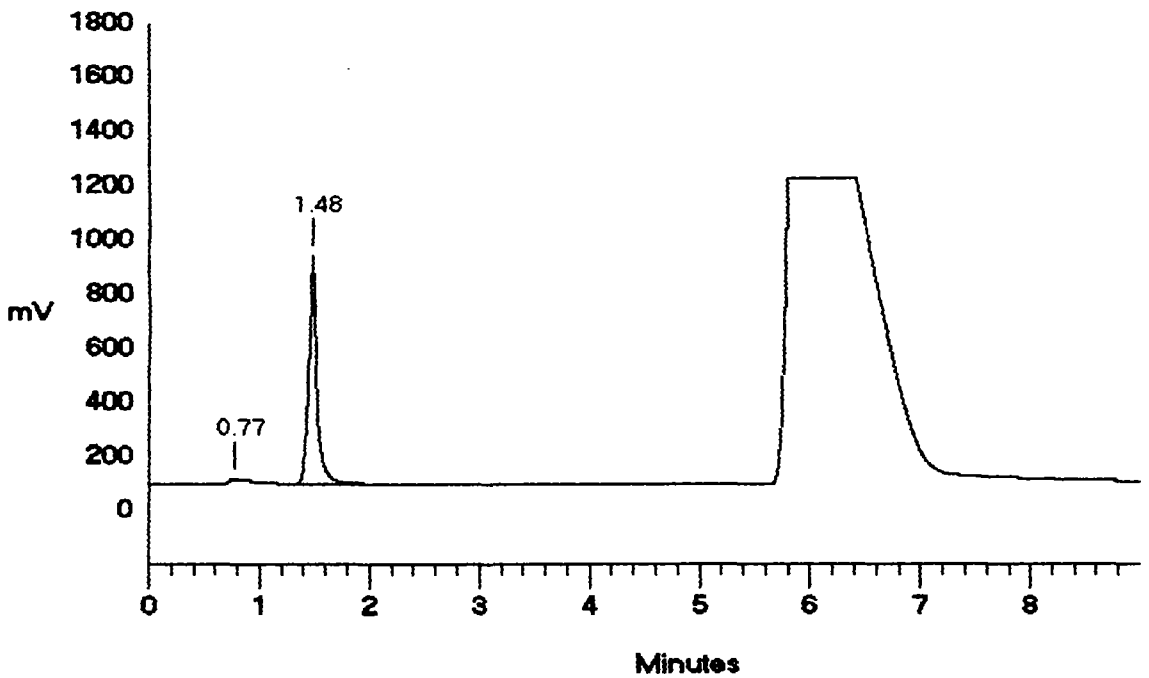
082

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.48	CHLORIDE	72.396	844477	4416688	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	72.396	844477	4416688		

File: W3121191.D04 Sample: 11967.02



Sample Name: 11967.03 7655-F-4 DnB 12/17/92 Date: 12/11/1992 11:30:10
Data File : C:\DX\DATA\W3121191.D05
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 5 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

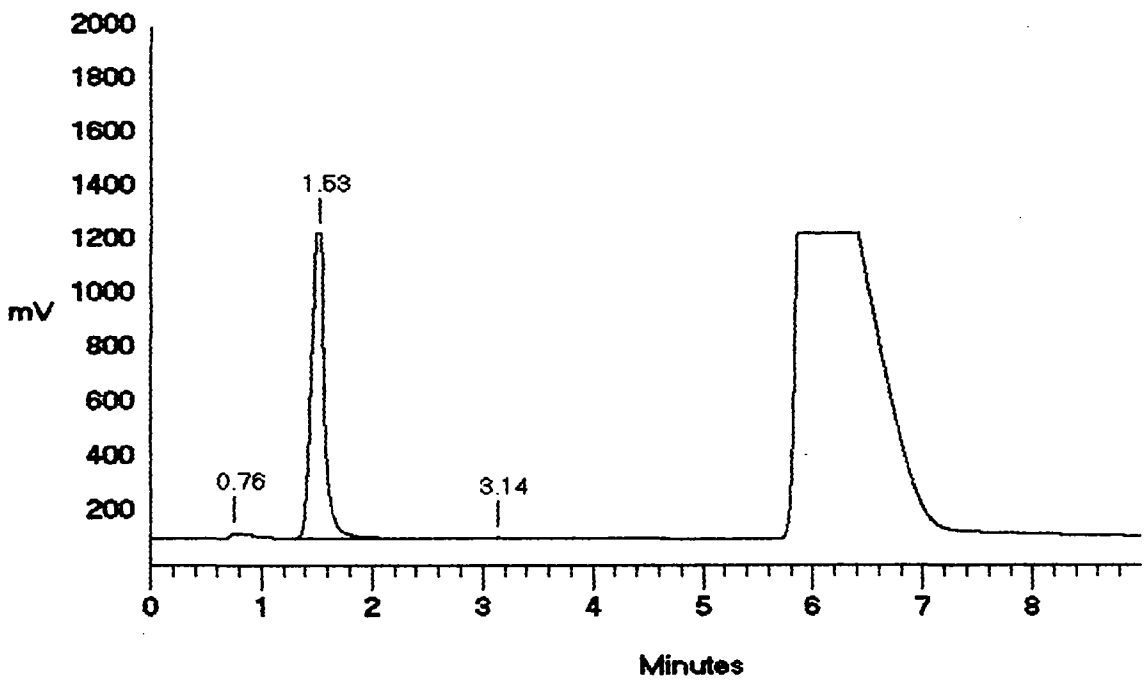
083

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.53	CHLORIDE	150.967	1127778	9413145	1	0.66
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.14	NITRATE	2.176	3955	29168	1	5.72
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	153.143	1131733	9442313		

File: W3121191.D05 Sample: 11967.03



Sample Name: 11967.04 7655-F-6 AMB 12/11/92 Date: 12/11/1992 11:41:08

Data File : C:\DX\DATA\W3121191.D06

Method : C:\DX\METHOD\AUTO.met

ACI Address: 1 System: 1 Inject#: 6 Vial: Detector:COND

alyst : D. BURNS Column: AS4A-SC SN.1857

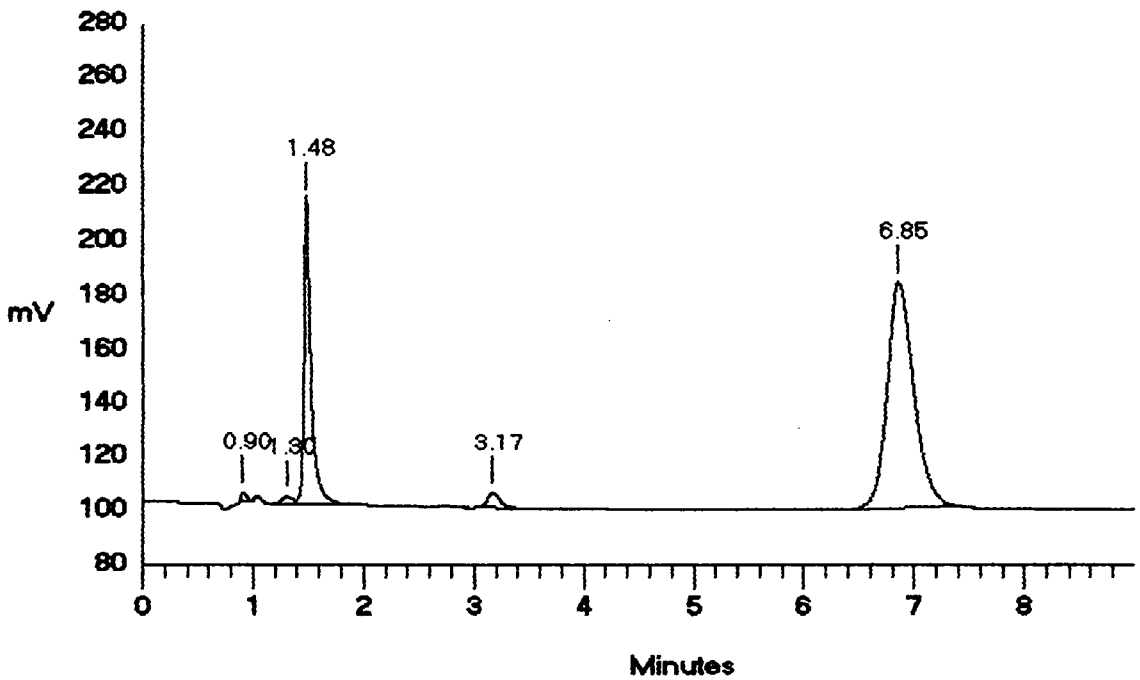
084

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	0.420	3393	11177	1	0.00
3	1.48	CHLORIDE	10.732	112814	495377	2	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.17	NITRATE	2.267	5436	42712	1	6.73
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.85	SULFATE	40.872	84062	1418897	1	-0.15
		Totals	54.290	205705	1968163		

File: W3121191.D06 Sample: 11967.04



Sample Name: 11967.05 7655-F-7 dsB 12/17/92 Date: 12/11/1992 11:52:07
Data File : C:\DX\DATA\W3121191.D07
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 7 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

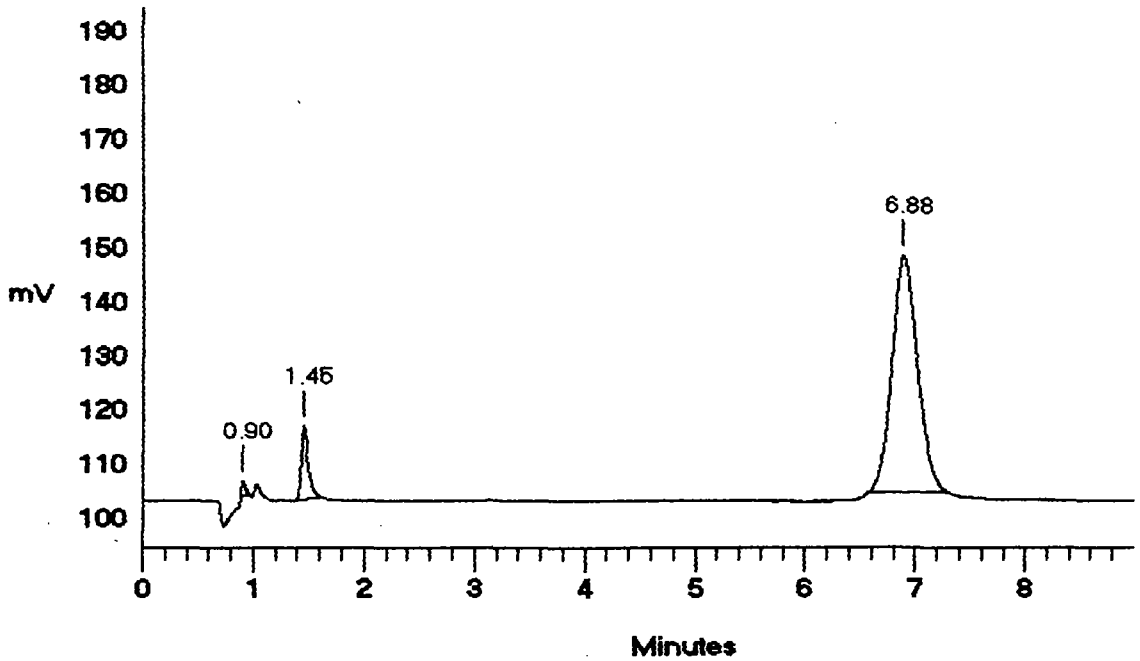
085

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	0.379	2642	7693	1	0.00
2	1.45	CHLORIDE	3.855	13384	58121	1	-4.61
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.88	SULFATE	22.048	43293	707259	1	0.29
		Totals	26.282	59319	773072		

File: W3121191.D07 Sample: 11967.05



Sample Name: 11967.06 7655-F-8 dnb 12/17/92 Date: 12/11/1992 12:03:07
Data File : C:\DX\DATA\W3121191.D08
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 8 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

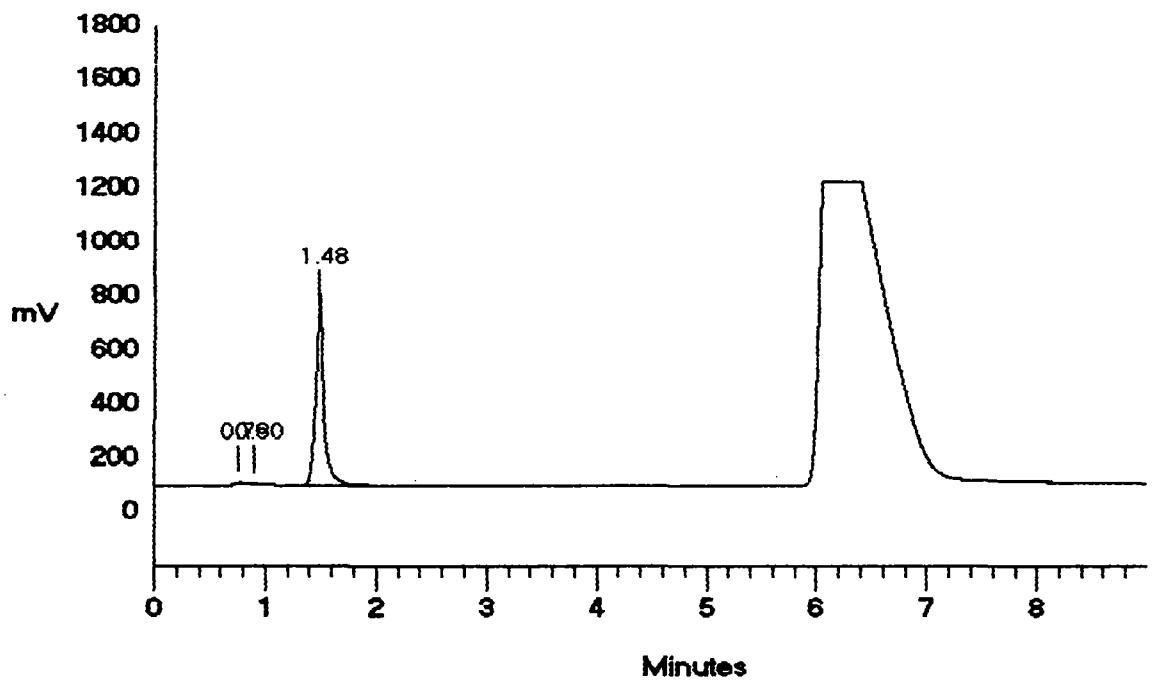
086

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	0.556	5470	22840	2	0.00
3	1.48	CHLORIDE	59.512	658323	3597400	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	60.069	663793	3620240		

File: W3121191.D08 Sample: 11967.06



087

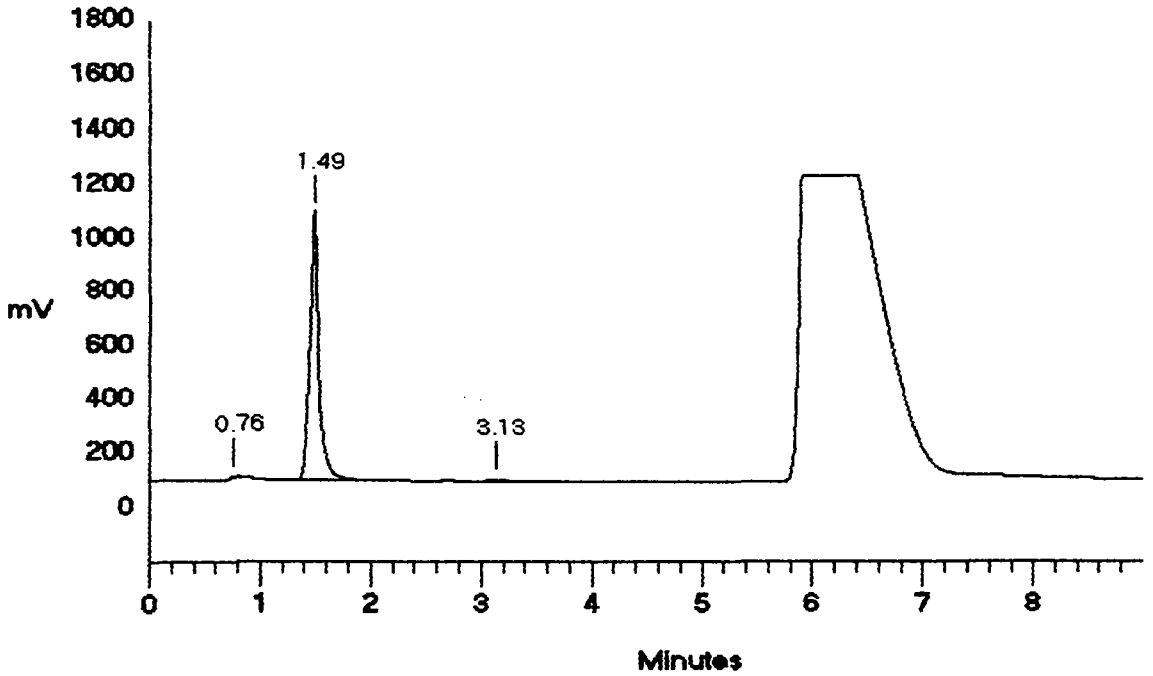
Sample Name: 11967.07 7655-F-9 Date: 12/11/1992 12:14:07
Data File : C:\DX\DATA\W3121191.D09
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 9 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.49	CHLORIDE	92.578	993574	5700095	1	-1.97
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.13	NITRATE	2.239	5240	38586	1	5.39
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	94.817	998814	5738681		

File: W3121191.D09 Sample: 11967.07



Sample Name: 11967.08 7655-F-10 dnb 12/17/92 Date: 12/11/1992 12:25:08
Data File : C:\DX\DATA\W3121191.D10
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 10 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

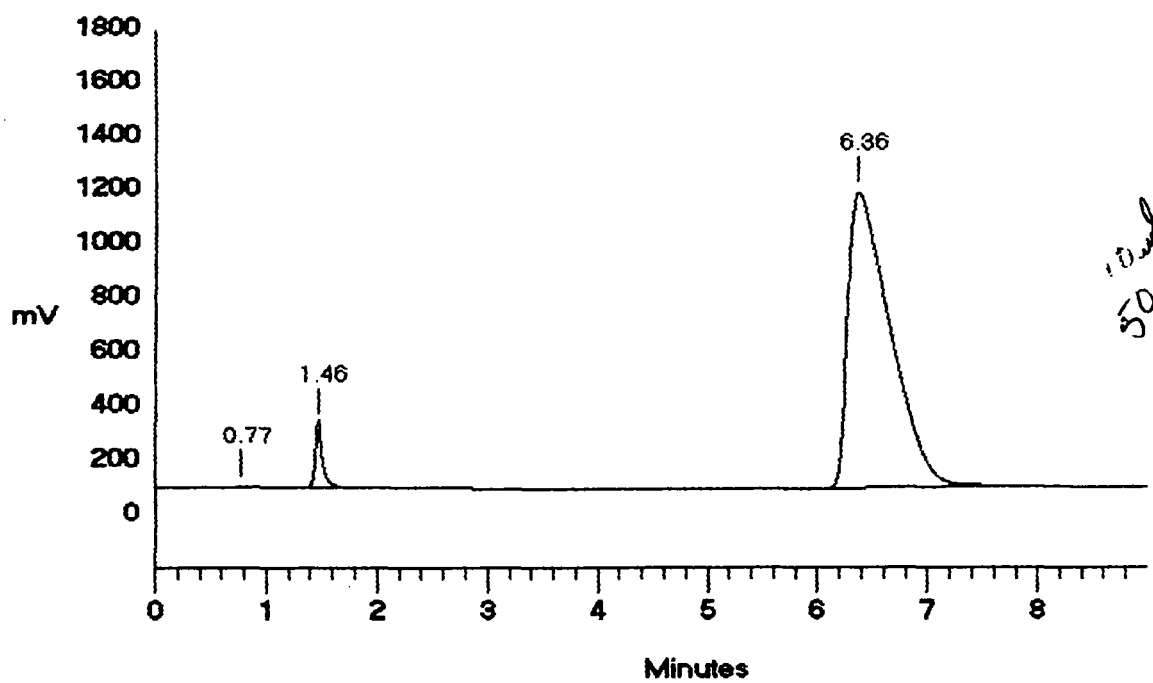
088

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.46	CHLORIDE	20.535	233831	1118797	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.36	SULFATE	771.604	1093947	29043490	1	-7.29
		Totals	792.139	1327778	30162287		

File: W3121191.D10 Sample: 11967.08



1/1

10 ml F
50 ml Cl
10 ml NO3
50 ml SO4 1/10

Sample Name: 11967.09 7655-F-11 dab 12/11/92 Date: 12/11/1992 12:36:07
Data File : C:\DX\DATA\W3121191.D11
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 11 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

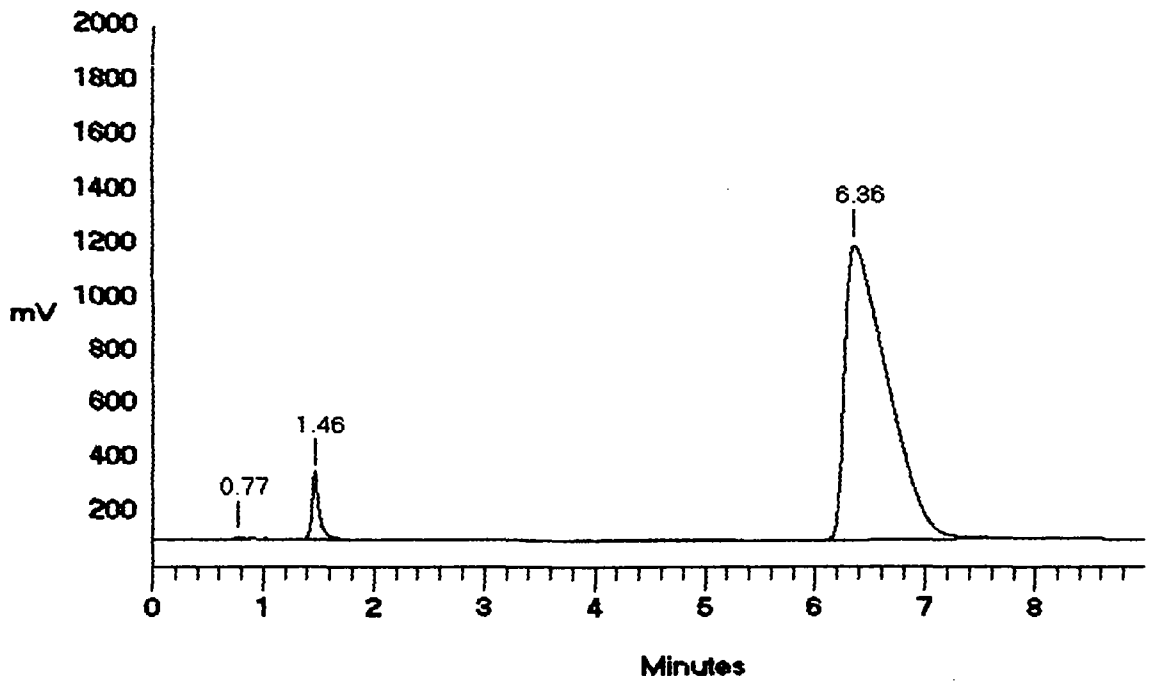
089

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
2	1.46	CHLORIDE	20.485	234422	1115624	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.36	SULFATE	770.435	1087895	28999294	1	-7.29
		Totals	790.920	1322317	30114918		

File: W3121191.D11 Sample: 11967.09



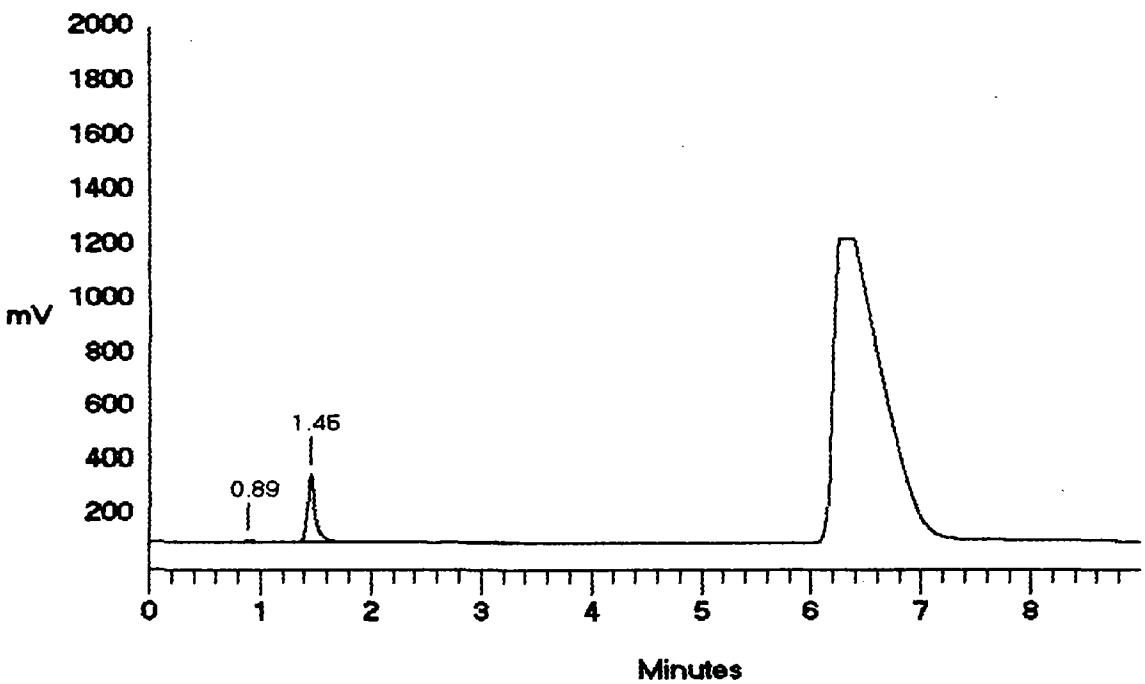
Sample Name: 11967.10 7655-F-12 12/11/92 Date: 12/11/1992 12:47:04 090
Data File : C:\DX\DATA\W3121191.D12
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 12 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.89	FLUORIDE	0.566	4271	23672	1	-1.11
2	1.45	CHLORIDE	22.221	252013	1226035	1	-4.61
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	22.788	256284	1249707		

File: W3121191.D12 Sample: 11967.10



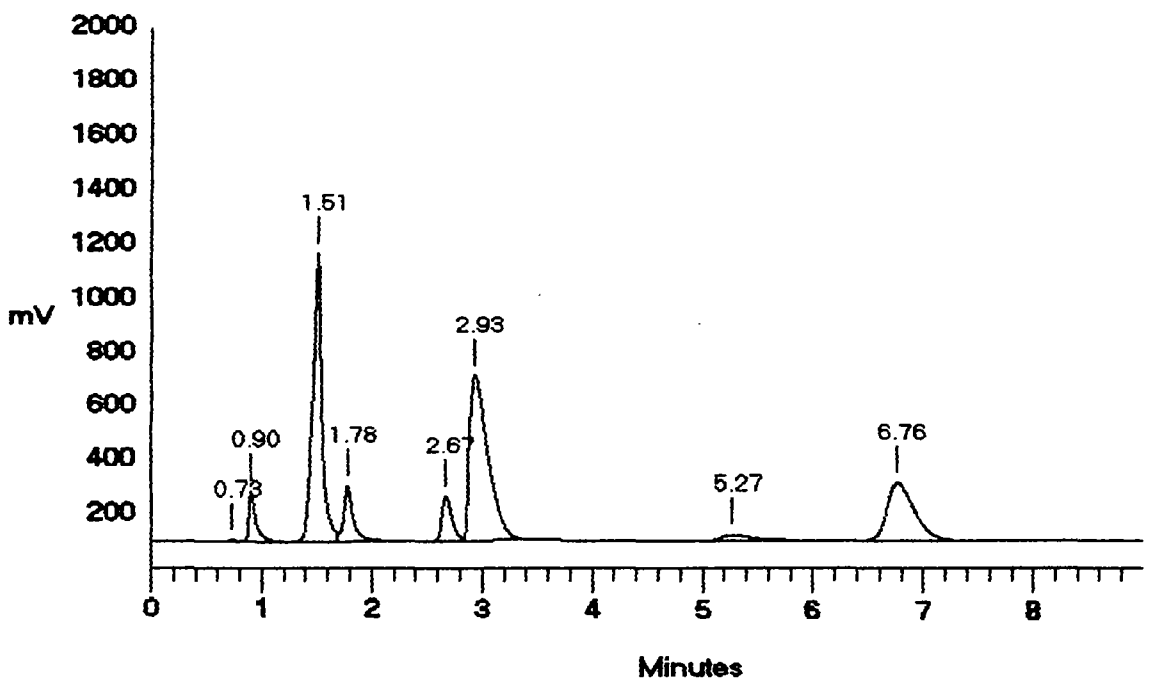
Sample Name: CCV Date: 12/11/1992 12:58:02
Data File : C:\DX\DATA\W3121191.D13
Method : C:\DX\METHOD\AUTO.met 091
ACI Address: 1 System: 1 Inject#: 13 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.041	186512	831737	2	0.00
3	1.51	CHLORIDE	100.490	1066094	6203238	2	-0.66
4	1.78	NITRITE	10.245	203825	1234451	2	-1.11
5	2.67	BROMIDE	50.416	164618	1046423	2	-1.48
6	2.93	NITRATE	50.365	613784	7195351	2	-1.35
7	5.27	ORTHO-PHOSPHATE	11.412	22673	460716	1	2.53
8	6.76	SULFATE	100.006	212639	3654408	1	-1.46
		Totals	332.976	2470144	20626324		

File: W3121191.D13 Sample: CCV



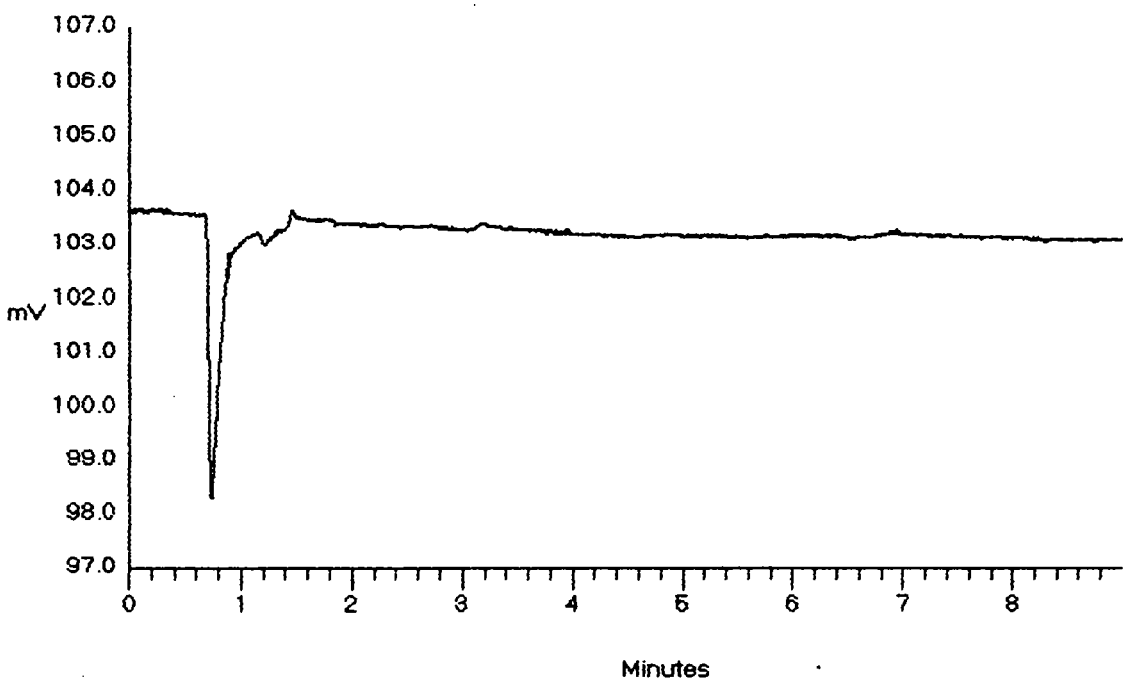
Sample Name: CCB Date: 12/11/1992 13:09:01
Data File : C:\DX\DATA\W3121191.D14 092
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 14 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W3121191.D14 Sample: CCB



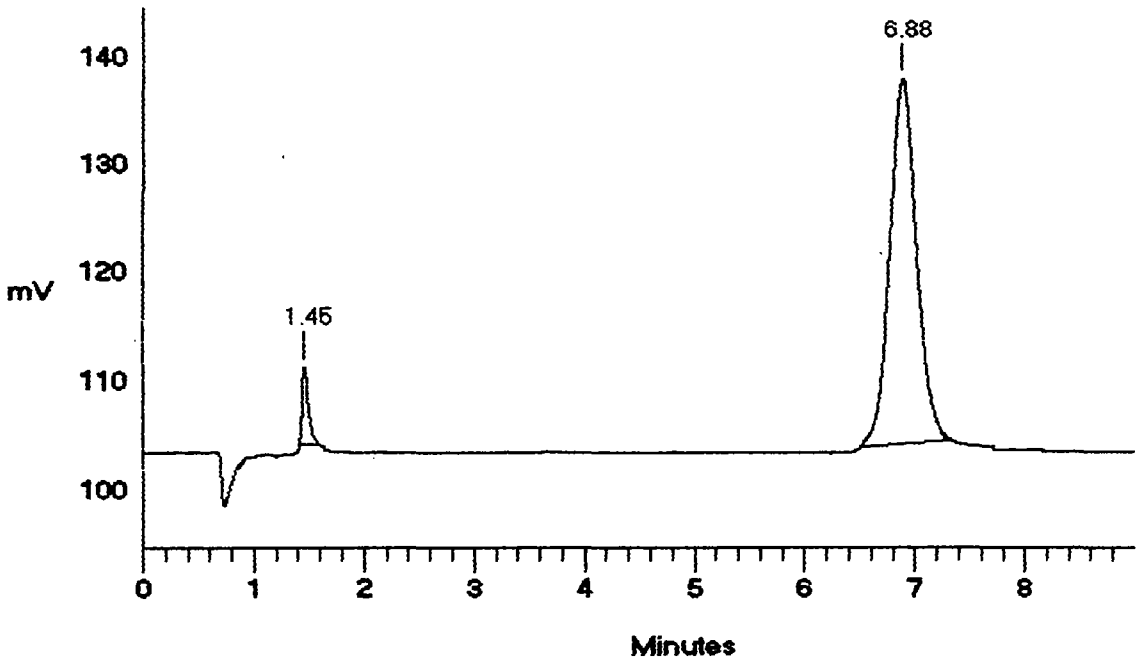
Sample Name: 11967.02 7655-F-3 1:99 Date: 12/11/1992 13:19:59
Data File : W3121191.D15 093
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 15 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.45	CHLORIDE	338.688	7007	28322	1	-4.61
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.88	SULFATE	1842.002	33641	570114	1	0.29
		Totals	2180.690	40647	598436		

File: W3121191.D15 Sample: 11967.02



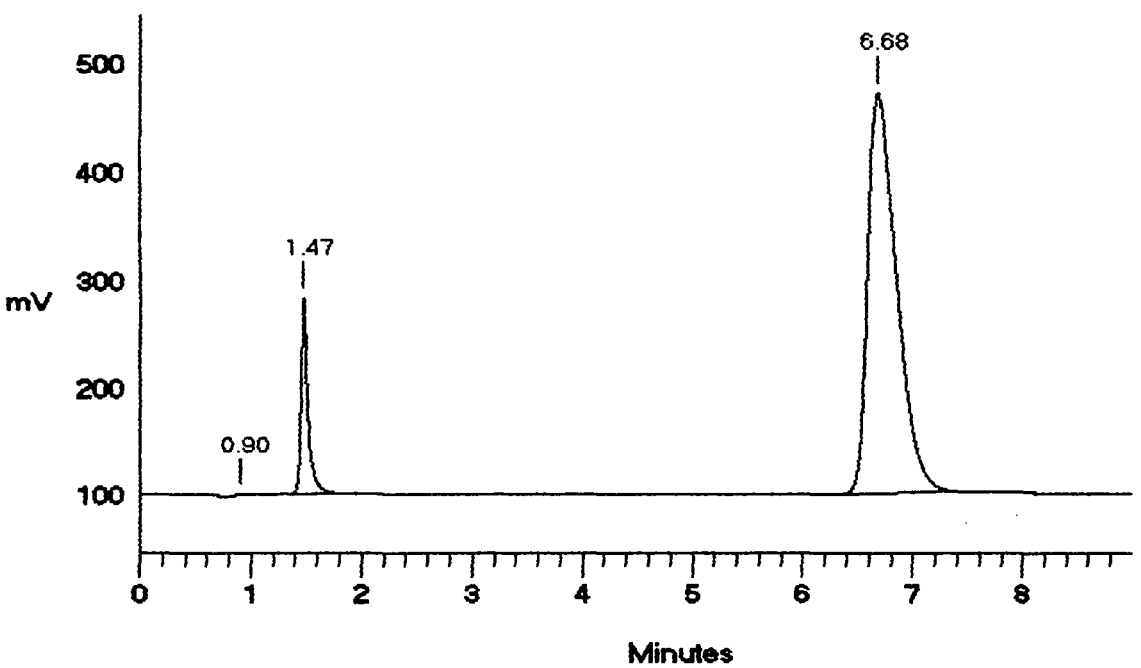
Sample Name: 11967.03 7655-F-4 1:9 Date: 12/11/1992 13:31:00
Data File : W3121191.D16 094
Method : C:\DX\METHOD\AUTO.met DB 12/11/92
ACI Address: 1 System: 1 Inject#: 16 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	3.693	643	6886	1	0.00
2	1.47	CHLORIDE	155.537	183097	802025	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.68	SULFATE	1828.432	372006	6785968	1	-2.62
		Totals	1987.662	555746	7594879		

File: W3121191.D16 Sample: 11967.03



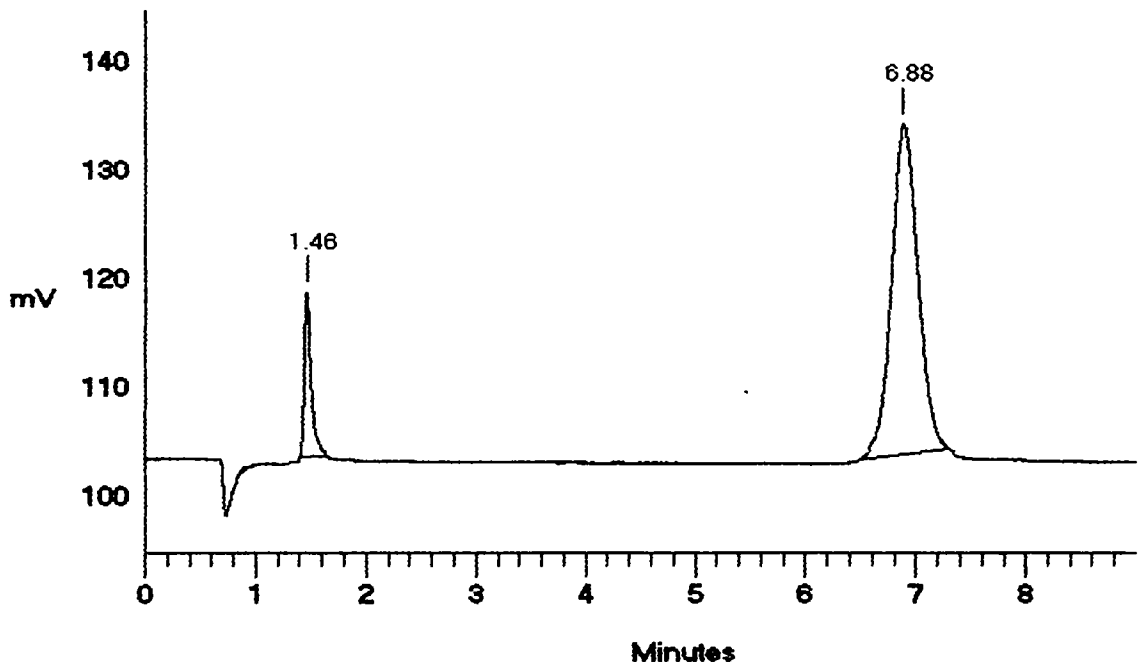
Sample Name: 11967.03 7655-F-4 1:99 Date: 12/11/1992 13:42:00
Data File : W3121191.D17
Method : C:\DX\METHOD\AUTO.met 095
ACI Address: 1 System: 1 Inject#: 17 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	397.433	15198	65678	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.88	SULFATE	1697.766	30527	515587	1	0.29
		Totals	2095.199	45725	581265		

File: W3121191.D17 Sample: 11967.03



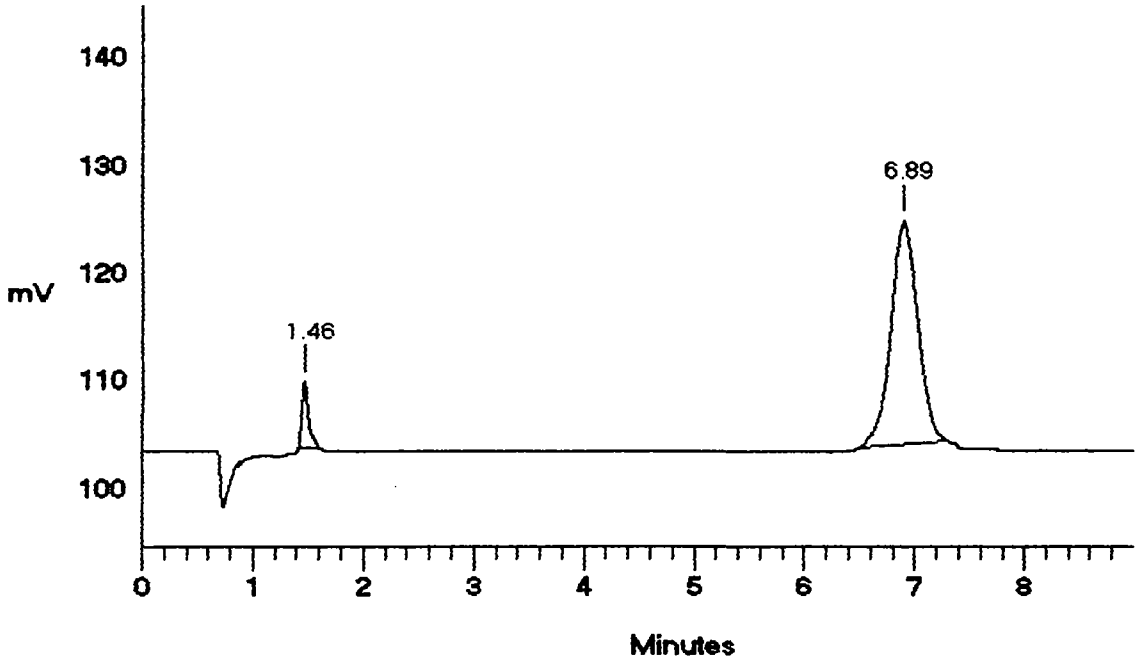
Sample Name: 11967.06 7655-F-8 1:99 Date: 12/11/1992 14:28:30
Data File : C:\DX\DATA\W4121191.D01
Method : C:\DX\METHOD\AUTO.met dab 12/17/92 096
ACI Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	100	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	334.244	6045	25495	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.89	SULFATE	1262.803	20779	351154	1	0.44
		Totals	1597.047	26824	376649		

File: W4121191.D01 Sample: 11967.06



Sample Name: 11967.07 7655-F-9 1:99 Date: 12/11/1992 14:39:31
Data File : C:\DX\DATA\W4121191.D02
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 2 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

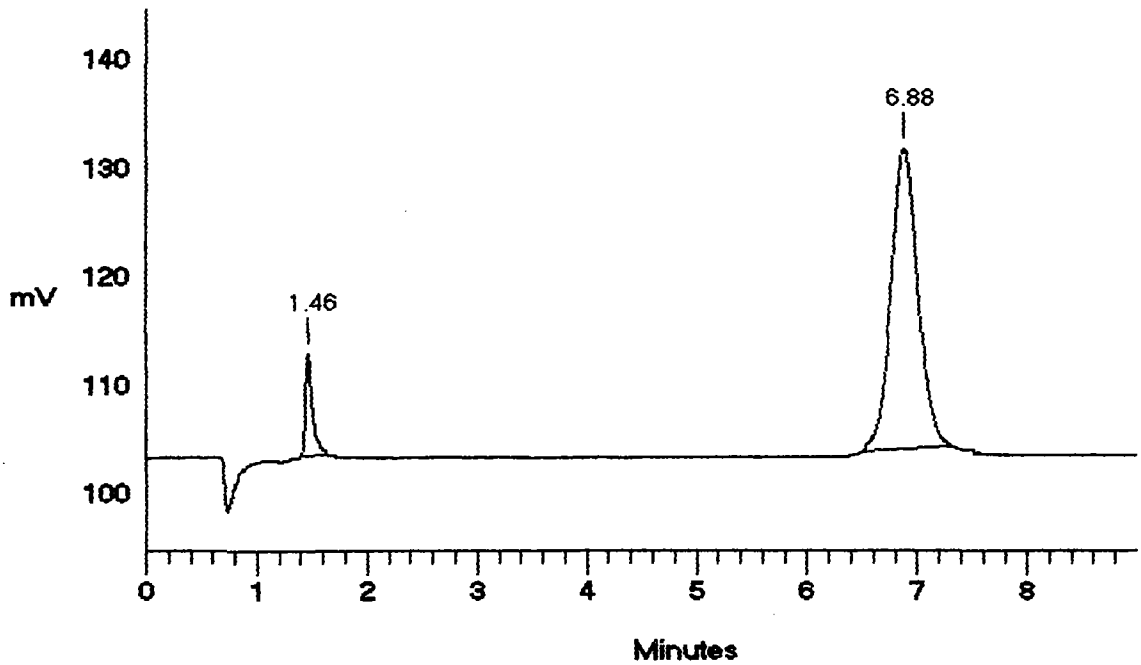
097

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	359.859	9440	41784	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.88	SULFATE	1577.596	27674	470158	1	0.29
		Totals	1937.455	37114	511943		

File: W4121191.D02 Sample: 11967.07



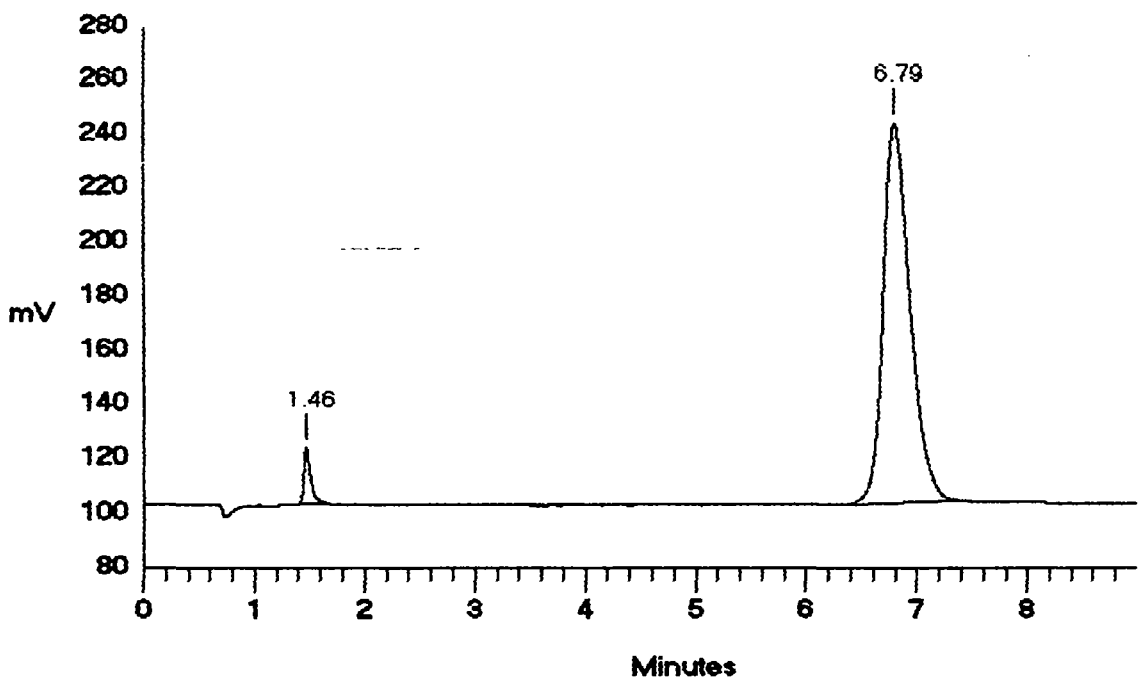
Sample Name: 11967.08 7655-F-10 1:9 Date: 12/11/1992 14:50:30
Data File : W4121191.D03 098
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 3 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	43.449	19510	89241	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.79	SULFATE	657.202	139759	2358252	1	-1.02
		Totals	700.651	159269	2447492		

File: W4121191.D03 Sample: 11967.08



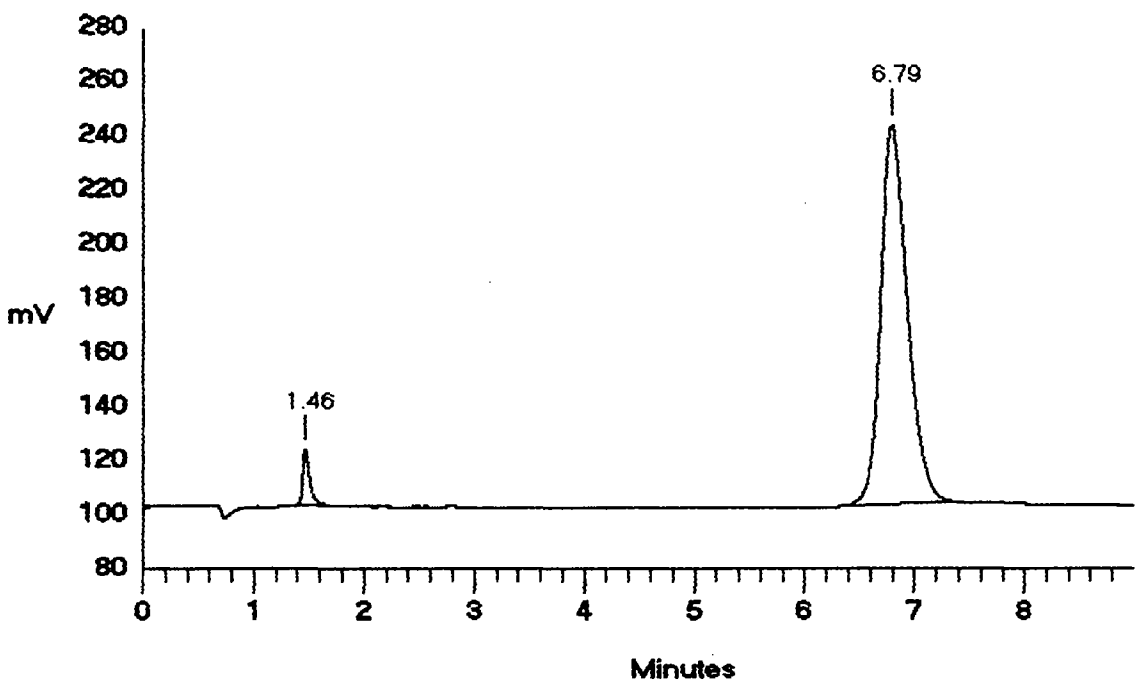
Sample Name: 11967.09 7655-F-11 1:9 Date: 12/11/1992 15:01:30 099
Data File : W4121191.D04
Method : C:\DX\METHOD\AUTO.met dab 12/11/92
ACI Address: 1 System: 1 Inject#: 4 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	43.581	20014	90085	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.79	SULFATE	654.296	139871	2347266	1	-1.02
		Totals	697.878	159885	2437351		

File: W4121191.D04 Sample: 11967.09



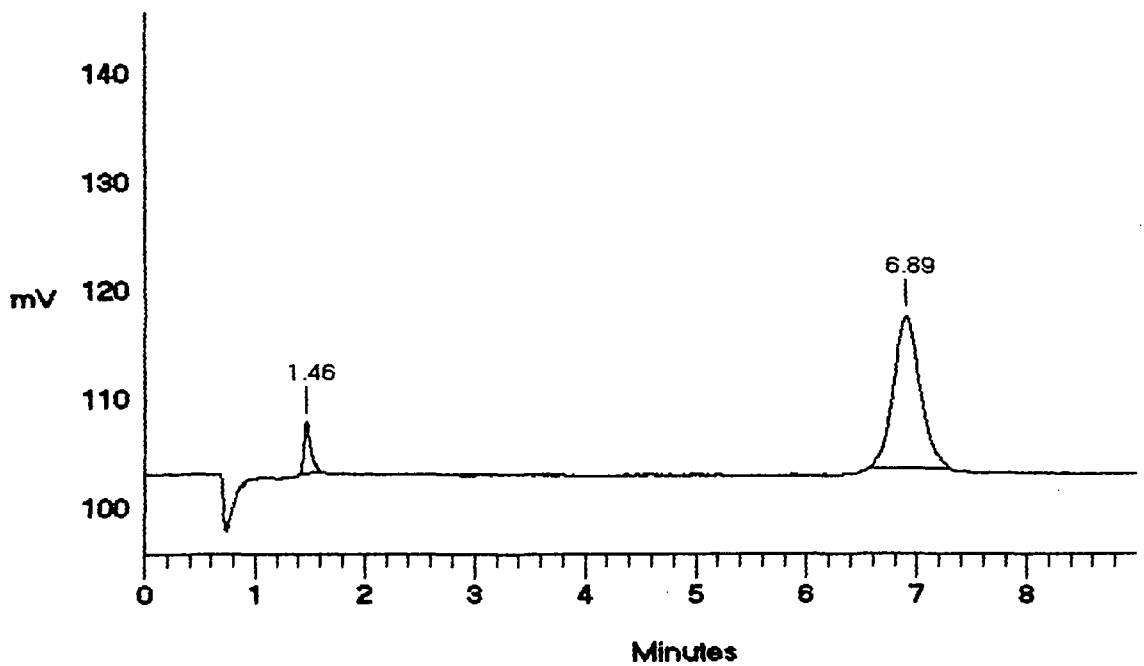
Sample Name: 11967.10 7655-F-12 1:99 Date: 12/11/1992 15:12:27
Data File : W4121191.D05
Method : C:\DX\METHOD\AUTO.met dab 12/17/92 100
ACI Address: 1 System: 1 Inject#: 5 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	100	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
1	1.46	CHLORIDE	325.591	4550	19993	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
2	6.89	SULFATE	958.432	13936	236089	1	0.44
		Totals	1284.023	18486	256083		

File: W4121191.D05 Sample: 11967.10



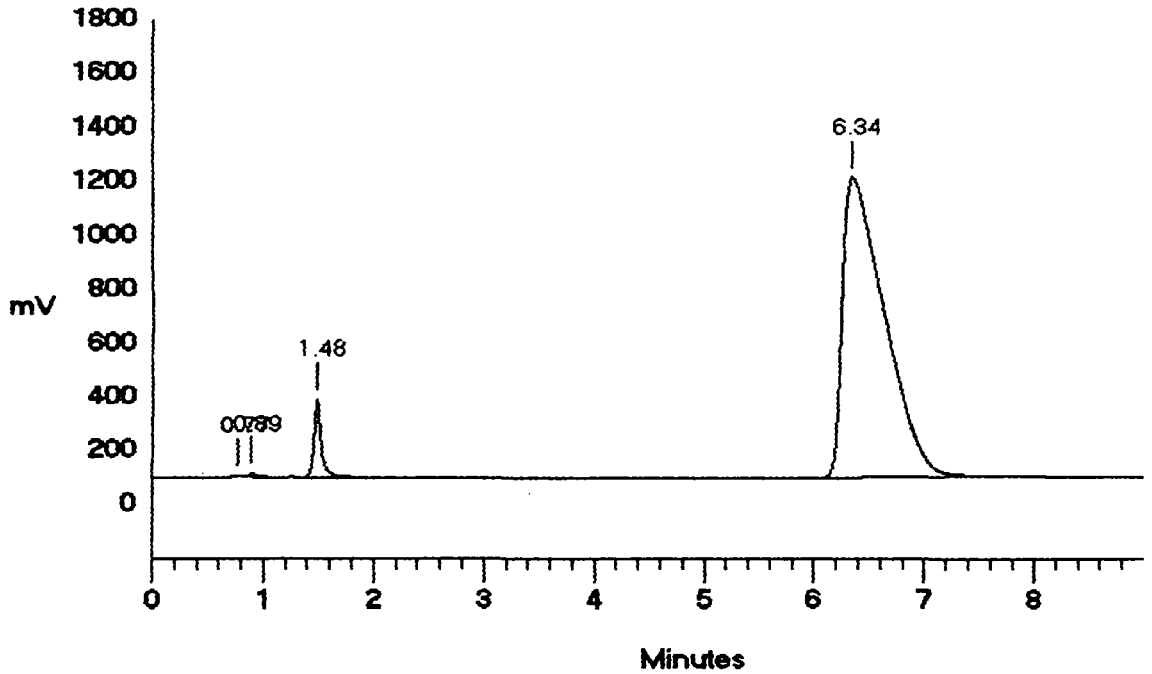
Sample Name: 11967.08MS 7655-F-10 S Date: 12/11/1992 15:23:27
Data File : W4121191.D06 101
Method : C:\DX\METHOD\AUTO.met DB 12/7/92
ACI Address: 1 System: 1 Inject#: 6 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	0.878	11253	50246	2	-1.11
3	1.48	CHLORIDE	22.830	292602	1264733	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
4	6.34	SULFATE	783.676	1113702	29499866	1	-7.58
		Totals	807.384	1417558	30814845		

File: W4121191.D06 Sample: 11967.08MS



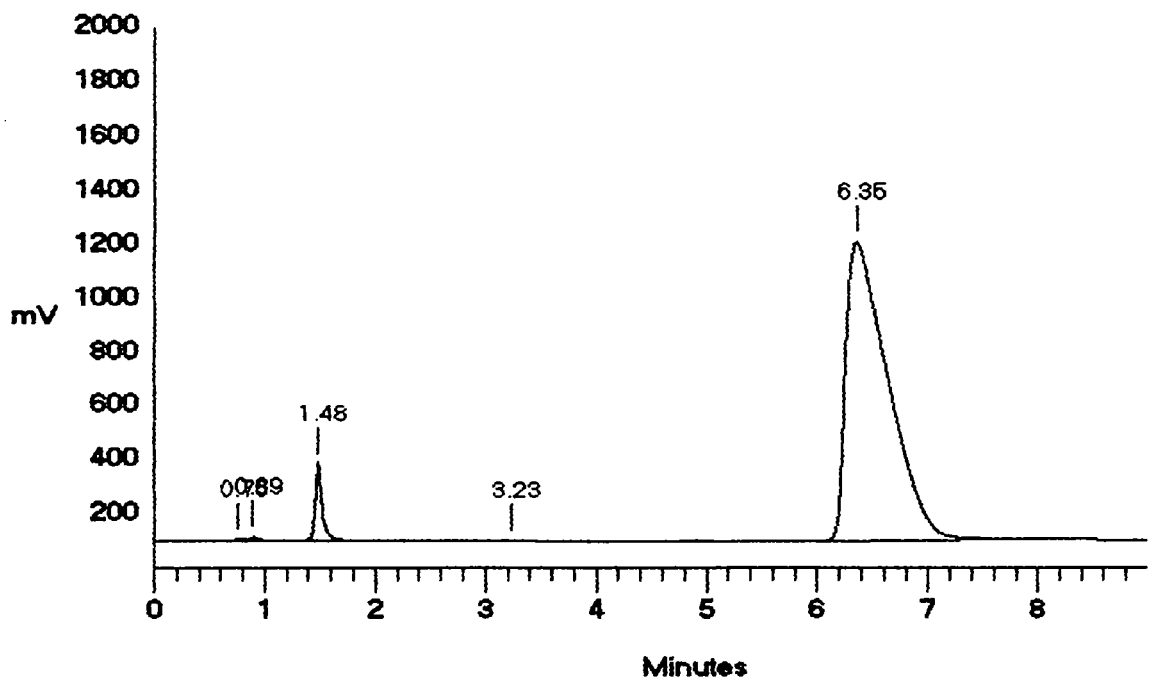
Sample Name: 11967.08MSD 7655-F-10 SD Date: 12/11/1992 15:34:27
Data File : W4121191.D07
Method : C:\DX\METHOD\AUTO.met AB 12/11/92 102
ACI Address: 1 System: 1 Inject#: 7 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	0.855	11053	48274	2	-1.11
3	1.48	CHLORIDE	22.650	283339	1253307	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.23	NITRATE	2.032	1231	7737	1	8.75
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.35	SULFATE	777.119	1109492	29251974	1	-7.43
		Totals	802.656	1405115	30561292		

File: W4121191.D07 Sample: 11967.08MSD



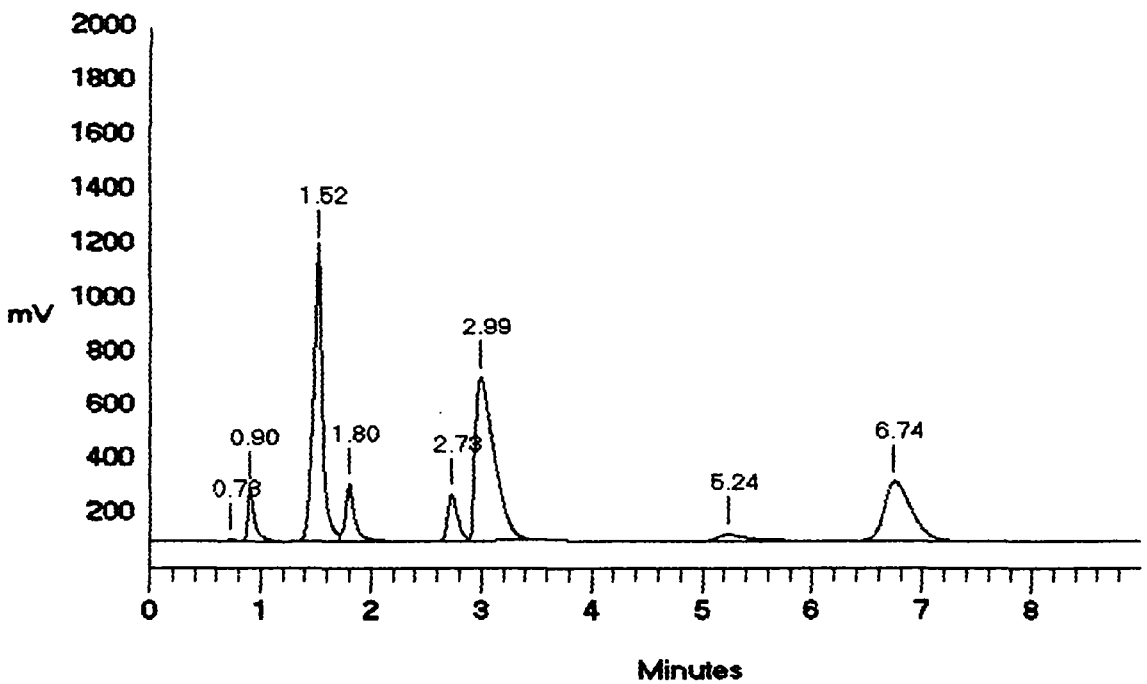
Sample Name: CCV Date: 12/11/1992 15:45:25
Data File : W4121191.D08 103
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 8 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.250	192750	849528	2	0.00
3	1.52	CHLORIDE	102.054	1087242	6302705	2	0.00
4	1.80	NITRITE	10.226	209560	1232086	2	0.00
5	2.73	BROMIDE	50.935	169362	1057489	2	0.74
6	2.99	NITRATE	50.677	602269	7241823	2	0.67
7	5.24	ORTHO-PHOSPHATE	11.687	24720	472534	1	1.95
8	6.74	SULFATE	101.900	216519	3726002	1	-1.75
		Totals	337.730	2502421	20882167		

File: W4121191.D08 Sample: CCV



104

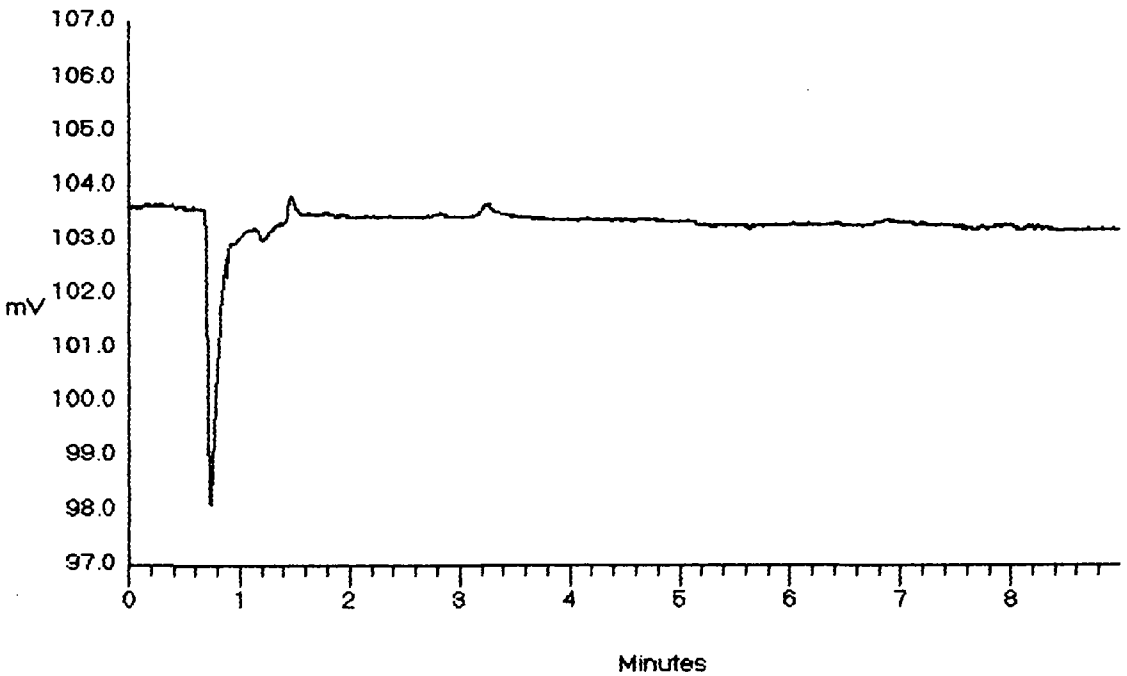
Sample Name: CCB	Date: 12/11/1992 15:56:24
Data File : W4121191.D09	
Method : C:\DX\METHOD\AUTO.met	
ACI Address: 1 System: 1 Inject#: 9 Vial:	Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857	

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W4121191.D09 Sample: CCB



Sample Name: 11967.08MS 7655-F-10 S 1:9 Date: 12/11/1992 16:07:22
Data File : W4121191.D10
Method : C:\DX\METHOD\AUTO.met 12/7/92
ACI Address: 1 System: 1 Inject#: 10 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

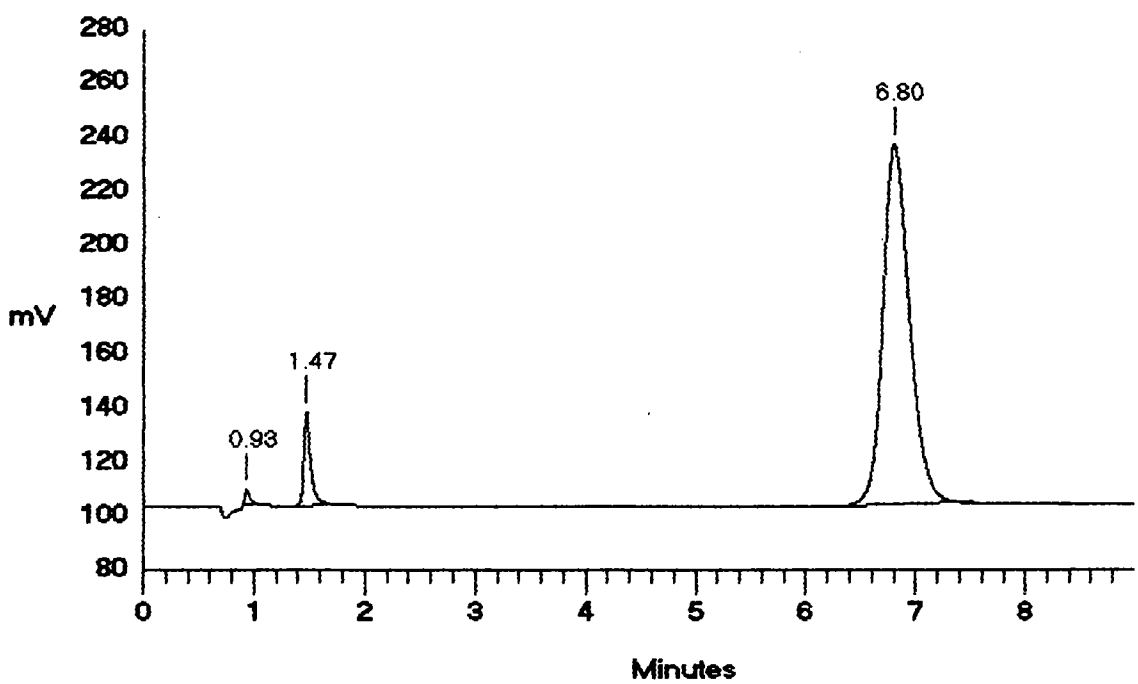
105

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	5.329	5749	20841	1	3.33
2	1.47	CHLORIDE	52.951	34646	149665	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.80	SULFATE	628.064	133360	2248098	1	-0.87
		Totals	686.344	173754	2418604		

File: W4121191.D10 Sample: 11967.08MS



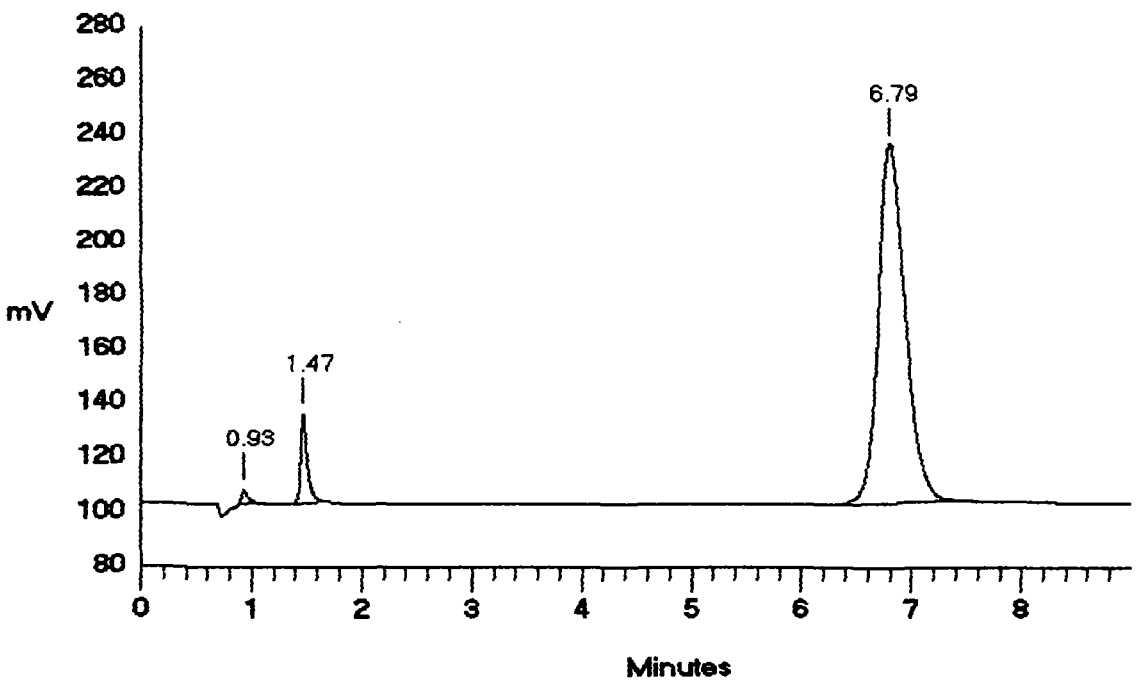
Sample Name: 11967.08MSD 7655-F-10 SD 1:9 Date: 12/11/1992 16:18:20
Data File : W4121191.D11
Method : C:\DX\METHOD\AUTO.met 12/17/92 106
ACI Address: 1 System: 1 Inject#: 11 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	10	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.93	FLUORIDE	5.159	5028	19386	1	3.33
2	1.47	CHLORIDE	51.487	32626	140360	1	-3.29
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.79	SULFATE	628.260	132856	2248837	1	-1.02
		Totals	684.906	170509	2408583		

File: W4121191.D11 Sample: 11967.08MSD



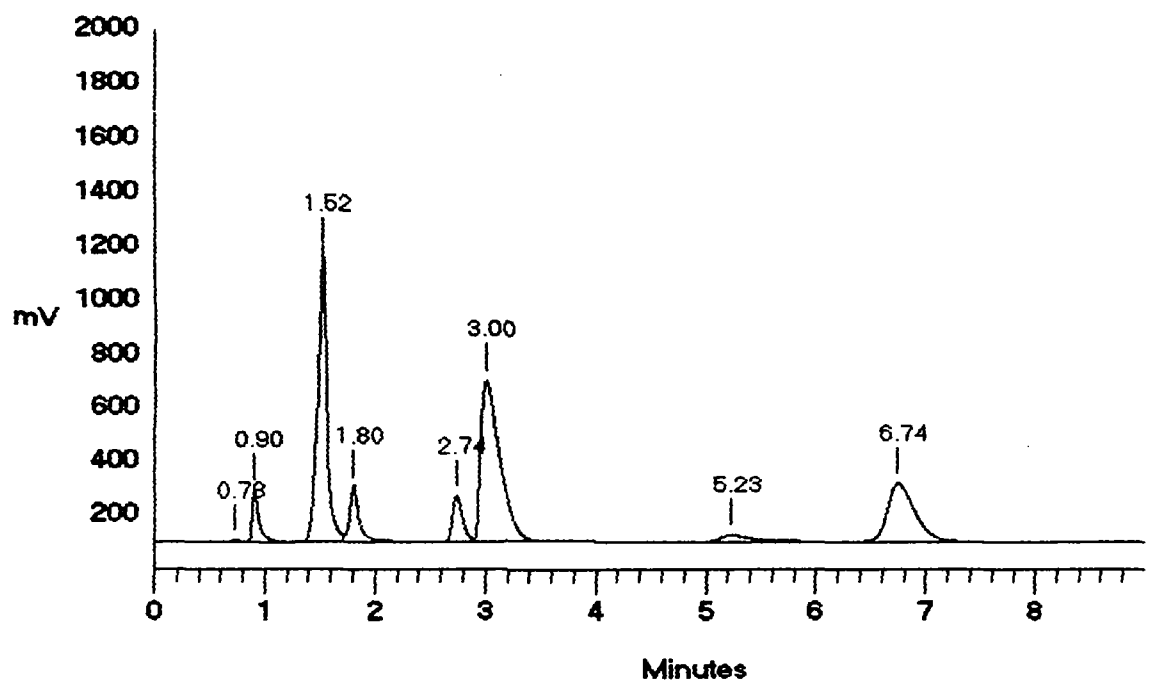
Sample Name: CCV Date: 12/11/1992 17:13:15
Data File : W4121191.D16 00107
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 16 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.238	193532	848532	2	0.00
3	1.52	CHLORIDE	101.958	1071807	6296591	2	0.00
4	1.80	NITRITE	10.349	207123	1247281	2	0.00
5	2.74	BROMIDE	50.975	169788	1058349	2	1.11
6	3.00	NITRATE	50.939	600280	7280733	2	1.01
7	5.23	ORTHO-PHOSPHATE	12.112	26018	490769	1	1.75
8	6.74	SULFATE	102.082	217915	3732858	1	-1.75
		Totals	338.653	2486463	20955113		

File: W4121191.D16 Sample: CCV



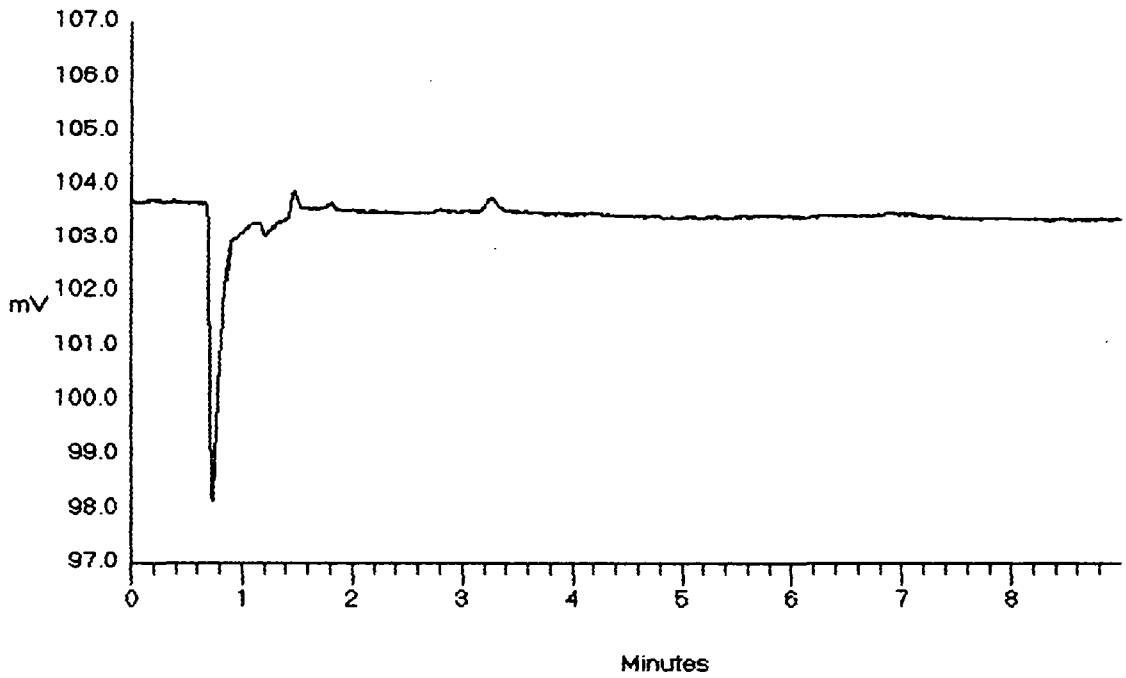
Sample Name: CCB Date: 12/11/1992 17:24:13
Data File : W4121191.D17
Method : C:\DX\METHOD\AUTO.met 108
ACI Address: 1 System: 1 Inject#: 17 Vial: Detector:COND
Analyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W4121191.D17 Sample: CCB



********** AUTOMATIC CALIBRATION UPDATE **********

109

Sample Name: AUTOCAL1 Date: Mon Dec 14 13:31:11 1992
w File : C:\DX\DATA\W1214921.D01
thod : C:\DX\METHOD\AUTO.met Calibration Level: 1
I Address: 1 System : 1 Inject#: 1 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	6.707e+004	6.630e+004	6.630e+004
2	CHLORIDE	1.52	1.47	1.47	4.897e+005	4.828e+005	4.828e+005
3	NITRITE	1.80	1.79	1.79	1.001e+005	9.218e+004	9.218e+004
4	BROMIDE	2.71	2.78	2.78	8.906e+004	8.492e+004	8.492e+004
5	NITRATE	2.97	3.18	3.18	5.413e+005	5.316e+005	5.316e+005
7	SULFATE	6.86	6.99	6.99	3.027e+005	2.818e+005	2.818e+005

110

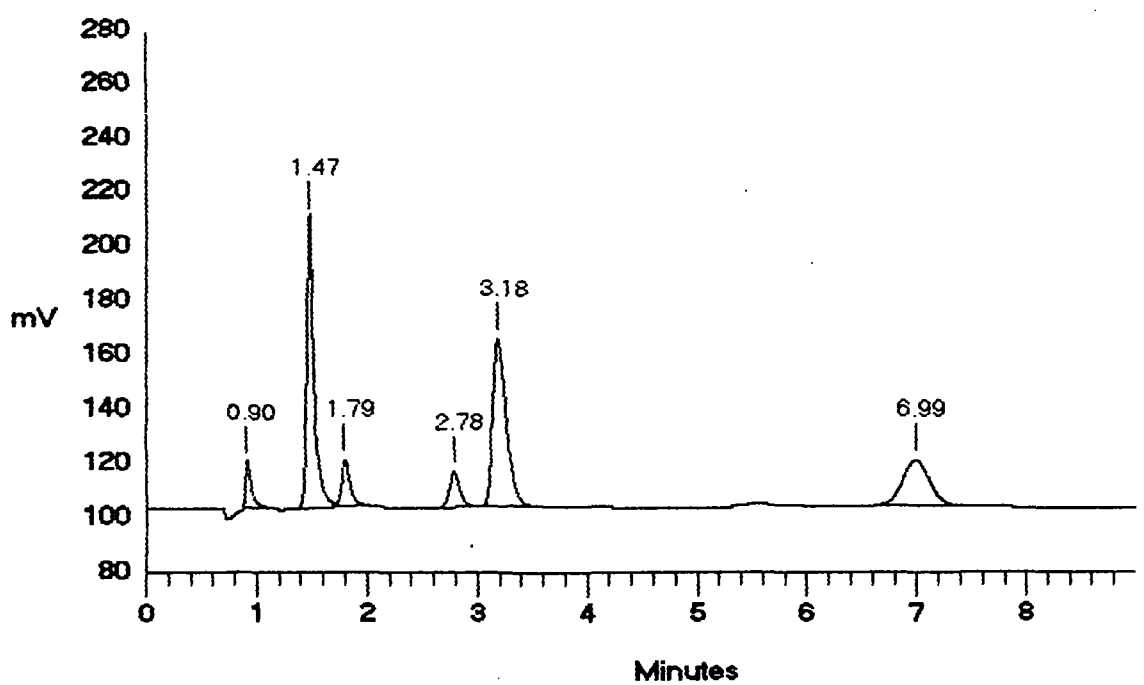
Sample Name: AUTOCAL1 Date: 12/14/1992 13:31:11
Data File : C:\DX\DATA\W1214921.D01
Method : C:\DX\METHOD\AUTO.met
I Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	1.000	16663	66302	1	0.00
2	1.47	CHLORIDE	10.000	106780	482760	2	-3.29
3	1.79	NITRITE	1.000	17157	92177	2	-0.56
4	2.78	BROMIDE	5.000	12770	84921	1	2.58
5	3.18	NITRATE	5.000	61434	531565	1	7.07
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
6	6.99	SULFATE	10.000	16889	281832	1	1.90
		Totals	32.000	231693	1539558		

File: W1214921.D01 Sample: AUTOCAL1



********** AUTOMATIC CALIBRATION UPDATE **********

111

Sample Name: AUTOCAL2 Date: Mon Dec 14 13:42:11 1992
w File : C:\DX\DATA\W1214921.D02
thod : C:\DX\METHOD\AUTO.met Calibration Level: 2
I Address: 1 System : 1 Inject#: 2 Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	3.907e+005	3.894e+005	3.894e+005
2	CHLORIDE	1.47	1.50	1.50	2.921e+006	2.904e+006	2.904e+006
3	NITRITE	1.79	1.79	1.79	5.620e+005	5.625e+005	5.625e+005
4	BROMIDE	2.78	2.75	2.75	4.841e+005	4.730e+005	4.730e+005
5	NITRATE	3.18	3.06	3.06	3.267e+006	3.234e+006	3.234e+006
6	ORTHO-PHOSPHATE	5.14	5.32	5.32	3.814e+005	2.038e+005	2.038e+005
7	SULFATE	6.99	6.92	6.92	1.678e+006	1.664e+006	1.664e+006

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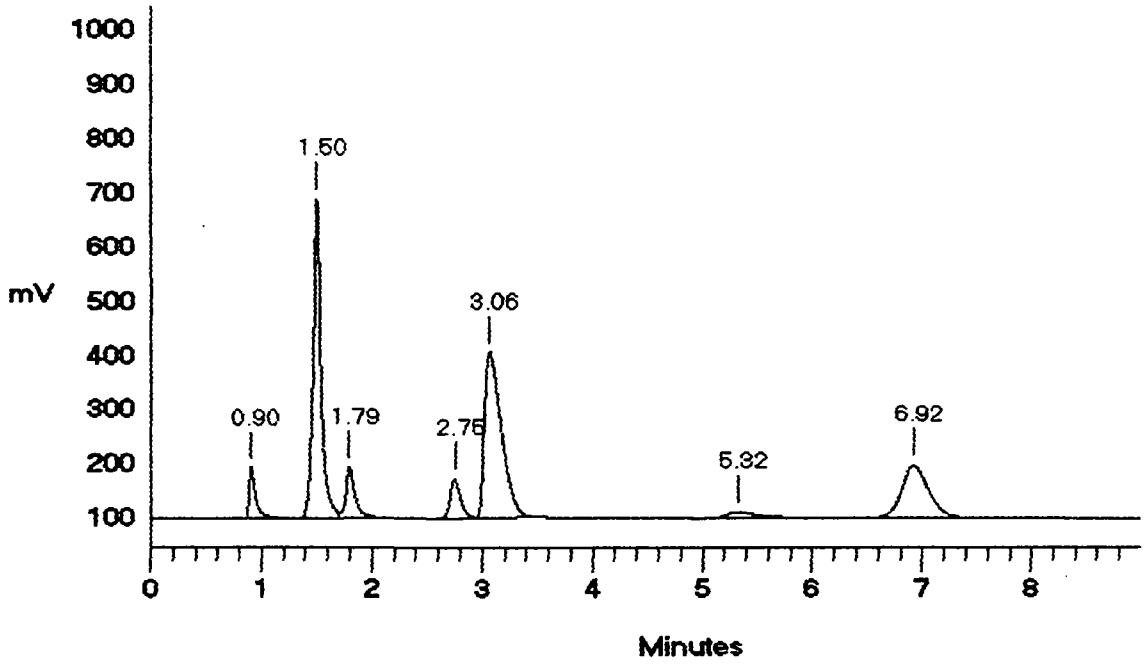
==============================================================================
| Sample Name: AUTOCAL2                          Date: 12/14/1992 13:42:11
| Data File  : C:\DX\DATA\W1214921.D02
| Method     : C:\DX\METHOD\AUTO.met
|  'I Address: 1  System: 1  Inject#: 2   Vial:            Detector:COND
|  alyst     : D. BURNS       Column: AS4A-SC SN.1857
==============================================================================
```

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	5.000	92201	389371	1	0.00
2	1.50	CHLORIDE	50.000	589635	2903654	2	2.04
3	1.79	NITRITE	5.000	93395	562539	2	0.00
4	2.75	BROMIDE	25.000	71951	472994	2	-1.08
5	3.06	NITRATE	25.000	303403	3234146	2	-3.77
6	5.32	ORTHO-PHOSPHATE	10.000	11106	203755	1	3.50
7	6.92	SULFATE	50.000	97182	1664340	1	-1.00
		Totals	170.000	1258873	9430799		

File: W1214921.D02 Sample: AUTOCAL2



********** AUTOMATIC CALIBRATION UPDATE **********

113

Sample Name: AUTOCAL3		Date: Mon Dec 14 13:53:12 1992	
w File : C:\DX\DATA\W1214921.D03			
thod : C:\DX\METHOD\AUTO.met			Calibration Level: 3
I Address: 1	System : 1	Inject#: 3	Detector: COND

********** COMPONENTS FOUND IN THIS RUN **********

COMP NUM	COMPONENT NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD RESPONSE	MEASURED RESPONSE	NEW RESPONSE
1	FLUORIDE	0.90	0.90	0.90	8.329e+005	8.378e+005	8.378e+005
2	CHLORIDE	1.50	1.52	1.52	6.202e+006	6.213e+006	6.213e+006
3	NITRITE	1.79	1.80	1.80	1.213e+006	1.228e+006	1.228e+006
4	BROMIDE	2.75	2.72	2.72	1.046e+006	1.039e+006	1.039e+006
5	NITRATE	3.06	2.98	2.98	7.205e+006	7.192e+006	7.192e+006
6	ORTHO-PHOSPHATE	5.32	5.25	5.25	8.371e+005	5.642e+005	5.642e+005
7	SULFATE	6.92	6.84	6.84	3.689e+006	3.674e+006	3.674e+006

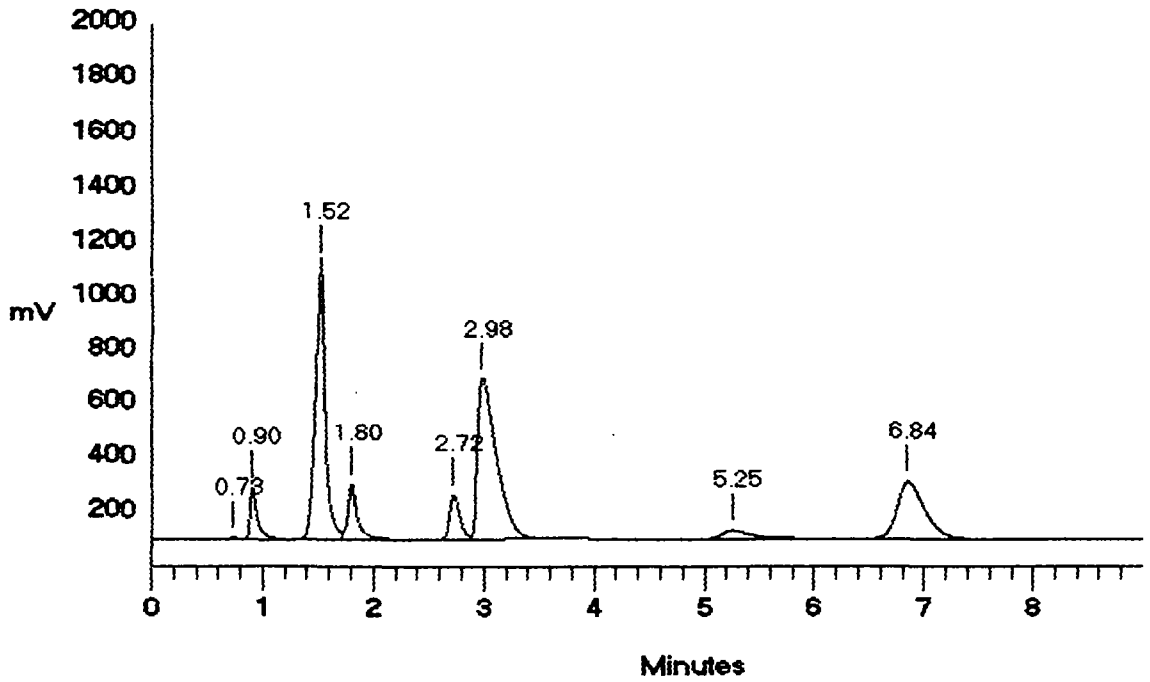
Sample Name: AUTOCAL3 Date: 12/14/1992 13:53:12
Data File : C:\DX\DATA\W1214921.D03 No. 114
Method : C:\DX\METHOD\AUTO.met
'I Address: 1 System: 1 Inject#: 3 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.000	188443	837810	2	0.00
3	1.52	CHLORIDE	100.000	1026837	6213434	2	1.33
4	1.80	NITRITE	10.000	202888	1228170	2	0.56
5	2.72	BROMIDE	50.000	162653	1039168	2	-1.09
6	2.98	NITRATE	50.000	589853	7192243	2	-2.61
7	5.25	ORTHO-PHOSPHATE	20.000	31473	564216	1	-1.32
8	6.84	SULFATE	100.000	208151	3674281	1	-1.16
		Totals	340.000	2410297	20749322		

File: W1214921.D03 Sample: AUTOCAL3



115

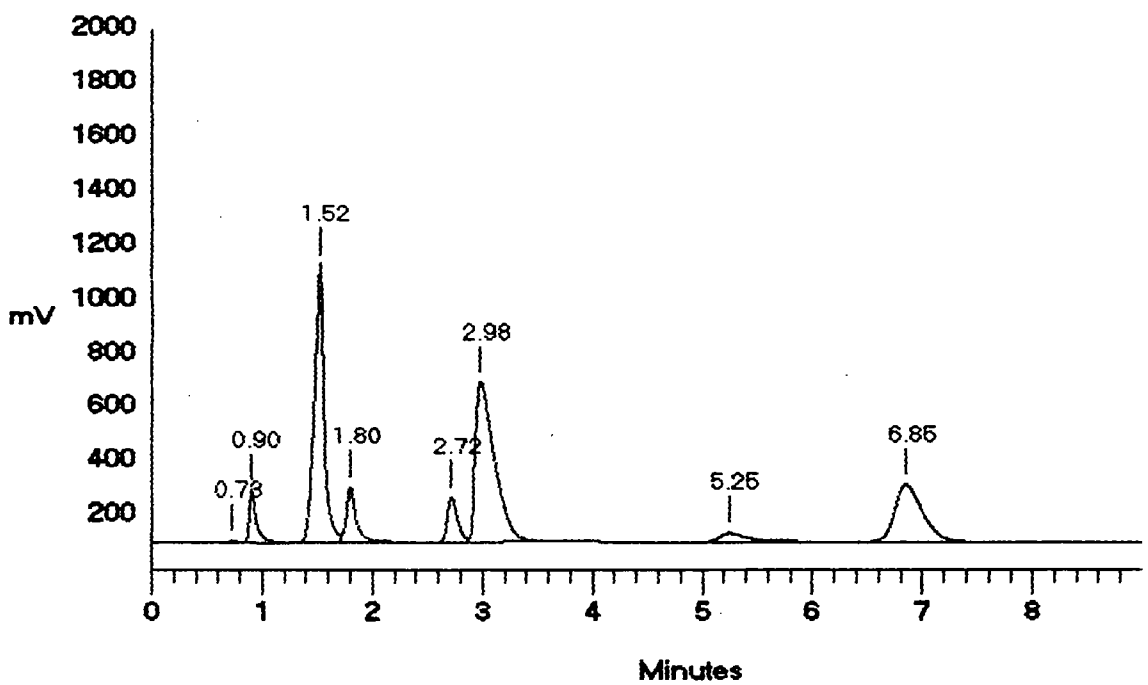
Sample Name: ICV Date: 12/14/1992 14:05:53
Data File : C:\DX\DATA\W2121491.D01
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 1 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	10.023	188118	834322	2	0.00
3	1.52	CHLORIDE	100.017	1023772	6179196	2	0.00
4	1.80	NITRITE	10.089	201566	1229978	2	0.00
5	2.72	BROMIDE	50.250	162298	1034797	2	0.00
6	2.98	NITRATE	50.219	589367	7155654	2	0.00
7	5.25	ORTHO-PHOSPHATE	20.598	31583	566333	1	0.00
8	6.85	SULFATE	100.544	207937	3661076	1	0.15
		Totals	341.740	2404642	20661356		

File: W2121491.D01 Sample: ICV



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==============================================================================
| Sample Name: ICB                                  Date: 12/14/1992 14:16:51  |
| Data File  : C:\DX\DATA\W2121491.D02                                        |
| Method     : C:\DX\METHOD\AUTO.met                                          |
| ACI Address: 1  System: 1  Inject#: 2   Vial:            Detector:COND      |
|   alyst    : D. BURNS        Column: AS4A-SC SN.1857                        |
==============================================================================
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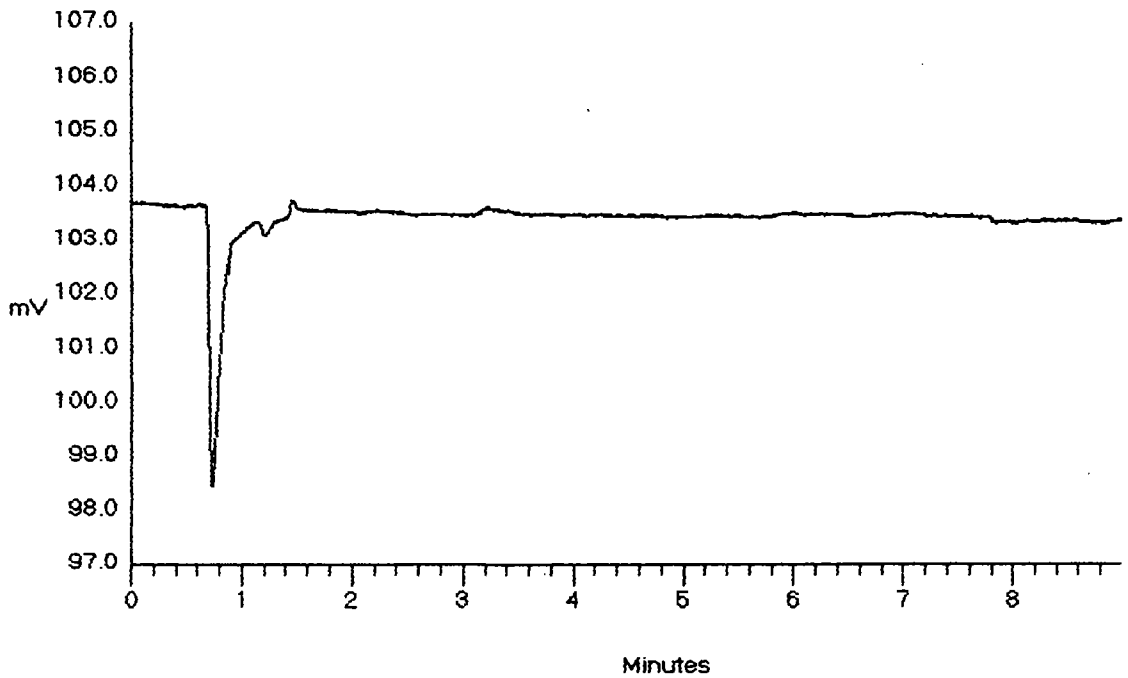
116

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121491.D02 Sample: ICB



Sample Name: 11967.08MS 7655-F-10 S Date: 12/14/1992 14:27:49
Data File : C:\DX\DATA\W2121491.D03
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 3 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

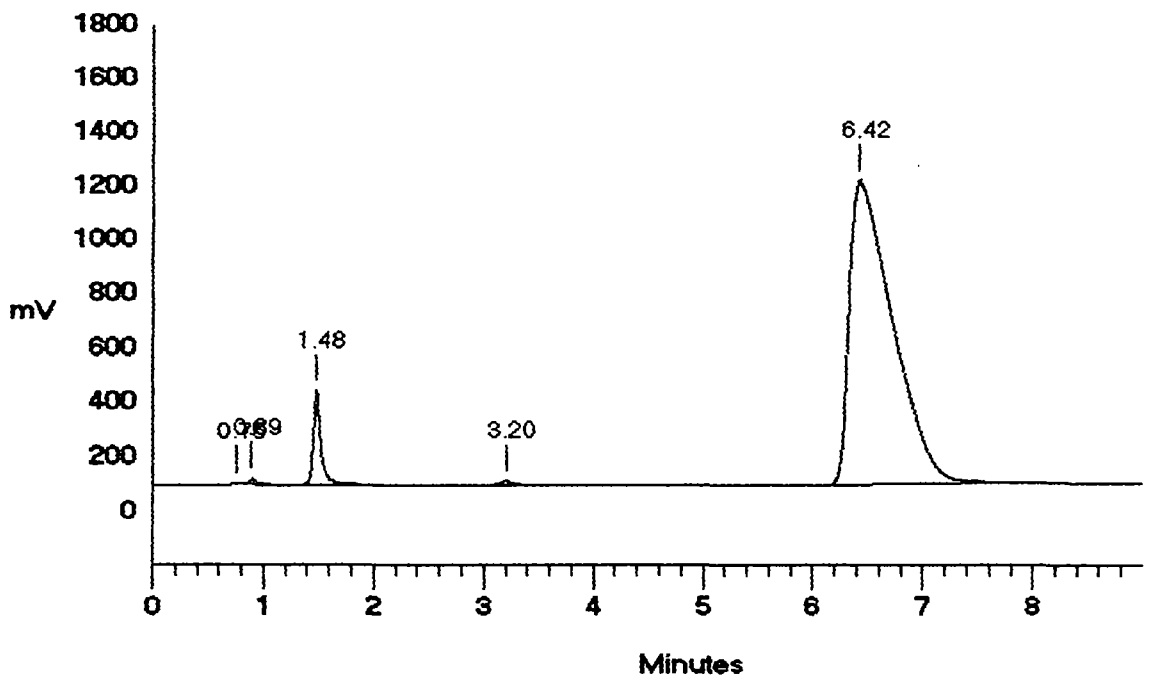
117

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	1	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	1.313	18635	85594	2	-1.11
3	1.48	CHLORIDE	28.297	342068	1602147	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.20	NITRATE	2.735	12151	93331	1	7.38
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.42	SULFATE	812.807	1121907	30630406	1	-6.14
		Totals	845.152	1494762	32411479		

File: W2121491.D03 Sample: 11967.08MS



Sample Name: 11967.08MSD 7655-F-10SD Date: 12/14/1992 14:38:49
Data File : C:\DX\DATA\W2121491.D04
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 4 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

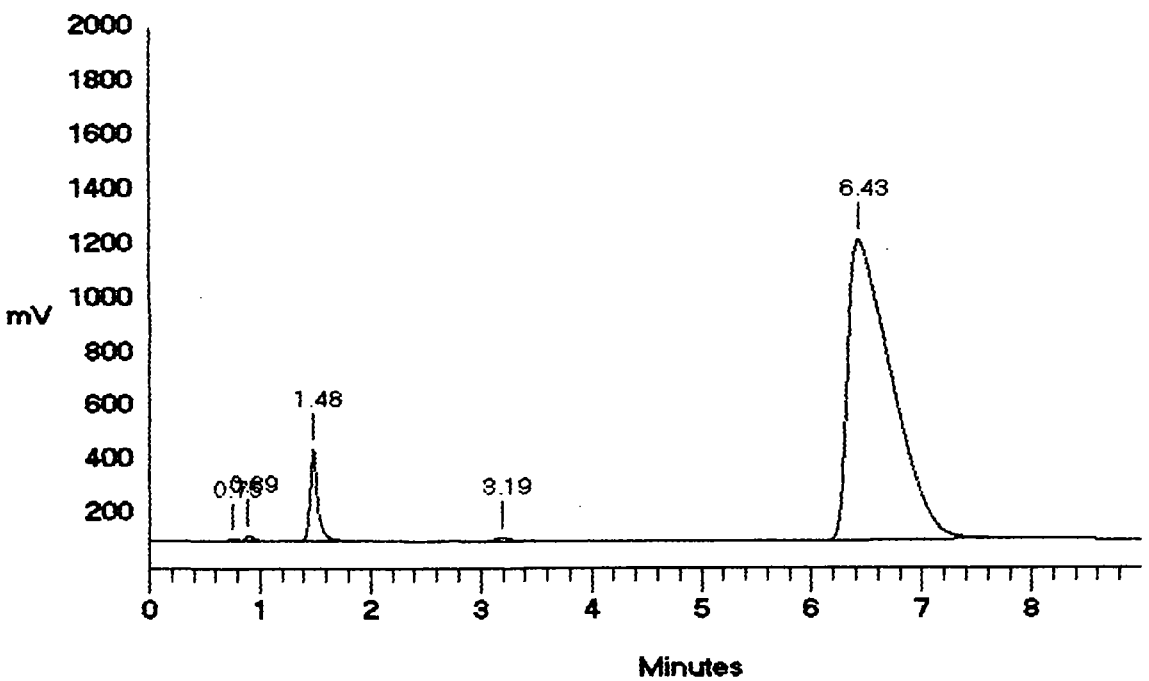
118

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00		1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.89	FLUORIDE	1.349	18829	88684	2	-1.11
3	1.48	CHLORIDE	28.563	343010	1619168	1	-2.63
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
4	3.19	NITRATE	2.766	12562	97928	1	7.05
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
5	6.43	SULFATE	812.027	1113448	30600872	1	-5.99
		Totals	844.705	1487849	32406651		

File: W2121491.D04 Sample: 11967.08MSD



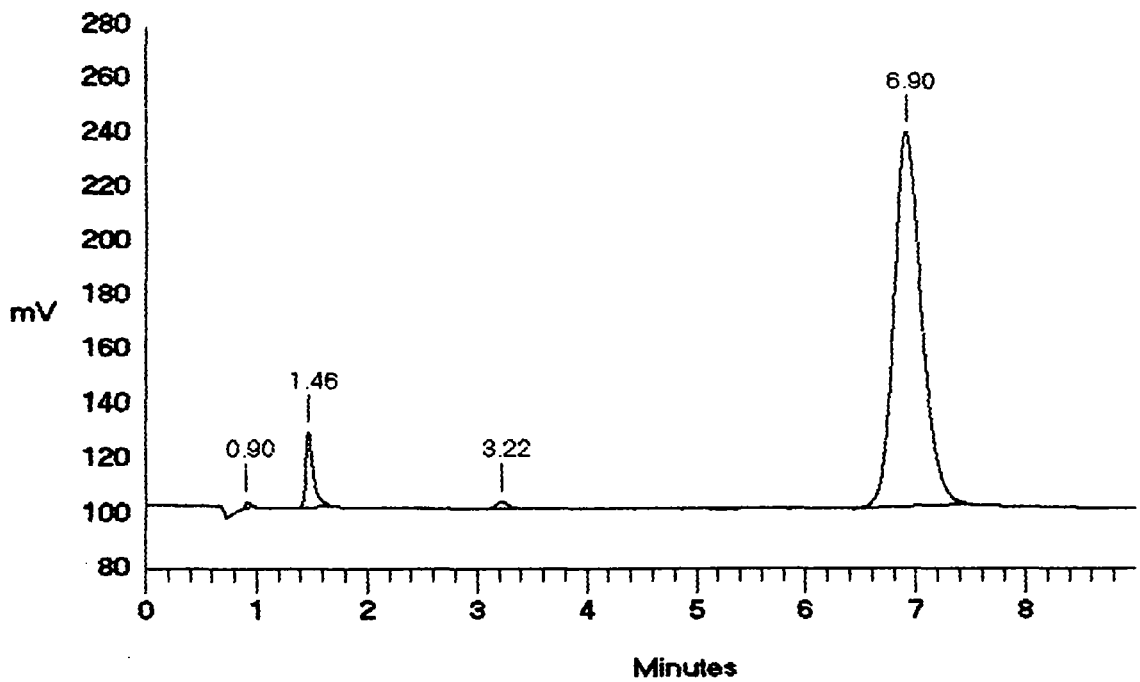
Sample Name: 11967.08MS 7655-F-10 S 1:9 Date: 12/14/1992 14:49:46 **119**
Data File : C:\DX\DATA\W2121491.D05
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 5 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.90	FLUORIDE	3.784	1721	5236	1	0.00
2	1.46	CHLORIDE	52.098	26979	128795	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
3	3.22	NITRATE	22.051	2210	14486	1	8.05
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
4	6.90	SULFATE	664.959	137602	2371877	1	0.88
		Totals	742.893	168513	2520394		

File: W2121491.D05 Sample: 11967.08MS



Sample Name: 11967.08MSD 7655-F-10SD 1:9 Date: 12/14/1992 15:00:46
Data File : C:\DX\DATA\W2121491.D06
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 6 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

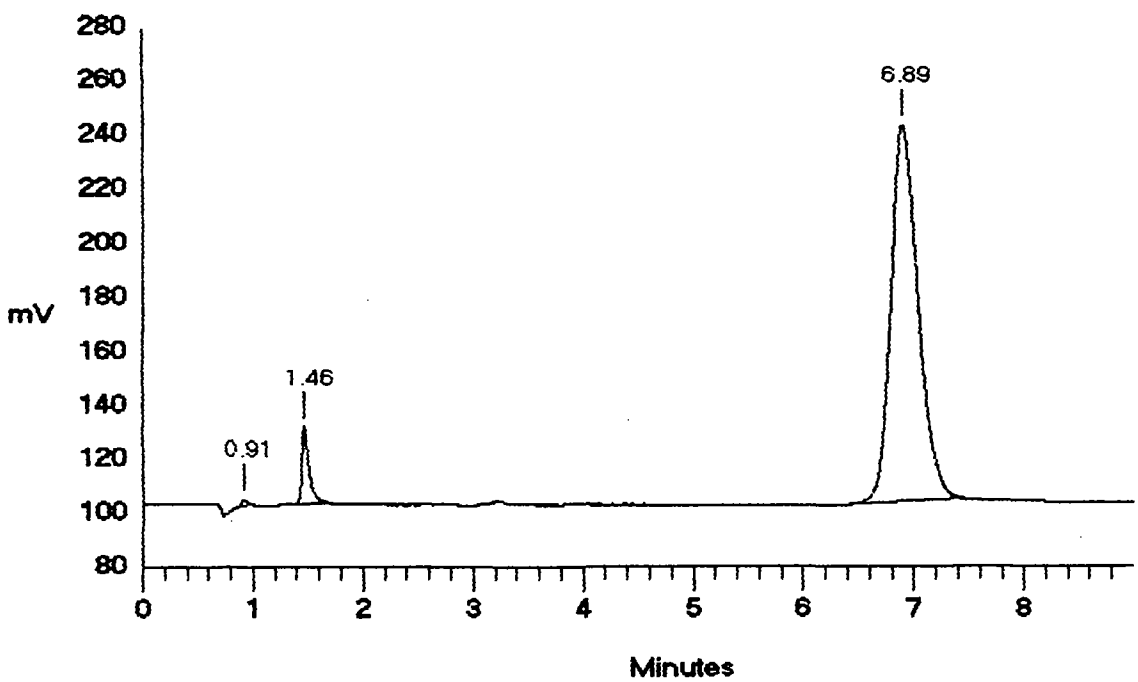
120

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area Reject
External	1	10	2700	5Hz	0.00	9.00	1000

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
1	0.91	FLUORIDE	3.832	1833	5646	1	1.11
2	1.46	CHLORIDE	52.567	28391	131786	1	-3.95
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
3	6.89	SULFATE	670.968	139289	2394627	1	0.73
		Totals	727.367	169512	2532059		

File: W2121491.D06 Sample: 11967.08MSD



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==============================================================================
| Sample Name: CCV                                Date: 12/14/1992 15:11:44   |
| Data File  : C:\DX\DATA\W2121491.D07                                        |
| Method     : C:\DX\METHOD\AUTO.met                                          |
| ACI Address: 1  System: 1  Inject#: 7   Vial:            Detector:COND      |
|   alyst    : D. BURNS        Column: AS4A-SC SN.1857                        |
==============================================================================
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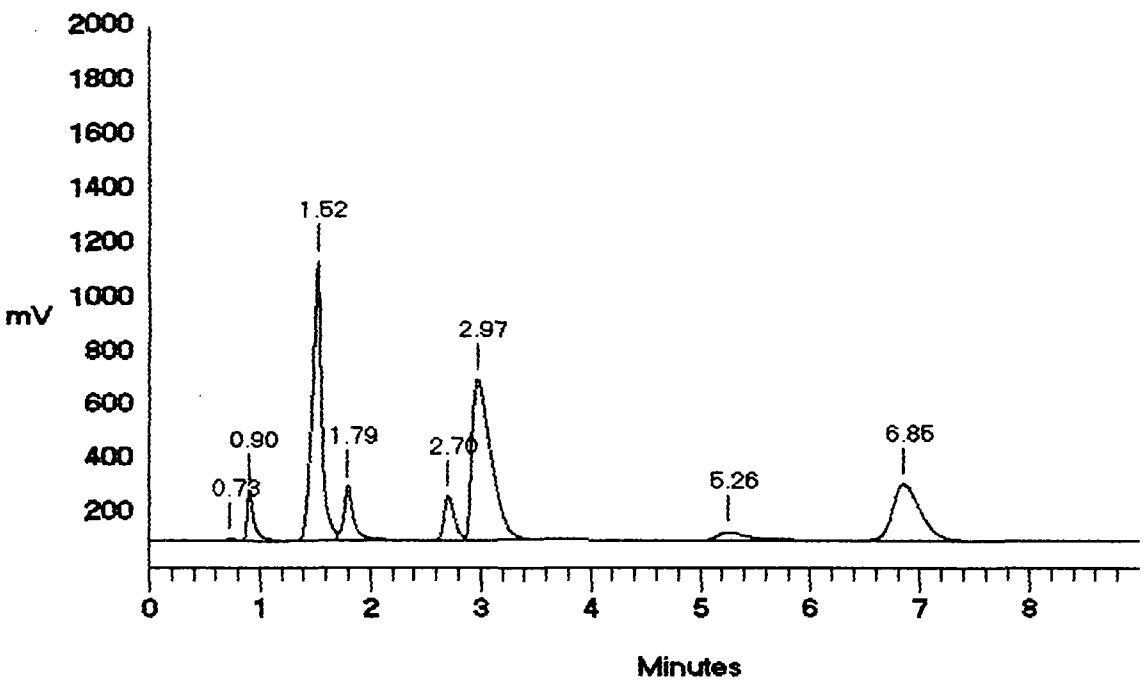
121

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
2	0.90	FLUORIDE	9.971	185658	829824	2	0.00
3	1.52	CHLORIDE	99.911	1032811	6172423	2	0.00
4	1.79	NITRITE	10.134	196307	1235613	2	-0.56
5	2.70	BROMIDE	50.280	157980	1035425	2	-0.74
6	2.97	NITRATE	50.239	594609	7158607	2	-0.34
7	5.26	ORTHO-PHOSPHATE	19.865	30399	545106	1	0.19
8	6.85	SULFATE	100.394	208221	3655411	1	0.15
		Totals	340.794	2405985	20632409		

File: W2121491.D07 Sample: CCV



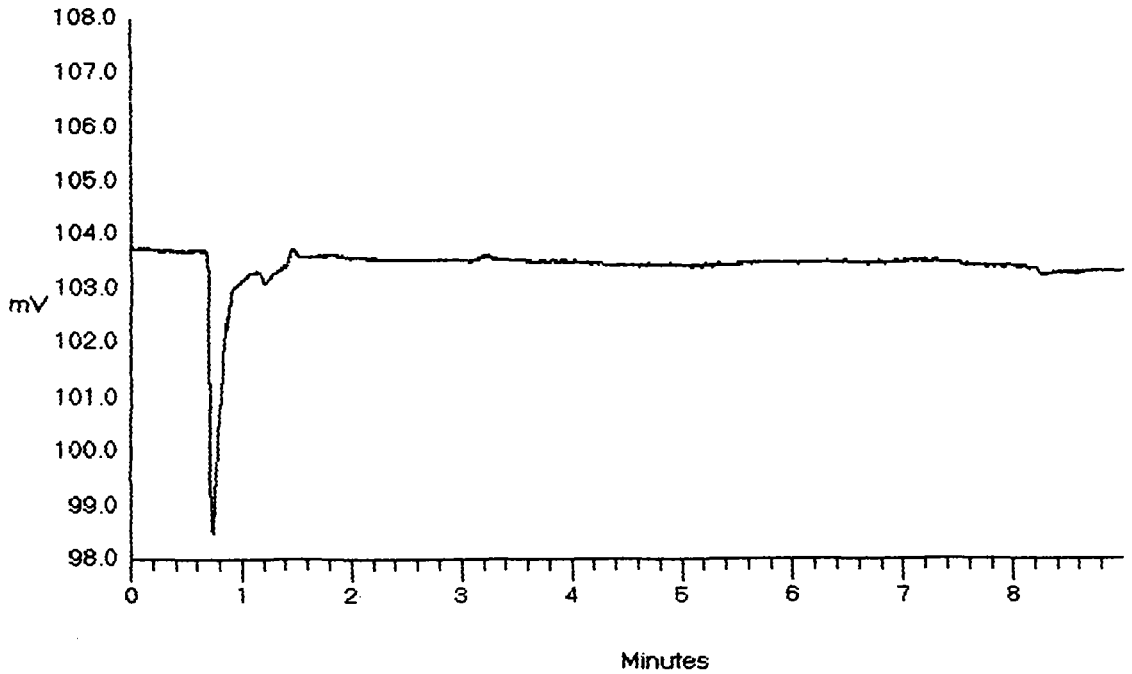
Sample Name: CCB Date: 12/14/1992 15:22:43
Data File : C:\DX\DATA\W2121491.D08 122
Method : C:\DX\METHOD\AUTO.met
ACI Address: 1 System: 1 Inject#: 8 Vial: Detector:COND
alyst : D. BURNS Column: AS4A-SC SN.1857

Calibration	Volume	Dilution	Points	Rate	Start	Stop	Area	Reject
External	1	1	2700	5Hz	0.00	9.00	1000	

********** Component Report: All Components **********

Pk. Num	Ret Time	Component Name	Concentration mg/l	Height	Area	Bl. Code	%Delta
0	0.00	FLUORIDE	0.000	0	0	0	0.00
0	0.00	CHLORIDE	0.000	0	0	0	0.00
0	0.00	NITRITE	0.000	0	0	0	0.00
0	0.00	BROMIDE	0.000	0	0	0	0.00
0	0.00	NITRATE	0.000	0	0	0	0.00
0	0.00	ORTHO-PHOSPHATE	0.000	0	0	0	0.00
0	0.00	SULFATE	0.000	0	0	0	0.00
		Totals	0.000	0	0		

File: W2121491.D08 Sample: CCB



T.D.S. 12-11-92

270

CR DL = 10 mg/l

13:30

sample #	Blank (D)	489 Conc 2 Control (I)	11967.01 (16)	11967.02 (F)	11967.03 (4)
	10:00	10:05	10:10	10:15	10:20
dry	71.1078	68.4944	72.3828	69.2908	67.5780
dish	71.1073 g	68.4639	72.3790	68.9829	67.2746
residue	0.0005	0.0305	0.0038	0.3079	0.3034
Vol	100 mls	100	100	100	100
TDS	5 mg/l	305 (106% Recov.) (or 105 % X)	38	3079	3034

sample #	11967.04 (19)	11967.05 (17)	11967.06 (20)	11967.07 (15)	11967.08 (E)
	10:25	10:30	10:35	10:40	10:45
dry	69.1352	71.1032	73.6710	64.2685	71.5477
dish	69.1028 g	71.0807	73.4622	64.0028	71.4246
residue	0.0324 g	0.0225	0.2088	0.2657	0.1231
Vol	100 mls	100	100 (Small bit of residue from filtrate)	100	100
TDS	324 mg/l	225	2088	2657	1231

sample	11967.09 (C)	11967.10 (G)	11967.08 (8) DUP	11967.08 (13) Spike *	
	10:50	10:55	11:00	13/14 64.9892 re 180°	11:05
dry	73.5342	73.6427	68.2238	64.9916	
dish	73.4101 g	73.5172 (72) not cooled	68.0964 (90) not cooled	64.8504 (28)	
residue	0.1241	0.1255	0.1248	0.1388	
				0.1364	
Vol	100 mls	100	100	100 + 2.5 mls	157/102 → 154
TDS	1241 mg/l	1255	1248 (17 → 1.48) 1239.5	~~1351?~~ 1361	130/102 → 127
				1331 mg/l (1331-1231 = 100)	100/102 → 98%

X Spike: Res 489 Batch 929 (Conc 1) vial/100 ml = 4080 ppm Use 2.5 mls per 100 ml sample → 102 mg/l

$\bar{X}$ = 4110 103

Control: Res 489 Batch 957 (Conc. 2) True value 287 mg/l

$\bar{X}$ 44 290

413

R/L

Alkalinity

010 023/024

12-15-92
10:30

1117

124

Sample #	Vol	begin pH	end pH	mls 0.0203 N H_2SO_4	Calc Value	mg/l $CaCO_3$-Alk	
Blank	50 mls	6.04	4.5	0.10 - 0.00 = 0.1	2	< 20	10:30
Std 50 mg/l	1.0 ml of 2500ppm / 50	10.4	4.5	2.65 - 0.20 = 2.45	49.7	99%	10:35
11967.01	50 mls	6.51	4.5	4.10 - 3.00 = 1.10	22.3	22	10:40
.02	50	7.47		13.80 - 4.10 = 9.70	196.9	197	10:45
.03	50	7.48		24.25 - 13.8 = 10.45	212.1	212	10:50
.04	50	7.32		35.60 - 24.3 = 11.30	229.4	229	10:55
.05	50	7.24		36.85 - 35.60 = 1.25	25.4	25	11:00
.06	50	7.49		48.90 - 37.00 = 11.9	241.6	242	11:05
.07	50	8.02		8.0 - 0.0 = 8.0	162.4	162	11:10
.08	50	8.00		18.95 - 8.6 = 10.35	210.1	210	11:15
.08 Dup	50	8.0		29.45 - 19.1 = 10.35	210.1	0% RPD	11:20
20 .08 MS	50 (400 ml 2500ppm)	8.34		40.95 - 29.5 = 19.45	232.4	23/20 → 110% Recov.	11:25
.09	50	8.01		1.45 + (50 - 41.0) = 10.45	212.1	212	11:30
11968.10	50 mls	9.87	4.5	5.8 - 0.4 = 5.4	109.6	110	11:35

mg/l Alk = $\frac{\text{mls std acid} \times N_{acid} \times 50{,}000}{\text{smpl mls}}$ $\frac{2.45 \times 0.0203 \times 50{,}000}{50} = 49.7$

11972.01	50 mls	7.81	4.5	14.8 - 6.1 = 8.7	176.6	T. 177	
11972.01						Bi 177	
11972.01						C. <1	
11972.04 DISS	50	7.83		43.65 - 34.8 = 8.85	179.7	T. 180	
11980.01	50	7.77		26.15 - 14.8 = 11.35	230.4	T. 230	
						Bi 230	
						C. <1	
11986.04 DISS	50	8.10		11.5 - 0.0 = 11.5	233.4	T 233	
11986.05	50	7.47		30.75 - 26.20 = 4.55	92.4	T. 92	
						Bi 92	
						C. <1	
11988.08 DISS	50	7.62		16.1 - 11.7 = 4.4	89.3	T 89	
.09	50	7.60		34.80 - 30.90 = 3.9	79.2	T. 79	
						Bi 79	
						C. <1	
11988.12 DISS	50 mls	7.61	4.5	20.05 - 16.2 = 3.85	78.2	T 78	

(DISS samples filtered → 0.45 micron filter.)

Alkalinity 12-17-92 15:30

S	Vol	begin pH	end pH	mls 0.0203N H_2SO_4			Alk. $CaCO_3$ mg/l
11967.10	50mls	9.99	8.3	26.25 − 25.8 = 0.15	P=9.1	Total	114
			4.5	31.4 − 25.8 = 5.6		BiCarb	96
						Carb	18 = <20
11992.101	50mls	10.63	8.3	35.5 − 31.5 = 4.0	P = 81	Total	183
			4.5	40.5 − 31.5 = 9.0		BiCarb	21
						Carb	162

Carb = 2P Bi Carb = T − 2P Total = $\frac{\text{mls acid} \times N_{acid} \times 50{,}000}{\text{sample mls}}$

$= \frac{0.45 \times 0.0203N \times 50000}{50} = 9.1$, BC = 114 − 18 = 96 $T = \frac{5.6 \times 0.0203 \times 50000}{50} = 113.7$

Carbonate = 18.2, BiCarb = 96 Total = 114

SWLO / AATS

Page 31 of Book 149

SAMPLE DIGESTION RECORD

Digestion Date 12-14-92
Type of Analysis Tep only

Digestion Batch No.
Client AATS-V

Analyst SMN
Matrix HCO
11:00

Sample ID	Client ID	Beaker No.	Initial wt/vol g/ml	Final vol (ml)	Description Water-Color, Clarity Soil-Color, Texture Artifacts		pH <2>	Comments (Spiking Sol)	Soil Preparation Pan wt(g)	Wet wt(g)	Dry wt(g)	Solid %
PBW			100ml	100ml								
LCSW								10 ml IOV 1 10 ml ICV 3	2	0 t.	195 397	
196701	7655-F2				Clear no color	Clear no color	6					
02	-F3											
.03	-F4											
.04	-F6				brown cloudy							
.05	-F7				Clear no color							
.06	-F8											
.07	-F9											
.08	-F10											
D .08												
S .08								1.0 ml MS #5				
.09	-F11											
.10	-F12											
						12-14-92		SMN				

SAMPLE DELIVERY GROUP (SDG)
TRAFFIC REPORT (TR) COVER SHEET

LAB NAME: AMERICAN ANALYTICAL & TECHNICAL SERVICES, Inc.

LAB CODE: AATS CONTRACT No.: 68-D1-0024

RAS No.: _____ SAS No.: 7655-F-01

SDG No./First Sample in SDG: 7655-F-2
(Lowest EPA Sample Number
in first shipment of samples) Receipt Date: 12/10/92

Last Sample in SDG: 7655-F-12
(Highest EPA Sample Number
in last shipment of samples) Receipt Date: 12/10/92

EPA Sample Numbers in the SDG (listed in alphanumeric order)

1.	7655-F-2	11967.01	11.	
2.	7655-F-3	.02	12.	
3.	7655-F-4	.03	13.	
4.	7655-F-6	.04	14.	
5.	7655-F-7	.05	15.	
6.	7655-F-8	.06	16.	
7.	7655-F-9	.07	17.	
8.	7655-F-10	.08	18.	
9.	7655-F-11	.09	19.	
10.	7655-F-12	.10	20.	

Note: There are a maximum of 20 field samples in SDG.

Attach Traffic Reports to this form in alphanumberic order (i.e., the order listed on this form).

Missy Hamby 12-10-92
Sample Custodian Date

SMART/AATSMT1.DOC

U.S.ENVIRONMENTAL PROTECTION AGENCY
CLP Sample Management Office
300 North Lee St., Suite 200
Alexandria, Va. 22314
Phone: (703) 557-2490

Case # _____

SAS # 7655-F-01

SPECIAL ANALYTICAL SERVICES
CLIENT REQUEST FORM

A. EPA Region/Client : Region 6

B. RSCC Representative : [redacted]

C. Telephone : [redacted]

D. Date of Request : [redacted]

E. Site Name : [redacted]

F. CERCLIS # : [redacted]

Please provide below description of your request for SAS under the CLP. In order to most efficiently obtain laboratory capability for your request, please address the following consideration if applicable. Incomplete or erroneous information may result in a delay in processing your request.

1. General description of analytical service requested:

   Ca, Mg, K, Na, Cl, F, N, SO4, HCO3, CO3, TDS.

2. Definition and number of work units involved.

   37 low conc. waters for the analysis of analytes in item # 1.

3. Purpose of analysis. Site spill ID number, if any.

   [redacted]

4. Estimated date(s) of collection:

   Week of December 7, 1992.

5. Estimated date(s) and method of shipment:

   Same as above. Overnight carrier.

To: Rhonda Holder

Page 2

6. Number of days analysis and data required after laboratory receipt of samples:

   The data package is due thirty five days after receipt of samples.

   Technical holding times indicated in the methods, must not be exceeded. Data will be regarded as unusable if these technical holding times are exceeded.

   The lab(s) awarded this contract must notify SMO immediately of any problems encountered during analysis that will delay submission of the data. SMO will contact the TPO to request instructions.

7. Analytical protocol required (attach copy if other than a protocol currently used in the program).

Analyte	Analytical Protocol	Method
Bicarbonate	Alkalinity titrimetric	2320B
Carbonate	" " " "	2320B
Chloride	Ion chromatography	300.0
Fluoride	" " "	300.0
Nitrate (N)	" " "	300.0
Sulfate	" " "	300.0
Calcium	CLP SOW	ILMO2.0
Magnesium	CLP SOW	"
Potasium	CLP SOW	"
Sodium	CLP SOW	"
TDS		160.1

8. Special Technical instructions (if outside protocol requirements, specify compound names, CAS numbers, detection limits)

   Lab(s) awarded this contract will hold the samples/extracts for 180 days after the data package has been forwarded to the Region, unless authorization for disposal is received from the Regional RSCC.

   For Method 2320 B for Carbonate and Bicarbonate analysis, report concentrations for both the Carbonate and the Bicarbonate.

To: Rhonda Holder
[redacted]
Page 3

9. Analytical results required.

Analytical results must be reported in a format consistent and equivalent to the SOW ILMO2.0. Submit all raw data.

All CSF Files (documentation files) must be submitted in original copies in compliance with CLP SOW OLMO2.0 per each SDG.

The Laboratory will include an example calculation with the formula and all definitions of parameters in the formula in sufficient detail to allow an independent third party reconstruction of the results from the data, for all analytes.

Each data package (SDG) must contain a narrative summary of all procedures actually used for sample preparation, cleanup and analysis including:

a. specific identification of all instruments used.

b. discussion of all factors affecting the analysis and of all corrective actions taken.

c. justification for dilution(s) of samples and/or extracts.

10. Other information required:

Submit copy of SAS Request Form (by SDG) and of any record of communication, generated during analyses, between the lab, SMO and/or TPO. Include copies of phone log communication. Report any inconsistencies and/or problems with CLP paperwork, shipping, and packaging of samples.

The lab(s) should forward the regional data package(s) to:

Data Reviewer
US EPA - Houston Branch
10625 Fallstone Rd.
Houston, Tx. 77099

11. Name of sampling/shipping contact:

[redacted]

To: Rhonda Holder

[redacted]

Page 4

12. Data requirements:

PARAMETER	DETECTION LIMITS		PRECISION
Ca	5,000	ppb	< 20 % RPD
Mg	5,000	ppb	" "
K	5,000	ppb	" "
Na	5,000	ppb	" "
Cl	15	ppb	" "
F	5	ppb	" "
N	10	ppb	" "
SO4	200	ppb	" "
HCO3	20,000	ppb	" "
CO3	20,000	ppb	" "
TDS	10,000	ppb	" "

13. QC requirement:

AUDITS REQUIRED	** FREQUENCY	LIMITS
Lab Method Blank	1/20 samples	below detection limits
Sample Dup	1/20 " "	< 20% RPD
Matrix Spike	" " " "	75 - 125 % Rec.
Lab Control STD	" " " "	75 - 125 % Rec.

** The frequency is per parameter per matrix.

See Table 4 for Spiking Levels

14. Actions required if limits are exceeded:

Contact Rhonda Holder from SMO immediately. SMO will contact the TPO and request instructions.

Reviewed by: M. Elfeky, Chemist Date: 11-18-92

whitehan

TABLE 4.

SPIKING LEVELS FOR SPIKE SAMPLE ANALYSIS

Parameter	Required Spiking Limits Waters (µg/L)	Required Spiking Limits Soils (µg/L)
Physical		
Acidity (Acd)	10000	20000
Alkalinity (Alk)	20000	40000
Cation-Exchange Capacity (CEC)	NA	NA
Chemical Oxygen Demand (COD)	10000	62500
Moisture Content (Moc)	NA	NA
Oil and Grease (O&G)	25000	12500
pH	NA	NA
Residue		
Filterable	100000	NA
Non-Filterable	20000	NA
Total	100000	NA
Volatile	20000	NA
Specific Conductance (SC)	NA	NA
Specific Gravity (SG)	NA	NA
Turbidity (Tur)	NA	NA
Non-metallic		
Ammonia, Nitrogen (NH_3)	5000	50000
Chloride (Cl)	25000	12500
Cyanide (CN)	500	500
Fluoride (F)	500	500
Kjeldahl Nitrogen (TKN)	500	500
Nitrate-Nitrite (NO_3-NO_2)	500	500
Organic Carbon, Total (TOC)	250	300
Organic Halide, Total (TOX)	250	250
Phosphorus, All Forms (TP)	5000	10000
Sulfate (SO_4)	25000	25000
Sulfide (S_2)	5000	10000
Metallic		
Aluminum (Al)	2000	10000
Calcium (Ca)	25000	50000
Chromium (Cr)	200	200
Hexavalent Chromium (Cr^{6+})	100	100
Iron (Fe)	1000	500
Magnesium (Mg)	25000	50000
Potassium (K)	25000	50000
Silicon (Silica)	200	200
Sodium (Na)	25000	50000

NA - Not applicable.

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER 6159041545

231 1n 6159041545

RECIPIENT'S COPY

1 Date 12-9-92

From (Your Name) Please Print: Moura Hanning
Your Phone Number (Very Important): (505) 27-2911
Company: NEW MEXICO ENVIRONMENT BUREAU
Department/Floor No.
Street Address: 1190 ST FRANCIS DR PO BOX 26110
City: SANTA FE State: NM ZIP Required: 87503

2 To (Recipient's Name) Please Print: Missy Hamby
Recipient's Phone Number (Very Important): (918) 251-0545
Company: American Analytical & Technical Services
Department/Floor No.
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 1700 West Albany, Suite A
City: Broken Arrow State: OK ZIP Required: 74012

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)
5T571149-173

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address
City State ZIP Required

3 PAYMENT: 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card
5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [X] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 [X] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOV'T LETTER
41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill in Box H) 1 [ ] WEEKDAY or 31 [ ] SATURDAY
DELIVER 2 [X] WEEKDAY or 3 [ ] SATURDAY (Extra charge) (Not available to all locations)
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice 9, UN 1845 ..... X ..... kg. III
7 [ ] OTHER SPECIAL SERVICE
9 [ ] SATURDAY PICK-UP (Extra charge)
[ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	50	0
Total 1	Total 50	Total 0

DIM SHIPMENT (Chargeable Weight). [ ] lbs.
L x W x H

Received At
1 [ ] Regular Stop 3 [ ] Drop Box
4 [ ] B.S.C.
2 [ ] On-Call Stop 5 [ ] Station

Emp. No. Date
[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold
Street Address
City State Zip
Received By: x M Hamby
Date/Time Received 12/10/92 FedEx Employee Number 0845

7 Release Signature:

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #138
138

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Special Analytical Service
Packing List/Chain of Custody

SAS No. 7655-F

1. Sample Description (Enter in Column A) 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil 7. Waste 8. Other (Specify)	2. Preservative (Enter in Column C) 1. HCl 2. HNO3 3. NAHSO4 4. H2SO4 5. NAOH 6. Other (SAS) (Specify) 7. Ice only N. Not preserved	3. Region No. VI	Sampling Co.	5. Date Shipped 12-9-92	Carrier Fed Ex
		Sampler (Name) STEPHEN WUST		Airbill Number 4159041545	
		Sampler Signature Stephen Wust		6. Ship To AATS 1700 WEST ALBANY SUITE A BROKEN ARROW, OK 74012	

7. Date Received -- Received by 12/10/92 M Hamby

Laboratory American Analytical

8. Transfer to

Date Received

Received by

Laboratory

4. Type of Activity

	Lead	Pre-Remedial	Remedial		Removal	
SF			RIFS		CLEM	
PRP		PA	RD		REMA	
ST		SSI	RA		REM	
FED		LSI	O&M		OIL	
			NPLD	✓	UST	

Sample Numbers	A Matrix Enter from Box 1	B Conc Low Med High	C Preservative Used from Box 2	D Analysis	E Sample used for spike and/or duplicate	F Regional Specific Tracking Number or Tag Number	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Sample Condition On Receipt
1. 7655-F7	1	LOW	7	General Chem		005468	C092W-HCBG	12/8/92 9:50	SDW	Intact
2. 7655-F9	1	LOW	7	General Chem		005392	C092W-HCUH	12/8/92 10:10	SDW	
3. 7655-F12	2	LOW	7	General Chem		039920	C092W-MW2	12/8/92 16:00	SDW	*Final sample receipt JDG, 12/16/92
4. 7655-F6	2	LOW	7	General Chem		005449	C092W-SPR	12/8/92 9:40	SDW	
5. 7655-F8	2	LOW	7	General Chem		005390	C092W-ESC	12/8/92 9:50	SDW	
6. 7655-F10	2	LOW	7	General Chem	✓	039916-17	C092W-MW3	12/8/92 12:35	SDW	
7. 7655-F11	2	LOW	7	General Chem		005378	C092W-MW3	12/8/92 12:35	SDW	
8. 7655-F3	1	LOW	7	General Chem		005443	C092W-MT1	12/7/92 15:30	SDW	
9. 7655-F4	1	LOW	7	General Chem		005197	C092W-MT2	12/7/92 15:35	SDW	
10. 7655-F2	2	LOW	7	General Chem		005445	C092W-B	12/7/92 13:25	SDW	

Shipment for SAS complete? (Y/N)

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature) M Hamby	Date / Time 12/10/92 0845	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature)
☐ Declined

EPA Form 9110-3 (4-91)

DISTRIBUTION:
White - Region Copy Yellow - SMO Copy Pink - Lab Copy for Return to SMO Gold - Lab Copy

SAMPLE LOG-IN SHEET

Lab Name: American Analytical + Technical Services Page 1 of 1

Received By (Print Name): M Hamby Log-in Date: 12/10/92

Received By: (Signature): M Hamby

Case Number:

Sample Delivery Group No: 7655-F-2 dhB 12/10/92

SAS Number: 7655-F

REMARKS:

1. Custody Seal(s) Present/Absent* Intact/Broken
2. Custody Seal Nos.: N/A
3. Chain-of-Custody Records Present/Absent*
4. Traffic Reports or Packing List Present/Absent*
5. Airbill Airbill/Sticker Present/Absent*
5. Airbill No: 6159041545
7. Sample Tags Present/Absent
   Sample Tag Numbers Listed/Not Listed on Chain-of-Custody
8. Sample Condition: Intact/Broken*/Leaking
9. Does information on custody records, traffic reports, and sample tags agree? Yes/No*
10. Date Received at Lab 12/10/92
11. Time Received 0845

Sample Transfer

Fraction:

Area #:

By: MaH MaH

On:

EPA SAMPLE #	CORRESPONDING SAMPLE TAG #	CORRESPONDING ASSIGNED LAB #	REMARKS: CONDITION OF SAMPLE SHIPMENT, ETC.
7655-F2	6-005445	11967.01	Intact
7655-F3	6-005443	11967.02	
7655-F4	6-005197	11967.03	
7655-F6	6-005449	11967.04	
7655-F7	6-005468	11967.05	
7655-F8	6-005390	11967.06	
7655-F9	6-005392	11967.07	
7655-F10	6-039916	11967.08	
7655-F11	6-005378	11967.09	
7655-F12	6-039920	11967.10	

* Contact SMO and attach record of resolution

Received By:

Date:

Logbook No:

Logbook Page No:

FORM DC-1

3/90

AMERICAN ANALYTICAL & TECHNICAL SERVICES, Inc.
Sample Tag Summary

RAS #_____

SAS #7655-F-01

SDG #7655-F-2

Samples are listed here as samples are listed on the Sample Delivery Group Traffic Report Cover Sheet.

	Sample ID	Assigned #		Sample ID	Assigned #
1.	7655-F-2	136	21.		
2.	7655-F-3	137	22.		
3.	7655-F-4	138	23.		
4.	7655-F-6	139	24.		
5.	7655-F-7	140	25.		
6.	7655-F-8	141	26.		
7.	7655-F-9	142	27.		
8.	7655-F-10	143	28.		
9.	7655-F-10	144	29.		
10.	7655-F-11	145	30.		
11.	7655-F-12	146	31.		
12.			32.		
13.			33.		
14.			34.		
15.			35.		
16.			36.		
17.			37.		
18.			38.		
19.			39.		
20.			40.		

\SDGTAGS.DOC

REFERENCE 19

CLP Data Sheets and Data Validation

TAL metals analysis for soil

TABLE 1, 9: LSI METALS ANALYSES FOR WASTE, SOIL & SEDIMENT SAMPLES, WHITEWATER & HANOVER CREEKS SITE

CLP No.	MFN649	MFN650	MFQ235	MFQ234	MFQ221	MFQ222	MFQ224	MFQ225
Site No.	CO92S-MT	CO92S-MG	CO92S-HCT	CH92S-BH	CH92S-TP1	CH92S-TP7	CH92S-SD	CH92S-WD
Location	Continental MainTailings	Continental MagnTail	Continental AbandTail	Bull Hill	Chino TailPond1	Chino TailPond7	Chino SDump	Chino WDump
Sample Index	W1	W2	W3	W4	W5	W6	W7	W8

CLP No.	MFQ210	MFQ233	MFQ236	MFQ028	MFQ029	MFQ030	MFQ031
Site No.	CO92S-HCBG	CH92S-BFBG	CH92S-LB	CH92S-BF1	CH92S-BF2	CH92S-BH1	CH92S-BH2
Location	FieroSpr	W of Bullfrog	LuckyBill Cyn	Gallegos	Cobre	SofBullHill	SWofBullHill
Sample Index	S1	S2	S3	S4	S5	S6	S7

CLP No.	MFQ026	MFQ027	MFQ205	MFQ223
Site No.	CH92S-HU1	CH92S-HU2	CO92S-MG2	CH92S-DIV
Location	Hurley	Hurley	Continental MagnTail	Chino DiversionChan
Sample Index	S8	S9	SD1	SD2

FEB 1993
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
EPA HOUSTON LABORATORY
10625 FALLSTONE ROAD
HOUSTON, TX 77099

93 FEB -9 PM 2:01

REVISION OF ORIGINAL DATA VALIDATION REPORT

DATE: February 4, 1993 CASE #: 19220

SAS #: _____

TO: K. Hill (6H-MA) SDG #: MFN649

USEPA Region 6 SITE NAME: Whitewater

LAB NAME: SKINER

FROM: Michael J. Fertitta
ESAT

THE FOLLOWING ARE REVISIONS TO THE ORIGINAL DATA VALIDATION REPORT:

A. The beryllium result for sample MFQ026 was originally qualified as undetected (3.A.1.a.). The result was not less than five times the highest associated blank concentration as originally stated. Therefore, the qualification should be removed. The beryllium result for sample MFQ026 is 0.59 mg/Kg as originally reported by the laboratory.

B. The selenium result for sample MFQ210 was originally qualified as estimated (J) due to a -19.9% pre-digestion matrix spike recovery of selenium (7.C.) and estimated (J) due to a furnace atomic absorption analytical spike recovery of selenium of 72.4% (11.A.2.C.). This result was actually an undetected selenium result and should therefore be qualified as unusable (R) due to the -19.9% pre-digestion matrix spike recovery. Please note that this revised qualification overides any original qualifications estimating the selenium result for sample MFQ210.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

Site Name Whitewater

Case# 19220

SDG# MFN-649

Date: 2-1-1993

Subject: CLP Data Review

From: Dr Melvin Ritter , Chemist , Region VI

To : K. Hill , 6H-MA , Region VI

A review of the laboratory raw data for the reference site has been completed by members of the Laboratory Section.
Samples were:

INORGANIC:	MFN-649	MFQ-210	MFQ-236	
	MFN-650	MFQ-211		
	MFQ-026 TO	MFQ-221 TO		
	MFQ-031	MFQ-225		
	MFQ-205	MFQ-233 TO		
ORGANIC:				

The data was found:

( ) Acceptable

(X) Provisional; use of data requires caution. Problems are noted in Review Summary.

( ) Unacceptable; data should not be used. Problems are noted in Review Summary.

Questions regarding the review can be addressed to me.

Attachments

cc: Mahmoud El-Feky, 6E-HO
Mike Hiatt, EMSL/Las Vegas
Regional TPO
Mitzie Dovel,Mantech ENV,VA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE RD.
HOUSTON, TEXAS 77099

MEMORANDUM

Date: 2-1-1993

Subject: CLP Data Review

From: Mahmoud El-Feky, Data Coordinator , Region VI

To: Dr. Melvin Ritter , Chemist , Region VI

Attached is the data review summary for Site Whitewater
Case # 19220
SDG # MFN-649

Data was found: ( ) Acceptable

(X) Provisional

( ) Unacceptable

Action required by TPO: ( ) Yes

(X) No

COMMENTS:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
HOUSTON BRANCH
10625 FALLSTONE ROAD
HOUSTON, TEXAS 77099

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19220
LABORATORY SKINER (MA)
CONTRACT # 68-D0-0108
SDG # MFN649
SOW# ILM02.1
ACCT # 3TGBDN77 SF # TGBUZZ

SITE Whitewater
NO. OF SAMPLES/
MATRIX 20/soil
REVIEWER (IF NOT ESD) ESAT
REVIEWER'S NAME Mike Fertitta
COMPLETION DATE January 28, 1993

SAMPLE NOs.: MFN649, MFN650, MFQ026, MFQ027, MFQ028, MFQ029, MFQ030, MFQ031, MFQ205, MFQ210, MFQ211, MFQ221, MFQ222, MFQ223, MFQ224, MFQ225, MFQ233, MFQ234, MFQ235, MFQ236

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CYANIDE
1. HOLDING TIMES	O	O	O	N/A
2. CALIBRATIONS	O	O	O	N/A
3. BLANKS	X	X	O	N/A
4. ICS	O			
5. LCS	O	O	O	N/A
6. DUPLICATE ANALYSIS	X	O	O	N/A
7. MATRIX SPIKE	X	M	O	N/A
8. MSA		X		
9. SERIAL DILUTION	X			
10. SAMPLE VERIFICATION	O	O	O	N/A
11. OTHER QC	N/A	X	N/A	N/A
12. OVERALL ASSESSMENT	X	M	O	N/A

O = Data had no problems/or qualified due to minor problems.
M = Data qualified due to major problems.
Z = Data unacceptable.
X = Problems, but do not affect data.
N/A= Not applicable

ACTION ITEMS: Blank concentrations were above the instrument detection limits; differences between duplicate results exceeded the quality control limits; matrix spike recoveries were below the lower quality control limit; method of standard addition correlation coefficients were below 0.995; a serial dilution difference exceeded the quality control limit; the percent relative standard deviations for duplicate FAA injections were above 20% for both the initial determinations and the reruns for three samples; and furnace atomic absorption analytical spike recoveries were outside of the quality control limits for 15 of 80 determinations.

AREA OF CONCERN: The data package was one day late.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFN649 Site Whitewater Lab SKINER (MA)

COMMENTS: Twenty soil samples were analyzed at low concentrations for total metals. The data package is provisional because: blank concentrations were above the instrument detection limits; differences between duplicate results exceeded the quality control limits; matrix spike recoveries were below the lower quality control limit; method of standard addition correlation coefficients were below 0.995; a serial dilution difference exceeded the quality control limit; the percent relative standard deviations for duplicate FAA injections were above 20% for both the initial determinations and the reruns for three samples; and furnace atomic absorption analytical spike recoveries were outside of the quality control limits for 15 of 80 determinations.

1. Holding Times

All holding time criteria were met.

2. Calibrations

All calibrations were acceptable.

3. Blanks

A. Calibration Blanks

1. The concentrations of arsenic, barium, beryllium, cadmium, cobalt, lead, magnesium, manganese, and sodium in the calibration blanks were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). The reviewer verified that the manganese results were unaffected.

   a. The following sample results were qualified as undetected (U) because they were greater than the IDLs but less than five times the highest associated blank concentrations:

      the arsenic results for samples MFQ210 and MFQ222;

      the barium result for sample MFN650;

      the beryllium results for all samples except samples MFQ030, MFQ221, MFQ225, MFQ233, MFQ235, and MFQ236;

      the cadmium results for samples MFQ026, MFQ030, MFQ031, MFQ235, and MFQ236;

3. Blanks (continued):

the cobalt and magnesium results for sample MFQ221; and

the sodium results for all samples except samples MFN649 and MFQ221.

b. The arsenic results for samples MFN649, MFQ028, and MFQ029 are biased high by calibration blank concentrations of 0.5 mg/Kg, 4.7 mg/Kg, and 0.6 mg/Kg, respectively.

c. The lead results for samples MFN650, MFQ031, MFQ210, MFQ221, and MFQ225 are biased high by calibration blank concentrations of 0.36 mg/Kg, 10.6 mg/Kg, 10.6 mg/Kg, 0.38 mg/Kg, and 5.9 mg/Kg, respectively.

2. The concentrations of calcium and copper in the calibration blanks were above the absolute values of the negative IDLs. The reviewer verified that the calcium results were unaffected. However, the copper results for samples MFQ210 and MFQ221 may be biased low. The analyses of these two samples were bracketed by blanks with copper concentrations of -5.8 µg/L and -9.2 µg/L.

3. The concentrations of iron in the calibration blanks were above the absolute values of both the positive and the negative IDL. In the reviewer's opinion, iron sample results were unaffected.

B. Preparation Blank

The concentrations of cobalt, copper, magnesium, manganese, sodium, and zinc in the preparation blank were above the instrument detection limits (IDL) but less than the contract required detection limits (CRDL). The reviewer verified that the copper, magnesium, and manganese results were unaffected. The following sample results should be qualified as undetected (U) because they were above the IDLs but less than five times the highest blank concentrations:

1. the cobalt results for samples MFQ221 and MFQ236;

2. the sodium results for samples MFN650, MFQ029, MFQ030, MFQ210, MFQ211, MFQ222, MFQ225, MFQ233, MFQ234, and MFQ235; and

3. Blanks (continued):

3. the zinc result for sample MFQ221.

C. All other blank results were acceptable.

4. ICS

Interference check sample criteria were met.

5. LCS

All laboratory control sample results were acceptable.

6. Duplicate Analysis

A. The 5.0 mg/Kg difference between duplicate chromium results exceeded the 4.2 mg/Kg technical quality control limit (twice the CRDL). The chromium results for all samples are qualified as estimated (J).

B. The iron results for all samples are qualified as estimated (J) due to a 35.5% relative percent difference for duplicate iron results.

C. All other duplicate results met technical quality control criteria.

7. Matrix Spike

The following sample results are qualified due to physical or chemical interferences that may exist in the samples.

A. The antimony and arsenic results for all samples are qualified as estimated (J and UJ) due to pre-digestion matrix spike recoveries of 54.4% and 70.8%, respectively.

B. The selenium results for samples MFN650, MFQ026, MFQ029, MFQ030, MFQ031, MFQ205, MFQ211, MFQ223, MFQ233, MFQ234, MFQ235, and MFQ236 are qualified as unusable (R) due to a -19.9% pre-digestion matrix spike recovery. False negatives are possible for selenium in these samples.

C. The selenium results for samples MFN649, MFQ027, MFQ028, MFQ210, MFQ221, MFQ222, MFQ224, and MFQ225 are qualified as estimated (J) due to the -19.9% pre-digestion matrix spike recovery. These results are the lowest at which they are present.

7. Matrix Spike (continued):

D. All other analytes had acceptable pre-digestion matrix spike recoveries.

8. MSA

A. The determinations for selenium in sample MFQ234 had correlation coefficients of 0.8041 and 0.9246. Physical or chemical interferences may exist in the sample. The selenium result for sample MFQ234 has already been qualified as unusable (R) in Section 7.B, so no action was taken.

B. The following sample results are qualified due to physical or chemical interferences that may exist in the samples.

1. The arsenic result for sample MFQ026 is qualified as estimated (J) due to correlation coefficients of 0.9918 and 0.9936.

2. The arsenic result for sample MFQ027 is qualified as estimated (J) due to correlation coefficients of 0.9932 and 0.9944.

3. The arsenic result for sample MFQ029 is qualified as estimated (J) due to correlation coefficients of 0.9911 and 0.9922.

4. The selenium result for sample MFQ222 is qualified as estimated (J) due to correlation coefficients of 0.9906 and 0.9918.

5. The selenium result for sample MFQ224 is qualified as estimated (J) due to correlation coefficients of 0.8041 and 0.9246.

C. All other method of standard addition results were acceptable.

9. Serial Dilutions

A. The cobalt results for all samples are qualified as estimated (J and UJ) due to a 10.7% serial dilution difference. Physical or chemical interferences may exist due to the sample matrix.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFN649 Site Whitewater Lab SKINER (MA)

9. Serial Dilutions (continued):

B. All other serial dilution results met quality control criteria.

10. Sample Verification

Sample results were reported correctly.

11. Other QC

A. Furnace Atomic Absorption (FAA) Quality Control

1. The following deficiencies occurred due to physical or chemical interferences that may exist in the samples.
   a. In determinations of selenium in samples MFQ029 and MFQ236, the percent relative standard deviations for duplicate FAA injections were above 20% for both the initial determinations and the reruns. The FAA analytical spike recoveries for samples MFQ029 and MFQ236 were 80.6% and 70.2%, respectively.

   b. The selenium results for samples MFN650, MFQ030, MFQ031, MFQ205, MFQ211, and MFQ233 had FAA analytical spike recoveries ranging from 44.2% to 81.7%.

   These sample results have already been qualified as unusable (R) in section 7.B, so no action was taken.

2. The following sample results are qualified due to physical or chemical interferences that may exist in the samples.

   a. The arsenic results for samples MFN650, MFQ205, and MFQ224 are qualified as estimated (J) due to FAA analytical spike recoveries of 73.9%, 83.9%, and 80.1%, respectively.

   b. The selenium result for sample MFQ028 is qualified as estimated (J) because the percent relative standard deviations for duplicate FAA injections were above 20% for both the initial determination and the rerun.

Case 19220 SDG MFN649 Site Whitewater Lab SKINER (MA)

11. Other QC (continued):

c. The selenium results for samples MFQ210 and MFQ221 are qualified as estimated (J and UJ) due to FAA analytical spike recoveries of 72.4% and 124.2%, respectively.

d. The thallium results for samples MFQ205 and MFQ223 are qualified as estimated (UJ) due to FAA analytical spike recoveries of 115.5% and 83.4%, respectively.

3. All other results had acceptable FAA quality control.

B. There were no other Section 11 QC problems.

12. Overall Assessment

A. The data package is provisional for the following reasons:

1. Blank concentrations were above the instrument detection limits for thirteen analytes. Some sample results were qualified as undetected (U).

2. Sample results for chromium and iron are estimated in all samples because differences between duplicate results exceeded the quality control limits.

3. Some selenium results were qualified as unusable (R) due to a -19.9% matrix spike recovery.

4. Matrix spike recoveries were below the lower quality control limit for antimony and arsenic.

5. Method of standard addition correlation coefficients were below 0.995 for the determinations of arsenic in samples MFQ026, MFQ027, and MFQ029; and for the determinations of selenium in samples MFQ222, MFQ224, and MFQ234.

6. The serial dilution difference exceeded the quality control limit for cobalt.

7. In the determinations of selenium in samples MFQ028, MFQ029, and MFQ236, the percent relative standard deviations for duplicate FAA injections were above 20% for both the initial determinations and the reruns.

INORGANIC QA REVIEW
CONTINUATION PAGE

Case 19220 SDG MFN649 Site Whitewater Lab SKINER (MA)

12. Overall Assessment (continued):

8. Furnace atomic absorption analytical spike recoveries were outside of the quality control limits for 15 of 80 determinations.

B. All other technical requirements were met.

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 19220 SDG No. MFN649 SDG Nos. To Follow SAS No. Date Rec 01/19/93

EPA Lab ID: SKINER
Lab Location: Waltham, MA
Region: 6 Audit No.: 19220/MFN649
Re_Submitted CSF? Yes ____ No X
Box No(s): 1
COMMENTS:

3,5 Forms 11A were listed as Forms llA and 11B on Form DC-2. The corrections were made on the Form DC-2 by the auditor.

Over for additional comments.

ORIGINALS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	X		
2. Intact upon receipt?	X		
FORM DC-2			
3. Numbering scheme accurate?		X	
4. Are enclosed documents listed?	X		
5. Are listed documents enclosed?		X	
FORM DC-1			
6. Present?	X		
7. Complete?	X		
8. Accurate?	X		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	X		
10. Dated?	X		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	X		
12. Dated?	X		
AIRBILLS/AIRBILL STICKER			
13. Present?	X		
14. Signed?	X		
15. Dated?	X		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?	X		
17. Present?	X		
OTHER DOCUMENTS			
18. Complete?	X		
19. Legible?	X		
20. Original?		X	
20a. If "NO", does the copy indicate where original documents are located?	X		

Audited by: Michael J. Fertitta — Michael J. Fertitta/Data Reviewer — Date 01/26/93
Audited by: ____ ____ Date ____
Audited by: ____ ____ Date ____

Signature — Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ____ Date Entered: ____ Date Reviewed: ____
Entered by: ____ ____
Reviewed by: ____ ____

Signature — Printed Name/Title

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code: 173 51571149
Account Code:
2. Region No.: 6
Sampling Co.: Fed Ex
4. Date Shipped: 12/11/92
Carrier: FED EX

Regional Information:
Sampler (Name): STEPHEN WUST
Airbill Number: 6159041571

Non-Superfund Program:
Sampler Signature: [signature]
5. Ship To: SKINNER + SHERMAN, 300 SECOND AVENUE, WALTHAM, MA 02254

Site Name: WHITEWATER AND HANOVER CREEKS
City, State: BAYARD, NM
Site Spill ID:

4. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI ✓; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (SAS) (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals: Total	Metals: Dissolved	Cyanide	Low Conc.: Nitrate/ Nitrite	Low Conc.: Fluoride	High: pH	High: Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
MFQ342	2	LOW	Grab	2/6	X							6-039944	CH92W-16S	12/9/92 11:36	SZW		—
MFQ343	2	LOW	Grab	2/6	X							6-039953	CH92W-WD4	12/9/92 16:45	SZW		—
MFQ344	2	LOW	Grab	2/6	X							6-039954	CH92W-WD10	12/9/92 15:20	SZW		—
MFQ226	2	LOW	Grab	2/6	X							6-039943	CH92W-CB6D	12/9/92 16:05	SZW		—
MFQ227	2	LOW	Grab	2/6	X							6-039940	CH92W-16S	12/9/92 11:36	SZW		—
MFQ228	2	LOW	Grab	2/6	X							6-039957	CH92W-7GS	12/9/92 13:40	SZW		—
MFQ229	2	LOW	Grab	2/6	X							6-039955	CH92W-WD10	12/9/92 15:20	SZW		—
MFQ230	2	LOW	Grab	2/6	X							6-039945	CH92W-WD4	12/9/92 16:45	SZW		—
MFQ231	2	LOW	Grab	2/6	X							6-039942	CH92W-7GS	12/9/92 13:40	SZW		—
MFQ232	2	LOW	Grab	2/6	X							6-039952	CH92W-CB6D	12/9/92 16:05	SZW		—

Shipment for Case complete? (Y/N) SZW Y

Page 1 of 4

Sample used for a spike and/or duplicate:

Additional Sampler Signatures:

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code: 173 51571149
Account Code:
2. Region No.: 6
Sampling Co.: Fed Ex
4. Date Shipped: 12/11/92
Carrier: FED EX

Regional Information:
Sampler (Name): STEPHEN WUST
Airbill Number: 6159041571

Non-Superfund Program:
Sampler Signature: [signature]
5. Ship To: Skinner & Sherman, 300 Second Ave., Waltham, MA 02254

Site Name: Whitewater [redacted] and Hanover Creeks
City, State: BAYARD, NM
Site Spill ID:

4. Type of Activity: SF, PRP, ST, FED; Lead; Pre-Remedial: PA, SSI, LSI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (SAS) (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
MFQ233	5	Low	Comp	6	X							6-039959	CH92S-BFBG	12/10/92 10:20	SLW		—
MFQ234	5	Low	Comp	6	X							6-039960	CH92S-BH	12/10/92 12:15	SLW		—
MFQ236	5	Low	Comp	6	X							6-039961	CH92S-LB	12/10/92 15:45	SLW		—
MFQ030	5	Low	Comp	6	X							6-039588	CH92S-BH1	12/10/92 13:38	SLW		—
MFQ031	5	Low	Comp	6	X							6-039589	CH92S-BH2	12/10/92 14:05	SLW		—
MFQ242	1	Low	grab	2/6	X							6-039600	CH92W-HCWD	12/10/92 11:20	SLW		—
MFQ238	1	Low	grab	2/6	X							6-039587	CH92W-HCBU	12/10/92 12:18	SLW		—
MFQ237	1	Low	grab	2/6	X							6-039963	CH92N-LB	12/10/92 15:35	SLW		—
MFQ-239	1	Low	grab	2/6	X							6-005385	CH92W-HCBH	12/10/92 11:50	SLW		—
MFQ-240	2	Low	grab	2/6	X							6-005383	CH92W-SW	12/10/92 15:10	SLW		

Shipment for Case complete? (Y/N): Y
Page 1 of ___ Page 3 of 4
Sample used for a spike and/or duplicate:
Additional Sampler Signatures:
Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code: 5157114 9 173
Account Code:
2. Region No.: 6
Sampling Co.: Fed Ex
4. Date Shipped: 12/11/92
Carrier: FED EX

Regional Information:
Sampler (Name): STEPHEN WUST
Airbill Number: 6159041571

Non-Superfund Program:
Sampler Signature: [signature]

Site Name: WHITEWATER & HANOVER CREEKS
City, State: BAYARD, NM
Site Spill ID:

3. Type of Activity

	Lead	Pre-Remedial	Remedial	Removal
SF			RIFS	CLEM
PRP		PA	RD	REMA
ST		SSI	RA	REM
FED		LSI	O&M	OIL
			NPLD	UST

5. Ship To: Skinner & Sherman
300 Second Ave.
Waltham, MA 02254
ATTN:

6. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (Specify)
N. Not preserved

7. Sample Description (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MFQ241	2	LOW	grab	2/6	X							6-039947	CH92W-SW	12/10/92 15:10	SLW		—

Shipment for Case complete? (Y/N): Y
Page 1 of ___ Page 4 of 4
Sample used for a spike and/or duplicate:
Additional Sampler Signatures:
Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Inorg-1

I 340102

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ226

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-01S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7830			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	15.0	B		P
7440-41-7	Beryllium	27.7		E	P
7440-43-9	Cadmium	159			P
7440-70-2	Calcium	481000			P
7440-47-3	Chromium	9.9	B		P
7440-48-4	Cobalt	1670			P
7440-50-8	Copper	6.5	B	*	P
7439-89-6	Iron	92500			P
7439-92-1	Lead	11.2		SN	F
7439-95-4	Magnesium	414000			P
7439-96-5	Manganese	119000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	471			P
7440-09-7	Potassium	4060	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	58400			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	68600			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

2

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ227

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-02S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	101000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	26.6	B		P
7440-41-7	Beryllium	28.3		E	P
7440-43-9	Cadmium	123			P
7440-70-2	Calcium	483000			P
7440-47-3	Chromium	29.6			P
7440-48-4	Cobalt	1750			P
7440-50-8	Copper	186000		*	P
7439-89-6	Iron	157000			P
7439-92-1	Lead	3.6		WN	F
7439-95-4	Magnesium	148000			P
7439-96-5	Manganese	28400			P
7439-97-6	Mercury	0.24			CV
7440-02-0	Nickel	546			P
7440-09-7	Potassium	26000			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	113000			P
7440-28-0	Thallium	2.7	B	W	F
7440-62-2	Vanadium	38.0	B		P
7440-66-6	Zinc	8750			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

3

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ228

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-03S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	141	B		P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	43.3	B		P
7440-41-7	Beryllium	0.54	B	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	798000			P
7440-47-3	Chromium	4.5	U		P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	195		*	P
7439-89-6	Iron	259			P
7439-92-1	Lead	2.0	U	WN	F
7439-95-4	Magnesium	91700			P
7439-96-5	Manganese	39.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	6340			P
7782-49-2	Selenium	19.0	U	N	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	73300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	5.0	B		P
7440-66-6	Zinc	3260			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

4

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ229

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-04S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	55700			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	79.9	B		P
7440-41-7	Beryllium	15.0		E	P
7440-43-9	Cadmium	87.6			P
7440-70-2	Calcium	467000			P
7440-47-3	Chromium	21.7			P
7440-48-4	Cobalt	452			P
7440-50-8	Copper	8130		*	P
7439-89-6	Iron	99100			P
7439-92-1	Lead	235		N	F
7439-95-4	Magnesium	551000			P
7439-96-5	Manganese	59600			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	301			P
7440-09-7	Potassium	20900			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	122000			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	14.9	B		P
7440-66-6	Zinc	37700			P
	Cyanide				NR

Color Before: GREY Clarity Before: CLOUDY Texture:

Color After: GREY Clarity After: CLOUDY Artifacts:

Comments:

5

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ230

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-05S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	767000			P
7440-36-0	Antimony	24.8	B		P
7440-38-2	Arsenic	18.5	U	N	F
7440-39-3	Barium	21.6	B		P
7440-41-7	Beryllium	111		E	P
7440-43-9	Cadmium	603			P
7440-70-2	Calcium	416000			P
7440-47-3	Chromium	52.0			P
7440-48-4	Cobalt	10500			P
7440-50-8	Copper	250000		*	P
7439-89-6	Iron	6810			P
7439-92-1	Lead	10.0	U	WN	F
7439-95-4	Magnesium	1270000			P
7439-96-5	Manganese	513000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3430			P
7440-09-7	Potassium	8980			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	26.9			P
7440-23-5	Sodium	93300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	102000			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

6

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ231

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-06S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1400			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	45.7	B		P
7440-41-7	Beryllium	0.49	B	E	P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	827000			P
7440-47-3	Chromium	17.2			P
7440-48-4	Cobalt	5.3	B		P
7440-50-8	Copper	122		*	P
7439-89-6	Iron	82.1	B		P
7439-92-1	Lead	2.6	B	WN	F
7439-95-4	Magnesium	92400			P
7439-96-5	Manganese	207			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.4	B		P
7440-09-7	Potassium	6910			P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	4.2	B		P
7440-23-5	Sodium	75500			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	11.5	B		P
7440-66-6	Zinc	2760			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ232

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-07S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7100			P
7440-36-0	Antimony	16.9	B		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	15.0	B		P
7440-41-7	Beryllium	27.7		E	P
7440-43-9	Cadmium	151			P
7440-70-2	Calcium	466000			P
7440-47-3	Chromium	8.9	B		P
7440-48-4	Cobalt	1580			P
7440-50-8	Copper	71.6		*	P
7439-89-6	Iron	89500			P
7439-92-1	Lead	6.8		+N	F
7439-95-4	Magnesium	398000			P
7439-96-5	Manganese	113000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	454			P
7440-09-7	Potassium	3960	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	56500			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	8.5	B		P
7440-66-6	Zinc	63700			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

8

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ237

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-08S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	207			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	N	F
7440-39-3	Barium	34.9	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	19000			P
7440-47-3	Chromium	8.9	B		P
7440-48-4	Cobalt	2.7	U		P
7440-50-8	Copper	76.9		*	P
7439-89-6	Iron	181			P
7439-92-1	Lead	3.8		MN	F
7439-95-4	Magnesium	6910			P
7439-96-5	Manganese	150			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	2250	B		P
7782-49-2	Selenium	19.0	U	N	F
7440-22-4	Silver	2.5	B		P
7440-23-5	Sodium	11500			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	3.6	B		P
7440-66-6	Zinc	96.5			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ238

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-09S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	238			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	39.9	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	1.0	U		P
7440-70-2	Calcium	442000			P
7440-47-3	Chromium	6.2	B		P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	89.2		*	P
7439-89-6	Iron	218			P
7439-92-1	Lead	2.5	B	WN	F
7439-95-4	Magnesium	179000			P
7439-96-5	Manganese	124			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	6340			P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	85300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	3.6	B		P
7440-66-6	Zinc	107			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

10

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ239

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-10S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	565			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	26.6	B		P
7440-41-7	Beryllium	0.40	U	E	P
7440-43-9	Cadmium	7.0			P
7440-70-2	Calcium	332000			P
7440-47-3	Chromium	4.5	U		P
7440-48-4	Cobalt	2.7	U		P
7440-50-8	Copper	97.5		*	P
7439-89-6	Iron	889			P
7439-92-1	Lead	6.7		SN	F
7439-95-4	Magnesium	96800			P
7439-96-5	Manganese	88.6			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	5.4	U		P
7440-09-7	Potassium	4590	B		P
7782-49-2	Selenium	8.8		sN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	97300			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	2170			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

11

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ240

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-11S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	85600			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	10.0	B		P
7440-41-7	Beryllium	19.7		E	P
7440-43-9	Cadmium	56.0			P
7440-70-2	Calcium	504000			P
7440-47-3	Chromium	9.8	B		P
7440-48-4	Cobalt	1410			P
7440-50-8	Copper	6310		*	P
7439-89-6	Iron	585			P
7439-92-1	Lead	9.0		+N	F
7439-95-4	Magnesium	216000			P
7439-96-5	Manganese	43600			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	506			P
7440-09-7	Potassium	1710	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	66800			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	16800			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLOUDY Artifacts:

Comments:

12

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ241

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-12S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	85800			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	11.6	B		P
7440-41-7	Beryllium	20.2		E	P
7440-43-9	Cadmium	57.5			P
7440-70-2	Calcium	507000			P
7440-47-3	Chromium	8.0	B		P
7440-48-4	Cobalt	1410			P
7440-50-8	Copper	6360		*	P
7439-89-6	Iron	302			P
7439-92-1	Lead	5.5		WN	F
7439-95-4	Magnesium	217000			P
7439-96-5	Manganese	43800			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	509			P
7440-09-7	Potassium	1790	B		P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	67000			P
7440-28-0	Thallium	1.7	B	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	16900			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

13

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ242

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-13S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7560			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	N	F
7440-39-3	Barium	16.6	B		P
7440-41-7	Beryllium	1.6	B	E	P
7440-43-9	Cadmium	23.9			P
7440-70-2	Calcium	393000			P
7440-47-3	Chromium	6.6	B		P
7440-48-4	Cobalt	30.1	B		P
7440-50-8	Copper	937		*	P
7439-89-6	Iron	11200			P
7439-92-1	Lead	8.9		+N	F
7439-95-4	Magnesium	104000			P
7439-96-5	Manganese	5440			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	19.7	B		P
7440-09-7	Potassium	3890	B		P
7782-49-2	Selenium	3.8	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	75500			P
7440-28-0	Thallium	1.3	U	W	F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	10900			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

14

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ342

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-14S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	113000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	18.5	U	N	F
7440-39-3	Barium	25.0	B		P
7440-41-7	Beryllium	28.4		E	P
7440-43-9	Cadmium	140			P
7440-70-2	Calcium	545000			P
7440-47-3	Chromium	18.6			P
7440-48-4	Cobalt	1930			P
7440-50-8	Copper	204000		*	P
7439-89-6	Iron	177000			P
7439-92-1	Lead	4.7		WN	F
7439-95-4	Magnesium	169000			P
7439-96-5	Manganese	32000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	608			P
7440-09-7	Potassium	28700			P
7782-49-2	Selenium	19.0	U	WN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	128000			P
7440-28-0	Thallium	2.9	B		F
7440-62-2	Vanadium	42.1	B		P
7440-66-6	Zinc	9610			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

15

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ343

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-15S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	748000			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	18.5	U	EN	F
7440-39-3	Barium	25.0	B		P
7440-41-7	Beryllium	111		E	P
7440-43-9	Cadmium	573			P
7440-70-2	Calcium	414000			P
7440-47-3	Chromium	38.7			P
7440-48-4	Cobalt	10200			P
7440-50-8	Copper	275000		*	P
7439-89-6	Iron	7130			P
7439-92-1	Lead	12.0	B	WN	F
7439-95-4	Magnesium	1410000			P
7439-96-5	Manganese	554000			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	3360			P
7440-09-7	Potassium	8420			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	16.6			P
7440-23-5	Sodium	92900			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	2.8	U		P
7440-66-6	Zinc	94800			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

16

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ344

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFQ226

Matrix (soil/water): WATER Lab Sample ID: 12196-16S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	48800			P
7440-36-0	Antimony	16.9	U		P
7440-38-2	Arsenic	3.7	U	WN	F
7440-39-3	Barium	11.6	B		P
7440-41-7	Beryllium	17.1		E	P
7440-43-9	Cadmium	60.7			P
7440-70-2	Calcium	412000			P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	408			P
7440-50-8	Copper	6740		*	P
7439-89-6	Iron	76700			P
7439-92-1	Lead	37.2		+N	F
7439-95-4	Magnesium	473000			P
7439-96-5	Manganese	53100			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	270			P
7440-09-7	Potassium	16500			P
7782-49-2	Selenium	19.0	U	EN	F
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	106000			P
7440-28-0	Thallium	1.3	U		F
7440-62-2	Vanadium	19.8	B		P
7440-66-6	Zinc	30300			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

17

PAGES 32-47 REMOVED AFTER PAGINATION

These are duplicates to pages 16-31

These pages were added to Reference 17

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

2. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

3. Region No.: 6

Sampling Co.: NMED

5. Date Shipped: 12-9-92

Carrier: Fed Ex

7. Date Received -- Received by: 12-10-92 [illegible]

Sampler (Name): Stephen Wust

Airbill Number: 6159041556

Laboratory Contract Number: 68-D200108

Unit Price: 100

Sampler Signature: [illegible]

6. Ship To: Skinner Sherman, 300 Second Avenue, Waltham MA 02254, ATTN: Jeff Depaola

8. Transfer to

Date Received

Received by:

Contract Number

Price

4. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	High Conc. Phases (Check below): Solids	Water Mis Liq.	Non Water - Mis Liq.
												Sample Ser. Inf. Agreed								
MFQ218	4	Low	Grab	2/6	X							6-039915	C092W-MB3	12/8/92 1258	SDW					
MFQ201	2	Low	Grab	2/6	X							6-005799	C092W-MW1	12/7/92 1325	SDW					
MFN651	2	Low	Grab	2/6	X							6-005447	C092W-MW1	12/7/92 1325	SDW					
MFQ206	2	Low	Grab	2/6	X							6-005439	C092W-MW4	12/7/92 1700	SDW					
MFQ204	2	Low	Grab	2/6	X							6-005490	C092W-MW4	12/7/92 1700	SDW					
MFQ202	2	Low	Grab	2/6	X							6-005397	C092W-B	12/7/92 1325	SDW					
MFQ203	1	Low	Grab	2/6	X							6-005178	C092W-MT1	12/7/92 1530	SDW					
MFQ209	1	Low	Grab	2/6	X							6-005198	C092W-MT2	12/7/92 1535	SDW					
MFN649	5	Low	Comp	6	X							6-005377	C092S-MT	12/7/92 1140	SDW					
MFQ211	5	Low	Comp	6	X							6-005950	C092S-FCC	12/8/92 1020	SDW					

Shipment for Case complete? (Y/N): N

Page 2 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: [illegible]

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[illegible]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		[illegible]	12/10/92 9:30		

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION: Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Inorg-2

I 340104

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (Specify)
N. Not preserved

3. Region No.: 6

Sampling Co.: NHED

Sampler (Name): Stephen Wust

Sampler Signature: [signature]

4. Type of Activity

Lead	Pre-Remedial	Remedial	Removal
SF	PA	RIFS	CLEM
PRP	SSI	RD	REMA
ST	LSI	RA	REM
FED		O&M	OIL
		NPLD	UST

5. Date Shipped: 12-9-92

Carrier: Fed Ex

Airbill Number: 6189041556

6. Ship To: Blanner & Sherman, 300 Second Avenue, Waltham, MA 02254

ATTN: Jeff Deprola

7. Date Received -- Received by: 12-10-92 J. Deprola

Laboratory Contract Number: 68D00108

Unit Price: 106.00

8. Transfer to

Date Received

Received by

Contract Number

Price

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	High Conc. Phases (Check below): Solids	Water MS Liq.	Non Water Mis Liq.
												Samples on Ice								
✓MFN160	5	Low	Grab	6	X							6-005326	0925-MG	12/7/92 1215	SW					
✓MFQ205	5	Low	Grab	6	X							6-005944	0925-MG2	12/7/92 1618	SW					
✓MFQ210	5	Low	Grab	6	X							6-005469	0925-MCB6	12/8/92 1440	SW					
49																				

Shipment for Case complete? (Y/N): N

Page 3 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: [signature]

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none
		[signature]	12/10/92 9:30		

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

339

I 340105

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 — FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Effluent
   5. Soil/Sediment
   6. Air (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO_3
   3. NaOH
   4. H_2SO_4
   5. K_2CrO_7
   6. Ice only
   7. Other (SAS) (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: FAX EX

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92

Sampler (Name): STEPHEN WUST

Airbill Number: 6154041571

Laboratory Contract Number: 68-D00106

Unit Price: 1.00

Sampler Signature: [signature]

6. Ship To: Skinner & Sherman
390 Second Ave
Waltham, MA 02254

Transfer to: Date Received

Received by: Date Received

Contract Number: Price

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI		O&M		OILS	
				NPLD		UST	

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	Sampler Initials	Corresp. CLP Org. Samp. No.	K Sample Condition Upon Receipt	SAS	Water - MS Liq.	Non Water - MS Liq.
												Sampling Site Tag Numbers								
MFQ233	5	Low	Comp	6	X							6-039959	CH925-BF06	12/10/92 10:20	SLW					
MFQ234	5	Low	Comp	6	X							6-039960	CH925-BH	12/10/92 12:15	SLW					
MFQ236	5	Low	Comp	6	X							6-039961	CH925-LB	12/10/92 15:45	SLW					
MFQ030	5	Low	Comp	6	X							6-039588	CH925-BH1	12/10/92 13:38	SLW					
MFQ031	5	Low	Comp	6	X							6-039589	CH925-BH2	12/10/92 14:05	SLW					
MFQ242	1	Low	grab	2/6	X							6-039600	CH92W-HCWD	12/10/92 11:20	SLW					
MFQ238	1	Low	grab	2/6	X							6-039587	CH92W-HCBU	12/10/92 12:18	SLW					
MFQ237	1	Low	grab	2/6	X							6-039963	CH92W-LB	12/10/92 15:35	SLW					
MFQ-239	1	Low	grab	2/6	X							6-005385	CH92W-HCBH	12/10/92 11:50	SLW					
MFQ-240	2	Low	grab	2/6	X							6-005383	CH98W-SW	12/10/92 15:10	SLW					

High Conc. Phases (Check below)

Shipment for Case complete? (Y/N): Y

Page 1 of ___ Page 3 of 4

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		[signature]	12/14/92 9:30		

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
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Inorg-2

I 015646

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A): Surface Water, Ground Water, Leachate, Leachate, Soil/Sediment, Other (SAS), Other (SAS), Other (Specify)

2. Preservative (Enter in Column B): 1. HCl, 2. HNO3, 3. NaOH, 4. H_2SO_4, 5. K_2CrO_7, 6. Ice only, 7. Other (SAS) (Specify), N. Not preserved

3. Region No.: 6

Sampling Co.: FEDEX

5. Date Shipped: 12/11/92

Carrier: FEDEX

7. Date Received: 12-14-92 — Received by: [illegible]

Sampler (Name): STEPHEN WUST

Airbill Number: 6159041571

Laboratory Contract Number: 68D00108

Unit Price: 100

Sampler Signature: [signature]

6. Ship To: Skinner + Sherman, 300 Second Ave., Waltham, MA 02254

8. Transfer to: Received by: [illegible]

Contract Number:

Date Received: 12/14/92

Price: 2313

4. Type of Activity: Lead: SF, RRP, ST, FED; Pre-Remedial: PA, SSI, USI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OILS, UST

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MS Liq.	Non Water - Ms Liq.
MFQ221	5	LOW	Comp	6	X							6-039446	CH92S-TP1	12/9/92 11:25	SW					
MFQ222	5	LOW	Comp	6	X							6-039951	CH92S-TP7	12/9/92 12:15	SW					
MFQ223	5	LOW	Comp	6	X							6-039937	CH92S-DIV	12/9/92 13:45	SW					
MFQ224	5	Low	Comp	6	X							6-039924	CH92S-SD	12/9/92 15:00	SW					
MFQ225	5	Low	Comp	6	X							6-039946	CH92S-WD	12/9/92 15:45	SW					
MFQ028	5	Low	Comp	6	X							6-039964	CH92S-BF1	12/10/92 11:30	SW					
MFQ235	5	Low	Comp	6	X							6-039921	CO92S-HCT	12/10/92 13:55	SW					
MFQ026	5	Low	Comp	6	X							6-039684	CH92S-HV1	12/10/92 10:00	SW					
MFQ029	5	Low	Comp	6	X							6-039685	CH92S-BF2	12/10/92 12:05	SW					
MFQ027	5	Low	Comp	6	X							6-039680	CH92S-HV2	12/10/92 10:40	SW					

Shipment for Case complete? (Y/N): Y

Page 1 of 4 (PAGE 2 of 4)

Sample used for a spike and/or duplicate

Additional Sample Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature) [signature]	Date / Time 12/14/92 15:30	Remarks: Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION: Green - Region Copy, Pink - SMO Copy, White - Lab Copy, Yellow - Lab Copy for Return to SMO

Inorg-2

015639

FULL INORGANICS
COMPLETE SDG FILE (CSF)
INVENTORY SHEET

Lab Name: SKINNER AND SHERMAN LABS **City/State:** WALTHAM, MA

Case No. 19220 **SDG No** MFN649 **SDG Nos. to Follow:** _____ _____ _____

SAS No. _____ **Contract No.** 68-D0 -010 **SOW No.** 3/90

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II D and Section III V)

		Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region
1.	Inventory Sheet (DC-2) (Do not number)			✓	✓
2.	Cover Page	1	2	✓	✓
3.	Inorganic Analysis Data Sheet (Form I-IN)	3	22	✓	✓
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	23	31	✓	✓
5.	CRDL Standards (Form IIB-IN)	32	34	✓	✓
6.	Blanks (Form III-IN)	35	41	✓	✓
7.	ICP Interference Check Sample (Form IV-IN)	42	—	✓	✓
8.	Spike Sample Recovery (Form VA-IN)	43	—	✓	✓
9.	Post Digest Spike Sample Recovery (Form VB-IN)	44	—	✓	✓
10.	Duplicates (Form VI-IN)	45	—	✓	✓
11.	Lab Control Sample (Form VII-IN)	46	—	✓	✓
12.	Standard Addition Results (Form VIII-IN)	47	—	✓	✓
13.	ICP Serial Dilution (Form IX-IN)	48	—	✓	✓
14.	Instrument Detection Limits (Form X-IN)	49	54	✓	✓
15.	ICP Interelement Correction Factors (Form XIA-IN) MJF 1/26/93	55	57	✓	✓
16.	ICP Interelement Correction Factors (Form XIB-IN) N/A	~~56~~	~~57~~	✓	NO FORMS ILB MJF 1/26/93
17.	ICP Linear Ranges (Form XII-IN)	58	—	✓	✓
18.	Preparation Log (Form XIII-IN)	59	61	✓	✓
19.	Analysis Run Log (Form XIV-IN)	62	93	✓	✓
20.	ICP Raw Data	94	146	✓	✓
21.	Furnace AA Raw Data	147	259	✓	✓
22.	Mercury Raw Data	260	309	✓	✓
23.	Cyanide Raw Data	NR	—	—	✓

	Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region
24. Traffic Report	325	328		✓
25. EPA Shipping/Receiving Documents				
Airbill (No. of Shipments 2)	329	330		✓
Chain-of-Custody Records	325	328		✓
Sample Tags	342A	T		✓
Sample Log-In Sheet (Lab & DCl)	331	334		✓
SDG Cover Sheet	335			✓
26. Misc. Shipping/Receiving Records (list all individual records)				
Telephone Logs				
27. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)				
28. Internal Original Sample Prep & Analysis Records (describe or list)				
Prep Records	310	315		✓
Analysis Records				
Description STANDARDS PREP LOG	316	324		✓
29. Other Records (describe or list)				
Telephone Communication Log				
ORIGINAL SHIPPING DOCUMENTS	336	341		✓
ORIGINAL RAW DATA				

30. Comments:
(EPA) Items 15/16 – Some Forms 11A were listed as Forms 11B. Correction made. MJF – 1/26/93

Completed by (CLP Lab):

(Signature)	(Print Name & Title)	(Date)
	DAVID N. PETERSON ASSISTANT EAOB MANAGER ~~KIRK JOHNSON~~ ~~USEPA DATA MANAGER~~	1/18/93

Audited by (EPA):

(Signature)	(Print Name & Title)	(Date)
Michael J. Fertitta	MICHAEL J. FERTITTA DATA REVIEWER	1/26/93

TMA
Thermo Analytical Inc.
Skinner & Sherman Labs., Inc.
300 Second Avenue
Post Office Box 521
Waltham, MA 02254-0521
(617) 890-7200
FAX (617) 890-3883

January 18, 1993

USEPA Contract Laboratory Program (CLP)
Sample Management Office (SMO)
300 North Lee Street, Suite 200
Alexandria, VA 22314

Attention: Data Receiver

Dear Sir:

Enclosed is the Sample Data package for the Inorganic Analyses of Case 19220 and SDG MFN649. The samples were analyzed under TMA/Skinner and Sherman Work Order #S212197.

Please feel free to call if there are any questions concerning the enclosed.

Sincerely,

TMA/SKINNER AND SHERMAN LABORATORIES, INC.

David N. Peterson
Assistant Laboratory Manager

Encl.

cc: Data Audit Staff, USEPA-EMSL-LV
Meg Jou, USEPA Region VI

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

SOW No.: ILM02.1

EPA Sample No.	Lab Sample ID.
MFN649	12197-01S
MFN649D	12197-01S2
MFN649S	12197-01DS
MFN650	12197-02S
MFQ026	12197-03S
MFQ027	12197-04S
MFQ028	12197-05S
MFQ029	12197-06S
MFQ030	12197-07S
MFQ031	12197-08S
MFQ205	12197-09S
MFQ210	12197-10S
MFQ211	12197-11S
MFQ221	12197-12S
MFQ222	12197-13S
MFQ223	12197-14S
MFQ224	12197-15S
MFQ225	12197-16S
MFQ233	12197-17S
MFQ234	12197-18S

Were ICP interelement corrections applied?	Yes/No	YES
Were ICP background corrections applied?	Yes/No	YES
If yes-were raw data generated before application of background corrections?	Yes/No	NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name: David N. Peterson

Date: 1/18/93 Title: Asst. Laboratory Manager

~~990~~ 001

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

SOW No.: ILM02.1

EPA Sample No.	Lab Sample ID.
MFQ235	12197-19S
MFQ236	12197-20S

Were ICP interelement corrections applied? Yes/No YES
Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Name: David N. Peterson

Date: 5/18/93 Title: Asst. Laboratory Manager

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	NMED	12-9-92	Fed Ex

Regional Information

Sampler (Name): Stephen Wust

Airbill Number: 6159041556

Non-Superfund Program

Sampler Signature: [signature]

5. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254, ATTN: Jeff Depaolo

Site Name: Whitewater and Hanover Creeks

City, State: Bayard, NM

Site Spill ID:

3. Type of Activity: SF, PRP, ST, FED; Lead; Pre-Remedial: PA, SSI, LSI; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MFQ218	4	Low	Grab	2/6	X							6-039915	C092W-EQB	12/8/92 12:50	SDW		—
MFQ201	2	Low	Grab	2/6	X							6-005199	C092W-MW1	12/7/92 1325	SDW		—
MFN651	2	Low	Grab	2/6	X							6-005447	C092W-MW1	12/7/92 1325	SDW		—
MFQ206	2	Low	Grab	2/6	X							6-005439	C092W-MW4	12/7/92 1100	SDW		—
MFQ207	2	Low	Grab	2/6	X							6-005440	C092W-MW4	12/7/92 1700	SDW		—
MFQ202	2	Low	Grab	2/6	X							6-005297	C092W-B	12/7/92 1325	SDW		B
MFQ203	1	Low	Grab	2/6	X							6-005178	C092W-MT1	12/7/92 1530	SDW		—
MFQ204	1	Low	Grab	2/6	X							6-005198	C092W-MT2	12/7/92 1535	SDW		—
MFN649	5	Low	Comp	6	X							6-005377	C092S-MT	12/7/92 1140	SDW		—
MFQ211	5	Low	Comp	6	X							6-005450	C092S-FCC	12/8/92 1020	SDW		—

1/15/93

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Shipment for Case complete? (Y/N): N

Page 2 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: [signature]

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

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Post-it™ brand fax transmittal memo 7671 | # of pages ▸ (1)

To MYRA PEREZ	From Nina Kuchar
Co. Reg 6	Co. VIAR
Dept.	Phone # 703 519 1360
Fax #	Fax #

In Reference to Case No(s): 19220

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: 12-14-92

Laboratory Name: NMED (Sampler)

Lab Contact: Steve Wust

Region: VI

Regional Contact: Myra Perez

Call Initiated By: * Laboratory ___ Region Sampler

In reference to data for the following sample number(s):

Summary of Questions/Issues Discussed:

No Soil QC designated -

Per Sampler: Use MFN649 TAG 6-085377
Ship date 12/9/92

Summary of Resolution:

12/14 Called Myra: passed info along.

12/14 Called Jeff Depaolo - @ Skinner: informed.

Signature: Nina Kuchar Date: 12/14/92

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
		6	NMED	12-9-92	Fed Ex

Regional Information

Sampler (Name): Stephen Wust

Airbill Number: 6159041556

Non-Superfund Program

Sampler Signature: [signature]

5. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254

ATTN: Jeff Depaolo

Site Name: Whitewater and Hanover Creeks

City, State: Bayard, NM

Site Spill ID:

3. Type of Activity: SF, PRP, ST, FED; Lead: PA, SSI, LSI (X); Pre-Remedial: RIFS, RD, RA, O&M, NPLD; Remedial: CLEM, REMA, REM, OIL, UST; Removal

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (High only) 7. Waste (High only) 8. Other (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Enter Appropriate Qualifier for Designated Field QC (B = Blank S = Spike D = Duplicate PE = Perform. Eval. — = Not a QC Sample)
MFN650	5	Low	Grab	6	X							6-005326	C092S-MG	12/7/92 1215	SSW		—
MFQ205	5	Low	Grab	6	X							6-005444	C092S-MG2	12/7/92 1618	SSW		—
MFQ210	5	Low	Grab	6	X							6-005469	C092S-HCBG	12/8/92 0940	SSW		—

Shipment for Case complete? (Y/N): N

Page 1 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: [signature]

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code	173 51571149
Account Code	
2. Region No.	6
Sampling Co.	FED EX
4. Date Shipped	12/11/92
Carrier	FED EX
Regional Information	
Sampler (Name)	STEPHEN WUST
Airbill Number	6815904157 1
Non-Superfund Program	
Sampler Signature	Stephen Wust
5. Ship To	Skinner & Sherman, 300 Second Ave., Waltham, MA 02254
Site Name	WHITEWATER AND HANOVER CREEKS
City, State	BAYARD NM
Site Spill ID	

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI	✓	O&M		OIL	
				NPLD		UST	

6. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (SAS) (Specify)
N. Not preserved

7. Sample Description (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Rinsate
5. Soil/Sediment
6. Oil (SAS)
7. Waste (SAS)
8. Other (SAS) (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
MFQ221	5	LOW	Comp	6	X							6-005446	CH92S-TP1	12/9/92 11:25	SZW		—
MFQ222	5	LOW	Comp	6	X							6-039951	CH92S-TP7	12/9/92 13:15	SZW		—
MFQ223	5	LOW	Comp	6	X							6-039937	CH92S-DIV	12/9/92 13:45	SZW		—
MFQ224	5	LOW	Comp	6	X							6-039924	CH92S-SD	12/9/92 15:00	SZW		—
MFQ225	5	LOW	Comp	6	X							6-039946	CH92S-WD	12/9/92 15:45	SZW		—
MFQ028	5	LOW	Comp	6	X							6-039964	CH92S-BF1	12/10/92 11:30	SZW		—
MFQ235	5	LOW	Comp	6	X							6-039921	CO92S-HCT	12/10/92 13:55	SLW		—
MFQ026	5	LOW	Comp	6	X							6-039684	CH92S-HV1	12/10/92 10:00	SLW		—
MFQ029	5	LOW	Comp	6	X							6-039685	CH92S-BF2	12/10/92 12:00	SLW		—
MFQ027	5	LOW	Comp	6	X							6-039686	CH92S-HU2	12/10/92 10:40	SLW		—

Shipment for Case complete? (Y/N): Y

Page 1 of PAGE 2 of 4

Sample used for a spike and/or duplicate:

Additional Sampler Signatures:

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

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Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Project Code: 173 51571149
Account Code:
2. Region No.: 6
Sampling Co.: Fed Ex
4. Date Shipped: 12/11/92
Carrier: FED EX

Regional Information:
Sampler (Name): STEPHEN WUST
Airbill Number: 6159041571

Non-Superfund Program:
Sampler Signature: [signature]
5. Ship To: Skinner & Sherman, 300 Second Ave., Waltham, MA 02254

Site Name: Whitewater [redacted] and HANOVER CREEKS
City, State: BAYARD, NM
Site Spill ID:

4. Type of Activity: Lead: SF, PRP, ST, FED; Pre-Remedial: PA, SSI, LSI ✓; Remedial: RIFS, RD, RA, O&M, NPLD; Removal: CLEM, REMA, REM, OIL, UST

6. Preservative (Enter in Column D): 1. HCl 2. HNO3 3. NaOH 4. H_2SO_4 5. $K_2CR_2O_7$ 6. Ice only 7. Other (SAS) (Specify) N. Not preserved

7. Sample Description (Enter in Column A): 1. Surface Water 2. Ground Water 3. Leachate 4. Rinsate 5. Soil/Sediment 6. Oil (SAS) 7. Waste (SAS) 8. Other (SAS) (Specify)

CLP Sample Numbers (from labels)	A Enter # from Box 7	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Designated Field QC
MFQ233	5	Low	Comp	6	X							6-039959	CH925-BFBG	12/10/92 10:20	SLW		—
MFQ234	5	Low	Comp	6	X							6-039960	CH925-BM	12/10/92 12:15	SLW		—
MFQ236	5	Low	Comp	6	X							6-039961	CH925-LB	12/10/92 15:45	SLW		—
MFQ030	5	Low	Comp	6	X							6-039588	CH925-BH1	12/10/92 13:38	SLW		—
MFQ031	5	Low	Comp	6	X							6-039589	CH925-BH2	12/10/92 14:05	SLW		—
MFQ242	1	Low	grab	2/6	X							6-039600	CH92W-HCWD	12/10/92 11:20	SLW		—
MFQ238	1	Low	grab	2/6	X							6-039587	CH92W-HCBU	12/10/92 12:18	SLW		—
MFQ237	1	Low	grab	2/6	X							6-039963	CH92N-LB	12/10/92 15:35	SLW		—
MFQ-239	1	Low	grab	2/6	X							6-005385	CH92W-HCBH	12/10/92 11:50	SLW		—
MFQ-240	2	Low	grab	2/6	X							6-005383	CH92W-SW	12/10/92 15:10	SLW		

1/20 93

Shipment for Case complete? (Y/N)
Page 1 of ____ Page 3 of 4
Sample used for a spike and/or duplicate:
Additional Sampler Signatures:
Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

Split Samples: ☐ Accepted (Signature) ☐ Declined

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFN649

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-01S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 91.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4170			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	4.9		SN	F
7440-39-3	Barium	2.2	B		P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.31	U		P
7440-70-2	Calcium	35600		*	P
7440-47-3	Chromium	8.9		*	P
7440-48-4	Cobalt	27.5		E	P
7440-50-8	Copper	812			P
7439-89-6	Iron	51400		*	P
7439-92-1	Lead	8.3			F
7439-95-4	Magnesium	7750			P
7439-96-5	Manganese	1160		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	8.4	B		P
7440-09-7	Potassium	68.1	B		P
7782-49-2	Selenium	1.9		SN	F
7440-22-4	Silver	3.2			P
7440-23-5	Sodium	193	B		P
7440-28-0	Thallium	0.80	U		F
7440-62-2	Vanadium	7.2	B		P
7440-66-6	Zinc	1030			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFN650

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-02S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 93.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	814			P
7440-36-0	Antimony	3.0	U	N	P
7440-38-2	Arsenic	1.2	B	WN	F
7440-39-3	Barium	0.82	B		P
7440-41-7	Beryllium	0.18	B		P
7440-43-9	Cadmium	0.31	U		P
7440-70-2	Calcium	6420		*	P
7440-47-3	Chromium	4.8		*	P
7440-48-4	Cobalt	14.8		E	P
7440-50-8	Copper	485			P
7439-89-6	Iron	70700		*	P
7439-92-1	Lead	2.4			F
7439-95-4	Magnesium	4480			P
7439-96-5	Manganese	811		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	5.1	B		P
7440-09-7	Potassium	57.8	B		P
7782-49-2	Selenium	0.80	U	WN	F
7440-22-4	Silver	4.2			P
7440-23-5	Sodium	25.8	B		P
7440-28-0	Thallium	0.80	U		F
7440-62-2	Vanadium	5.4	B		P
7440-66-6	Zinc	219			P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: FINE

Color After: BLACK Clarity After: Artifacts:

Comments:

004

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ026

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-03S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 74.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9930			P
7440-36-0	Antimony	3.9	U	N	P
7440-38-2	Arsenic	5.0		+N	F
7440-39-3	Barium	202			P
7440-41-7	Beryllium	0.59	B		P
7440-43-9	Cadmium	1.1	B		P
7440-70-2	Calcium	113000		*	P
7440-47-3	Chromium	12.5		*	P
7440-48-4	Cobalt	7.9	B	E	P
7440-50-8	Copper	2030			P
7439-89-6	Iron	14400		*	P
7439-92-1	Lead	101		S	F
7439-95-4	Magnesium	3810			P
7439-96-5	Manganese	279		*	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	11.9			P
7440-09-7	Potassium	2670			P
7782-49-2	Selenium	1.0	U	N	F
7440-22-4	Silver	0.95	U		P
7440-23-5	Sodium	126	B		P
7440-28-0	Thallium	1.0	U		F
7440-62-2	Vanadium	21.9			P
7440-66-6	Zinc	126			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

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005

EPA SAMPLE NO.

MFQ027

INORGANIC ANALYSIS DATA SHEET

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-04S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 84.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6060			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	5.6		+N	F
7440-39-3	Barium	135			P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	5.8			P
7440-70-2	Calcium	65900		*	P
7440-47-3	Chromium	10.3		*	P
7440-48-4	Cobalt	10.0	B	E	P
7440-50-8	Copper	6180			P
7439-89-6	Iron	14300		*	P
7439-92-1	Lead	79.4		S	F
7439-95-4	Magnesium	2360			P
7439-96-5	Manganese	293		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	12.4			P
7440-09-7	Potassium	1340			P
7782-49-2	Selenium	1.3		N	F
7440-22-4	Silver	1.3	B		P
7440-23-5	Sodium	73.2	B		P
7440-28-0	Thallium	0.88	U		F
7440-62-2	Vanadium	17.9			P
7440-66-6	Zinc	121			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

006

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ028

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-05S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 77.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4990			P
7440-36-0	Antimony	3.7	U	N	P
7440-38-2	Arsenic	25.5		SN	F
7440-39-3	Barium	14.0	B		P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	0.37	U		P
7440-70-2	Calcium	41800		*	P
7440-47-3	Chromium	12.4		*	P
7440-48-4	Cobalt	7.9	B	E	P
7440-50-8	Copper	1010			P
7439-89-6	Iron	93400		*	P
7439-92-1	Lead	633			F
7439-95-4	Magnesium	2730			P
7439-96-5	Manganese	1210		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	3.3	B		P
7440-09-7	Potassium	931	B		P
7782-49-2	Selenium	1.4		MN	F
7440-22-4	Silver	8.6			P
7440-23-5	Sodium	80.0	B		P
7440-28-0	Thallium	0.95	U		F
7440-62-2	Vanadium	12.5			P
7440-66-6	Zinc	933			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

FORM I - IN ILM02.1

007

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ029

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-06S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 90.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8830			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	3.7		+N	F
7440-39-3	Barium	81.7			P
7440-41-7	Beryllium	0.51	B		P
7440-43-9	Cadmium	0.32	U		P
7440-70-2	Calcium	2360		*	P
7440-47-3	Chromium	8.8		*	P
7440-48-4	Cobalt	8.3	B	E	P
7440-50-8	Copper	252			P
7439-89-6	Iron	20000		*	P
7439-92-1	Lead	123			F
7439-95-4	Magnesium	3030			P
7439-96-5	Manganese	793		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	10.1			P
7440-09-7	Potassium	1700			P
7782-49-2	Selenium	0.83	U	MWN	F
7440-22-4	Silver	1.2	B		P
7440-23-5	Sodium	46.5	B		P
7440-28-0	Thallium	0.83	U		F
7440-62-2	Vanadium	18.3			P
7440-66-6	Zinc	279			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ030

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-07S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 68.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5910			P
7440-36-0	Antimony	4.1	U	N	P
7440-38-2	Arsenic	6.2		N	F
7440-39-3	Barium	109			P
7440-41-7	Beryllium	0.75	B		P
7440-43-9	Cadmium	2.4			P
7440-70-2	Calcium	15600		*	P
7440-47-3	Chromium	14.6		*	P
7440-48-4	Cobalt	14.7		E	P
7440-50-8	Copper	645			P
7439-89-6	Iron	28900		*	P
7439-92-1	Lead	228		S	F
7439-95-4	Magnesium	2870			P
7439-96-5	Manganese	1400		*	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	10.6	B		P
7440-09-7	Potassium	2040			P
7782-49-2	Selenium	1.1	U	WN	F
7440-22-4	Silver	2.1	B		P
7440-23-5	Sodium	74.9	B		P
7440-28-0	Thallium	1.1	U		F
7440-62-2	Vanadium	23.3			P
7440-66-6	Zinc	1000			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

FORM I - IN ILM02.1

009

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ031

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-08S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 86.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8850			P
7440-36-0	Antimony	3.1	U	N	P
7440-38-2	Arsenic	2.3		N	F
7440-39-3	Barium	40.2	B		P
7440-41-7	Beryllium	0.37	B		P
7440-43-9	Cadmium	2.5			P
7440-70-2	Calcium	4810		*	P
7440-47-3	Chromium	7.5		*	P
7440-48-4	Cobalt	7.4	B	E	P
7440-50-8	Copper	146			P
7439-89-6	Iron	16100		*	P
7439-92-1	Lead	81.2			F
7439-95-4	Magnesium	3690			P
7439-96-5	Manganese	861		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	6.1	B		P
7440-09-7	Potassium	1590			P
7782-49-2	Selenium	0.83	U	WN	F
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	73.9	B		P
7440-28-0	Thallium	0.83	U		F
7440-62-2	Vanadium	18.2			P
7440-66-6	Zinc	1230			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS, STONES

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ205

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-09S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 85.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	946			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	1.1	B	WN	F
7440-39-3	Barium	6.5	B		P
7440-41-7	Beryllium	0.20	B		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	17300		*	P
7440-47-3	Chromium	6.5		*	P
7440-48-4	Cobalt	19.8		E	P
7440-50-8	Copper	324			P
7439-89-6	Iron	117000		*	P
7439-92-1	Lead	3.5			F
7439-95-4	Magnesium	4000			P
7439-96-5	Manganese	1070		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	6.4	B		P
7440-09-7	Potassium	153	B		P
7782-49-2	Selenium	0.81	U	WN	F
7440-22-4	Silver	6.1			P
7440-23-5	Sodium	112	B		P
7440-28-0	Thallium	0.81	U	W	F
7440-62-2	Vanadium	10.0	B		P
7440-66-6	Zinc	221			P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: FINE

Color After: BLACK Clarity After: Artifacts:

Comments:

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011

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ210

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-10S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 87.0

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10500			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	1.6	B	SN	F
7440-39-3	Barium	71.9			P
7440-41-7	Beryllium	0.57	B		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	1880		*	P
7440-47-3	Chromium	14.3		*	P
7440-48-4	Cobalt	9.0	B	E	P
7440-50-8	Copper	53.2			P
7439-89-6	Iron	29500		*	P
7439-92-1	Lead	58.6			F
7439-95-4	Magnesium	4040			P
7439-96-5	Manganese	973		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	9.0			P
7440-09-7	Potassium	1660			P
7782-49-2	Selenium	4.1	U	WN	F
7440-22-4	Silver	1.8	B		P
7440-23-5	Sodium	58.8	B		P
7440-28-0	Thallium	0.82	U		F
7440-62-2	Vanadium	21.7			P
7440-66-6	Zinc	253			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ211

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-11S

Level (low/med): LOW Date Received: 12/10/92

% Solids: 85.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6750			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	1.2	B	N	F
7440-39-3	Barium	81.6			P
7440-41-7	Beryllium	0.39	B		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	4430		*	P
7440-47-3	Chromium	5.3		*	P
7440-48-4	Cobalt	9.3	B	E	P
7440-50-8	Copper	354			P
7439-89-6	Iron	26600		*	P
7439-92-1	Lead	8.1			F
7439-95-4	Magnesium	3840			P
7439-96-5	Manganese	581		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	4.5	B		P
7440-09-7	Potassium	1220			P
7782-49-2	Selenium	0.84	U	WN	F
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	49.3	B		P
7440-28-0	Thallium	0.84	U		F
7440-62-2	Vanadium	21.1			P
7440-66-6	Zinc	120			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ221

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-12S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 88.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	612			P
7440-36-0	Antimony	3.2	U	N	P
7440-38-2	Arsenic	0.48	U	N	F
7440-39-3	Barium	42.3	B		P
7440-41-7	Beryllium	0.07	U		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	1880		*	P
7440-47-3	Chromium	1.5	B	*	P
7440-48-4	Cobalt	0.60	B	E	P
7440-50-8	Copper	89.7			P
7439-89-6	Iron	9330		*	P
7439-92-1	Lead	2.5			F
7439-95-4	Magnesium	38.4	B		P
7439-96-5	Manganese	4.8		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	0.57	U		P
7440-09-7	Potassium	1110			P
7782-49-2	Selenium	0.86	B	WN	F
7440-22-4	Silver	0.93	B		P
7440-23-5	Sodium	142	B		P
7440-28-0	Thallium	0.83	U		F
7440-62-2	Vanadium	3.6	B		P
7440-66-6	Zinc	5.1			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ222

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-13S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 92.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4000			P
7440-36-0	Antimony	3.0	U	N	P
7440-38-2	Arsenic	2.2		SN	F
7440-39-3	Barium	13.2	B		P
7440-41-7	Beryllium	0.39	B		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	5430		*	P
7440-47-3	Chromium	9.9		*	P
7440-48-4	Cobalt	43.5		E	P
7440-50-8	Copper	1380			P
7439-89-6	Iron	77600		*	P
7439-92-1	Lead	5.1		S	F
7439-95-4	Magnesium	3730			P
7439-96-5	Manganese	288		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	12.7			P
7440-09-7	Potassium	1290			P
7782-49-2	Selenium	9.4		+N	F
7440-22-4	Silver	4.1			P
7440-23-5	Sodium	48.9	B		P
7440-28-0	Thallium	0.79	U		F
7440-62-2	Vanadium	11.8			P
7440-66-6	Zinc	38.4			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ223

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-14S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 82.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2880			P
7440-36-0	Antimony	3.6	U	N	P
7440-38-2	Arsenic	2.1	B	N	F
7440-39-3	Barium	35.0	B		P
7440-41-7	Beryllium	0.47	B		P
7440-43-9	Cadmium	0.36	U		P
7440-70-2	Calcium	1840		*	P
7440-47-3	Chromium	5.7		*	P
7440-48-4	Cobalt	8.2	B	E	P
7440-50-8	Copper	247			P
7439-89-6	Iron	15000		*	P
7439-92-1	Lead	29.4		S	F
7439-95-4	Magnesium	1070	B		P
7439-96-5	Manganese	224		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	6.1	B		P
7440-09-7	Potassium	664	B		P
7782-49-2	Selenium	0.88	U	N	F
7440-22-4	Silver	0.97	B		P
7440-23-5	Sodium	88.8	B		P
7440-28-0	Thallium	0.88	U	W	F
7440-62-2	Vanadium	15.9			P
7440-66-6	Zinc	70.6			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts:

Comments:

016

FORM I - IN ILM02.1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ224

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-15S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 85.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4460			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	1.3	B	WN	F
7440-39-3	Barium	59.0			P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.34	U		P
7440-70-2	Calcium	1240		*	P
7440-47-3	Chromium	13.4		*	P
7440-48-4	Cobalt	48.1		E	P
7440-50-8	Copper	894			P
7439-89-6	Iron	49100		*	P
7439-92-1	Lead	4.8			F
7439-95-4	Magnesium	2050			P
7439-96-5	Manganese	86.7		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	9.8			P
7440-09-7	Potassium	1910			P
7782-49-2	Selenium	3.2		+N	F
7440-22-4	Silver	3.4			P
7440-23-5	Sodium	79.6	B		P
7440-28-0	Thallium	0.84	U		F
7440-62-2	Vanadium	19.3			P
7440-66-6	Zinc	26.7			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

017

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ225

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-16S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 87.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8770			P
7440-36-0	Antimony	3.3	U	N	P
7440-38-2	Arsenic	1.8	B	N	F
7440-39-3	Barium	45.8			P
7440-41-7	Beryllium	1.1	B		P
7440-43-9	Cadmium	0.33	U		P
7440-70-2	Calcium	3520		*	P
7440-47-3	Chromium	9.7		*	P
7440-48-4	Cobalt	55.3		E	P
7440-50-8	Copper	2840			P
7439-89-6	Iron	38600		*	P
7439-92-1	Lead	43.2			F
7439-95-4	Magnesium	8610			P
7439-96-5	Manganese	672		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	10.8			P
7440-09-7	Potassium	1870			P
7782-49-2	Selenium	1.2		N	F
7440-22-4	Silver	3.5			P
7440-23-5	Sodium	47.4	B		P
7440-28-0	Thallium	0.86	U		F
7440-62-2	Vanadium	24.9			P
7440-66-6	Zinc	309			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ233

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-17S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 72.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8050			P
7440-36-0	Antimony	3.9	U	N	P
7440-38-2	Arsenic	5.4		N	F
7440-39-3	Barium	120			P
7440-41-7	Beryllium	0.72	B		P
7440-43-9	Cadmium	4.3			P
7440-70-2	Calcium	2660		*	P
7440-47-3	Chromium	19.3		*	P
7440-48-4	Cobalt	10.2	B	E	P
7440-50-8	Copper	281			P
7439-89-6	Iron	19700		*	P
7439-92-1	Lead	187		S	F
7439-95-4	Magnesium	1940			P
7439-96-5	Manganese	1140		*	P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	17.3			P
7440-09-7	Potassium	1710			P
7782-49-2	Selenium	0.97	U	WN	F
7440-22-4	Silver	1.4	B		P
7440-23-5	Sodium	49.8	B		P
7440-28-0	Thallium	0.97	U		F
7440-62-2	Vanadium	27.6			P
7440-66-6	Zinc	438			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

FORM I - IN ILM02.1

-019

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ234

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-18S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 93.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	572			P
7440-36-0	Antimony	2.9	U	N	P
7440-38-2	Arsenic	4.4		N	F
7440-39-3	Barium	70.0			P
7440-41-7	Beryllium	0.33	B		P
7440-43-9	Cadmium	16.8			P
7440-70-2	Calcium	37200		*	P
7440-47-3	Chromium	2.6		*	P
7440-48-4	Cobalt	16.2		E	P
7440-50-8	Copper	204			P
7439-89-6	Iron	49600		*	P
7439-92-1	Lead	1530			F
7439-95-4	Magnesium	662	B		P
7439-96-5	Manganese	3770		*	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	4.6	B		P
7440-09-7	Potassium	39.3	B		P
7782-49-2	Selenium	0.77	U	+N	F
7440-22-4	Silver	4.0			P
7440-23-5	Sodium	32.8	B		P
7440-28-0	Thallium	0.77	U		F
7440-62-2	Vanadium	1.9	B		P
7440-66-6	Zinc	9320			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: FINE

Color After: BROWN Clarity After: Artifacts:

Comments:

FORM I - IN ILM02.1

020

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MFQ235

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-19S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 83.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	43200			P
7440-36-0	Antimony	3.4	U	N	P
7440-38-2	Arsenic	8.1		N	F
7440-39-3	Barium	30.6	B		P
7440-41-7	Beryllium	4.1			P
7440-43-9	Cadmium	1.5			P
7440-70-2	Calcium	2930		*	P
7440-47-3	Chromium	36.2		*	P
7440-48-4	Cobalt	44.7		E	P
7440-50-8	Copper	5690			P
7439-89-6	Iron	72300		*	P
7439-92-1	Lead	44.8			F
7439-95-4	Magnesium	901	B		P
7439-96-5	Manganese	788		*	P
7439-97-6	Mercury	1.1			CV
7440-02-0	Nickel	54.9			P
7440-09-7	Potassium	860	B		P
7782-49-2	Selenium	4.5	U	N	F
7440-22-4	Silver	4.4			P
7440-23-5	Sodium	39.6	B		P
7440-28-0	Thallium	0.90	U		F
7440-62-2	Vanadium	72.8			P
7440-66-6	Zinc	583			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: BROWN Clarity After: Artifacts: YES

Comments:
STONES

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MFQ236

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Lab Sample ID: 12197-20S

Level (low/med): LOW Date Received: 12/14/92

% Solids: 77.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4540			P
7440-36-0	Antimony	3.7	U	N	P
7440-38-2	Arsenic	1.4	B	N	F
7440-39-3	Barium	51.6			P
7440-41-7	Beryllium	1.2	B		P
7440-43-9	Cadmium	0.60	B		P
7440-70-2	Calcium	6880		*	P
7440-47-3	Chromium	2.2	B	*	P
7440-48-4	Cobalt	3.6	B	E	P
7440-50-8	Copper	221			P
7439-89-6	Iron	4240		*	P
7439-92-1	Lead	18.3			F
7439-95-4	Magnesium	2010			P
7439-96-5	Manganese	335		*	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	2.4	B		P
7440-09-7	Potassium	1570			P
7782-49-2	Selenium	0.93	U	MWN	F
7440-22-4	Silver	0.91	U		P
7440-23-5	Sodium	68.5	B		P
7440-28-0	Thallium	0.93	U		F
7440-62-2	Vanadium	7.8	B		P
7440-66-6	Zinc	46.0			P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: BROWN Clarity After: Artifacts: YES

Comments:
ROOTS

-022

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum	1878.0	1908.20	101.6	25000.0	24266.00	97.1	24261.00	97.0	P
Antimony	978.0	1001.20	102.4	2500.0	2357.90	94.3	2373.30	94.9	P
Arsenic	50.4	50.61	100.4	50.0	52.86	105.7	53.10	106.2	F
Barium	1891.0	1902.30	100.6	2500.0	2363.80	94.6	2347.20	93.9	P
Beryllium	478.0	466.45	97.6	500.0	481.37	96.3	479.51	95.9	P
Cadmium	493.0	468.56	95.0	2500.0	2325.40	93.0	2350.20	94.0	P
Calcium	48810.0	49867.00	102.2	25000.0	24606.00	98.4	24856.00	99.4	P
Chromium	480.0	479.03	99.8	2500.0	2341.00	93.6	2363.90	94.6	P
Cobalt	487.0	473.84	97.3	2500.0	2340.80	93.6	2346.30	93.9	P
Copper	486.0	464.70	95.6	2500.0	2379.10	95.2	2438.60	97.5	P
Iron	1962.0	1998.50	101.9	10000.0	9865.60	98.7	10415.00	104.2	P
Lead	98.4	97.48	99.1	50.0	48.91	97.8	49.42	98.8	F
Magnesium	23859.0	24736.00	103.7	25000.0	24521.00	98.1	24459.00	97.8	P
Manganese	474.0	470.84	99.3	2500.0	2344.20	93.8	2360.50	94.4	P
Mercury	5.0	4.82	96.4	2.0	2.14	107.0	2.10	105.0	CV
Nickel	488.0	475.22	97.4	2500.0	2334.20	93.4	2379.80	95.2	P
Potassium	49182.0	49655.00	101.0	25000.0	24557.00	98.2	24554.00	98.2	P
Selenium	50.3	49.93	99.3	50.0	52.36	104.7	50.73	101.5	F
Silver	478.0	518.47	108.5	500.0	518.80	103.8	516.32	103.3	P
Sodium	46804.0	49473.00	105.7	25000.0	24286.00	97.1	24193.00	96.8	P
Thallium	100.7	105.24	104.5	50.0	49.52	99.0	50.03	100.1	F
Vanadium	482.0	484.97	100.6	2500.0	2370.20	94.8	2368.70	94.7	P
Zinc	2921.0	2842.50	97.3	2500.0	2344.10	93.8	2357.30	94.3	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-023

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	24501.00	98.0	24125.00	96.5	P
Antimony				2500.0	2397.20	95.9	2359.20	94.4	P
Arsenic				50.0	53.57	107.1	53.10	106.2	F
Barium				2500.0	2378.70	95.1	2341.50	93.7	P
Beryllium				500.0	485.85	97.2	479.59	95.9	P
Cadmium				2500.0	2364.50	94.6	2333.20	93.3	P
Calcium				25000.0	24835.00	99.3	24597.00	98.4	P
Chromium				2500.0	2364.60	94.6	2338.80	93.6	P
Cobalt				2500.0	2366.10	94.6	2329.50	93.2	P
Copper				2500.0	2417.30	96.7	2414.30	96.6	P
Iron				10000.0	10113.00	101.1	9931.90	99.3	P
Lead				50.0	49.08	98.2	49.16	98.3	F
Magnesium				25000.0	24698.00	98.8	24429.00	97.7	P
Manganese				2500.0	2364.50	94.6	2322.10	92.9	P
Mercury				2.0	2.17	108.5	2.16	108.0	CV
Nickel				2500.0	2359.70	94.4	2327.10	93.1	P
Potassium				25000.0	24832.00	99.3	24418.00	97.7	P
Selenium				50.0	52.20	104.4	45.61	91.2	F
Silver				500.0	522.91	104.6	517.09	103.4	P
Sodium				25000.0	24485.00	97.9	24096.00	96.4	P
Thallium				50.0	49.01	98.0	49.01	98.0	F
Vanadium				2500.0	2393.80	95.8	2359.60	94.4	P
Zinc				2500.0	2388.20	95.5	2408.80	96.4	P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-024

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum				25000.0	23653.00	94.6			P
Antimony				2500.0	2312.60	92.5			P
Arsenic				50.0	49.91	99.8	50.38	100.8	F
Barium				2500.0	2307.40	92.3			P
Beryllium				500.0	470.72	94.1			P
Cadmium				2500.0	2291.40	91.7			P
Calcium				25000.0	23958.00	95.8			P
Chromium				2500.0	2290.50	91.6			P
Cobalt				2500.0	2284.00	91.4			P
Copper				2500.0	2335.20	93.4			P
Iron				10000.0	9602.10	96.0			P
Lead				50.0	51.99	104.0	54.02	108.0	F
Magnesium				25000.0	23959.00	95.8			P
Manganese				2500.0	2296.50	91.9			P
Mercury				2.0	2.12	106.0	2.19	109.5	CV
Nickel				2500.0	2275.30	91.0			P
Potassium				25000.0	23910.00	95.6			P
Selenium				50.0	47.98	96.0	45.24	90.5	F
Silver				500.0	505.06	101.0			P
Sodium				25000.0	23700.00	94.8			P
Thallium				50.0	53.50	107.0	51.06	102.1	F
Vanadium				2500.0	2317.10	92.7			P
Zinc				2500.0	2313.70	92.5			P
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-025

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	50.38	100.8			F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	50.36	100.7	48.58	97.2	F
Magnesium									NR
Manganese									NR
Mercury				2.0	2.09	104.5	2.08	104.0	CV
Nickel									NR
Potassium									NR
Selenium	50.3	53.65	106.7	50.0	52.14	104.3	51.55	103.1	F
Silver									NR
Sodium									NR
Thallium				50.0	47.15	94.3	47.50	95.0	F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

026

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic	50.4	51.12	101.4	50.0	50.65	101.3	49.60	99.2	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	49.93	99.9	47.06	94.1	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	45.58	91.2	48.48	97.0	F
Silver									NR
Sodium									NR
Thallium				50.0	47.15	94.3			F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

027

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	48.20	96.4	48.55	97.1	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	47.64	95.3	45.39	90.8	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	48.18	96.4	49.04	98.1	F
Silver									NR
Sodium									NR
Thallium	100.7	100.81	100.1	50.0	49.50	99.0	48.42	96.8	F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-028

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	48.90	97.8	48.55	97.1	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead	98.4	103.04	104.7	50.0	49.55	99.1	49.56	99.1	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium				50.0	48.46	96.9			F
Silver									NR
Sodium									NR
Thallium				50.0	47.53	95.1			F
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

029

U.S. EPA - CLP

2A

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	48.55	97.1	47.62	95.2	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead	98.4	99.53	101.1	50.0	46.77	93.5	50.12	100.2	F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium	50.3	49.74	98.9	50.0	48.59	97.2	49.41	98.8	F
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-030

U.S. EPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Initial Calibration Source: EPA-LV

Continuing Calibration Source: SKINER

Concentration Units: ug/L

Analyte	Initial Calibration True	Initial Calibration Found	Initial Calibration %R(1)	Continuing Calibration True	Continuing Calibration Found	Continuing Calibration %R(1)	Continuing Calibration Found	Continuing Calibration %R(1)	M
Aluminum									NR
Antimony									NR
Arsenic				50.0	47.39	94.8	49.95	99.9	F
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead				50.0	46.59	93.2			F
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

(1) Control limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

-031

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source: SKINER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony				120.0	111.36	92.8	115.16	96.0
Arsenic	10.0	11.10	111.0					
Barium								
Beryllium				10.0	9.40	94.0	9.30	93.0
Cadmium				10.0	10.34	103.4	9.49	94.9
Calcium								
Chromium				20.0	16.38	81.9	18.64	93.2
Cobalt				100.0	91.08	91.1	87.66	87.7
Copper				50.0	55.66	111.3	72.15	144.3
Iron								
Lead	3.0	3.60	120.0					
Magnesium								
Manganese				30.0	26.86	89.5	26.23	87.4
Mercury								
Nickel				80.0	73.99	92.5	72.95	91.2
Potassium								
Selenium	5.0	5.53	110.6					
Silver				20.0	27.78	138.9	24.55	122.8
Sodium								
Thallium	10.0	9.51	95.1					
Vanadium				100.0	90.23	90.2	87.69	87.7
Zinc				40.0	41.43	103.6	52.55	131.4

032

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony								
Arsenic	10.0	9.42	94.2					
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead	3.0	3.85	128.3					
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	5.33	106.6					
Silver								
Sodium								
Thallium	10.0	9.66	96.6					
Vanadium								
Zinc								

-033

U.S. EPA - CLP

2B
CRDL STANDARD FOR AA AND ICP

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

AA CRDL Standard Source: SKINER

ICP CRDL Standard Source:

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
					Initial		Final	
	True	Found	%R	True	Found	%R	Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead	3.0	3.11	103.7					
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	6.44	128.8					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

-034

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	14.7	U	22.3	B	14.7	U	14.7	U	2.974	B	P
Antimony	14.8	U	14.8	U	14.8	U	14.8	U	2.960	U	P
Arsenic	2.2	U	2.2	U	2.2	U	2.2	U	0.440	U	F
Barium	0.7	U	1.6	B	0.8	B	1.0	B	0.140	U	P
Beryllium	0.4	B	0.4	B	0.4	B	0.5	B	0.060	U	P
Cadmium	1.5	U	2.9	B	1.5	U	1.8	B	0.300	U	P
Calcium	-28.6	B	13.7	U	13.7	U	-17.3	B	6.064	B	P
Chromium	2.6	U	2.6	U	2.6	U	2.6	U	0.520	U	P
Cobalt	1.3	U	2.7	B	1.3	U	2.0	B	0.684	B	P
Copper	-13.9	B	-10.6	B	-5.8	B	-9.2	B	0.732	B	P
Iron	-11.0	B	-4.1	B	18.9	B	22.8	B	2.278	B	P
Lead	1.2	U	1.2	U	1.2	U	1.2	U	0.240	U	F
Magnesium	18.0	U	62.1	B	22.8	B	18.0	U	6.602	B	P
Manganese	0.9	U	1.4	B	1.0	B	0.9	U	0.222	B	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.050	U	CV
Nickel	2.6	U	3.9	B	2.6	U	2.6	U	0.520	U	P
Potassium	79.4	U	79.4	U	79.4	U	79.4	U	15.880	U	P
Selenium	3.8	U	3.8	U	3.8	U	3.8	U	0.760	U	F
Silver	3.6	U	3.6	U	3.6	U	3.6	U	0.720	U	P
Sodium	69.5	B	102.7	B	85.7	B	90.6	B	10.510	B	P
Thallium	3.8	U	3.8	U	3.8	U	3.8	U	0.760	U	F
Vanadium	2.5	U	3.5	B	2.5	U	2.5	U	0.500	U	P
Zinc	5.7	U	5.7	U	5.7	U	5.7	U	2.910	B	P
Cyanide											NR

-035

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			14.7	U	14.7	U					P
Antimony			14.8	U	14.8	U					P
Arsenic			2.2	U	2.2	U	2.2	U			F
Barium			0.8	B	0.7	U					P
Beryllium			0.3	U	0.4	B					P
Cadmium			1.5	U	1.5	U					P
Calcium			13.7	U	13.7	U					P
Chromium			2.6	U	2.6	U					P
Cobalt			1.4	B	1.7	B					P
Copper			-5.8	B	-11.7	B					P
Iron			20.6	B	-8.8	B					P
Lead			1.2	U	1.2	U	1.7	B			F
Magnesium			21.2	B	19.6	B					P
Manganese			1.6	B	0.9	U					P
Mercury			0.1	U	0.1	U	0.1	U			CV
Nickel			2.6	U	2.6	U					P
Potassium			79.4	U	79.4	U					P
Selenium			3.8	U	3.8	U	3.8	U			F
Silver			3.6	U	3.6	U					P
Sodium			101.9	B	80.0	B					P
Thallium			3.8	U	3.8	U	3.8	U			F
Vanadium			2.5	U	2.5	U					P
Zinc			5.7	U	5.7	U					P
Cyanide											NR

036

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			2.2	U							F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			1.7	B	1.2	U	2.6	B			F
Magnesium											NR
Manganese											NR
Mercury			0.1	U	0.1	U					CV
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium			3.8	U	3.8	U	3.8	U			F
Vanadium											NR
Zinc											NR
Cyanide											NR

-037

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic	2.2	U	2.3	B	2.2	U	2.2	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead			1.2	U	1.2	U	1.2	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.8	U	3.8	U	3.8	U			F
Silver											NR
Sodium											NR
Thallium	3.8	U	3.8	U	3.8	U	3.8	U			F
Vanadium											NR
Zinc											NR
Cyanide											NR

-038

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			2.2	U	2.3	B	2.2	U			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	1.2	U	1.2	U	1.2	U					F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium			3.8	U							F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

039

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			3.7	B	2.2	U	2.8	B			F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead	1.2	U	1.2	U	1.2	U	1.2	U			F
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium	3.8	U	3.8	U	3.8	U					F
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

040

U.S. EPA - CLP

3
BLANKS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											NR
Antimony											NR
Arsenic			2.2	U							F
Barium											NR
Beryllium											NR
Cadmium											NR
Calcium											NR
Chromium											NR
Cobalt											NR
Copper											NR
Iron											NR
Lead											NR
Magnesium											NR
Manganese											NR
Mercury											NR
Nickel											NR
Potassium											NR
Selenium											NR
Silver											NR
Sodium											NR
Thallium											NR
Vanadium											NR
Zinc											NR
Cyanide											NR

041

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 ICS Source: ICF-0292

Concentration Units: ug/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum	514927	507757	519010	523400.0	103.1	512540	517280.0	101.9
Antimony	0	0	3	-9.1		-32	14.7	
Arsenic								
Barium	0	499	0	461.3	92.4	-2	455.6	91.3
Beryllium	0	488	0	456.2	93.5	0	449.9	92.2
Cadmium	0	928	0	823.4	88.7	0	817.5	88.1
Calcium	529351	525385	494430	498290.0	94.8	483980	490150.0	93.3
Chromium	14	464	20	449.2	96.8	17	443.3	95.5
Cobalt	0	475	-2	452.7	95.3	-3	448.9	94.5
Copper	0	488	-18	449.5	92.1	-20	444.9	91.2
Iron	190348	187957	188360	190460.0	101.3	184690	187120.0	99.6
Lead								
Magnesium	543610	533685	529090	533030.0	99.9	520290	525870.0	98.5
Manganese	36	502	27	466.0	92.8	27	456.8	91.0
Mercury								
Nickel	0	897	1	816.5	91.0	-2	810.5	90.4
Potassium	0	0	53	83.0		-43	56.4	
Selenium								
Silver	0	899	-2	986.5	109.7	-6	986.3	109.7
Sodium	0	0	849	862.7		827	843.3	
Thallium								
Vanadium	0	473	7	454.5	96.1	2	449.6	95.1
Zinc	71	1001	64	959.1	95.8	62	940.3	93.9

-042

U.S. EPA - CLP

5A

SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MFN649S

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix: SOIL Level (low/med): LOW

% Solids for Sample: 91.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	58.0482		3.1004	U	106.80	54.4	N	P
Arsenic	75-125	10.9941		4.8810		8.63	70.8	N	F
Barium	75-125	383.9762		2.1807	B	427.19	89.4		P
Beryllium	75-125	10.0068		0.2430	B	10.68	91.4		P
Cadmium	75-125	9.3938		0.3142	U	10.68	88.0		P
Calcium									NR
Chromium	75-125	44.8332		8.8780		42.72	84.2		P
Cobalt	75-125	122.2842		27.5411		106.80	88.7		P
Copper		786.2361		811.6935		53.40	-47.7		P
Iron									NR
Lead	75-125	12.4717		8.3350		4.31	96.0		F
Magnesium									NR
Manganese		1090.8198		1158.0149		106.80	-62.9		P
Mercury	75-125	0.5904		0.0519	U	0.54	109.3		CV
Nickel	75-125	99.7779		8.3501	B	106.80	85.6		P
Potassium									NR
Selenium	75-125	1.5175		1.9482		2.16	-19.9	N	F
Silver	75-125	12.8070		3.1507		10.68	90.4		P
Sodium									NR
Thallium	75-125	11.2017		0.7960	U	10.79	103.8		F
Vanadium	75-125	99.8612		7.1749	B	106.80	86.8		P
Zinc		1193.1736		1032.5540		106.80	150.4		P
Cyanide									NR

Comments:

-043

U.S. EPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MFN649A

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix: SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		112.07		14.80	U	120.0	93.4		P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

-044

U.S. EPA - CLP

6
DUPLICATES

EPA SAMPLE NO.

MFN649D

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 91.8 % Solids for Duplicate: 91.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	G	M
Aluminum		4166.2477		4998.2363		18.2		P
Antimony		3.1004	U	3.0709	U			P
Arsenic	2.1	4.8810		4.7763		2.2		F
Barium		2.1807	B	1.7657	B	21.0		P
Beryllium		0.2430	B	0.2282	B	6.3		P
Cadmium		0.3142	U	0.3112	U			P
Calcium		35618.8202		49042.4318		31.7	*	P
Chromium	2.1	8.8780		13.8811		44.0	*	P
Cobalt	10.5	27.5411		29.3391		6.3		P
Copper		811.6935		764.5606		6.0		P
Iron		51397.2683		73547.0484		35.5	*	P
Lead		8.3350		6.9279		18.4		F
Magnesium		7754.1059		7439.9834		4.1		P
Manganese		1158.0149		1431.9535		21.2	*	P
Mercury		0.0519	U	0.0519	U			CV
Nickel	8.4	8.3501	B	8.9179		6.6		P
Potassium		68.1268	B	82.6268	B	19.2		P
Selenium	1.0	1.9482		1.5711		21.4		F
Silver	2.1	3.1507		4.0336		24.6		P
Sodium		193.4347	B	166.7621	B	14.8		P
Thallium		0.7960	U	0.7960	U			F
Vanadium	10.5	7.1749	B	11.4721		46.1		P
Zinc		1032.5540		1046.1459		1.3		P
Cyanide								NR

-045

7
LABORATORY CONTROL SAMPLE

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Solid LCS Source: QAL-0287

Aqueous LCS Source:

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				325.0	274.3		225.0	424.0	84.4
Antimony				211.0	196.2		127.0	294.0	93.0
Arsenic				917.0	851.6		635.0	1199.0	92.9
Barium				4.8	5.2	B	0.0	40.0	108.3
Beryllium				19.4	17.8		16.5	22.3	91.8
Cadmium				45.4	36.7		35.7	55.1	80.8
Calcium				196200.0	187140.0		166800.0	225600.0	95.4
Chromium				99.6	92.4		79.2	120.0	92.8
Cobalt				144.0	131.5		125.0	162.0	91.3
Copper				6910.0	6366.0		6006.0	7820.0	92.1
Iron				22430.0	20740.0		17770.0	27080.0	92.5
Lead				236.0	246.6		188.0	285.0	104.5
Magnesium				118100.0	115398.0		100400.0	129900.0	97.7
Manganese				208.0	190.6		177.0	239.0	91.6
Mercury				12.7	13.3		8.5	17.0	104.7
Nickel				60.9	51.5		49.2	72.6	84.6
Potassium				50.0	45.1	B	0.0	1000.0	90.2
Selenium				39.2	28.1		19.1	59.4	71.7
Silver				22.2	20.9		15.5	29.0	94.1
Sodium				50.0	35.6	B	0.0	1000.0	71.2
Thallium				39.0	42.7		24.6	53.5	109.5
Vanadium				65.8	62.7		51.7	79.9	95.3
Zinc				187.0	158.8		138.0	236.0	84.9
Cyanide									

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8

STANDARD ADDITION RESULTS

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Concentration Units: ug/L

EPA Sample No.	An	0 ADD ABS	1 ADD CON	1 ADD ABS	2 ADD CON	2 ADD ABS	3 ADD CON	3 ADD ABS	Final Conc.	r	Q
MFN649	AS	0.079	10.00	0.116	20.00	0.147	30.00	0.183	23.3	0.9995	
MFN649D	AS	0.075	10.00	0.108	20.00	0.145	30.00	0.173	22.8	0.9987	
MFQ026	AS	0.041	10.00	0.078	20.00	0.097	30.00	0.137	13.7	0.9918	+
MFQ026	AS	0.052	10.00	0.082	20.00	0.101	30.00	0.137	18.9	0.9936	+
MFQ027	AS	0.064	10.00	0.097	20.00	0.127	30.00	0.146	24.3	0.9932	+
MFQ027	AS	0.063	10.00	0.099	20.00	0.120	30.00	0.147	24.3	0.9944	+
MFQ028	AS	0.072	10.00	0.107	20.00	0.143	30.00	0.177	20.5	0.9999	
MFQ029	AS	0.047	10.00	0.074	20.00	0.117	30.00	0.137	15.0	0.9911	+
MFQ029	AS	0.047	10.00	0.086	20.00	0.116	30.00	0.138	16.9	0.9922	+
MFQ210	AS	0.051	10.00	0.095	20.00	0.114	30.00	0.152	17.0	0.9899	+
MFQ210	AS	0.056	5.00	0.093	10.00	0.126	15.00	0.167	7.6	0.9992	
MFQ222	AS	0.034	5.00	0.054	10.00	0.069	15.00	0.084	10.8	0.9973	
MFQ026	PB	0.111	10.00	0.194	20.00	0.224	30.00	0.299	19.8	0.9862	+
MFQ026	PB	0.104	10.00	0.157	20.00	0.219	30.00	0.265	19.2	0.9985	
MFQ027	PB	0.092	10.00	0.167	20.00	0.240	30.00	0.282	15.4	0.9925	+
MFQ027	PB	0.089	10.00	0.150	20.00	0.203	30.00	0.251	17.1	0.9985	
MFQ030	PB	0.231	10.00	0.293	20.00	0.347	30.00	0.405	40.4	0.9997	
MFQ222	PB	0.122	10.00	0.172	20.00	0.233	30.00	0.270	24.5	0.9960	
MFQ223	PB	0.085	10.00	0.145	20.00	0.211	30.00	0.280	12.7	0.9995	
MFQ233	PB	0.204	10.00	0.255	20.00	0.336	30.00	0.378	33.6	0.9930	+
MFQ233	PB	0.189	10.00	0.243	20.00	0.298	30.00	0.344	36.6	0.9992	
MFN649	SE	0.025	5.00	0.042	10.00	0.052	15.00	0.068	9.3	0.9955	
MFN649D	SE	0.020	5.00	0.031	10.00	0.045	15.00	0.058	7.5	0.9989	
MFQ222	SE	0.068	10.00	0.112	20.00	0.136	30.00	0.164	23.5	0.9906	+
MFQ222	SE	0.093	10.00	0.108	20.00	0.136	30.00	0.151	45.4	0.9918	+
MFQ224	SE	0.067	5.00	0.084	10.00	0.115	15.00	0.132	14.5	0.9924	+
MFQ224	SE	0.080	5.00	0.082	10.00	0.098	15.00	0.119	28.1	0.9506	+
MFQ234	SE	0.007	5.00	0.039	10.00	0.038	15.00	0.041	8.0	0.8041	+
MFQ234	SE	0.008	5.00	0.014	10.00	0.048	15.00	0.048	2.1	0.9246	+

-047

9

ICP SERIAL DILUTIONS

EPA SAMPLE NO.

MFN649L

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	19888.00		18905.00		4.9		P
Antimony	14.80	U	74.00	U			P
Arsenic							NR
Barium	10.41	B	10.20	B	2.0		P
Beryllium	1.16	B	1.50	U	100.0		P
Cadmium	1.50	U	7.50	U			P
Calcium	170030.00		170120.00		0.1		P
Chromium	42.38		36.65	B	13.5		P
Cobalt	131.47		145.50	B	10.7	E	P
Copper	3874.70		3998.90		3.2		P
Iron	245350.00		248265.00		1.2		P
Lead							NR
Magnesium	37015.00		36734.00		0.8		P
Manganese	5527.90		5561.00		0.6		P
Mercury							NR
Nickel	39.86	B	36.45	B	8.6		P
Potassium	325.21	B	397.00	U	100.0		P
Selenium							NR
Silver	15.04		18.00	U	100.0		P
Sodium	923.38	B	1063.25	B	15.1		P
Thallium							NR
Vanadium	34.25	B	32.05	B	6.4		P
Zinc	4929.00		5134.00		4.2		P

048

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F2

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium	276.80	BS	10	3.8	F
Vanadium			50		NR
Zinc			20		NR

Comments:
F2: THERMO JARRELL-ASH VIDEO 22E (#2511)

-049

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number: F2

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead	283.30	BS	3	1.2	F
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F2: THERMO JARRELL-ASH VIDEO 22E (#2511)

-050

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number: F6

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic	197.20	BS	10	2.2	F
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F6: THERMO JARRELL-ASH VIDEO 21

-051

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: Date: 01/15/93

Flame AA ID Number:

Furnace AA ID Number: F6

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury			0.2		NR
Nickel			40		NR
Potassium			5000		NR
Selenium	196.00	BS	5	3.8	F
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
F6: THERMO JARRELL-ASH VIDEO 21

-052

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: Date: 10/15/92

Flame AA ID Number: M3

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR

Comments:
M3: LDC ANALYTICAL #050941

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10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 Date: 10/15/92

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	14.7	P
Antimony	206.80		60	14.8	P
Arsenic			10		NR
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.3	P
Cadmium	226.50		5	1.5	P
Calcium	317.90		5000	13.7	P
Chromium	267.70		10	2.6	P
Cobalt	228.60		50	1.3	P
Copper	324.70		25	1.9	P
Iron	259.90		100	4.0	P
Lead			3		NR
Magnesium	279.00		5000	18.0	P
Manganese	257.60		15	0.9	P
Mercury			0.2		NR
Nickel	231.60		40	2.6	P
Potassium	766.40		5000	79.4	P
Selenium			5		NR
Silver	328.00		10	3.6	P
Sodium	588.90		5000	32.7	P
Thallium			10		NR
Vanadium	292.40		50	2.5	P
Zinc	213.80		20	5.7	P

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

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11

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Al	Ca	Fe	Mg	Cr
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	-0.0006600
Antimony	206.80	0.0000000	0.0000000	0.0002200	0.0000000	0.0130700
Arsenic						
Barium	493.40	0.0000300	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0002000	0.0000000	0.0000000
Calcium	317.90	0.0000000	0.0000000	-0.0001800	0.0000700	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000300	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0002500
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	-0.0000600
Iron	259.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead						
Magnesium	279.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.60	0.0000200	0.0000000	-0.0000100	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0000000	-0.0003100	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	0.0000000	-0.0000300	0.0000000	-0.0037800
Zinc	213.80	0.0000000	0.0000000	0.0001200	0.0000000	0.0000000

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

055

11

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Cu	Mn	Mo	Ni	Sn
Aluminum	308.20	0.0000000	0.0009700	0.0006000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0000000	-0.0017900	0.0000000
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	-0.0002300	0.0000000
Calcium	317.90	0.0000000	0.0003000	0.0000000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0002500	0.0000700	0.0000000	0.0000000
Cobalt	228.60	0.0000000	0.0000000	0.0000000	-0.0001800	0.0000000
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	259.90	0.0000000	-0.0030600	0.0002000	0.0000000	-0.0000500
Lead						
Magnesium	279.00	0.0000000	-0.0038500	0.0002000	0.0000000	0.0000000
Manganese	257.60	-0.0000400	0.0000000	0.0000000	0.0000000	0.0000000
Mercury						
Nickel	231.60	0.0000000	0.0000000	-0.0002300	0.0000000	0.0000000
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium						
Silver	328.00	0.0000000	0.0001000	0.0000000	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium						
Vanadium	292.40	0.0000000	-0.0001100	0.0000000	0.0000000	0.0000000
Zinc	213.80	0.0018900	0.0001100	0.0000000	0.0039800	0.0000000

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

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11

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 Date: 07/01/92

Analyte	Wave-length (nm)	Sr	Ti	V	Zn	__
Aluminum	308.20	0.0000000	0.0000000	-0.0323900	0.0000000	
Antimony	206.80	0.0000000	0.0015000	-0.0094100	-0.0007400	
Arsenic						
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	
Beryllium	313.00	0.0000000	0.0000000	-0.0014700	0.0000000	
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	
Calcium	317.90	0.0000300	0.0000000	0.0000000	0.0000000	
Chromium	267.70	0.0000000	0.0000000	0.0005100	0.0000000	
Cobalt	228.60	0.0000000	0.0014400	0.0000000	0.0000000	
Copper	324.70	0.0000000	0.0000000	0.0000000	0.0000000	
Iron	259.90	0.0000050	0.0000000	0.0000000	0.0000000	
Lead						
Magnesium	279.00	0.0000000	-0.0038300	0.0000000	0.0000000	
Manganese	257.60	0.0000000	0.0000000	0.0000000	0.0000000	
Mercury						
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	
Potassium	766.40	0.0000000	0.0000000	0.0000000	0.0000000	
Selenium						
Silver	328.00	0.0000000	-0.0001400	0.0000000	0.0000000	
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	
Thallium						
Vanadium	292.40	0.0000000	0.0003400	0.0000000	0.0000000	
Zinc	213.80	0.0000000	0.0000000	0.0000000	0.0000000	

Comments:

P2: THERMO JARRELL-ASH ICAP61 (#22982)

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12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

ICP ID Number: P2 Date: 10/15/92

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	5.00	1000000.0	P
Antimony	5.00	25000.0	P
Arsenic			NR
Barium	5.00	100000.0	P
Beryllium	5.00	25000.0	P
Cadmium	5.00	25000.0	P
Calcium	5.00	800000.0	P
Chromium	5.00	200000.0	P
Cobalt	5.00	100000.0	P
Copper	5.00	250000.0	P
Iron	5.00	550000.0	P
Lead			NR
Magnesium	5.00	1000000.0	P
Manganese	5.00	100000.0	P
Mercury			NR
Nickel	5.00	250000.0	P
Potassium	5.00	900000.0	P
Selenium			NR
Silver	5.00	40000.0	P
Sodium	5.00	1000000.0	P
Thallium			NR
Vanadium	5.00	50000.0	P
Zinc	5.00	150000.0	P

Comments:
P2: THERMO JARRELL-ASH ICAP61 (#22982)

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	12/16/92	0.20	100
MFN649	12/16/92	0.21	100
MFN649D	12/16/92	0.21	100
MFN649S	12/16/92	0.20	100
MFN650	12/16/92	0.21	100
MFQ026	12/16/92	0.20	100
MFQ027	12/16/92	0.21	100
MFQ028	12/16/92	0.22	100
MFQ029	12/16/92	0.21	100
MFQ030	12/16/92	0.20	100
MFQ031	12/16/92	0.21	100
MFQ205	12/16/92	0.22	100
MFQ210	12/16/92	0.23	100
MFQ211	12/16/92	0.22	100
MFQ221	12/16/92	0.21	100
MFQ222	12/16/92	0.22	100
MFQ223	12/16/92	0.22	100
MFQ224	12/16/92	0.23	100
MFQ225	12/16/92	0.20	100
MFQ233	12/16/92	0.21	100
MFQ234	12/16/92	0.21	100
MFQ235	12/16/92	0.23	100
MFQ236	12/16/92	0.21	100
PBS	12/16/92	0.20	100

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Method: F

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	01/08/93	1.00	200
MFN649	01/08/93	1.04	200
MFN649D	01/08/93	1.04	200
MFN649S	01/08/93	1.01	200
MFN650	01/08/93	1.01	200
MFQ026	01/08/93	1.02	200
MFQ027	01/08/93	1.02	200
MFQ028	01/08/93	1.03	200
MFQ029	01/08/93	1.01	200
MFQ030	01/08/93	1.04	200
MFQ031	01/08/93	1.06	200
MFQ205	01/08/93	1.10	200
MFQ210	01/08/93	1.07	200
MFQ211	01/08/93	1.06	200
MFQ221	01/08/93	1.04	200
MFQ222	01/08/93	1.04	200
MFQ223	01/08/93	1.05	200
MFQ224	01/08/93	1.05	200
MFQ225	01/08/93	1.01	200
MFQ233	01/08/93	1.08	200
MFQ234	01/08/93	1.05	200
MFQ235	01/08/93	1.01	200
MFQ236	01/08/93	1.06	200
PBS	01/08/93	1.00	200

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PREPARATION LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSS	01/08/93	1.00	200
MFN649	01/08/93	1.04	200
MFN649D	01/08/93	1.05	200
MFN649S	01/08/93	1.02	200
MFN650	01/08/93	1.04	200
MFQ026	01/08/93	1.02	200
MFQ027	01/08/93	1.08	200
MFQ028	01/08/93	1.04	200
MFQ029	01/08/93	1.02	200
MFQ030	01/08/93	1.07	200
MFQ031	01/08/93	1.11	200
MFQ205	01/08/93	1.07	200
MFQ210	01/08/93	1.03	200
MFQ211	01/08/93	1.07	200
MFQ221	01/08/93	1.04	200
MFQ222	01/08/93	1.08	200
MFQ223	01/08/93	1.01	200
MFQ224	01/08/93	1.04	200
MFQ225	01/08/93	1.03	200
MFQ233	01/08/93	1.05	200
MFQ234	01/08/93	1.10	200
MFQ235	01/08/93	1.04	200
MFQ236	01/08/93	1.03	200
PBS	01/08/93	1.00	200

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: M3 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SB	ASA	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1037																X									
S0.2	1.00	1042																X									
S1.0	1.00	1046																X									
S2.0	1.00	1050																X									
S5.0	1.00	1054																X									
ICV	2.00	1103																X									
ICB	1.00	1107																X									
CCV	1.00	1112																X									
CCB	1.00	1116																X									
ZZZZZZ	1.00	1120																									
ZZZZZZ	1.00	1125																									
ZZZZZZ	1.00	1129																									
ZZZZZZ	1.00	1133																									
ZZZZZZ	1.00	1138																									
ZZZZZZ	1.00	1142																									
ZZZZZZ	1.00	1146																									
ZZZZZZ	1.00	1151																									
ZZZZZZ	1.00	1155																									
ZZZZZZ	1.00	1159																									
CCV	1.00	1203																X									
CCB	1.00	1208																X									
ZZZZZZ	1.00	1212																									
ZZZZZZ	1.00	1216																									
ZZZZZZ	1.00	1221																									
ZZZZZZ	1.00	1225																									
ZZZZZZ	1.00	1229																									
ZZZZZZ	1.00	1234																									
ZZZZZZ	1.00	1238																									
ZZZZZZ	1.00	1242																									
ZZZZZZ	1.00	1247																									
ZZZZZZ	1.00	1251																									
CCV	1.00	1255																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: M3 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1300																X									
ZZZZZZ	1.00	1304																									
ZZZZZZ	1.00	1308																									
ZZZZZZ	1.00	1313																									
ZZZZZZ	1.00	1317																									
ZZZZZZ	1.00	1321																									
ZZZZZZ	1.00	1325																									
ZZZZZZ	1.00	1330																									
ZZZZZZ	1.00	1334																									
ZZZZZZ	1.00	1338																									
ZZZZZZ	1.00	1343																									
CCV	1.00	1347																X									
CCB	1.00	1351																X									
ZZZZZZ	1.00	1356																									
ZZZZZZ	1.00	1400																									
ZZZZZZ	1.00	1404																									
ZZZZZZ	1.00	1409																									
ZZZZZZ	1.00	1413																									
ZZZZZZ	1.00	1417																									
ZZZZZZ	1.00	1422																									
ZZZZZZ	1.00	1426																									
ZZZZZZ	1.00	1430																									
ZZZZZZ	1.00	1434																									
CCV	1.00	1439																X									
CCB	1.00	1443																X									
PBS	1.00	1447																X									
LCSS	10.00	1452																X									
MFN649	1.00	1456																X									
MFN649D	1.00	1500																X									
MFN649S	1.00	1505																X									
MFN650	1.00	1509																X									
MFQ026	1.00	1513																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: M3 Method: CV

Start date: 12/17/92 End date: 12/17/92

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ027	1.00	1518																X									
MFQ028	1.00	1522																X									
MFQ029	1.00	1526																X									
CCV	1.00	1531																X									
CCB	1.00	1535																X									
MFQ030	1.00	1539																X									
MFQ031	1.00	1544																X									
MFQ205	1.00	1548																X									
MFQ210	1.00	1552																X									
MFQ211	1.00	1556																X									
MFQ221	1.00	1601																X									
MFQ222	1.00	1605																X									
MFQ223	1.00	1609																X									
MFQ224	1.00	1614																X									
MFQ225	1.00	1618																X									
CCV	1.00	1622																X									
CCB	1.00	1627																X									
MFQ233	1.00	1631																X									
MFQ234	1.00	1635																X									
MFQ235	1.00	1640																X									
MFQ236	1.00	1644																X									
ZZZZZZ	1.00	1648																									
ZZZZZZ	1.00	1653																									
CCV	1.00	1657																X									
CCB	1.00	1701																X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BBE	CDA	CAR	CCO	CUE	FEB	PBG	MGN	MNG	HGI	NIK	SEG	AGA	NAL	TLV	VZN	ZCN
S0	1.00	0911											X										
S3	1.00	0916											X										
S50	1.00	0920											X										
S100	1.00	0924											X										
ICV	2.00	0931											X										
ICB	1.00	0935											X										
CRA	1.00	0939											X										
CCV	1.00	0944											X										
CCB	1.00	0948											X										
ZZZZZZ	100.00	0952																					
ZZZZZZ	100.00	0957																					
CCV	1.00	1001											X										
CCB	1.00	1005											X										
ZZZZZZ	1.00	1016																					
ZZZZZZ	1.00	1020																					
ZZZZZZ	1.00	1024																					
ZZZZZZ	1.00	1029																					
ZZZZZZ	1.00	1033																					
ZZZZZZ	1.00	1037																					
ZZZZZZ	1.00	1042																					
ZZZZZZ	1.00	1046																					
ZZZZZZ	1.00	1050																					
ZZZZZZ	1.00	1055																					
CCV	1.00	1059											X										
CCB	1.00	1103											X										
ZZZZZZ	1.00	1108																					
ZZZZZZ	1.00	1112																					
ZZZZZZ	1.00	1116																					
ZZZZZZ	1.00	1121																					
ZZZZZZ	1.00	1125																					
ZZZZZZ	1.00	1129																					
CCV	1.00	1134											X										

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1138													X												
PBS	1.00	1204													X												
PBSA	1.00	1209	109.1												X												
ZZZZZZ	5.00	1213																									
ZZZZZZ	5.00	1217																									
LCSS	20.00	1222													X												
LCSSA	20.00	1226	104.8												X												
MFN649	1.00	1230													X												
MFN649A	1.00	1235	108.0												X												
MFN649S	1.00	1239													X												
ZZZZZZ	1.00	1243																									
CCV	1.00	1248													X												
CCB	1.00	1252													X												
MFN649D	1.00	1256													X												
MFN649DA	1.00	1301	108.1												X												
MFN650	1.00	1305													X												
MFN650A	1.00	1309	100.6												X												
MFQ026	1.00	1314																									
MFQ026A	1.00	1318	-9999.9																								
MFQ027	1.00	1322																									
MFQ027A	1.00	1327	-9999.9																								
ZZZZZZ	1.00	1336																									
ZZZZZZ	1.00	1340																									
CCV	1.00	1345													X												
CCB	1.00	1349													X												
MFQ029	1.00	1353																									
MFQ029A	1.00	1358	-9999.9																								
MFQ030	1.00	1402																									
MFQ030A	1.00	1406	-9999.9																								
MFQ031	1.00	1411																									
MFQ031A	1.00	1415	-9999.9																								
MFQ205	1.00	1419													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BBA	BBE	CCD	CCA	CCR	CCO	CCU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ205A	1.00	1424	106.1												X												
MFQ210	1.00	1428																									
MFQ210A	1.00	1432	-9999.9																								
CCV	1.00	1437													X												
CCB	1.00	1441													X												
MFQ211	1.00	1445													X												
MFQ211A	1.00	1450	95.4												X												
MFQ221	1.00	1454													X												
MFQ221A	1.00	1458	101.6												X												
MFQ222	1.00	1503																									
MFQ222A	1.00	1507	82.4																								
MFQ223	1.00	1511																									
MFQ223A	1.00	1516	-9999.9																								
MFQ224	1.00	1520													X												
MFQ224A	1.00	1524	91.7												X												
CCV	1.00	1529													X												
CCB	1.00	1533													X												
MFQ225	1.00	1537																									
MFQ225A	1.00	1542	-9999.9																								
MFQ233	1.00	1546																									
MFQ233A	1.00	1551	-9999.9																								
MFQ234	1.00	1555																									
MFQ234A	1.00	1559	-9999.9																								
MFQ235	1.00	1604																									
MFQ235A	1.00	1608	-9999.9																								
MFQ236	1.00	1612													X												
MFQ236A	1.00	1617	97.3												X												
CCV	1.00	1621													X												
CCB	1.00	1625													X												
MFQ028	1.00	1702																									
MFQ028A	1.00	1706	-9999.9																								
MFQ223	10.00	1710																									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ223A	10.00	1715	82.3																								
MFQ225	10.00	1719													X												
MFQ225A	10.00	1723	102.3												X												
MFQ026	20.00	1728																									
MFQ026A	20.00	1732	105.1																								
MFQ027	20.00	1737																									
MFQ027A	20.00	1741	117.2																								
CCV	1.00	1745													X												
CCB	1.00	1750													X												
MFQ029	20.00	1754													X												
MFQ029A	20.00	1758	100.0												X												
MFQ030	20.00	1803																									
MFQ030A	20.00	1807	132.6																								
MFQ031	20.00	1811													X												
MFQ031A	20.00	1816	92.3												X												
MFQ210	20.00	1820													X												
MFQ210A	20.00	1824	108.7												X												
MFQ233	20.00	1829																									
MFQ233A	20.00	1833	136.0																								
CCV	1.00	1837													X												
CCB	1.00	1842													X												
MFQ234	50.00	1859																									
MFQ234A	50.00	1903	-9999.9																								
MFQ235	20.00	1908													X												
MFQ235A	20.00	1912	102.3												X												
MFQ223	1.00	1917																									
MFQ223A	1.00	1921	-9999.9																								
MFQ223	10.00	1943																									
MFQ223A	10.00	1947	75.1																								
MFQ026	20.00	1951																									
MFQ026A	20.00	1956	80.9																								
CCV	1.00	2000													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	2004													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BBE	CDA	CAR	CCO	CUE	FEB	PBG	MNG	HGI	NIK	SEG	AGA	NAL	TLN	VZN	CN					
S0	1.00	0911																		X							
S10	1.00	0916																		X							
S50	1.00	0920																		X							
S100	1.00	0924																		X							
ICV	2.00	0931																		X							
ICB	1.00	0935																		X							
CRA	1.00	0939																		X							
CCV	1.00	0944																		X							
CCB	1.00	0948																		X							
ZZZZZZ	100.00	0952																									
ZZZZZZ	100.00	0957																									
CCV	1.00	1001																		X							
CCB	1.00	1005																		X							
ZZZZZZ	1.00	1016																									
ZZZZZZ	1.00	1020																									
ZZZZZZ	1.00	1024																									
ZZZZZZ	1.00	1029																									
ZZZZZZ	1.00	1033																									
ZZZZZZ	1.00	1037																									
ZZZZZZ	1.00	1042																									
ZZZZZZ	1.00	1046																									
ZZZZZZ	1.00	1050																									
ZZZZZZ	1.00	1055																									
CCV	1.00	1059																		X							
CCB	1.00	1103																		X							
ZZZZZZ	1.00	1108																									
ZZZZZZ	1.00	1112																									
ZZZZZZ	1.00	1116																									
ZZZZZZ	1.00	1121																									
ZZZZZZ	1.00	1125																									
ZZZZZZ	1.00	1129																									
CCV	1.00	1134																		X							

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	KE	SE	AG	NA	TL	VN	ZN	CN
CCB	1.00	1138																						X			
PBS	1.00	1204																						X			
PBSA	1.00	1209	106.9																					X			
LCSS	5.00	1213																						X			
LCSSA	5.00	1217	61.9																					X			
ZZZZZZ	20.00	1222																									
ZZZZZZ	20.00	1226																									
MFN649	1.00	1230																						X			
MFN649A	1.00	1235	106.2																					X			
MFN649S	1.00	1239																						X			
ZZZZZZ	1.00	1243																									
CCV	1.00	1248																						X			
CCB	1.00	1252																						X			
MFN649D	1.00	1256																						X			
MFN649DA	1.00	1301	109.1																					X			
MFN650	1.00	1305																						X			
MFN650A	1.00	1309	107.6																					X			
MFQ026	1.00	1314																						X			
MFQ026A	1.00	1318	90.8																					X			
MFQ027	1.00	1322																						X			
MFQ027A	1.00	1327	95.7																					X			
ZZZZZZ	1.00	1336																									
ZZZZZZ	1.00	1340																									
CCV	1.00	1345																						X			
CCB	1.00	1349																						X			
MFQ029	1.00	1353																						X			
MFQ029A	1.00	1358	99.2																					X			
MFQ030	1.00	1402																						X			
MFQ030A	1.00	1406	112.7																					X			
MFQ031	1.00	1411																						X			
MFQ031A	1.00	1415	101.3																					X			
MFQ205	1.00	1419																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ASA	BAE	BED	CDA	CAR	COU	CUE	FEB	PBG	MGN	MNG	HGI	NIK	SEG	AGA	NAL	TLV	VZN	ZCN	CN	
MFQ205A	1.00	1424	115.5																			X				
MFQ210	1.00	1428																				X				
MFQ210A	1.00	1432	98.5																			X				
CCV	1.00	1437																				X				
CCB	1.00	1441																				X				
MFQ211	1.00	1445																				X				
MFQ211A	1.00	1450	97.8																			X				
MFQ221	1.00	1454																				X				
MFQ221A	1.00	1458	104.9																			X				
MFQ222	1.00	1503																				X				
MFQ222A	1.00	1507	97.8																			X				
MFQ223	1.00	1511																								
MFQ223A	1.00	1516	112.8																							
MFQ224	1.00	1520																				X				
MFQ224A	1.00	1524	97.1																			X				
CCV	1.00	1529																				X				
CCB	1.00	1533																				X				
MFQ225	1.00	1537																				X				
MFQ225A	1.00	1542	99.2																			X				
MFQ233	1.00	1546																				X				
MFQ233A	1.00	1551	104.8																			X				
MFQ234	1.00	1555																				X				
MFQ234A	1.00	1559	102.7																			X				
MFQ235	1.00	1604																				X				
MFQ235A	1.00	1608	104.1																			X				
MFQ236	1.00	1612																				X				
MFQ236A	1.00	1617	95.8																			X				
CCV	1.00	1621																				X				
CCB	1.00	1625																				X				

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1739				X																					
S10	1.00	1744				X																					
S50	1.00	1749				X																					
S100	1.00	1754				X																					
ICV	1.00	1801				X																					
ICB	1.00	1806				X																					
CRA	1.00	1810				X																					
CCV	1.00	1815				X																					
CCB	1.00	1820				X																					
PBS	1.00	1825				X																					
PBSA	1.00	1830	108.2			X																					
ZZZZZZ	5.00	1835																									
ZZZZZZ	5.00	1840																									
ZZZZZZ	1.00	1844																									
LCSS	200.00	1849																									
LCSSA	200.00	1854																									
ZZZZZZ	1.00	1859																									
MFN649S	1.00	1904				X																					
ZZZZZZ	1.00	1909																									
CCV	1.00	1914				X																					
CCB	1.00	1918				X																					
MFN649	1.00	1923																									
MFN649A	1.00	1928	81.8																								
MFN649D	1.00	1933																									
MFN649DA	1.00	1938	74.6																								
MFN650	1.00	1943				X																					
MFN650A	1.00	1948	73.9			X																					
MFQ026	1.00	1952																									
MFQ026A	1.00	1957	80.3																								
ZZZZZZ	1.00	2002																									
ZZZZZZ	1.00	2007																									
CCV	1.00	2012				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBA	ASA	BBA	BED	CDA	CAR	CRO	COU	CUE	FEB	PBG	MGN	MNG	HGI	NIK	SEA	AGN	NAL	TLV	VZN	ZCN
CCB	1.00	2017				X																			
MFQ027	1.00	2022																							
MFQ027A	1.00	2026	74.0																						
MFQ028	1.00	2031																							
MFQ028A	1.00	2036	61.7																						
MFQ029	1.00	2041																							
MFQ029A	1.00	2046	84.3																						
MFQ030	1.00	2051				X																			
MFQ030A	1.00	2056	91.7			X																			
MFQ031	1.00	2100				X																			
MFQ031A	1.00	2105	96.0			X																			
CCV	1.00	2110				X																			
CCB	1.00	2115				X																			
MFQ205	1.00	2120				X																			
MFQ205A	1.00	2125	83.9			X																			
MFQ210	1.00	2130																							
MFQ210A	1.00	2134	80.6																						
MFQ211	1.00	2139				X																			
MFQ211A	1.00	2144	86.7			X																			
MFQ221	1.00	2149				X																			
MFQ221A	1.00	2154	98.1			X																			
ZZZZZZ	1.00	2159																							
ZZZZZZ	1.00	2203																							
CCV	1.00	2208				X																			
CCB	1.00	2213				X																			
MFQ222	1.00	2218																							
MFQ222A	1.00	2223	76.0																						
MFQ223	1.00	2228				X																			
MFQ223A	1.00	2232	90.7			X																			
MFQ224	1.00	2237				X																			
MFQ224A	1.00	2242	80.1			X																			
MFQ225	1.00	2247				X																			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ225A	1.00	2252	97.3			X																					
ZZZZZZ	1.00	2257																									
ZZZZZZ	1.00	2302																									
CCV	1.00	2306				X																					
CCB	1.00	2311				X																					
MFQ233	1.00	2316				X																					
MFQ233A	1.00	2321	93.9			X																					
MFQ234	1.00	2326				X																					
MFQ234A	1.00	2331	87.6			X																					
MFQ235	1.00	2335				X																					
MFQ235A	1.00	2340	92.1			X																					
MFQ236	1.00	2345				X																					
MFQ236A	1.00	2350	94.6			X																					
ZZZZZZ	1.00	2355																									
ZZZZZZ	1.00	0000																									
CCV	1.00	0005				X																					
CCB	1.00	0009				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALKB	SBAS	ABAE	BCDA	CARO	COUE	FEPB	MGMN	HGNI	K	SE	AGAL	NTN	VZ	CN								
S0	1.00	1739												X												
S5	1.00	1744												X												
S50	1.00	1749												X												
S100	1.00	1754												X												
ICV	1.00	1801												X												
ICB	1.00	1806												X												
CRA	1.00	1810												X												
CCV	1.00	1815												X												
CCB	1.00	1820												X												
PBS	1.00	1825												X												
PBSA	1.00	1830	110.8											X												
LCSS	5.00	1835												X												
LCSSA	5.00	1840	95.0											X												
ZZZZZZ	1.00	1844																								
ZZZZZZ	200.00	1849																								
ZZZZZZ	200.00	1854																								
ZZZZZZ	1.00	1859																								
MFN649S	1.00	1904																								
ZZZZZZ	1.00	1909																								
CCV	1.00	1914												X												
CCB	1.00	1918												X												
MFN649	1.00	1923																								
MFN649A	1.00	1928	43.3																							
MFN649D	1.00	1933																								
MFN649DA	1.00	1938	68.2																							
MFN650	1.00	1943												X												
MFN650A	1.00	1948	66.4											X												
MFQ026	1.00	1952												X												
MFQ026A	1.00	1957	84.8											X												
ZZZZZZ	1.00	2002																								
ZZZZZZ	1.00	2007																								
CCV	1.00	2012												X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	2017																			X						
MFQ027	1.00	2022																									
MFQ027A	1.00	2026	56.7																								
MFQ028	1.00	2031																									
MFQ028A	1.00	2036	79.4																								
MFQ029	1.00	2041																									
MFQ029A	1.00	2046	69.5																								
MFQ030	1.00	2051																			X						
MFQ030A	1.00	2056	55.3																		X						
MFQ031	1.00	2100																			X						
MFQ031A	1.00	2105	44.2																		X						
CCV	1.00	2110																			X						
CCB	1.00	2115																			X						
MFQ205	1.00	2120																			X						
MFQ205A	1.00	2125	81.7																		X						
MFQ210	1.00	2130																									
MFQ210A	1.00	2134	0.0																								
MFQ211	1.00	2139																			X						
MFQ211A	1.00	2144	76.6																		X						
MFQ221	1.00	2149																			X						
MFQ221A	1.00	2154	124.2																		X						
ZZZZZZ	1.00	2159																									
ZZZZZZ	1.00	2203																									
CCV	1.00	2208																			X						
CCB	1.00	2213																			X						
MFQ222	1.00	2218																									
MFQ222A	1.00	2223	71.6																								
MFQ223	1.00	2228																			X						
MFQ223A	1.00	2232	97.3																		X						
MFQ224	1.00	2237																									
MFQ224A	1.00	2242	68.3																								
MFQ225	1.00	2247																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALK	SBS	ABA	BEB	CDA	CRO	CUE	FEB	PBG	MNG	HGI	NIK	SE	AGA	NAL	TL	VN	ZN	CN
MFQ225A	1.00	2252	93.6													X						
ZZZZZZ	1.00	2257																				
ZZZZZZ	1.00	2302																				
CCV	1.00	2306														X						
CCB	1.00	2311														X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBA	ASE	BAE	BEE	CDA	CAR	CRO	COU	CUE	FEB	PBG	MGN	MNG	HGI	NIK	SEG	AGA	NAL	TLV	VZN	ZCN
S0	1.00	2107													X												
S3	1.00	2111													X												
S50	1.00	2116													X												
S100	1.00	2120													X												
ICV	2.00	2141													X												
ICB	1.00	2145													X												
CRA	1.00	2150													X												
CCV	1.00	2154													X												
CCB	1.00	2158													X												
ZZZZZZ	1.00	2203																									
ZZZZZZ	1.00	2207																									
MFQ028	20.00	2212																									
MFQ028A	20.00	2216	-9999.9																								
MFQ234	100.00	2220																									
MFQ234A	100.00	2225	-9999.9																								
MFQ028	50.00	2236													X												
MFQ028A	50.00	2240	90.1												X												
MFQ234	200.00	2244													X												
MFQ234A	200.00	2249	93.3												X												
CCV	1.00	2253													X												
CCB	1.00	2257													X												

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBA	ASA	BAR	BEC	CDM	CAD	CRO	COD	CUP	FEE	PBS	MGN	MMN	HGN	NIC	KEL	SEL	AGN	NAN	TLN	VAN	ZNN	CYN
S0	1.00	2107																						X			
S10	1.00	2111																						X			
S50	1.00	2116																						X			
S100	1.00	2120																						X			
ICV	2.00	2141																						X			
ICB	1.00	2145																						X			
CRA	1.00	2150																						X			
CCV	1.00	2154																						X			
CCB	1.00	2158																						X			
MFQ223	1.00	2203																						X			
MFQ223A	1.00	2207	83.4																					X			
ZZZZZZ	20.00	2212																									
ZZZZZZ	20.00	2216																									
ZZZZZZ	100.00	2220																									
ZZZZZZ	100.00	2225																									
ZZZZZZ	50.00	2236																									
ZZZZZZ	50.00	2240																									
ZZZZZZ	200.00	2244																									
ZZZZZZ	200.00	2249																									
CCV	1.00	2253																						X			
CCB	1.00	2257																						X			
MFQ028	1.00	2306																						X			
MFQ028A	1.00	2311	85.6																					X			
CCV	1.00	2315																						X			
CCB	1.00	2319																						X			

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																				
				ALSB	ASA	BAE	BED	CAR	CRO	CUF	FEB	PBG	MGN	MGI	NIK	SEA	AGN	NAT	TLV	VZN	CCN
S0	1.00	0842			X																
S10	1.00	0847			X																
S50	1.00	0851			X																
S100	1.00	0856			X																
ICV	1.00	0909			X																
ICB	1.00	0914			X																
CRA	1.00	0919			X																
CCV	1.00	0923			X																
CCB	1.00	0928			X																
LCSS	200.00	0933			X																
LCSSA	200.00	0938	95.0		X																
ZZZZZZ	1.00	0943																			
ZZZZZZ	1.00	0948																			
ZZZZZZ	1.00	0952																			
ZZZZZZ	1.00	0957																			
ZZZZZZ	1.00	1002																			
ZZZZZZ	1.00	1011																			
ZZZZZZ	1.00	1016																			
ZZZZZZ	1.00	1021																			
CCV	1.00	1026			X																
CCB	1.00	1031			X																
ZZZZZZ	5.00	1036																			
ZZZZZZ	5.00	1040																			
ZZZZZZ	1.00	1045																			
ZZZZZZ	1.00	1050																			
ZZZZZZ	1.00	1055																			
ZZZZZZ	1.00	1100																			
ZZZZZZ	1.00	1105																			
ZZZZZZ	1.00	1109																			
ZZZZZZ	1.00	1114																			
ZZZZZZ	1.00	1119																			
CCV	1.00	1124			X																

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALSB	ASA	BAE	BCD	CAR	COU	CFB	PBG	MNG	HGI	NIK	SEA	GAN	ALT	VZN	CN							
CCB	1.00	1129			X																					
ZZZZZZ	1.00	1134																								
ZZZZZZ	1.00	1139																								
CCV	1.00	1143			X																					
CCB	1.00	1148			X																					
ZZZZZZ	1.00	1214																								
ZZZZZZ	1.00	1218																								
CCV	1.00	1223			X																					
CCB	1.00	1228			X																					
MFN6490	1.00	1302			X																					
MFN6491	1.00	1304			X																					
MFN6492	1.00	1307			X																					
MFN6493	1.00	1310			X																					
MFN649D0	1.00	1312			X																					
MFN649D1	1.00	1315			X																					
MFN649D2	1.00	1318			X																					
MFN649D3	1.00	1320			X																					
ZZZZZZ0	1.00	1323																								
ZZZZZZ1	1.00	1326																								
ZZZZZZ2	1.00	1329																								
ZZZZZZ3	1.00	1331																								
ZZZZZZ0	1.00	1334																								
ZZZZZZ1	1.00	1337																								
ZZZZZZ2	1.00	1339																								
ZZZZZZ3	1.00	1342																								
ZZZZZZ	1.00	1345																								
ZZZZZZ	1.00	1347																								
CCV	1.00	1350			X																					
CCB	1.00	1353			X																					
ZZZZZZ0	1.00	1407																								
ZZZZZZ1	1.00	1410																								
ZZZZZZ2	1.00	1413																								

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				ALB	SBA	ASE	BAG	BEN	CDI	CAL	CRO	COB	CUM	FEG	PBN	MGN	MNG	HGI	NIK	SEL	AGN	NAL	TLN	VAN	ZNA	CN
ZZZZZZ3	1.00	1415																										
ZZZZZZ0	1.00	1418																										
ZZZZZZ1	1.00	1421																										
ZZZZZZ2	1.00	1423																										
ZZZZZZ3	1.00	1426																										
ZZZZZZ0	1.00	1429																										
ZZZZZZ1	1.00	1431																										
ZZZZZZ2	1.00	1434																										
ZZZZZZ3	1.00	1437																										
ZZZZZZ0	1.00	1448																										
ZZZZZZ1	1.00	1451																										
ZZZZZZ2	1.00	1454																										
ZZZZZZ3	1.00	1456																										
ZZZZZZ	1.00	1459																										
ZZZZZZ	1.00	1502																										
CCV	1.00	1505				X																						
CCB	1.00	1507				X																						
MFQ0260	1.00	1510				X																						
MFQ0261	1.00	1513				X																						
MFQ0262	1.00	1515				X																						
MFQ0263	1.00	1518				X																						
MFQ0270	1.00	1521				X																						
MFQ0271	1.00	1524				X																						
MFQ0272	1.00	1526				X																						
MFQ0273	1.00	1529				X																						
MFQ0280	5.00	1532				X																						
MFQ0281	5.00	1534				X																						
MFQ0282	5.00	1537				X																						
MFQ0283	5.00	1540				X																						
MFQ0290	1.00	1542				X																						
MFQ0291	1.00	1545				X																						
MFQ0292	1.00	1548				X																						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ0293	1.00	1550				X																					
ZZZZZZ	1.00	1553																									
ZZZZZZ	1.00	1556																									
CCV	1.00	1558				X																					
CCB	1.00	1601				X																					
MFQ0260	1.00	1611				X																					
MFQ0261	1.00	1614				X																					
MFQ0262	1.00	1617				X																					
MFQ0263	1.00	1619				X																					
MFQ0270	1.00	1622				X																					
MFQ0271	1.00	1625				X																					
MFQ0272	1.00	1627				X																					
MFQ0273	1.00	1630				X																					
MFQ0290	1.00	1633				X																					
MFQ0291	1.00	1635				X																					
MFQ0292	1.00	1638				X																					
MFQ0293	1.00	1641				X																					
MFQ2100	1.00	1643				X																					
MFQ2101	1.00	1646				X																					
MFQ2102	1.00	1649				X																					
MFQ2103	1.00	1651				X																					
CCV	1.00	1654				X																					
CCB	1.00	1657				X																					
MFQ2220	1.00	1703				X																					
MFQ2221	1.00	1706				X																					
MFQ2222	1.00	1708				X																					
MFQ2223	1.00	1711				X																					
MFQ2100	1.00	1714				X																					
MFQ2101	1.00	1716				X																					
MFQ2102	1.00	1719				X																					
MFQ2103	1.00	1722				X																					
CCV	1.00	1724				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1727				X																					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																					
				ALB	SBS	ABA	BBE	CDA	CAR	COU	CFE	PBG	MGN	MGI	NIK	SE	AGA	NAL	TVN	ZCN					
S0	1.00	0842														X									
S5	1.00	0847														X									
S50	1.00	0851														X									
S100	1.00	0856														X									
ICV	1.00	0909														X									
ICB	1.00	0914														X									
CRA	1.00	0919														X									
CCV	1.00	0923														X									
CCB	1.00	0928														X									
ZZZZZZ	200.00	0933																							
ZZZZZZ	200.00	0938																							
MFQ233	1.00	0943														X									
MFQ233A	1.00	0948	81.6													X									
MFQ234	1.00	0952																							
MFQ234A	1.00	0957	56.7																						
MFQ235	1.00	1002																							
MFQ235A	1.00	1011	0.0																						
MFQ236	1.00	1016																							
MFQ236A	1.00	1021	80.5																						
CCV	1.00	1026														X									
CCB	1.00	1031														X									
MFQ210	5.00	1036														X									
MFQ210A	5.00	1040	72.4													X									
MFQ027	1.00	1045														X									
MFQ027A	1.00	1050	96.0													X									
MFQ028	1.00	1055														X									
MFQ028A	1.00	1100	107.0													X									
MFQ029	1.00	1105														X									
MFQ029A	1.00	1109	80.6													X									
MFN649S	1.00	1114														X									
ZZZZZZ	1.00	1119																							
CCV	1.00	1124														X									

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1129																			X						
MFQ222	1.00	1134																									
MFQ222A	1.00	1139	66.4																								
CCV	1.00	1143																			X						
CCB	1.00	1148																			X						
MFQ236	1.00	1214																			X						
MFQ236A	1.00	1218	70.2																		X						
CCV	1.00	1223																			X						
CCB	1.00	1228																			X						
MFN6490	1.00	1302																			X						
MFN6491	1.00	1304																			X						
MFN6492	1.00	1307																			X						
MFN6493	1.00	1310																			X						
MFN649D0	1.00	1312																			X						
MFN649D1	1.00	1315																			X						
MFN649D2	1.00	1318																			X						
MFN649D3	1.00	1320																			X						
MFQ2220	1.00	1323																			X						
MFQ2221	1.00	1326																			X						
MFQ2222	1.00	1329																			X						
MFQ2223	1.00	1331																			X						
MFQ2240	1.00	1334																			X						
MFQ2241	1.00	1337																			X						
MFQ2242	1.00	1339																			X						
MFQ2243	1.00	1342																			X						
ZZZZZZ	1.00	1345																									
ZZZZZZ	1.00	1347																									
CCV	1.00	1350																			X						
CCB	1.00	1353																			X						
MFQ2220	1.00	1407																			X						
MFQ2221	1.00	1410																			X						
MFQ2222	1.00	1413																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BEB	CDA	CAR	COU	CFE	PBG	MGN	HGI	NIK	SE	AGA	NAL	TLV	ZN	CN
MFQ2223	1.00	1415														X					
MFQ2240	1.00	1418														X					
MFQ2241	1.00	1421														X					
MFQ2242	1.00	1423														X					
MFQ2243	1.00	1426														X					
MFQ2340	1.00	1429														X					
MFQ2341	1.00	1431														X					
MFQ2342	1.00	1434														X					
MFQ2343	1.00	1437														X					
MFQ2340	1.00	1448														X					
MFQ2341	1.00	1451														X					
MFQ2342	1.00	1454														X					
MFQ2343	1.00	1456														X					
ZZZZZZ	1.00	1459																			
ZZZZZZ	1.00	1502																			
CCV	1.00	1505														X					
CCB	1.00	1507														X					

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				ALB	SBS	ABA	BEE	CDA	CAR	COU	CUE	FEB	PBG	MNI	MGI	NIK	SEA	AGN	NAL	TLV	ZNC	CN				
S0	1.00	0856										X														
S3	1.00	0901										X														
S50	1.00	0905										X														
S100	1.00	0909										X														
ICV	2.00	0946										X														
ICB	1.00	0949										X														
CRA	1.00	0951										X														
CCV	1.00	0954										X														
CCB	1.00	0956										X														
MFQ0260	20.00	0958										X														
MFQ0261	20.00	1001										X														
MFQ0262	20.00	1003										X														
MFQ0263	20.00	1006										X														
MFQ0270	20.00	1008										X														
MFQ0271	20.00	1011										X														
MFQ0272	20.00	1013										X														
MFQ0273	20.00	1016										X														
MFQ0300	20.00	1018										X														
MFQ0301	20.00	1021										X														
MFQ0302	20.00	1023										X														
MFQ0303	20.00	1026										X														
MFQ2220	1.00	1028										X														
MFQ2221	1.00	1031										X														
MFQ2222	1.00	1033										X														
MFQ2223	1.00	1036										X														
ZZZZZZ	1.00	1038																								
ZZZZZZ	1.00	1040																								
CCV	1.00	1043										X														
CCB	1.00	1045										X														
MFQ2230	10.00	1048										X														
MFQ2231	10.00	1050										X														
MFQ2232	10.00	1053										X														

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F2 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SBS	ABA	BBE	CDA	CAR	CCO	CUE	FEB	PBG	MGN	MGI	HGI	NIK	SEG	AGA	NAL	TLV	ZNC	CN
MFQ2233	10.00	1055											X										
MFQ2330	20.00	1058											X										
MFQ2331	20.00	1100											X										
MFQ2332	20.00	1103											X										
MFQ2333	20.00	1105											X										
MFQ0260	20.00	1110											X										
MFQ0261	20.00	1112											X										
MFQ0262	20.00	1114											X										
MFQ0263	20.00	1117											X										
MFQ0270	20.00	1119											X										
MFQ0271	20.00	1122											X										
MFQ0272	20.00	1124											X										
MFQ0273	20.00	1127											X										
MFQ2330	20.00	1129											X										
MFQ2331	20.00	1132											X										
MFQ2332	20.00	1134											X										
MFQ2333	20.00	1137											X										
CCV	1.00	1139											X										
CCB	1.00	1142											X										

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: F6 Method: F

Start date: 01/15/93 End date: 01/15/93

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1904																			X						
S5	1.00	1909																			X						
S50	1.00	1914																			X						
S100	1.00	1919																			X						
ICV	1.00	1931																			X						
ICB	1.00	1936																			X						
CRA	1.00	1941																			X						
CCV	1.00	1946																			X						
CCB	1.00	1951																			X						
MFQ235	5.00	1956																			X						
MFQ235A	5.00	2001	90.7																		X						
ZZZZZZ	1.00	2005																									
ZZZZZZ	1.00	2010																									
CCV	1.00	2015																			X						
CCB	1.00	2020																			X						

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: P2 Method: P

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1818		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
S	1.00	1820		X						X				X		X				X			X				
S	1.00	1822			X		X	X	X		X	X	X				X		X						X	X	
S	1.00	1825																				X					
ICV	1.00	1828		X			X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICV	1.00	1830																									
ICV	1.00	1833			X																						
ICB	1.00	1836		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	1838		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	1843		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	1848			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	1850		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1853		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
PBS	1.00	1856		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
LCSS	1.00	1858		X	X		X	X	X		X	X	X	X		X	X		X	X		X	X		X	X	
LCSS	5.00	1901								X																	
ZZZZZZ	1.00	1904																									
MFN649	1.00	1906		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFN649D	1.00	1909		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFN649S	1.00	1911			X		X	X	X		X	X	X				X		X			X			X	X	
MFN649L	5.00	1914		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFN650	1.00	1917		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ026	1.00	1919		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCV	1.00	1922		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1925		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ027	1.00	1927		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ028	1.00	1930		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ029	1.00	1932		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ030	1.00	1935		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ031	1.00	1938		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ205	1.00	1940		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ210	1.00	1943		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

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ANALYSIS RUN LOG

Lab Name: SKINNER & SHERMAN LABS. Contract: 68-D0-0108

Lab Code: SKINER Case No.: 19220 SAS No.: SDG No.: MFN649

Instrument ID Number: P2 Method: P

Start date: 01/14/93 End date: 01/14/93

EPA Sample No.	D/F	Time	% R	Analytes																							
				ALB	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MFQ211	1.00	1946		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ221	1.00	1948		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ222	1.00	1951		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCV	1.00	1953		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	1956		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ223	1.00	1959		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ224	1.00	2001		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ225	1.00	2004		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ233	1.00	2007		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ234	1.00	2009		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ235	1.00	2012		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFQ236	1.00	2015		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
MFN649A	1.00	2017			X																						
CCV	1.00	2020		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	2022		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSA	1.00	2025		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
ICSAB	1.00	2028		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CRI	1.00	2033			X			X	X		X	X	X				X		X			X			X	X	
CCV	1.00	2036		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	
CCB	1.00	2038		X	X		X	X	X	X	X	X	X	X		X	X		X	X		X	X		X	X	

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C L P M E T A L S 3.02e

CASE 19220

Run id: P2 9301403
THERMO JARRELL-ASH ICAP61 (#22982)
Analytical method: P
Element: Multi-Element

Acquired: 01/14/93 by LYN
Crunched: 01/15/93 by SRP
Time: 0930
Processing protocol: 3/90

Al Sb Ba Be Cd Ca Cr Co Cu
Fe Mg Mn Ni K Ag Na V Zn

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
2	ICV1	ICV	P			ICV	01/14/93	18:28
3	ICV2	ICV	P			ICV	01/14/93	18:30
4	ICV3	ICV	P			ICV	01/14/93	18:33
5	STDB	ICB	P			ICB	01/14/93	18:36
6	ICSAA	ICSA0	P			ICSA	01/14/93	18:38
7	ICSABB	ICSAB0	P			ICSAB	01/14/93	18:43
8	2XCRDL292Q4	CRI0	P		10/15/92	CRI	01/14/93	18:48
9	HALFSTD	CCV	P			CCV	01/14/93	18:50
10	STDB	CCB	P			CCB	01/14/93	18:53
11	PB	PBS	P	2565	01/08/93	PBS	01/14/93	18:56
12	LCSPS	LCSS	P	2565	01/08/93	LCSS	01/14/93	18:58
13	LCSPS	LCSS	P	2565	01/08/93	LCSS	01/14/93	19:01
14	X	X	P			ZZZZZZ	01/14/93	19:04
15	S212197-01	S	P	2565	01/08/93	MFN649	01/14/93	19:06
16	S212197-01	S2	P	2565	01/08/93	MFN649D	01/14/93	19:09
17	S212197-01	DS	P	2565	01/08/93	MFN649S	01/14/93	19:11
18	S212197-01	ISD	P	2565		MFN649L	01/14/93	19:14
19	S212197-02	S	P	2565	01/08/93	MFN650	01/14/93	19:17
20	S212197-03	S	P	2565	01/08/93	MFQ026	01/14/93	19:19
21	HALFSTD	CCV	P			CCV	01/14/93	19:22
22	STDB	CCB	P			CCB	01/14/93	19:25
23	S212197-04	S	P	2565	01/08/93	MFQ027	01/14/93	19:27
24	S212197-05	S	P	2565	01/08/93	MFQ028	01/14/93	19:30
25	S212197-06	S	P	2565	01/08/93	MFQ029	01/14/93	19:32
26	S212197-07	S	P	2565	01/08/93	MFQ030	01/14/93	19:35
27	S212197-08	S	P	2565	01/08/93	MFQ031	01/14/93	19:38
28	S212197-09	S	P	2565	01/08/93	MFQ205	01/14/93	19:40
29	S212197-10	S	P	2565	01/08/93	MFQ210	01/14/93	19:43
30	S212197-11	S	P	2565	01/08/93	MFQ211	01/14/93	19:46
31	S212197-12	S	P	2565	01/08/93	MFQ221	01/14/93	19:48
32	S212197-13	S	P	2565	01/08/93	MFQ222	01/14/93	19:51
33	HALFSTD	CCV	P			CCV	01/14/93	19:53
34	STDB	CCB	P			CCB	01/14/93	19:56
35	S212197-14	S	P	2565	01/08/93	MFQ223	01/14/93	19:59
36	S212197-15	S	P	2565	01/08/93	MFQ224	01/14/93	20:01
37	S212197-16	S	P	2565	01/08/93	MFQ225	01/14/93	20:04
38	S212197-17	S	P	2565	01/08/93	MFQ233	01/14/93	20:07
39	S212197-18	S	P	2565	01/08/93	MFQ234	01/14/93	20:09
40	S212197-19	S	P	2565	01/08/93	MFQ235	01/14/93	20:12
41	S212197-20	S	P	2565	01/08/93	MFQ236	01/14/93	20:15
42	S212197-01	PS	P	2565		MFN649A	01/14/93	20:17
43	HALFSTD	CCV	P			CCV	01/14/93	20:20
44	STDB	CCB	P			CCB	01/14/93	20:22

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CASE 19220

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
45	ICSAA	ICSA1	P			ICSA	01/14/93	20:25
46	ICSABB	ICSAB1	P			ICSAB	01/14/93	20:28
47	2XCRDL292Q4	CRI1	P		10/15/92	CRI	01/14/93	20:33
48	HALFSTD	CCV	P			CCV	01/14/93	20:36
49	STDB	CCB	P			CCB	01/14/93	20:38
50	STDB	WS0	P			S0	01/14/93	18:18
51	STD3	WS1	P			S	01/14/93	18:20
52	STD1	WS2	P			S	01/14/93	18:22
53	STD2	WS3	P			S	01/14/93	18:25

095

Method: CLP01AP2 Standard: STDB

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Avge	.01067	-.00113	-.00280	-.00007	.00027	-.00013	.01288
SDev	.00140	.00099	.00040	.00023	.00012	.00061	.00061
%RSD	13.170	87.051	14.286	346.41	43.301	458.26	4.7522
#1	.00920	-.00180	-.00240	.00020	.00020	-.00080	.01327
#2	.01200	-.00160	-.00280	-.00020	.00020	.00040	.01321
#3	.01080	.00000	-.00320	-.00020	.00040	.00000	.01218

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Avge	.00007	-.00020	.00253	.00827	-.00087	.00113	.00113
SDev	.00023	.00020	.00031	.00081	.00145	.00160	.00031
%RSD	346.41	100.00	12.059	9.7777	166.94	141.54	26.956
#1	.00020	-.00040	.00260	.00920	-.00160	.00280	.00080
#2	.00020	-.00020	.00280	.00780	.00080	.00100	.00120
#3	-.00020	.00000	.00220	.00780	-.00180	-.00040	.00140

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Avge	.00007	.00280	.02960	.06147	-.00007	.00060
SDev	.00012	.00072	.00413	.00061	.00042	.00020
%RSD	173.21	25.754	13.962	.99405	624.50	33.333
#1	.00020	.00200	.03340	.06080	.00040	.00060
#2	.00000	.00340	.03020	.06160	-.00040	.00040
#3	.00000	.00300	.02520	.06200	-.00020	.00080

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Method: CLP01AP2 Standard: STD3

Elem	Al3082	Ca3179	Fe2599	Mg2790	K_7664	Na5889
Avge	9.1903	22.516	11.128	4.2427	1.0073	4.1840
SDev	.1058	.249	.118	.0414	.0115	.0507
%RSD	1.1509	1.1053	1.0614	.97635	1.1415	1.2108
#1	9.1552	22.448	11.093	4.2344	1.0034	4.1616
#2	9.3092	22.791	11.260	4.2876	1.0202	4.2420
#3	9.1066	22.307	11.032	4.2060	.99820	4.1484

097

Method: CLP01AP2 Standard: STD1

Elem	Sb2068	As1936	Ba4934	Be3130	Cd2265	Cr2677	Co2286
Avge	1.2107	1.1856	1.6959	.71940	1.9683	1.0341	.97333
SDev	.0190	.0169	.0105	.00682	.0214	.0087	.00932
%RSD	1.5666	1.4255	.61849	.94850	1.0873	.84352	.95771
#1	1.2144	1.1826	1.6926	.71740	1.9680	1.0334	.97160
#2	1.1902	1.1704	1.6874	.71380	1.9470	1.0258	.96500
#3	1.2276	1.2038	1.7076	.72700	1.9898	1.0432	.98340

Elem	Cu3247	Pb2203	Mn2576	Ni2316	V_2924	Zn2138
Avge	.91280	.93740	2.0853	1.2795	1.0461	1.0762
SDev	.00635	.01290	.0177	.0112	.0088	.0127
%RSD	.69564	1.3763	.84922	.87611	.83783	1.1837
#1	.91040	.93760	2.0822	1.2800	1.0436	1.0716
#2	.90800	.92440	2.0694	1.2680	1.0388	1.0664
#3	.92000	.95020	2.1044	1.2904	1.0558	1.0906

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Method: CLP01AP2 Standard: STD2

Elem	Ag3280
Avge	2.6049
SDev	.0219
%RSD	.84156
#1	2.5804
#2	2.6226
#3	2.6118

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Analysis Report QC Standard Thu 01-14-93 06:30:46 PM page 1

Method: CLP01AP2 Sample Name: ICV1;ICV Operator: LP
Run Time: 01/14/93 18:28:13
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.9082	-.00056	.00237	1.9023	.46646	.46857	49.867
SDev	.0202	.02100	.01340	.0065	.00223	.00233	.280
%RSD	1.0582	3762.1	565.54	.34092	.47773	.49665	.56212
#1	1.9304	.02362	.01512	1.9088	.46869	.47111	50.176
#2	1.9030	-.01100	-.01160	1.9023	.46645	.46806	49.798
#3	1.8911	-.01429	.00358	1.8959	.46423	.46654	49.628
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass
Value	1.8780			1.8910	.47800	.49300	48.810
Range	10.000			10.000	10.000	10.000	10.000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47903	.47384	.46470	1.9985	4.7474	24.736	.47084
SDev	.00502	.00258	.00317	.0101	.0406	.137	.00220
%RSD	1.0486	.54539	.68277	.50697	.85526	.55353	.46693
#1	.48483	.47658	.46653	2.0092	4.7896	24.892	.47324
#2	.47613	.47350	.46653	1.9973	4.7438	24.678	.47037
#3	.47613	.47144	.46104	1.9890	4.7087	24.638	.46893
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48000	.48700	.48600	1.9620	4.7390	23.859	.47400
Range	10.000	10.000	10.000	10.000	10.000	10.000	10.000

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.47522	49.655	.51847	49.473	.48497	2.8425
SDev	.00239	.245	.00382	.113	.00347	.0115
%RSD	.50247	.49288	.73615	.22779	.71452	.40594
#1	.47731	49.847	.52288	49.566	.48882	2.8558
#2	.47574	49.738	.51612	49.505	.48209	2.8353
#3	.47262	49.379	.51642	49.347	.48400	2.8363
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass
Value	.48800	49.182	.47800	46.804	.48200	2.9210
Range	10.000	10.000	10.000	10.000	10.000	10.000

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Analysis Report QC Standard Thu 01-14-93 06:33:24 PM page 1

Method: CLP01AP2 Sample Name: ICV2;ICV Operator: LP
Run Time: 01/14/93 18:30:53
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00240	.00818	.18281	.00256	.00047	.00135	.04035
SDev	.01526	.01078	.00484	.00059	.00000	.00088	.00538
%RSD	635.45	131.81	2.6483	23.074	.29861	65.082	13.334
#1	.00852	.02029	Q.17995	.00314	.00047	.00186	.04654
#2	-.01983	-.00034	Q.18009	.00256	.00047	.00034	.03767
#3	.00410	.00458	.18840	.00197	.00047	.00186	.03683
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			.20200				
Range			10.000				

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01031	.00205	-.00842	.02914	.01741	.04401	.00128
SDev	.00097	.00103	.00190	.00090	.00831	.01516	.00028
%RSD	9.3783	50.039	22.609	3.1062	47.763	34.439	21.645
#1	.01031	.00308	-.00732	.03010	.02273	.05502	.00112
#2	.00935	.00103	-.01061	.02830	.00783	.02672	.00112
#3	.01128	.00205	-.00732	.02902	.02166	.05030	.00160
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00808	-.02655	.02310	.05983	.00418	.01486
SDev	.00197	.04145	.00314	.03097	.00095	.00094
%RSD	24.354	156.12	13.588	51.759	22.812	6.3115
#1	.00990	.01991	.02362	.09379	.00514	.01485
#2	.00599	-.03982	.01973	.03315	.00418	.01580
#3	.00834	-.05973	.02595	.05256	.00323	.01392
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

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Analysis Report QC Standard Thu 01-14-93 06:36:03 PM page 1

Method: CLP01AP2 Sample Name: ICV3;ICV Operator: LP
Run Time: 01/14/93 18:33:31
Comment: ICV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00424	1.0012	-.00056	.00098	.00019	.00048	.03028
SDev	.00845	.0138	.00779	.00034	.00000	.00059	.00285
%RSD	199.34	1.3747	1388.3	34.655	1.2871	123.19	9.4293
#1	-.01117	.98574	-.00950	.00138	.00019	-.00020	.02703
#2	.00517	1.0056	.00474	.00079	.00019	.00081	.03238
#3	-.00672	1.0122	.00308	.00079	.00019	.00082	.03144
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value		.97800					
Range		10.000					

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07221	.00136	-.01019	.33923	.00992	.02990	.00928
SDev	.00097	.00059	.00168	.00270	.01016	.00720	.00048
%RSD	1.3394	43.467	16.461	.79563	102.42	24.094	5.1703
#1	.07318	.00205	-.01166	.34199	.00353	.02204	.00880
#2	.07125	.00102	-.00836	.33659	.02164	.03619	.00928
#3	.07221	.00102	-.01056	.33911	.00459	.03147	.00976
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value							
Range							

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06904	.25553	.00196	.03234	.00251	.00714
SDev	.00197	.03200	.00107	.02964	.00166	.00093
%RSD	2.8490	12.524	54.396	91.652	65.844	13.047
#1	.06930	.21902	.00103	.00647	.00156	.00621
#2	.06696	.26880	.00313	.02587	.00155	.00808
#3	.07087	.27875	.00173	.06469	.00443	.00713
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value						
Range						

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Method: CLP01AP2 Sample Name: STDB;ICB Operator: LP
Run Time: 01/14/93 18:36:10
Comment: ICB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00618	-.00741	.01154	-.00039	.00037	.00051	-.02864
SDev	.00665	.01204	.01001	.00156	.00016	.00029	.00250
%RSD	107.53	162.45	86.745	397.02	43.141	57.548	8.7440
#1	-.01343	.00636	.00343	-.00098	.00019	.00034	-.02927
#2	-.00035	-.01265	H.02272	.00138	.00046	.00085	-.02588
#3	-.00477	-.01594	.00846	-.00157	.00046	.00034	-.03077
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00129	.00034	-.01392	-.01103	-.00319	.00079	.00048
SDev	.00167	.00157	.00110	.00198	.00326	.00817	.00028
%RSD	129.85	457.71	7.8919	17.969	102.07	1036.9	57.809
#1	-.00226	.00000	-.01282	-.01091	.00036	.00550	.00064
#2	.00064	.00205	-.01502	-.00911	-.00604	.00550	.00064
#3	-.00226	-.00103	-.01392	-.01307	-.00391	-.00864	.00016
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00026	.01659	.00090	.06954	-.00032	-.00090
SDev	.00119	.09250	.00245	.01057	.00111	.00161
%RSD	458.26	557.49	271.32	15.205	341.90	178.60
#1	.00052	-.08960	.00077	.06469	.00031	-.00277
#2	.00130	.05973	.00341	.08166	.00032	.00002
#3	-.00104	.07964	-.00148	.06226	-.00160	.00003
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/14/93 18:38:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	519.01	.00297	-.35307	-.00044	.00020	-.00046	494.43
SDev	1.73	.00760	.04289	.00151	.00000	.00019	3.91
%RSD	.33345	256.15	12.148	346.73	2.2254	40.303	.79092
#1	517.46	.00541	-.32691	-.00059	.00019	-.00048	491.05
#2	520.88	-.00555	-.40257	-.00187	.00019	-.00064	493.51
#3	518.71	.00905	-.32973	.00115	.00020	-.00027	498.71
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02015	-.00206	-.01778	188.36	.04573	529.09	.02733
SDev	.00405	.00103	.00367	1.04	.03043	3.05	.00076
%RSD	20.086	49.870	20.634	.55269	66.551	.57650	2.7672
#1	.01883	-.00206	-.01942	187.31	.04018	526.14	.02719
#2	.01693	-.00309	-.02034	188.39	.01845	528.91	.02665
#3	.02469	-.00103	-.01358	189.39	.07855	532.23	.02814
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00052	.05310	-.00197	.84899	.00669	.06358
SDev	.00475	.12002	.00636	.03951	.00296	.00110
%RSD	912.41	226.04	323.43	4.6540	44.207	1.7231
#1	-.00182	-.05973	-.00556	.82150	.00601	.06310
#2	-.00261	.03982	-.00571	.83120	.00413	.06483
#3	.00599	.17920	.00537	.89427	.00992	.06281
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

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Method: CLP01AP2 Sample Name: ICSABB:ICSAB Operator: LP
Run Time: 01/14/93 18:43:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	523.40	-.00914	-.25508	.46132	.45622	.82345	498.29
SDev	4.62	.03844	.03622	.00463	.00499	.00968	5.52
%RSD	.88318	420.50	14.198	1.0031	1.0943	1.1751	1.1084
#1	520.43	-.04876	-.28552	.45866	.45306	.81737	494.55
#2	528.73	.02800	-.21503	.46667	.46197	.83461	504.63
#3	521.05	-.00667	-.26469	.45864	.45362	.81837	495.68
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.44924	.45268	.44950	190.46	4.3448	533.03	.46598
SDev	.00409	.00566	.00769	2.23	.0604	5.88	.00672
%RSD	.90971	1.2500	1.7115	1.1699	1.3893	1.1038	1.4424
#1	.44792	.44994	.44451	189.11	4.3054	529.33	.46186
#2	.45383	.45919	.45836	193.03	4.4143	539.81	.47373
#3	.44599	.44892	.44563	189.23	4.3146	529.94	.46233
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.81653	.08296	.98648	.86274	.45451	.95911
SDev	.01258	.04705	.01585	.01260	.00498	.01145
%RSD	1.5405	56.710	1.6066	1.4610	1.0965	1.1935
#1	.81262	.11947	.97887	.87729	.45032	.95496
#2	.83060	.09956	1.0047	.85546	.46002	.97205
#3	.80637	.02987	.97588	.85546	.45318	.95032
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

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Method: CLP01AP2 Sample Name: 2XCRDL29204:CRI Operator: LP
Run Time: 01/14/93 18:48:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.09332	.11136	.02971	-.00020	.00940	.01034	.08657
SDev	.02298	.01281	.00719	.00034	.00016	.00029	.01396
%RSD	24.623	11.503	24.212	170.52	1.7078	2.8253	16.131
#1	.11263	.12432	.03381	.00019	.00950	.01051	.09398
#2	.09944	.09870	.03391	-.00040	.00949	.01051	.09527
#3	.06791	.11107	.02140	-.00040	.00922	.01000	.07046

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01639	.09109	.05567	.03413	.03511	.07005	.02687
SDev	.00148	.00157	.00168	.00700	.00989	.00720	.00055
%RSD	9.0109	1.7227	3.0153	20.518	28.179	10.283	2.0611
#1	.01606	.09143	.05750	.03953	.04611	.07162	.02751
#2	.01510	.09246	.05420	.03665	.02694	.07633	.02655
#3	.01800	.08937	.05530	.02622	.03229	.06219	.02655

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07399	-.00996	.02778	.02264	.09024	.04143
SDev	.00282	.07902	.00067	.01482	.00191	.00185
%RSD	3.8087	793.72	2.4162	65.466	2.1207	4.4736
#1	.07634	.01991	.02851	.00647	.09215	.04328
#2	.07087	.04978	.02765	.03558	.08832	.04145
#3	.07477	-.09956	.02719	.02587	.09025	.03957

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Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 18:50:46
Comment: CCV#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.266	2.3579	2.3180	2.3638	.48137	2.3254	24.606
SDev	.161	.0033	.0235	.0181	.00365	.0143	.147
%RSD	.66164	.13874	1.0159	.76637	.75793	.61628	.59812
#1	24.104	2.3561	2.3094	2.3445	.47755	2.3090	24.454
#2	24.270	2.3560	2.3000	2.3663	.48175	2.3318	24.616
#3	24.425	2.3617	2.3446	2.3805	.48482	2.3354	24.748
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3410	2.3408	2.3791	9.8656	2.3433	24.521	2.3442
SDev	.0155	.0144	.0182	.0587	.0120	.110	.0166
%RSD	.66228	.61430	.76524	.59538	.51194	.45044	.70806
#1	2.3249	2.3264	2.3619	9.8011	2.3296	24.404	2.3269
#2	2.3423	2.3408	2.3773	9.8799	2.3486	24.536	2.3456
#3	2.3559	2.3552	2.3982	9.9159	2.3517	24.624	2.3600
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3342	24.557	.51881	24.286	2.3702	2.3441
SDev	.0150	.156	.00204	.194	.0131	.0074
%RSD	.64091	.63370	.39341	.80043	.55161	.31663
#1	2.3204	24.391	.51656	24.079	2.3554	2.3398
#2	2.3321	24.580	.51930	24.314	2.3746	2.3397
#3	2.3501	24.700	.52055	24.465	2.3804	2.3526
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB:CCB Operator: LP
Run Time: 01/14/93 18:53:25
Comment: CCB#1
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02226	.01019	H.01753	.00157	.00038	.00288	-.00677
SDev	.02077	.00522	.01326	.00090	.00043	.00152	.00288
%RSD	93.285	51.268	75.605	57.268	113.40	52.907	42.507
#1	.02374	.00717	H.02257	.00138	.00047	.00440	-.00617
#2	.00080	.00717	.00250	.00079	-.00009	.00136	-.00990
#3	.04226	.01622	H.02753	.00255	.00075	.00288	-.00424
Errors	LC Pass	LC Pass	LC High	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00225	.00274	-.01062	-.00407	H.01775	.06209	.00144
SDev	.00201	.00157	.00110	.00157	.01357	.02055	.00028
%RSD	89.286	57.272	10.347	38.523	76.457	33.104	19.235
#1	.00161	.00308	-.01062	-.00299	.00886	.05266	.00160
#2	.00064	.00103	-.01172	-.00587	.01101	.04794	.00112
#3	.00451	.00411	-.00952	-.00335	H.03336	.08567	.00160
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC High	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00391	.06969	.00119	.10269	.00351	-.00247
SDev	.00180	.11307	.00200	.02356	.00111	.00143
%RSD	46.188	162.25	168.28	22.943	31.568	57.640
#1	.00287	.01991	-.00062	.10835	.00415	-.00092
#2	.00287	-.00996	.00085	.07681	.00223	-.00278
#3	.00599	.19911	.00334	.12290	.00416	-.00372
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: PB;PBS Operator: LP
Run Time: 01/14/93 18:56:14
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01488	.00328	.00835	.00020	.00018	.00118	.03033
SDev	.00832	.00373	.00884	.00059	.00028	.00106	.00384
%RSD	55.922	113.71	105.95	300.56	151.91	89.359	12.649
#1	.01599	-.00030	H.01506	.00020	.00046	.00085	.03447
#2	.00606	.00300	-.00167	-.00039	-.00010	.00034	.02691
#3	.02259	.00715	.01165	.00079	.00019	.00237	.02960
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00193	.00342	.00366	.01139	-.00143	.03301	.00112
SDev	.00201	.00059	.00330	.00252	.00709	.02454	.00000
%RSD	104.01	17.331	89.964	22.099	495.19	74.336	.01369
#1	.00355	.00411	.00696	.01427	.00034	.05266	.00112
#2	-.00032	.00308	.00037	.00960	-.00924	.00551	.00112
#3	.00258	.00308	.00366	.01031	.00460	.04087	.00112
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00104	.00664	.00187	.05256	-.00031	.01455
SDev	.00478	.07538	.00300	.01591	.00293	.00266
%RSD	458.26	1135.8	160.97	30.265	941.50	18.304
#1	.00521	.03982	.00435	.06711	.00033	.01763
#2	-.00417	-.07964	-.00147	.03558	-.00351	.01303
#3	.00208	.05973	.00272	.05498	.00224	.01300
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: LCSPS;LCSS Operator: LP
Run Time: 01/14/93 18:58:53
Comment: LCS
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	1.3716	.98103	4.6469	.02610	.08918	.18367	901.54
SDev	.0437	.02197	.1099	.00118	.00159	.00520	18.10
%RSD	3.1856	2.2394	2.3641	4.5136	1.7822	2.8322	2.0079
#1	1.3228	.95568	4.5202	.02492	.08741	L.17767	880.75
#2	1.4069	.99294	4.7166	.02728	.08965	.18647	910.05
#3	1.3851	.99448	4.7038	.02610	.09048	.18688	913.82
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.1200	1.4700	5.9950	.20000	.11150	.27550	1128.0
Low	1.1250	.63500	3.1750	.00000	.08250	.17850	834.00

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46206	.65733	31.830	103.70	1.0181	576.99	.95309
SDev	.01137	.01438	.431	1.68	.0279	9.48	.01618
%RSD	2.4613	2.1875	1.3535	1.6198	2.7424	1.6426	1.6975
#1	.44912	.64090	31.366	101.81	.98659	566.23	.93466
#2	.47046	.66349	31.909	104.30	1.0397	580.69	.95965
#3	.46661	.66760	32.216	105.00	1.0280	584.07	.96495
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.60000	.81000	39.100	135.40	1.4250	649.50	1.1950
Low	.39600	.62500	30.030	88.850	.94000	502.00	.88500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.25767	.22566	.10464	.17788	.31372	.79400
SDev	.00770	.08698	.00478	.03807	.00561	.00968
%RSD	2.9875	38.545	4.5707	21.402	1.7890	1.2197
#1	.24908	.12942	.09956	.13503	.30724	.78460
#2	.26393	.29867	.10905	.20780	.31696	.79344
#3	.26002	.24889	.10530	.19082	.31696	.80395
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.36300	5.0000	.14500	5.0000	.39950	1.1800
Low	.24600	.00000	.07750	.00000	.25850	.69000

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Method: CLP01AP2 Sample Name: LCSPS;LCSS/5 Operator: LP
Run Time: 01/14/93 19:01:31
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.27256	.21435	.97405	.00510	.01938	.04071	187.14
SDev	.01205	.01153	.00702	.00090	.00016	.00146	1.17
%RSD	4.4205	5.3811	.72062	17.652	.83897	3.5979	.62630
#1	.25871	.22529	.96596	.00491	.01919	.03985	188.13
#2	.27835	.20230	.97772	.00432	.01947	.03988	185.85
#3	.28063	.21545	.97847	.00608	.01948	.04240	187.46

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.10052	.14379	6.6656	22.569	.22102	115.96	.20504
SDev	.00224	.00103	.0451	.107	.00547	.66	.00127
%RSD	2.2243	.71378	.67666	.47253	2.4771	.57079	.62032
#1	.10181	.14482	6.7143	22.666	.22565	116.53	.20648
#2	.09794	.14276	6.6253	22.455	.21497	115.24	.20456
#3	.10181	.14379	6.6572	22.586	.22243	116.11	.20408

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05393	-.01659	.01970	.04771	.06704	.17629
SDev	.00226	.08583	.00097	.01681	.00199	.00151
%RSD	4.1837	517.30	4.9159	35.228	2.9712	.85454
#1	.05133	-.10951	.01913	.02830	.06545	.17495
#2	.05523	.05973	.01915	.05741	.06639	.17792
#3	.05523	-.00000	.02082	.05741	.06927	.17599

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Method: CLP01AP2 Sample Name: S212197-01:S Operator: LP
Run Time: 01/14/93 19:06:45
Comment: MFN649
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.888	.00315	.00606	.01041	.00116	-.00183	170.03
SDev	.108	.00974	.01482	.00034	.00016	.00073	.78
%RSD	.54393	309.50	244.45	3.2586	13.907	39.862	.45716
#1	19.935	-.00799	.02136	.01080	.00107	-.00258	169.87
#2	19.964	.01007	.00507	.01021	.00107	-.00113	170.87
#3	19.764	.00736	-.00824	.01022	.00135	-.00176	169.34

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04239	.13148	3.8747	245.35	.03895	37.015	5.5279
SDev	.00004	.00000	.0287	1.47	.00357	.191	.0363
%RSD	.08408	.00012	.74134	.60103	9.1699	.51729	.65636
#1	.04240	.13148	3.8949	245.93	.03852	37.120	5.5388
#2	.04241	.13148	3.8873	246.44	.04271	37.131	5.5575
#3	.04235	.13148	3.8418	243.67	.03561	36.794	5.4874

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03986	.32521	.01505	.92338	.03426	4.9290
SDev	.00090	.07538	.00119	.00243	.00091	.0249
%RSD	2.2641	23.179	7.8736	.26269	2.6578	.50553
#1	.04038	.23893	.01640	.92095	.03428	4.9168
#2	.03882	.35840	.01422	.92581	.03334	4.9577
#3	.04038	.37831	.01451	.92338	.03516	4.9125

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Method: CLP01AP2 Sample Name: S212197-01;S2 Operator: LP
Run Time: 01/14/93 19:09:21
Comment: MFN649D
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.089	.00111	.01353	.00852	.00110	-.00457	236.36
SDev	.423	.01313	.00732	.00035	.00028	.00144	4.28
%RSD	1.7539	1179.8	54.116	4.1382	25.469	31.549	1.8106
#1	23.631	-.01405	.02065	.00892	.00082	-.00366	231.52
#2	24.463	.00840	.01391	.00831	.00110	-.00623	239.67
#3	24.174	.00898	.00603	.00832	.00138	-.00381	237.88

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06690	.14140	3.6848	354.46	.05664	35.857	6.9013
SDev	.00061	.00214	.0623	5.78	.00769	.600	.1180
%RSD	.91727	1.5120	1.6907	1.6295	13.585	1.6738	1.7097
#1	.06642	.13969	3.6189	347.99	.06387	35.177	6.7695
#2	.06670	.14072	3.7428	359.08	.04855	36.312	6.9970
#3	.06759	.14380	3.6928	356.32	.05750	36.083	6.9375

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04299	.39822	.01945	.80371	.05530	5.0419
SDev	.00090	.09956	.00131	.01197	.00158	.0918
%RSD	2.0995	25.000	6.7610	1.4888	2.8522	1.8209
#1	.04351	.49778	.01846	.81180	.05381	4.9384
#2	.04351	.29867	.01894	.78997	.05513	5.1135
#3	.04195	.39822	.02094	.80937	.05695	5.0739

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Method: CLP01AP2 Sample Name: S212197-01:DS Operator: LP
Run Time: 01/14/93 19:11:57
Comment: MFN649S
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	16.834	.27178	1.8166	1.7977	.04685	.04399	128.57
SDev	.066	.00863	.0359	.0090	.00033	.00076	.72
%RSD	.39061	3.1763	1.9746	.50200	.69767	1.7399	.55640
#1	16.822	.26513	1.7956	1.8011	.04704	.04311	128.56
#2	16.905	.28153	1.8581	1.8046	.04705	.04455	129.29
#3	16.775	.26867	1.7963	1.7875	.04648	.04430	127.85

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.20991	.57252	3.6810	181.30	.47539	38.132	5.1070
SDev	.00297	.00214	.0226	.93	.00370	.196	.0278
%RSD	1.4167	.37351	.61390	.51455	.77769	.51384	.54363
#1	.21056	.57012	3.6906	181.48	.47112	38.188	5.1001
#2	.21250	.57320	3.6973	182.13	.47741	38.294	5.1376
#3	.20666	.57423	3.6552	180.29	.47764	37.915	5.0833

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.46715	.32853	.05996	.83444	.46754	5.5862
SDev	.00313	.11219	.00381	.00980	.00435	.0343
%RSD	.66927	34.150	6.3610	1.1748	.93090	.61353
#1	.46715	.25884	.05647	.82878	.46786	5.5843
#2	.47027	.45795	.06403	.84576	.47172	5.6214
#3	.46402	.26880	.05939	.82878	.46303	5.5529

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Method: CLP01AP2 Sample Name: S212197-01:ISD/5 Operator: LP
Run Time: 01/14/93 19:14:34
Comment: MFN649L
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.7810	-.00166	-.00280	.00205	.00029	-.00035	34.024
SDev	.0215	.01020	.00698	.00090	.00043	.00129	.289
%RSD	.56896	614.51	249.21	43.935	148.76	374.57	.85044
#1	3.8050	.00104	.00424	.00303	.00075	-.00057	34.358
#2	3.7746	.00692	-.00972	.00185	.00020	.00104	33.868
#3	3.7635	-.01293	-.00292	.00126	-.00009	-.00151	33.847

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00733	.02910	.79978	49.653	.01087	7.3468	1.1122
SDev	.00148	.00157	.01012	.328	.01125	.0674	.0059
%RSD	20.126	5.3917	1.2650	.66006	103.51	.91755	.52749
#1	.00766	.03082	.81083	50.025	.01935	7.4246	1.1186
#2	.00862	.02773	.79755	49.405	.01516	7.3067	1.1070
#3	.00572	.02876	.79097	49.530	-.00190	7.3090	1.1109

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00730	.00996	.00140	.21265	.00642	1.0268
SDev	.00386	.01724	.00269	.01986	.00308	.0177
%RSD	52.852	173.21	192.31	9.3369	47.982	1.7273
#1	.00912	.01991	.00422	.20780	.00771	1.0466
#2	.00990	.01991	.00109	.23448	.00865	1.0123
#3	.00287	-.00996	-.00112	.19567	.00290	1.0216

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Method: CLP01AP2 Sample Name: S212197-02:S Operator: LP
Run Time: 01/14/93 19:17:11
Comment: MFN650
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	3.9747	-.01024	-.00507	.00401	.00087	-.01275	31.344
SDev	.0061	.00527	.01835	.00034	.00032	.00097	.091
%RSD	.15400	51.420	361.62	8.4920	36.771	7.5722	.28956
#1	3.9815	-.01622	-.01069	.00420	.00106	-.01303	31.413
#2	3.9697	-.00820	.01543	.00420	.00106	-.01168	31.241
#3	3.9728	-.00630	-.01996	.00362	.00050	-.01355	31.377

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02353	.07225	2.3694	345.15	.03608	21.877	3.9617
SDev	.00100	.00237	.0132	1.40	.00653	.126	.0185
%RSD	4.2479	3.2842	.55620	.40688	18.090	.57715	.46774
#1	.02452	.07088	2.3805	345.92	.02998	21.911	3.9764
#2	.02252	.07499	2.3548	343.53	.04296	21.737	3.9409
#3	.02356	.07088	2.3728	345.99	.03530	21.982	3.9677

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02501	.28207	.02059	.12614	.02649	1.0692
SDev	.00180	.09033	.00178	.01976	.00187	.0057
%RSD	7.2169	32.025	8.6601	15.663	7.0598	.53126
#1	.02397	.17920	.01900	.10350	.02461	1.0673
#2	.02710	.31858	.02025	.13988	.02835	1.0648
#3	.02397	.34844	.02251	.13503	.02652	1.0756

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Method: CLP01AP2 Sample Name: S212197-03;S Operator: LP
Run Time: 01/14/93 19:19:48
Comment: MFQ026
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	37.667	-.00540	-.01605	.76541	.00225	.00437	427.08
SDev	.417	.00201	.00138	.00957	.00028	.00082	4.12
%RSD	1.1074	37.167	8.6118	1.2509	12.462	18.730	.96391
#1	37.512	-.00426	-.01705	.76207	.00226	.00489	426.19
#2	38.140	-.00772	-.01662	.77621	.00253	.00479	431.57
#3	37.350	-.00422	-.01447	.75795	.00197	.00342	423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04743	.03013	7.6869	54.765	.32956	14.465	1.0600
SDev	.00096	.00059	.0902	.563	.00164	.146	.0119
%RSD	2.0279	1.9685	1.1729	1.0284	.49717	1.0084	1.1220
#1	.04646	.02978	7.6360	54.687	.33074	14.424	1.0549
#2	.04745	.03081	7.7910	55.363	.33026	14.627	1.0736
#3	.04839	.02978	7.6337	54.244	.32769	14.344	1.0515

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04507	10.138	-.00066	.47786	.08319	.47972
SDev	.00156	.195	.00046	.01197	.00222	.00635
%RSD	3.4682	1.9201	68.898	2.5040	2.6671	1.3232
#1	.04351	10.085	-.00024	.49161	.08446	.48262
#2	.04507	10.354	-.00059	.46978	.08448	.48410
#3	.04664	9.9754	-.00115	.47220	.08063	.47244

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Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 19:22:25
Comment: CCV#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.261	2.3733	2.3172	2.3472	.47952	2.3502	24.856
SDev	.191	.0196	.0236	.0197	.00461	.0183	.221
%RSD	.78841	.82637	1.0178	.84134	.96123	.78057	.88809
#1	24.481	2.3829	2.3348	2.3698	.48484	2.3714	25.111
#2	24.147	2.3861	2.2904	2.3333	.47672	2.3389	24.732
#3	24.154	2.3507	2.3265	2.3386	.47700	2.3404	24.724
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3639	2.3463	2.4386	10.415	2.3777	24.459	2.3605
SDev	.0123	.0237	.0261	.052	.0236	.205	.0153
%RSD	.52064	1.0119	1.0704	.49606	.99094	.83704	.64939
#1	2.3781	2.3737	2.4686	10.447	2.4049	24.694	2.3778
#2	2.3559	2.3315	2.4257	10.355	2.3647	24.327	2.3485
#3	2.3578	2.3336	2.4214	10.443	2.3636	24.355	2.3552
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3798	24.554	.51632	24.193	2.3687	2.3573
SDev	.0129	.309	.00392	.211	.0211	.0070
%RSD	.54069	1.2565	.75974	.87039	.89113	.29807
#1	2.3876	24.889	.51962	24.436	2.3929	2.3569
#2	2.3649	24.282	.51198	24.057	2.3546	2.3646
#3	2.3868	24.491	.51737	24.086	2.3585	2.3505
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 19:25:04
Comment: CCB#2
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00650	.00717	.00478	.00079	.00037	.00068	.01064
SDev	.00820	.01111	.00713	.00059	.00042	.00059	.00544
%RSD	126.27	154.94	149.37	74.954	114.11	86.985	51.136
#1	.00298	.01955	.01006	.00138	.00074	.00034	.01690
#2	-.01125	-.00192	.00761	.00020	.00046	.00135	.00808
#3	-.01122	.00388	-.00334	.00079	-.00009	.00034	.00696
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00065	.00000	-.00586	.01895	.01137	.02279	.00096
SDev	.00056	.00103	.00229	.00875	.01230	.01421	.00073
%RSD	86.524	259510.	39.029	46.194	108.20	62.348	76.360
#1	-.00032	.00103	-.00403	.01463	H.01847	.03616	.00160
#2	-.00032	.00000	-.00512	.01319	-.00284	.02436	.00016
#3	-.00129	-.00103	-.00842	.02902	H.01848	.00786	.00112
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00130	-.06637	-.00023	.08571	.00127	.00000
SDev	.00078	.04023	.00069	.00852	.00096	.00000
%RSD	60.000	60.622	304.10	9.9393	75.112	79.740
#1	.00130	-.01991	.00000	.09379	.00223	.00000
#2	.00052	-.08960	-.00101	.08652	.00032	.00001
#3	.00208	-.08960	.00032	.07681	.00127	.00000
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: S212197-04;S Operator: LP
Run Time: 01/14/93 19:27:43
Comment: MFQ027
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	27.653	.00417	-.01437	.61810	.00188	.02626	300.72
SDev	.356	.02022	.00493	.00905	.00016	.00057	3.68
%RSD	1.2857	485.07	34.312	1.4648	8.5133	2.1842	1.2223
#1	27.380	.02744	-.01235	.61202	.00197	.02637	297.04
#2	28.055	-.00591	-.01077	.62851	.00197	.02564	304.39
#3	27.525	-.00903	-.01998	.61378	.00170	.02677	300.74

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04704	.04554	28.208	65.336	.29349	10.787	1.3391
SDev	.00054	.00157	.408	.800	.00793	.101	.0177
%RSD	1.1505	3.4450	1.4467	1.2248	2.7025	.93419	1.3183
#1	.04766	.04520	27.899	64.540	.29760	10.702	1.3227
#2	.04673	.04725	28.670	66.140	.28435	10.898	1.3578
#3	.04671	.04417	28.054	65.327	.29853	10.759	1.3367

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05680	6.1094	.00595	.33394	.08162	.55147
SDev	.00207	.0811	.00050	.01698	.00053	.00557
%RSD	3.6409	1.3272	8.4244	5.0848	.64967	1.0099
#1	.05836	6.0530	.00631	.31453	.08192	.54997
#2	.05445	6.2023	.00538	.34121	.08101	.55763
#3	.05758	6.0729	.00615	.34607	.08194	.54680

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Method: CLP01AP2 Sample Name: S212197-05;S Operator: LP
Run Time: 01/14/93 19:30:21
Comment: MFQ028
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	20.216	-.00246	.10137	.05679	.00156	-.00825	169.42
SDev	.078	.01141	.02193	.00059	.00033	.00060	1.31
%RSD	.38696	464.68	21.632	1.0366	20.938	7.2509	.77323
#1	20.209	-.01360	.07913	.05738	.00137	-.00815	168.61
#2	20.298	.00921	.10200	.05678	.00193	-.00889	170.93
#3	20.142	-.00297	.12298	.05620	.00137	-.00770	168.71

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05006	.03183	4.0888	378.25	2.0144	11.050	4.9154
SDev	.00250	.00103	.0350	2.94	.0350	.129	.0312
%RSD	4.9957	3.2267	.85616	.77636	1.7359	1.1715	.63505
#1	.04743	.03081	4.1148	376.32	1.9837	10.973	4.8986
#2	.05241	.03286	4.1025	381.63	2.0525	11.200	4.9514
#3	.05035	.03183	4.0490	376.80	2.0071	10.978	4.8962

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01329	3.7698	.03480	.32423	.05063	3.7792
SDev	.00325	.0754	.00257	.02701	.00354	.0237
%RSD	24.490	1.9996	7.3732	8.3308	7.0017	.62653
#1	.01068	3.6835	.03199	.29513	.04769	3.7537
#2	.01694	3.8229	.03702	.34849	.05457	3.8004
#3	.01225	3.8030	.03539	.32909	.04963	3.7835

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Method: CLP01AP2 Sample Name: S212197-06:S Operator: LP
Run Time: 01/14/93 19:32:59
Comment: MFQ029
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	40.802	-.00505	.00060	.37733	.00235	.00110	10.926
SDev	.130	.02474	.01073	.00090	.00032	.00048	.056
%RSD	.31979	489.99	1799.6	.23767	13.601	43.600	.51300
#1	40.840	.02020	.01297	.37752	.00253	.00106	10.971
#2	40.910	-.02926	-.00493	.37811	.00253	.00160	10.943
#3	40.657	-.00609	-.00625	.37635	.00198	.00064	10.863

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04082	.03835	1.1667	92.621	.47716	13.996	3.6654
SDev	.00147	.00059	.0094	.306	.00995	.014	.0111
%RSD	3.6108	1.5468	.80514	.33064	2.0862	.10277	.30261
#1	.04115	.03800	1.1763	92.879	.46574	14.003	3.6713
#2	.03921	.03800	1.1663	92.700	.48169	14.005	3.6722
#3	.04211	.03903	1.1575	92.282	.48404	13.979	3.6526

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04664	7.8549	.00555	.21508	.08459	1.2874
SDev	.00234	.0981	.00351	.01112	.00110	.0112
%RSD	5.0279	1.2483	63.177	5.1683	1.2980	.86675
#1	.04664	7.8848	.00156	.22721	.08396	1.2979
#2	.04429	7.9346	.00695	.20538	.08395	1.2886
#3	.04898	7.7454	.00815	.21265	.08586	1.2757

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Method: CLP01AP2 Sample Name: S212197-07;S Operator: LP
Run Time: 01/14/93 19:35:36
Comment: MFQ030
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	21.550	.00634	.00355	.39756	.00272	.00877	56.956
SDev	.101	.01110	.02078	.00177	.00016	.00153	.451
%RSD	.47027	175.05	585.85	.44430	6.0553	17.497	.79259
#1	21.433	-.00396	-.01975	.39580	.00253	.00702	56.444
#2	21.606	.00488	.02016	.39933	.00282	.00988	57.296
#3	21.610	.01810	.01022	.39756	.00281	.00942	57.128

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05342	.05375	2.3532	105.53	.54529	10.467	5.1215
SDev	.00312	.00119	.0067	.70	.01711	.087	.0318
%RSD	5.8410	2.2057	.28639	.66725	3.1374	.83151	.61993
#1	.04986	.05238	2.3461	104.73	.52696	10.368	5.0853
#2	.05568	.05443	2.3595	106.08	.56084	10.531	5.1448
#3	.05471	.05443	2.3539	105.77	.54807	10.503	5.1343

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03882	7.4501	.00780	.27329	.08486	3.6592
SDev	.00271	.0663	.00063	.02556	.00401	.0418
%RSD	6.9747	.88976	8.0309	9.3512	4.7247	1.1414
#1	.03726	7.3770	.00781	.24661	.08164	3.6110
#2	.04195	7.5065	.00843	.29755	.08935	3.6833
#3	.03726	7.4666	.00717	.27572	.08360	3.6833

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Method: CLP01AP2 Sample Name: S212197-08:S Operator: LP
Run Time: 01/14/93 19:38:13
Comment: MFQ031
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	42.378	-.00865	.00128	.19253	.00180	.01187	23.029
SDev	.337	.00967	.00956	.00147	.00016	.00044	.194
%RSD	.79542	111.78	747.08	.76552	8.9370	3.7267	.84269
#1	42.076	.00162	.00839	.19116	.00170	.01195	22.893
#2	42.742	-.01759	.00504	.19409	.00198	.01227	23.251
#3	42.316	-.00999	-.00959	.19233	.00170	.01140	22.943

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03574	.03526	.69903	77.324	.39580	17.678	4.1235
SDev	.00001	.00059	.00621	.695	.01097	.164	.0377
%RSD	.03201	1.6807	.88900	.89920	2.7716	.92828	.91495
#1	.03573	.03492	.69783	76.771	.40423	17.527	4.0919
#2	.03575	.03595	.70575	78.105	.38340	17.852	4.1653
#3	.03573	.03492	.69350	77.096	.39977	17.654	4.1134

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02918	7.6093	.00508	.35415	.08735	5.9114
SDev	.00163	.0747	.00067	.02571	.00003	.0496
%RSD	5.5759	.98198	13.206	7.2594	.02867	.83841
#1	.03100	7.5662	.00586	.37760	.08733	5.8712
#2	.02788	7.6956	.00468	.35819	.08737	5.9668
#3	.02866	7.5662	.00471	.32666	.08734	5.8963

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Method: CLP01AP2 Sample Name: S212197-09;S Operator: LP
Run Time: 01/14/93 19:40:50
Comment: MFQ205
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	4.3357	-.01299	-.01607	.02994	.00090	-.02061	79.470
SDev	.0296	.01175	.00661	.00034	.00016	.00075	.674
%RSD	.68253	90.484	41.140	1.1340	17.607	3.6605	.84791
#1	4.3517	-.01927	-.02053	.03014	.00081	-.02142	79.419
#2	4.3016	-.02028	-.01921	.02955	.00109	-.02048	78.823
#3	4.3539	.00057	-.00847	.03014	.00081	-.01992	80.168

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.03001	.09074	1.4864	536.73	.04128	18.339	4.8916
SDev	.00159	.00059	.0112	3.45	.00271	.118	.0317
%RSD	5.2999	.65354	.75580	.64226	6.5743	.64449	.64809
#1	.03097	.09039	1.4890	536.45	.03987	18.296	4.8913
#2	.03088	.09142	1.4742	533.42	.04441	18.249	4.8601
#3	.02817	.09039	1.4962	540.30	.03956	18.473	4.9235

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02918	.70021	.02788	.51182	.04607	1.0112
SDev	.00090	.04023	.00208	.00980	.00156	.0156
%RSD	3.0929	5.7461	7.4485	1.9154	3.3878	1.5385
#1	.02866	.74666	.02865	.51344	.04574	1.0218
#2	.03022	.67698	.02552	.50131	.04469	.99335
#3	.02866	.67698	.02945	.52072	.04776	1.0185

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Method: CLP01AP2 Sample Name: S212197-10;S Operator: LP
Run Time: 01/14/93 19:43:27
Comment: MFQ210
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	47.094	-.00173	-.00420	.32230	.00255	-.00379	8.4367
SDev	.098	.01861	.01077	.00090	.00000	.00026	.0071
%RSD	.20829	1073.0	256.52	.27887	.08478	6.8853	.08409
#1	47.206	-.02022	-.01040	.32309	.00256	-.00349	8.4423
#2	47.023	-.00197	.00824	.32250	.00255	-.00394	8.4392
#3	47.054	.01699	-.01042	.32132	.00255	-.00394	8.4288

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06408	.04039	.23856	132.39	.21454	18.120	4.3599
SDev	.00148	.00059	.00172	.23	.01237	.034	.0051
%RSD	2.3110	1.4684	.71919	.17511	5.7658	.18879	.11768
#1	.06537	.04005	.24044	132.66	.22545	18.155	4.3658
#2	.06246	.04108	.23708	132.26	.20110	18.120	4.3567
#3	.06440	.04005	.23818	132.27	.21706	18.086	4.3571

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04038	7.4501	.00814	.26359	.09710	1.1334
SDev	.00156	.0402	.00022	.00875	.00147	.0063
%RSD	3.8710	.54006	2.6566	3.3180	1.5165	.55973
#1	.04195	7.4069	.00837	.26602	.09870	1.1312
#2	.03882	7.4866	.00794	.25389	.09581	1.1405
#3	.04038	7.4567	.00810	.27087	.09678	1.1284

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Method: CLP01AP2 Sample Name: S212197-11;S Operator: LP
Run Time: 01/14/93 19:46:04
Comment: MFQ211
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	30.980	-.00464	-.00601	.37467	.00181	-.00354	20.340
SDev	.183	.00216	.00392	.00265	.00016	.00127	.125
%RSD	.59115	46.662	65.255	.70818	8.9334	35.864	.61350
#1	30.987	-.00712	-.00154	.37487	.00172	-.00455	20.378
#2	31.159	-.00315	-.00761	.37722	.00200	-.00211	20.442
#3	30.793	-.00365	-.00888	.37193	.00172	-.00395	20.201

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02422	.04280	1.6229	122.08	.04854	17.615	2.6679
SDev	.00202	.00119	.0089	.69	.00729	.111	.0157
%RSD	8.3543	2.7726	.54874	.56259	15.015	.62988	.58685
#1	.02583	.04211	1.6228	122.04	.05174	17.641	2.6714
#2	.02488	.04211	1.6318	122.79	.05369	17.710	2.6815
#3	.02195	.04417	1.6139	121.42	.04020	17.493	2.6508

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02058	5.6083	.00485	.22640	.09709	.54965
SDev	.00045	.0583	.00148	.01221	.00098	.00513
%RSD	2.1925	1.0401	30.439	5.3928	1.0132	.93398
#1	.02084	5.5651	.00321	.21508	.09709	.55554
#2	.02006	5.6747	.00606	.22478	.09807	.54614
#3	.02084	5.5851	.00528	.23934	.09610	.54727

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Method: CLP01AP2 Sample Name: S212197-12;S Operator: LP
Run Time: 01/14/93 19:48:40
Comment: MFQ221
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.8056	.01242	-.00520	.19391	.00012	-.00107	8.6092
SDev	.0239	.01069	.01350	.00207	.00016	.00047	.0715
%RSD	.85177	86.122	259.78	1.0677	135.73	43.476	.83087
#1	2.7976	.01191	.00784	.19175	.00021	-.00155	8.5614
#2	2.8325	.02336	-.00432	.19587	.00021	-.00061	8.6914
#3	2.7868	.00199	-.01912	.19411	-.00007	-.00106	8.5748

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00675	.00274	.41081	42.739	.02413	.17612	.02198
SDev	.00096	.00059	.00109	.316	.00583	.01114	.00028
%RSD	14.223	21.664	.26501	.73909	24.176	6.3268	1.2692
#1	.00674	.00308	.41187	42.495	.02380	.16355	.02166
#2	.00579	.00308	.41087	43.096	.03012	.18477	.02214
#3	.00771	.00205	.40969	42.626	.01847	.18005	.02214

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00208	5.0906	.00429	.65089	.01660	.02353
SDev	.00078	.0608	.00196	.01651	.00146	.00298
%RSD	37.500	1.1949	45.580	2.5367	8.8234	12.681
#1	.00208	5.0773	.00207	.65655	.01500	.02572
#2	.00130	5.1570	.00504	.66383	.01693	.02472
#3	.00287	5.0375	.00576	.63230	.01788	.02013

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Method: CLP01AP2 Sample Name: S212197-13;S Operator: LP
Run Time: 01/14/93 19:51:17
Comment: MFQ222
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.956	-.00969	-.00638	.06603	.00194	-.01663	27.092
SDev	.201	.00189	.01177	.00068	.00000	.00173	.261
%RSD	1.0087	19.549	184.39	1.0251	.06340	10.381	.96157
#1	20.031	-.00875	-.00357	.06564	.00194	-.01790	27.157
#2	19.728	-.00845	.00373	.06565	.00194	-.01466	26.805
#3	20.109	-.01187	-.01930	.06681	.00194	-.01731	27.314

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04927	.21708	6.8950	387.39	.02743	18.619	1.4352
SDev	.00142	.00330	.0848	4.06	.00866	.189	.0148
%RSD	2.8738	1.5212	1.2305	1.0483	31.570	1.0147	1.0321
#1	.05058	.21468	6.9149	388.04	.03727	18.655	1.4390
#2	.04947	.21571	6.8020	383.04	.02401	18.415	1.4188
#3	.04777	.22085	6.9681	391.09	.02100	18.787	1.4477

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06331	6.4246	.02048	.24419	.05912	.19171
SDev	.00180	.0835	.00286	.02389	.00084	.00268
%RSD	2.8511	1.2996	13.976	9.7836	1.4159	1.3973
#1	.06227	6.3715	.01780	.22478	.05915	.19284
#2	.06540	6.3815	.02350	.27087	.05995	.19364
#3	.06227	6.5209	.02016	.23691	.05827	.18866

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Method: CLP01AP2 Sample Name: HALFSTD:CCV Operator: LP
Run Time: 01/14/93 19:53:56
Comment: CCV#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.501	2.3972	2.3275	2.3787	.48586	2.3645	24.835
SDev	.131	.0093	.0091	.0135	.00238	.0054	.086
%RSD	.53381	.38954	.39153	.56674	.49010	.22978	.34605
#1	24.533	2.3914	2.3380	2.3840	.48679	2.3633	24.878
#2	24.357	2.3922	2.3230	2.3634	.48315	2.3598	24.736
#3	24.613	2.4080	2.3216	2.3887	.48764	2.3704	24.892
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3646	2.3661	2.4173	10.113	2.3890	24.698	2.3645
SDev	.0063	.0076	.0095	.063	.0112	.085	.0086
%RSD	.26788	.31998	.39203	.62465	.46949	.34302	.36536
#1	2.3655	2.3634	2.4191	10.184	2.3815	24.720	2.3648
#2	2.3578	2.3603	2.4070	10.062	2.4018	24.605	2.3557
#3	2.3703	2.3747	2.4257	10.094	2.3835	24.770	2.3730
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3597	24.832	.52291	24.485	2.3938	2.3882
SDev	.0084	.133	.00268	.176	.0115	.0046
%RSD	.35726	.53388	.51189	.71893	.48024	.19131
#1	2.3633	24.799	.51993	24.552	2.3938	2.3934
#2	2.3501	24.720	.52370	24.285	2.3823	2.3861
#3	2.3657	24.978	.52511	24.618	2.4053	2.3850
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 19:56:35
Comment: CCB#3
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00511	.00523	.00865	.00098	.00046	.00186	-.01729
SDev	.01211	.00939	.00899	.00068	.00000	.00051	.00406
%RSD	236.74	179.70	103.90	69.298	.46271	27.309	23.492
#1	.01602	.01294	.00664	.00138	.00047	.00186	-.01863
#2	.00724	-.00523	H.01848	.00020	.00046	.00135	-.02051
#3	-.00792	.00797	.00084	.00138	.00047	.00237	-.01273
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00032	.00205	-.00915	.02278	.00745	.01336	.00080
SDev	.00112	.00103	.00168	.00306	.01150	.02005	.00028
%RSD	346.26	50.005	18.342	13.430	154.35	150.05	34.629
#1	-.00032	.00308	-.00952	.02506	-.00073	.00551	.00112
#2	-.00032	.00103	-.01062	.01931	.00248	-.00157	.00064
#3	.00161	.00205	-.00732	.02398	H.02061	.03615	.00064
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00078	-.03650	-.00077	.09056	.00096	.00001
SDev	.00090	.07063	.00364	.00370	.00146	.00092
%RSD	115.47	193.49	472.80	4.0916	152.78	8125.1
#1	.00130	.03982	.00024	.09379	.00127	.00001
#2	-.00026	-.04978	-.00481	.08652	-.00064	-.00091
#3	.00130	-.09956	.00226	.09137	.00224	.00094
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: S212197-14;S Operator: LP
Run Time: 01/14/93 19:59:14
Comment: MFQ223
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	11.966	.00501	-.00116	.14548	.00195	-.00076	7.6701
SDev	.122	.01472	.00675	.00102	.00000	.00127	.0644
%RSD	1.0185	293.66	584.58	.69951	.08347	166.70	.84013
#1	11.826	-.00342	-.00398	.14430	.00195	-.00220	7.5957
#2	12.043	.02201	.00655	.14607	.00195	.00021	7.7100
#3	12.031	-.00355	-.00604	.14607	.00195	-.00030	7.7045

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02385	.03424	1.0297	62.341	.12551	4.4540	.93188
SDev	.00222	.00059	.0090	.524	.01125	.0260	.00873
%RSD	9.3101	1.7327	.87098	.84020	8.9665	.58348	.93707
#1	.02641	.03390	1.0194	61.736	.13845	4.4367	.92180
#2	.02256	.03492	1.0349	62.645	.12010	4.4839	.93668
#3	.02256	.03390	1.0349	62.642	.11798	4.4415	.93716

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02527	2.7610	.00406	.36951	.06611	.29377
SDev	.00239	.0747	.00067	.01615	.00111	.00385
%RSD	9.4486	2.7063	16.559	4.3709	1.6759	1.3121
#1	.02788	2.7577	.00391	.37760	.06546	.29261
#2	.02475	2.8373	.00347	.38003	.06548	.29062
#3	.02319	2.6880	.00479	.35092	.06739	.29807

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Method: CLP01AP2 Sample Name: S212197-15:S Operator: LP
Run Time: 01/14/93 20:01:52
Comment: MFQ224
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.893	.00433	-.01216	.26297	.00105	-.00657	5.5274
SDev	.161	.00519	.01260	.00207	.00016	.00079	.0309
%RSD	.80771	119.94	103.55	.78562	15.284	12.042	.55928
#1	19.716	.00083	.00183	.26082	.00114	-.00566	5.4965
#2	19.933	.01029	-.02258	.26317	.00087	-.00697	5.5275
#3	20.030	.00187	-.01574	.26494	.00115	-.00708	5.5583

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.05993	.21433	3.9829	218.75	.05068	9.1436	.38627
SDev	.00055	.00415	.0313	1.50	.00775	.0474	.00201
%RSD	.91582	1.9369	.78469	.68648	15.291	.51855	.52052
#1	.06021	.21057	3.9471	217.08	.05485	9.0910	.38402
#2	.05930	.21365	3.9969	219.18	.04174	9.1829	.38691
#3	.06029	.21879	4.0047	219.99	.05546	9.1570	.38788

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04377	8.5319	.01494	.35496	.08585	.11910
SDev	.00045	.1467	.00090	.02091	.00150	.00174
%RSD	1.0310	1.7189	6.0513	5.8918	1.7493	1.4582
#1	.04351	8.4025	.01477	.37760	.08453	.11782
#2	.04351	8.5020	.01592	.33636	.08554	.11840
#3	.04429	8.6912	.01413	.35092	.08748	.12107

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Method: CLP01AP2 Sample Name: S212197-16:S Operator: LP
Run Time: 01/14/93 20:04:30
Comment: MFQ225
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	39.649	.00140	-.01196	.20696	.00480	-.00379	15.926
SDev	.342	.01007	.01757	.00265	.00049	.00111	.109
%RSD	.86213	720.55	146.96	1.2801	10.120	29.326	.68535
#1	39.546	-.00324	-.03059	.20716	.00508	-.00480	15.892
#2	40.030	.01295	-.00959	.20950	.00508	-.00397	16.048
#3	39.370	-.00551	.00431	.20421	.00424	-.00260	15.838

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04407	.24995	12.821	174.72	.20801	38.941	3.0383
SDev	.00150	.00415	.122	1.27	.01209	.258	.0235
%RSD	3.4006	1.6608	.95279	.72582	5.8147	.66303	.77464
#1	.04278	.24755	12.798	174.68	.21413	38.892	3.0373
#2	.04572	.25474	12.953	176.01	.21583	39.220	3.0623
#3	.04372	.24755	12.712	173.47	.19408	38.711	3.0152

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04872	8.4655	.01601	.21427	.11248	1.3956
SDev	.00119	.0548	.00198	.01884	.00280	.0116
%RSD	2.4506	.64770	12.365	8.7933	2.4851	.82964
#1	.04898	8.5020	.01766	.21993	.11407	1.3907
#2	.04976	8.4921	.01657	.19325	.11413	1.4089
#3	.04742	8.4025	.01382	.22963	.10926	1.3873

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Method: CLP01AP2 Sample Name: S212197-17;S Operator: LP
Run Time: 01/14/93 20:07:08
Comment: MFQ233
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	30.615	-.00190	.00225	.45527	.00275	.01628	10.100
SDev	.290	.02174	.01308	.00446	.00043	.00191	.144
%RSD	.94646	1142.5	581.60	.97877	15.523	11.759	1.4251
#1	30.441	-.01532	.00680	.45213	.00229	.01634	10.052
#2	30.950	.02318	.01245	.46037	.00313	.01817	10.262
#3	30.455	-.01357	-.01250	.45331	.00284	.01434	9.9866

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07331	.03868	1.0692	74.932	.54806	7.3632	4.3508
SDev	.00350	.00258	.0130	.924	.01927	.1116	.0539
%RSD	4.7708	6.6810	1.2140	1.2327	3.5163	1.5163	1.2386
#1	.07428	.03903	1.0666	74.511	.54396	7.3096	4.3190
#2	.07623	.04108	1.0833	75.991	.56905	7.4915	4.4131
#3	.06944	.03595	1.0577	74.293	.53117	7.2884	4.3205

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06592	6.5176	.00545	.18920	.10497	1.6645
SDev	.00226	.1521	.00464	.01961	.00340	.0148
%RSD	3.4230	2.3333	85.178	10.363	3.2402	.89129
#1	.06461	6.5507	.00401	.20052	.10464	1.6506
#2	.06852	6.6503	.01065	.20052	.10852	1.6802
#3	.06461	6.3516	.00170	.16656	.10174	1.6628

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Method: CLP01AP2 Sample Name: S212197-18;S Operator: LP
Run Time: 01/14/93 20:09:45
Comment: MFQ234
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.9453	-.00256	.02678	.36097	.00168	.08651	191.52
SDev	.0209	.00826	.00917	.00213	.00016	.00154	.69
%RSD	.70856	322.30	34.225	.58886	9.4941	1.7788	.36157
#1	2.9693	.00697	.02620	.36274	.00159	.08796	191.66
#2	2.9355	-.00760	.03623	.35861	.00159	.08667	190.76
#3	2.9311	-.00706	.01792	.36156	.00187	.08489	192.13

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01344	.08355	1.0534	255.46	6.5284	3.4092	19.409
SDev	.00203	.00059	.0060	1.00	.0222	.0187	.070
%RSD	15.072	.70999	.56791	.39271	.33960	.54801	.36150
#1	.01409	.08320	1.0557	255.98	6.5390	3.4212	19.460
#2	.01117	.08423	1.0466	254.30	6.5029	3.3877	19.329
#3	.01507	.08320	1.0579	256.09	6.5433	3.4188	19.439

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.02397	.20243	.02052	.16899	.00985	48.005
SDev	.00234	.07538	.00037	.02073	.00112	.105
%RSD	9.7826	37.239	1.7893	12.264	11.421	.21975
#1	.02631	.16924	.02033	.16656	.01115	48.022
#2	.02162	.28871	.02095	.19082	.00916	47.892
#3	.02397	.14933	.02029	.14958	.00924	48.101

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Method: CLP01AP2 Sample Name: S212197-19:S Operator: LP
Run Time: 01/14/93 20:12:23
Comment: MFQ235
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	187.79	-.01227	-.00765	.13293	.01771	.00636	12.749
SDev	2.48	.01539	.03265	.00130	.00033	.00058	.122
%RSD	1.3219	125.48	426.57	.97932	1.8488	9.1853	.95651
#1	185.45	-.02994	-.04450	.13143	.01733	.00569	12.620
#2	187.51	-.00181	.01768	.13373	.01789	.00671	12.766
#3	190.39	-.00505	.00386	.13364	.01790	.00669	12.862

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.15733	.19414	24.719	314.21	.30680	3.9167	3.4273
SDev	.00103	.00370	.336	3.69	.01517	.0439	.0392
%RSD	.65549	1.9079	1.3604	1.1738	4.9461	1.1219	1.1441
#1	.15788	.19003	24.413	310.56	.30942	3.8662	3.3865
#2	.15798	.19723	24.664	314.14	.32049	3.9465	3.4306
#3	.15615	.19517	25.079	317.93	.29049	3.9372	3.4647

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.23865	3.7400	.01897	.17222	.31661	2.5339
SDev	.00275	.1132	.00117	.01379	.00489	.0135
%RSD	1.1502	3.0273	6.1746	8.0088	1.5449	.53156
#1	.23579	3.6139	.01828	.17627	.31171	2.5492
#2	.24126	3.8329	.02032	.18354	.31661	2.5287
#3	.23891	3.7731	.01831	.15686	.32150	2.5238

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Method: CLP01AP2 Sample Name: S212197-20;S Operator: LP
Run Time: 01/14/93 20:15:00
Comment: MFQ236
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	18.038	.01257	-.00600	.20525	.00459	.00238	27.357
SDev	.150	.00795	.00337	.00245	.00016	.00076	.188
%RSD	.83028	63.205	56.215	1.1945	3.4822	32.071	.68655
#1	17.887	.02112	-.00504	.20250	.00440	.00155	27.146
#2	18.186	.00540	-.00974	.20603	.00468	.00305	27.505
#3	18.040	.01121	-.00320	.20721	.00468	.00256	27.422

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00886	.01438	.87807	16.850	.09278	7.9889	1.3305
SDev	.00056	.00178	.00416	.088	.00208	.0531	.0101
%RSD	6.3018	12.371	.47415	.52144	2.2370	.66496	.75543
#1	.00951	.01541	.87988	16.771	.09076	7.9275	1.3195
#2	.00854	.01233	.88101	16.944	.09266	8.0196	1.3391
#3	.00854	.01541	.87330	16.835	.09491	8.0195	1.3329

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00964	6.2222	.00059	.27249	.03096	.18301
SDev	.00180	.0606	.00125	.00780	.00110	.00738
%RSD	18.725	.97325	213.95	2.8616	3.5585	4.0313
#1	.00756	6.2620	-.00070	.27572	.03159	.18860
#2	.01068	6.1525	.00066	.26359	.02968	.18577
#3	.01068	6.2521	.00180	.27815	.03159	.17465

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Method: CLP01AP2 Sample Name: S212197-01:PS Operator: LP
Run Time: 01/14/93 20:17:37
Comment: MFN649A
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	19.448	.11208	.20357	.37895	.01122	.00806	168.18
SDev	.069	.01075	.00704	.00245	.00028	.00044	.66
%RSD	.35391	9.5937	3.4592	.64727	2.4921	5.4435	.39153
#1	19.525	.10743	.20756	.38170	.01150	.00756	168.92
#2	19.393	.12437	.19544	.37699	.01094	.00835	167.65
#3	19.425	.10444	.20770	.37817	.01122	.00827	167.98

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.06062	.22325	3.8308	241.38	.22786	36.495	5.4292
SDev	.00099	.00059	.0167	1.07	.01499	.147	.0227
%RSD	1.6368	.26557	.43611	.44316	6.5796	.40224	.41782
#1	.06162	.22291	3.8482	242.57	.24477	36.664	5.4548
#2	.05963	.22291	3.8149	240.50	.22264	36.400	5.4116
#3	.06061	.22393	3.8293	241.07	.21618	36.421	5.4212

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.11021	.38163	.03192	.85384	.12692	4.9668
SDev	.00325	.01521	.00217	.01462	.00099	.0124
%RSD	2.9527	3.9848	6.8042	1.7124	.78250	.25032
#1	.11386	.39822	.03431	.85546	.12792	4.9793
#2	.10760	.37831	.03006	.83848	.12593	4.9666
#3	.10917	.36835	.03139	.86759	.12691	4.9544

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Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 20:20:14
Comment: CCV#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	24.125	2.3592	2.3055	2.3415	.47960	2.3332	24.597
SDev	.128	.0186	.0052	.0133	.00300	.0220	.220
%RSD	.53213	.78780	.22573	.56686	.62469	.94378	.89529
#1	24.177	2.3641	2.3063	2.3410	.48146	2.3430	24.777
#2	24.219	2.3749	2.3103	2.3551	.48119	2.3486	24.663
#3	23.979	2.3387	2.3000	2.3286	.47614	2.3080	24.352
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3388	2.3295	2.4143	9.9319	2.3761	24.429	2.3221
SDev	.0195	.0196	.0131	.1074	.0317	.172	.0180
%RSD	.83515	.84121	.54360	1.0817	1.3360	.70556	.77499
#1	2.3501	2.3418	2.4202	10.023	2.4009	24.522	2.3303
#2	2.3501	2.3398	2.4235	9.9586	2.3870	24.534	2.3346
#3	2.3162	2.3069	2.3993	9.8136	2.3403	24.230	2.3015
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.3271	24.418	.51709	24.096	2.3596	2.4088
SDev	.0195	.214	.00532	.139	.0154	.0338
%RSD	.83990	.87668	1.0297	.57804	.65442	1.4030
#1	2.3407	24.471	.52315	24.137	2.3661	2.4372
#2	2.3360	24.600	.51498	24.210	2.3708	2.4177
#3	2.3047	24.182	.51315	23.941	2.3420	2.3714
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB:CCB Operator: LP
Run Time: 01/14/93 20:22:54
Comment: CCB#4
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00007	.00577	.00333	.00079	.00028	.00101	-.00457
SDev	.01077	.00791	.00630	.00000	.00016	.00059	.00449
%RSD	14909.	137.05	189.30	.04109	57.924	57.843	98.343
#1	.00730	.00713	.00920	.00079	.00019	.00135	.00054
#2	-.01230	.01292	-.00334	.00079	.00019	.00034	-.00790
#3	.00522	-.00273	.00413	.00079	.00047	.00135	-.00634
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00193	.00137	-.00586	.02063	.01066	.02122	.00160
SDev	.00056	.00059	.00229	.00360	.00907	.00491	.00048
%RSD	28.908	43.336	39.054	17.470	85.141	23.131	29.985
#1	.00258	.00103	-.00512	.02434	.00141	.01965	.00160
#2	.00161	.00103	-.00403	.01715	H.01955	.01729	.00112
#3	.00161	.00205	-.00842	.02039	.01101	.02673	.00208
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00156	-.04978	.00060	.10188	.00224	.00372
SDev	.00197	.01991	.00039	.01221	.00166	.00247
%RSD	125.83	40.000	65.067	11.984	73.917	66.233
#1	-.00026	-.02987	.00055	.11320	.00129	.00652
#2	.00130	-.04978	.00024	.10350	.00128	.00279
#3	.00365	-.06969	.00102	.08894	.00415	.00186
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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Method: CLP01AP2 Sample Name: ICSAA;ICSA Operator: LP
Run Time: 01/14/93 20:25:33
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	512.54	-.03171	-.25626	-.00181	.00028	.00022	483.98
SDev	2.93	.00476	.03971	.00115	.00016	.00046	3.32
%RSD	.57159	15.010	15.498	63.138	55.977	205.93	.68537
#1	509.49	-.03582	-.27938	-.00271	.00046	.00058	480.83
#2	515.33	-.02650	-.21040	-.00052	.00019	-.00029	487.44
#3	512.79	-.03281	-.27899	-.00222	.00019	.00038	483.67
Errors	LC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	LC Pass
High	617.91						635.22
Low	411.94						423.48

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01681	-.00309	-.01987	184.69	.01800	520.29	.02694
SDev	.00197	.00205	.00352	1.30	.03405	3.66	.00069
%RSD	11.729	66.549	17.703	.70638	189.16	.70428	2.5587
#1	.01484	-.00103	-.02339	183.36	-.01665	516.56	.02635
#2	.01879	-.00514	-.01636	185.96	.05141	523.89	.02770
#3	.01682	-.00309	-.01986	184.74	.01923	520.42	.02678
Errors	NOCHECK	NOCHECK	NOCHECK	LC Pass	NOCHECK	LC Pass	NOCHECK
High				228.42		652.33	
Low				152.28		434.89	

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00234	-.04314	-.00640	.82716	.00242	.06249
SDev	.00587	.08290	.00598	.00852	.00202	.00178
%RSD	250.19	192.15	93.458	1.0299	83.637	2.8452
#1	-.00808	-.06969	-.01276	.82635	.00014	.06267
#2	.00365	-.10951	-.00090	.81908	.00310	.06416
#3	-.00261	.04978	-.00553	.83606	.00402	.06062
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK
High						
Low						

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Method: CLP01AP2 Sample Name: ICSABB:ICSAB Operator: LP
Run Time: 01/14/93 20:28:12
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	517.28	.01470	-.24461	.45561	.44991	.81748	490.15
SDev	7.88	.02078	.01909	.00773	.01006	.01633	10.16
%RSD	1.5235	141.32	7.8050	1.6958	2.2357	1.9975	2.0728
#1	509.08	-.00294	-.26313	.44780	.43942	.80039	479.62
#2	517.97	.00945	-.24571	.45578	.45083	.81915	490.93
#3	524.79	.03761	-.22499	.46325	.45947	.83292	499.89
Errors	LC Pass	NOCHECK	NOCHECK	LC Pass	LC Pass	LC Pass	LC Pass
High	609.31			.59880	.58560	1.1140	630.46
Low	406.21			.39920	.39040	.74240	420.31

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.44335	.44892	.44490	187.12	4.3242	525.87	.45679
SDev	.00833	.01144	.00840	3.60	.1163	9.92	.00878
%RSD	1.8778	2.5482	1.8887	1.9241	2.6890	1.8858	1.9225
#1	.43518	.43659	.43585	183.42	4.2043	515.68	.44764
#2	.44303	.45097	.44640	187.33	4.3319	526.45	.45758
#3	.45183	.45919	.45245	190.61	4.4365	535.49	.46515
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.55680	.57000	.58560	225.55	5.6540	640.42	.60240
Low	.37120	.38000	.39040	150.37	3.7700	426.95	.40160

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.81054	.05641	.98629	.84333	.44960	.94033
SDev	.01606	.02072	.01748	.01284	.00971	.01745
%RSD	1.9818	36.735	1.7724	1.5220	2.1609	1.8554
#1	.79386	.03982	.96728	.82878	.43958	.92134
#2	.81184	.04978	.98992	.84818	.45025	.94402
#3	.82591	.07964	1.0017	.85304	.45898	.95564
Errors	LC Pass	NOCHECK	LC Pass	NOCHECK	LC Pass	LC Pass
High	1.0760		1.0790		.56760	1.2010
Low	.71760		.71920		.37840	.80080

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Method: CLP01AP2 Sample Name: 2XCRDL292Q4;CRI Operator: LP
Run Time: 01/14/93 20:33:28
Comment:
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.04204	.11516	.02237	-.00000	.00931	.00949	.12524
SDev	.01930	.00516	.00752	.00034	.00032	.00135	.01333
%RSD	45.912	4.4785	33.611	27018.	3.4682	14.198	10.645
#1	.05580	.12094	.02233	-.00039	.00949	.01051	.13452
#2	.05036	.11101	.02991	.00020	.00893	.00796	.13124
#3	.01998	.11354	.01487	.00020	.00950	.01000	.10997

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.01865	.08766	.07215	.05799	.03728	.08576	.02623
SDev	.00056	.00237	.00168	.02729	.00547	.01415	.00055
%RSD	2.9932	2.7060	2.3255	47.053	14.679	16.494	2.1115
#1	.01800	.09040	.07398	.04636	.04189	.07162	.02655
#2	.01897	.08629	.07179	.08917	.03123	.09991	.02655
#3	.01897	.08629	.07068	.03845	.03872	.08576	.02559

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.07295	-.10951	.02455	.01375	.08770	.05256
SDev	.00119	.07902	.00196	.01698	.00221	.00186
%RSD	1.6366	72.157	7.9704	123.53	2.5177	3.5448
#1	.07165	-.01991	.02292	.03315	.08642	.05442
#2	.07321	-.16924	.02402	.00162	.08643	.05069
#3	.07399	-.13938	.02672	.00647	.09025	.05256

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Method: CLP01AP2 Sample Name: HALFSTD;CCV Operator: LP
Run Time: 01/14/93 20:36:07
Comment: CCV#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	23.653	2.3126	L2.2459	2.3074	.47073	2.2914	23.958
SDev	.071	.0165	.0121	.0079	.00202	.0135	.105
%RSD	.29976	.71487	.53694	.34371	.43020	.58743	.43973
#1	23.734	2.3132	2.2592	2.3162	.47306	2.3065	24.076
#2	23.604	2.2958	L2.2356	2.3009	.46970	2.2806	23.874
#3	23.620	2.3289	L2.2430	2.3050	.46943	2.2872	23.924
Errors	LC Pass	LC Pass	LC Low	LC Pass	LC Pass	LC Pass	LC Pass
High	27.500	2.7500	2.7500	2.7500	.55000	2.7500	27.500
Low	22.500	2.2500	2.2500	2.2500	.45000	2.2500	22.500

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.2905	2.2840	2.3352	9.6021	2.3082	23.959	2.2965
SDev	.0073	.0101	.0073	.0446	.0197	.145	.0094
%RSD	.31665	.44372	.31357	.46441	.85484	.60613	.40742
#1	2.2988	2.2956	2.3432	9.6535	2.3288	24.121	2.3072
#2	2.2863	2.2771	2.3289	9.5751	2.3065	23.841	2.2900
#3	2.2863	2.2792	2.3333	9.5776	2.2894	23.916	2.2924
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	2.7500	2.7500	11.000	2.7500	27.500	2.7500
Low	2.2500	2.2500	2.2500	9.0000	2.2500	22.500	2.2500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	2.2753	23.910	.50507	23.700	2.3171	2.3137
SDev	.0127	.126	.00608	.094	.0094	.0075
%RSD	.55957	.52723	1.2039	.39724	.40756	.32271
#1	2.2899	24.023	.51155	23.800	2.3276	2.3205
#2	2.2664	23.774	.50415	23.613	2.3094	2.3150
#3	2.2696	23.933	.49949	23.686	2.3142	2.3057
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	2.7500	27.500	.55000	27.500	2.7500	2.7500
Low	2.2500	22.500	.45000	22.500	2.2500	2.2500

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Method: CLP01AP2 Sample Name: STDB;CCB Operator: LP
Run Time: 01/14/93 20:38:52
Comment: CCB#5
Mode: CONC Corr. Factor: 1

Elem	Al3082	Sb2068	As1936	Ba4934	Be3130	Cd2265	Ca3179
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00472	.00743	.00816	.00039	.00037	.00085	-.01034
SDev	.01032	.00311	.00177	.00090	.00016	.00102	.00092
%RSD	218.63	41.886	21.750	229.11	43.203	119.83	8.9327
#1	-.01125	.00881	.01014	.00138	.00019	-.00017	-.01140
#2	-.01010	.00386	.00760	.00020	.00047	.00186	-.00997
#3	.00718	.00960	.00673	-.00039	.00046	.00085	-.00967
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.20000	.06000	.01220	.20000	.00500	.00500	5.0000
Low	-.20000	-.06000	-.01220	-.20000	-.00500	-.00500	-5.0000

Elem	Cr2677	Co2286	Cu3247	Fe2599	Pb2203	Mg2790	Mn2576
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Avge	-.00000	.00171	-.01172	-.00875	.00888	.01965	.00064
SDev	.00056	.00059	.00110	.00180	.00426	.00408	.00000
%RSD	132000.	34.654	9.3749	20.553	47.997	20.782	.03612
#1	-.00032	.00205	-.01062	-.00695	.01315	.02201	.00064
#2	.00064	.00205	-.01282	-.00875	.00462	.02201	.00064
#3	-.00032	.00103	-.01172	-.01055	.00887	.01493	.00064
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.01000	.05000	.02500	.10000	.01430	5.0000	.01500
Low	-.01000	-.05000	-.02500	-.10000	-.01430	-5.0000	-.01500

Elem	Ni2316	K_7664	Ag3280	Na5889	V_2924	Zn2138
Units	ppm	ppm	ppm	ppm	ppm	ppm
Avge	.00000	-.00996	.00041	.08005	-.00000	-.00184
SDev	.00163	.05268	.00111	.01197	.00241	.00093
%RSD	8386e6	529.15	268.51	14.948	1241500.	50.427
#1	.00130	-.06969	.00116	.07439	.00032	-.00091
#2	.00052	.00996	.00093	.09379	.00223	-.00277
#3	-.00182	.02987	-.00086	.07196	-.00255	-.00183
Errors	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass	LC Pass
High	.04000	5.0000	.01000	5.0000	.05000	.02000
Low	-.04000	-5.0000	-.01000	-5.0000	-.05000	-.02000

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C L P M E T A L S 3.02e

S212197--ARSENIC

Run id: F6 9301402
THERMO JARRELL-ASH VIDEO 21
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1103
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	17:39
2	10 PPB	WS1	F			S10	01/14/93	17:44
3	50 PPB	WS2	F			S50	01/14/93	17:49
4	100 PPB	WS3	F			S100	01/14/93	17:54
5	ICV-2	ICV	F			ICV	01/14/93	18:01
6	CAL BLK	ICB	F			ICB	01/14/93	18:06
7	CRA	CRA0	F			CRA	01/14/93	18:10
8	50 PPB	CCV	F			CCV	01/14/93	18:15
9	CAL BLK	CCB	F			CCB	01/14/93	18:20
10	PB	PBS	F	2565	01/08/93	PBS	01/14/93	18:25
11	PB	ASPBS	F	2565		PBSA	01/14/93	18:30
12	LCSFS	LCSS	F			LCSS	01/14/93	18:35
13	LCSF	ASLCSS	F			LCSSA	01/14/93	18:40
14	X	X	F			ZZZZZZ	01/14/93	18:44
15	LCSFS	LCSS	F	2565	01/08/93	LCSS	01/14/93	18:49
16	LCSFS	ASLCSS	F	2565		LCSSA	01/14/93	18:54
17	X	X	F			ZZZZZZ	01/14/93	18:59
18	S212197-01	DS	F	2565	01/08/93	MFN649S	01/14/93	19:04
19	X	X	F			ZZZZZZ	01/14/93	19:09
20	50 PPB	CCV	F			CCV	01/14/93	19:14
21	CAL BLK	CCB	F			CCB	01/14/93	19:18
22	S212197-01	S	F	2565	01/08/93	MFN649	01/14/93	19:23
23	S212197-01	AS	F	2565		MFN649A	01/14/93	19:28
24	S212197-01	S2	F	2565	01/08/93	MFN649D	01/14/93	19:33
25	S212197-01	ASS2	F	2565		MFN649DA	01/14/93	19:38
26	S212197-02	S	F	2565	01/08/93	MFN650	01/14/93	19:43
27	S212197-02	AS	F	2565		MFN650A	01/14/93	19:48
28	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	19:52
29	S212197-03	AS	F	2565		MFQ026A	01/14/93	19:57
30	X	X	F			ZZZZZZ	01/14/93	20:02
31	X	X	F			ZZZZZZ	01/14/93	20:07
32	50 PPB	CCV	F			CCV	01/14/93	20:12
33	CAL BLK	CCB	F			CCB	01/14/93	20:17
34	S212197-04	S	F	2565	01/08/93	MFQ027	01/14/93	20:22
35	S212197-04	AS	F	2565		MFQ027A	01/14/93	20:26
36	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	20:31
37	S212197-05	AS	F	2565		MFQ028A	01/14/93	20:36
38	S212197-06	S	F	2565	01/08/93	MFQ029	01/14/93	20:41
39	S212197-06	AS	F	2565		MFQ029A	01/14/93	20:46
40	S212197-07	S	F	2565	01/08/93	MFQ030	01/14/93	20:51
41	S212197-07	AS	F	2565		MFQ030A	01/14/93	20:56
42	S212197-08	S	F	2565	01/08/93	MFQ031	01/14/93	21:00
43	S212197-08	AS	F	2565		MFQ031A	01/14/93	21:05

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S212197--ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	21:10
45	CAL BLK	CCB	F			CCB	01/14/93	21:15
46	S212197-09	S	F	2565	01/08/93	MFQ205	01/14/93	21:20
47	S212197-09	AS	F	2565		MFQ205A	01/14/93	21:25
48	S212197-10	S	F	2565	01/08/93	MFQ210	01/14/93	21:30
49	S212197-10	AS	F	2565		MFQ210A	01/14/93	21:34
50	S212197-11	S	F	2565	01/08/93	MFQ211	01/14/93	21:39
51	S212197-11	AS	F	2565		MFQ211A	01/14/93	21:44
52	S212197-12	S	F	2565	01/08/93	MFQ221	01/14/93	21:49
53	S212197-12	AS	F	2565		MFQ221A	01/14/93	21:54
54	X	X	F			ZZZZZZ	01/14/93	21:59
55	X	X	F			ZZZZZZ	01/14/93	22:03
56	50 PPB	CCV	F			CCV	01/14/93	22:08
57	CAL BLK	CCB	F			CCB	01/14/93	22:13
58	S212197-13	S	F	2565	01/08/93	MFQ222	01/14/93	22:18
59	S212197-13	AS	F	2565		MFQ222A	01/14/93	22:23
60	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	22:28
61	S212197-14	AS	F	2565		MFQ223A	01/14/93	22:32
62	S212197-15	S	F	2565	01/08/93	MFQ224	01/14/93	22:37
63	S212197-15	AS	F	2565		MFQ224A	01/14/93	22:42
64	S212197-16	S	F	2565	01/08/93	MFQ225	01/14/93	22:47
65	S212197-16	AS	F	2565		MFQ225A	01/14/93	22:52
66	X	X	F			ZZZZZZ	01/14/93	22:57
67	X	X	F			ZZZZZZ	01/14/93	23:02
68	50 PPB	CCV	F			CCV	01/14/93	23:06
69	CAL BLK	CCB	F			CCB	01/14/93	23:11
70	S212197-17	S	F	2565	01/08/93	MFQ233	01/14/93	23:16
71	S212197-17	AS	F	2565		MFQ233A	01/14/93	23:21
72	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	23:26
73	S212197-18	AS	F	2565		MFQ234A	01/14/93	23:31
74	S212197-19	S	F	2565	01/08/93	MFQ235	01/14/93	23:35
75	S212197-19	AS	F	2565		MFQ235A	01/14/93	23:40
76	S212197-20	S	F	2565	01/08/93	MFQ236	01/14/93	23:45
77	S212197-20	AS	F	2565		MFQ236A	01/14/93	23:50
78	X	X	F			ZZZZZZ	01/14/93	23:55
79	X	X	F			ZZZZZZ	01/15/93	00:00
80	50 PPB	CCV	F			CCV	01/15/93	00:05
81	CAL BLK	CCB	F			CCB	01/15/93	00:09

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S212197--SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	21:10
45	CAL BLK	CCB	F			CCB	01/14/93	21:15
46	S212197-09	S	F	2565	01/08/93	MFQ205	01/14/93	21:20
47	S212197-09	AS	F	2565		MFQ205A	01/14/93	21:25
48	S212197-10	S	F	2565	01/08/93	MFQ210	01/14/93	21:30
49	S212197-10	AS	F	2565		MFQ210A	01/14/93	21:34
50	S212197-11	S	F	2565	01/08/93	MFQ211	01/14/93	21:39
51	S212197-11	AS	F	2565		MFQ211A	01/14/93	21:44
52	S212197-12	S	F	2565	01/08/93	MFQ221	01/14/93	21:49
53	S212197-12	AS	F	2565		MFQ221A	01/14/93	21:54
54	X	X	F			ZZZZZZ	01/14/93	21:59
55	X	X	F			ZZZZZZ	01/14/93	22:03
56	50 PPB	CCV	F			CCV	01/14/93	22:08
57	CAL BLK	CCB	F			CCB	01/14/93	22:13
58	S212197-13	S	F	2565	01/08/93	MFQ222	01/14/93	22:18
59	S212197-13	AS	F	2565		MFQ222A	01/14/93	22:23
60	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	22:28
61	S212197-14	AS	F	2565		MFQ223A	01/14/93	22:32
62	S212197-15	S	F	2565	01/08/93	MFQ224	01/14/93	22:37
63	S212197-15	AS	F	2565		MFQ224A	01/14/93	22:42
64	S212197-16	S	F	2565	01/08/93	MFQ225	01/14/93	22:47
65	S212197-16	AS	F	2565		MFQ225A	01/14/93	22:52
66	X	X	F			ZZZZZZ	01/14/93	22:57
67	X	X	F			ZZZZZZ	01/14/93	23:02
68	50 PPB	CCV	F			CCV	01/14/93	23:06
69	CAL BLK	CCB	F			CCB	01/14/93	23:11

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C L P M E T A L S 3.02e

S212197--SELENIUM

Run id: F6 9301452
THERMO JARRELL-ASH VIDEO 21
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1749
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	17:39
2	5 PPB	WS1	F			S5	01/14/93	17:44
3	50 PPB	WS2	F			S50	01/14/93	17:49
4	100 PPB	WS3	F			S100	01/14/93	17:54
5	ICV-2	ICV	F			ICV	01/14/93	18:01
6	CAL BLK	ICB	F			ICB	01/14/93	18:06
7	CRA	CRA0	F			CRA	01/14/93	18:10
8	50 PPB	CCV	F			CCV	01/14/93	18:15
9	CAL BLK	CCB	F			CCB	01/14/93	18:20
10	PB	PBS	F	2565	01/08/93	PBS	01/14/93	18:25
11	PB	ASPBS	F	2565		PBSA	01/14/93	18:30
12	LCSFS	LCSS	F	2565	01/08/93	LCSS	01/14/93	18:35
13	LCSFS	ASLCSS	F	2565		LCSSA	01/14/93	18:40
14	X	X	F			ZZZZZZ	01/14/93	18:44
15	LCSFS	LCSS	F			LCSS	01/14/93	18:49
16	LCSFS	ASLCSS	F			LCSSA	01/14/93	18:54
17	X	X	F			ZZZZZZ	01/14/93	18:59
18	S212197-01	DS	F	2565	01/08/93	MFN649S	01/14/93	19:04
19	X	X	F			ZZZZZZ	01/14/93	19:09
20	50 PPB	CCV	F			CCV	01/14/93	19:14
21	CAL BLK	CCB	F			CCB	01/14/93	19:18
22	S212197-01	S	F	2565	01/08/93	MFN649	01/14/93	19:23
23	S212197-01	AS	F	2565		MFN649A	01/14/93	19:28
24	S212197-01	S2	F	2565	01/08/93	MFN649D	01/14/93	19:33
25	S212197-01	ASS2	F	2565		MFN649DA	01/14/93	19:38
26	S212197-02	S	F	2565	01/08/93	MFN650	01/14/93	19:43
27	S212197-02	AS	F	2565		MFN650A	01/14/93	19:48
28	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	19:52
29	S212197-03	AS	F	2565		MFQ026A	01/14/93	19:57
30	X	X	F			ZZZZZZ	01/14/93	20:02
31	X	X	F			ZZZZZZ	01/14/93	20:07
32	50 PPB	CCV	F			CCV	01/14/93	20:12
33	CAL BLK	CCB	F			CCB	01/14/93	20:17
34	S212197-04	S	F	2565	01/08/93	MFQ027	01/14/93	20:22
35	S212197-04	AS	F	2565		MFQ027A	01/14/93	20:26
36	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	20:31
37	S212197-05	AS	F	2565		MFQ028A	01/14/93	20:36
38	S212197-06	S	F	2565	01/08/93	MFQ029	01/14/93	20:41
39	S212197-06	AS	F	2565		MFQ029A	01/14/93	20:46
40	S212197-07	S	F	2565	01/08/93	MFQ030	01/14/93	20:51
41	S212197-07	AS	F	2565		MFQ030A	01/14/93	20:56
42	S212197-08	S	F	2565	01/08/93	MFQ031	01/14/93	21:00
43	S212197-08	AS	F	2565		MFQ031A	01/14/93	21:05

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1608 GFAA ID: F1 F2 F3 F4 F5 F6 Method: 150

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8:00 1/14/93

Operator: SP

Disk # F6

Acq

SAMIN 5212197

Standards Source
1. Calibration: 10 ppm
2. ICV: [X] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:	9301402		Channel B:	9301452	
RUN ID:			RUN ID:		
Element:	[X] AS	[] PB	Element:	[X] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[X] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	PB0		
	11	PB0A		
Se only	12	LCSS	1:4	
	13	LCSSA		
	14	X		
RSD	15	LCSS	1:199	As only
	16	LCSSA		
	17	X		
	18	013		RSD
	19	X		
	20	CCV		
	21	CCB		
m(18)	22	01		m(6)
	23	01A		
m(19)	24	01D		m(4)
	25	01DA		
	26	02		
	27	02A		
m(11)	28	03		
	29	03A		
	30	X		
	31	X		
	32	CCV		
	33	CCB		
m(14)	34	04		RSD
	35	04A		
m(77)	36	05		RSD
	37	05A		
m(12)	38	06		RSD
	39	06A 10		

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1608
Page 2 of 2

	40	07	
	41	07A	
	42	08	
	43	08A	
	44	CCV	
	45	CCB	
	46	09	
	47	09A	
m(13)	48	10	<40%
	49	10A	
	50	11	
	51	11A	
	52	12	
	53	12A	
	54	X	
	55	X	
	56	CCV	
	57	CCB	
m(8)	58	13	RSD
	59	13A	
	60	14	
	61	14A	
	62	15	m(13)
	63	15A	
	64	16	
	65	16A	
	66	X	
	67	X	
	68	CCV	
	69	CCB	
	70	17	
	71	17A	
	72	18	
	73	18A	
	74	19	
	75	19A	
	76	20	
	77	20A	
	78	X	
	79	X	
	80	CCV	
	81	CCB	
	82		
	83		
	84		
	85		
	86		
	87		
	88		
	89		
	90		
-152	91		
	92		
	93		
	94		
	95		

AS
Alley
See CCV out
11/15/93

Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	17:39

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/14/93	17:44

	<-As->		<-Se->	
Burns (Abs)	0.048 A	0.049 A	0.029A	0.030A
Mean	0.0485		0.0295	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	17:49

	<-As->		<-Se->	
Burns (Abs)	0.219 A	0.223 A	0.217A	0.206A
Mean	0.2210		0.2115	
CV %	0.00		3.68	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	17:54

	<-As->		<-Se->	
Burns (Abs)	0.420 A	0.428 A	0.343A	0.322A
Mean	0.4240		0.3325	
CV %	1.33		4.47	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.004638268	0.005168168
Coef[2]:	-4.002816e-006	-1.845022e-005
Correl. coef.:	0.9999	0.9998

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/14/93	18:01

	<-As->		<-Se->	
Burns (Conc)	50.730	50.494	51.431	48.424
Mean	50.6120		49.9275	
CV %	0.33		4.26	
Sample value	50.61		49.93	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	18:06

	<-As->		<-Se->	
Burns (Conc)	0.647	0.431	-1.156	0.971
Mean	0.5390		-0.0925	
CV %	28.34		1625.96	
Sample value	2.20U		3.60U	

7	CRA	CRA	CRA	1.00x	01/14/93	18:10

	<-As->		<-Se->	
Burns (Conc)	10.882	11.322	6.335	4.723
Mean	11.1020		5.5290	
CV %	2.80		20.62 ***	
Sample value	11.10		5.53	

8	50 PPB	CCV	CCV	1.00x	01/14/93	18:15

	<-As->		<-Se->	
Burns (Conc)	52.387	53.336	53.598	51.126
Mean	52.8615		52.3620	
CV %	1.27		3.34	
Sample value	52.86		52.36	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	18:20

	<-As->		<-Se->	
Burns (Conc)	0.863	0.216	0.194	0.388
Mean	0.5395		0.2910	
CV %	84.80		47.14	
Sample value	2.20U		3.60U	

10	PB	PBS	PBS	1.00x	01/14/93	18:25

	<-As->		<-Se->	
Burns (Conc)	0.863	1.727	1.948	1.752
Mean	1.2950		1.8500	
CV %	47.18		7.49	
Sample value	2.20U		3.60U	

11	PB	ASPBS	PBSA	1.00x	01/14/93	18:30

	<-As->		<-Se->	
Burns (Conc)	23.323	19.963	12.135	10.034
Mean	21.6430		11.0845	
CV %	10.98		13.40	
Sample value	21.64		11.09	
Spike added	20.00		10.00	
Spike recovery, %	108.21		110.85	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	LCSFS	LCSS	LCSS	5.00x	01/14/93	18:35

	<-As->		<-Se->	
Burns (Conc)	999.999	999.999	30.632	25.549
Mean	999.9990		28.0905	
CV %	0.02	Se only	12.80	
Sample value	5000.00	1/15/93 KH	140.46	

13	LCSF	ASLCSS	LCSSA	5.00x	01/14/93	18:40

	<-As->		<-Se->	
Burns (Conc)	999.999	999.999	40.760	34.412
Mean	999.9990		37.5860	
CV %	0.02		11.94	
Sample value	5000.00		187.93	
Spike added	20.00		10.00	
Spike recovery, %	0.00 ***		94.95	

14	X	X	ZZZZZZ	1.00x	01/14/93	18:44

	<-As->		<-Se->	
Burns (Conc)	3.894	3.026	-1.731	1.948
Mean	3.4600		0.1085	
CV %	17.74		2397.65	
Sample value	3.46		3.60U	

15	LCSFS	LCSS	LCSS	200.00x	01/14/93	18:49

	<-As->		<-Se->	
Burns (Conc)	31.014	23.323	1.166	1.361
Mean	27.1685		1.2635	
CV %	20.02 ***	As only	10.91	
Sample value	5433.60		720.00U	

16	LCSFS	ASLCSS	LCSSA	200.00x	01/14/93	18:54

	<-As->		<-Se->	
Burns (Conc)	48.608	43.223	10.452	7.148
Mean	45.9155		8.8000	
CV %	8.29		26.55 ***	
Sample value	9183.00		1760.00	
Spike added	20.00		10.00	
Spike recovery, %	93.74		88.00	

17	X	X	ZZZZZZ	1.00x	01/14/93	18:59

	<-As->		<-Se->	
Burns (Conc)	1.079	1.295	-0.772	1.166
Mean 155	1.1870		0.1970	
CV %	12.87		695.62	
Sample value	2.20U		3.60U	

Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	S212197-01	DS	MFN649S	1.00x	01/14/93	19:04

	<-As->		<-Se->	
Burns (Conc)	50.022	51.913	11.501	6.944
Mean	50.9675		9.2225	
CV %	2.62		34.94 ***	
Sample value	50.97		9.22	

19	X	X	ZZZZZZ	1.00x	01/14/93	19:09

	<-As->		<-Se->	
Burns (Conc)	1.079	0.431	-0.772	-1.156
Mean	0.7550		-0.9640	
CV %	60.69		28.17	
Sample value	2.20U		3.60U	

20	50 PPB	CCV 2	CCV	1.00x	01/14/93	19:14

	<-As->		<-Se->	
Burns (Conc)	52.624	53.574	47.541	53.912
Mean	53.0990		50.7265	
CV %	1.27		8.88	
Sample value	53.10		50.73	

21	CAL BLK	CCB 2	CCB	1.00x	01/14/93	19:18

	<-As->		<-Se->	
Burns (Conc)	1.079	1.295	0.971	-0.964
Mean	1.1870		0.0035	
CV %	12.87		>9999.99	
Sample value	2.20U		3.60U	

22	-01	S	MFN649	1.00x	01/14/93	19:23

	<-As->		<-Se->	
Burns (Conc)	16.624	19.294	6.538	6.335
Mean	17.9590		6.4365	
CV %	10.51		2.23	
Sample value	17.96		6.44	

23	-01	AS	MFN649A	1.00x	01/14/93	19:28

	<-As->		<-Se->	
Burns (Conc)	33.068	35.589	11.080	10.452
Mean	34.3285		10.7660	
CV %	5.19		4.12	
Sample value	34.33		10.77	
Spike added	20.00		10.00	
Spike recovery, %	81.85 ***		43.30 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-01	S2	MFN649D	1.00x	01/14/93	19:33

	<-As->		<-Se->	
Burns (Conc)	18.180	20.187	1.557	6.538
Mean	19.1835		4.0475	
CV %	7.40		87.02	
Sample value	19.18		4.05	

25	-01	ASS2	MFN649DA	1.00x	01/14/93	19:38

	<-As->		<-Se->	
Burns (Conc)	33.983	34.212	11.501	10.243
Mean	34.0975		10.8720	
CV %	0.48		8.18	
Sample value	34.10		10.87	
Spike added	20.00		10.00	
Spike recovery, %	74.57 ***		68.25 ***	

26	-02	S	MFN650	1.00x	01/14/93	19:43

	<-As->		<-Se->	
Burns (Conc)	5.851	5.198	1.948	0.582
Mean	5.5245		1.2650	
CV %	8.36		76.36	
Sample value	5.52		3.60U	

27	-02	AS	MFN650A	1.00x	01/14/93	19:48

	<-As->		<-Se->	
Burns (Conc)	20.857	19.740	5.930	7.352
Mean	20.2985		6.6410	
CV %	3.89		15.14	
Sample value	20.30		6.64	
Spike added	20.00		10.00	
Spike recovery, %	73.88 ***		66.41 ***	

28	-03	S	MFQ026	1.00x	01/14/93	19:52

	<-As->		<-Se->	
Burns (Conc)	10.223	12.202	2.341	2.341
Mean	11.2125		2.3410	
CV %	12.48		0.00	
Sample value	11.21		3.60U	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-03	AS	MFQ026A	1.00x	01/14/93	19:57

	<-As->		<-Se->	
Burns (Conc)	27.834	26.703	7.966	8.996
Mean	27.2685		8.4810	
CV %	2.93		8.59	
Sample value	27.27		8.48	
Spike added	20.00		10.00	
Spike recovery, %	80.27 ***		84.81 ***	

30	X	X	ZZZZZZ	1.00x	01/14/93	20:02

	<-As->		<-Se->	
Burns (Conc)	1.079	0.216	-1.731	-0.772
Mean	0.6475		-1.2515	
CV %	94.24		54.18	
Sample value	2.20U		3.60U	

31	X	X	ZZZZZZ	1.00x	01/14/93	20:07

	<-As->		<-Se->	
Burns (Conc)	1.079	1.295	-1.922	0.582
Mean	1.1870		-0.6700	
CV %	12.87		264.27	
Sample value	2.20U		3.60U	

32	50 PPB	CCV 3	CCV	1.00x	01/14/93	20:12

	<-As->		<-Se->	
Burns (Conc)	53.574	53.574	52.973	51.431
Mean	53.5740		52.2020	
CV %	0.00		2.09	
Sample value	53.57		52.20	

33	CAL BLK	CCB 3	CCB	1.00x	01/14/93	20:17

	<-As->		<-Se->	
Burns (Conc)	1.079	0.216	-1.156	-2.493
Mean	0.6475		-1.8245	
CV %	94.24		51.82	
Sample value	2.20U		3.60U	

34	-04	S	MFQ027	1.00x	01/14/93	20:22

	<-As->		<-Se->	
Burns (Conc)	14.851	14.851	8.583	7.148
Mean	14.8510		7.8655	
CV %	0.00		12.90	
Sample value	14.85		7.87	

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ARGOS MODEL SA4 Version 1.29

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-04	AS	MF0027A	1.00x	01/14/93	20:26

	<-As->		<-Se->	
Burns (Conc)	30.786	28.514	15.571	11.501
Mean	29.6500		13.5360	
CV %	5.42		21.26 ***	
Sample value	29.65		13.54	
Spike added	20.00		10.00	
Spike recovery, %	73.99 ***		56.70 ***	

36	-05	S	MF0028	1.00x	01/14/93	20:31

	<-As->		<-Se->	
Burns (Conc)	77.643	77.146	5.125	7.966
Mean	77.3945		6.5455	
CV %	0.45		30.69 ***	
Sample value	77.39		6.55	

37	-05	AS	MF0028A	1.00x	01/14/93	20:36

	<-As->		<-Se->	
Burns (Conc)	88.211	91.272	15.136	13.841
Mean	89.7415		14.4885	
CV %	2.41		6.32	
Sample value	89.74		14.49	
Spike added	20.00		10.00	
Spike recovery, %	61.74 ***		79.44 ***	

38	-06	S	MF0029	1.00x	01/14/93	20:41

	<-As->		<-Se->	
Burns (Conc)	11.762	11.982	0.194	2.145
Mean	11.8720		1.1695	
CV %	1.31		117.96	
Sample value	11.87		3.60U	

39	-06	AS	MF0029A	1.00x	01/14/93	20:46

	<-As->		<-Se->	
Burns (Conc)	28.060	29.422	7.966	5.930
Mean	28.7410		6.9480	
CV %	3.35		20.72 ***	
Sample value	28.74		6.95	
Spike added	20.00		10.00	
Spike recovery, %	84.35 ***		69.48 ***	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-07	S	MF0030	1.00x	01/14/93	20:51

	<-As->		<-Se->	
Burns (Conc)	22.649	21.529	-1.348	0.776
Mean	22.0890		-0.2860	
CV %	3.59		525.14	
Sample value	22.09		3.60U	

41	-07	AS	MF0030A	1.00x	01/14/93	20:56

	<-As->		<-Se->	
Burns (Conc)	40.666	40.202	5.527	5.527
Mean	40.4340		5.5270	
CV %	0.81		0.00	
Sample value	40.43		5.53	
Spike added	20.00		10.00	
Spike recovery, %	91.72		55.27 ***	

42	-08	S	MF0031	1.00x	01/14/93	21:00

	<-As->		<-Se->	
Burns (Conc)	10.443	10.223	-2.112	-3.629
Mean	10.3330		-2.8705	
CV %	1.50		37.37	
Sample value	10.33		3.60U	

43	-08	AS	MF0031A	1.00x	01/14/93	21:05

	<-As->		<-Se->	
Burns (Conc)	31.470	27.607	4.523	4.324
Mean	29.5385		4.4235	
CV %	9.25		3.18	
Sample value	29.54		4.42	
Spike added	20.00		10.00	
Spike recovery, %	96.03		44.23 ***	

44	50 PPB	CCV 4	CCV	1.00x	01/14/93	21:10

	<-As->		<-Se->	
Burns (Conc)	52.624	53.574	41.307	49.915
Mean	53.0990		45.6110	
CV %	1.27		13.34	
Sample value	53.10		45.61	

45	CAL BLK	CCB 4	CCB	1.00x	01/14/93	21:15

	<-As->		<-Se->	
Burns (Conc)	1.295	1.511	-0.193	-2.112
Mean	1.4030		-1.1525	
CV %	10.89		117.74	
Sample value	2.20U		3.60U	

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Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
46	-09	S	MFQ205	1.00x	01/14/93	21:20

	<-As->		<-Se->	
Burns (Conc)	4.763	5.851	0.000	0.000
Mean	5.3070		0.0000	
CV %	14.50		---	
Sample value	5.31		3.60U	

47	-09	AS	MFQ205A	1.00x	01/14/93	21:25

	<-As->		<-Se->	
Burns (Conc)	21.305	22.874	8.172	8.172
Mean	22.0895		8.1720	
CV %	5.02		0.00	
Sample value	22.09		8.17	
Spike added	20.00		10.00	
Spike recovery, %	83.91 ***		81.72 ***	

48	-10	S	MFQ210	1.00x	01/14/93	21:30

	<-As->		<-Se->	
Burns (Conc)	13.967	13.304	-3.629	-2.112
Mean	13.6355		-2.8705	
CV %	3.44		37.37	
Sample value	13.64		3.60U	

49	-10	AS	MFQ210A	1.00x	01/14/93	21:34

	<-As->		<-Se->	
Burns (Conc)	29.422	30.103	1.752	2.538
Mean	29.7625		2.1450	
CV %	1.62		25.91	
Sample value	29.76		3.60U	
Spike added	20.00		10.00	
Spike recovery, %	80.63 ***		0.00 ***	

50	-11	S	MFQ211	1.00x	01/14/93	21:39

	<-As->		<-Se->	
Burns (Conc)	5.415	5.198	0.194	-1.348
Mean	5.3065		-0.5770	
CV %	2.89		188.97	
Sample value	5.31		3.60U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-11	AS	MFQ211A	1.00x	01/14/93	21:44

	<-As->		<-Se->	
Burns (Conc)	22.425	22.874	8.172	7.148
Mean	22.6495		7.6600	
CV %	1.40		9.45	
Sample value	22.65		7.66	
Spike added	20.00		10.00	
Spike recovery, %	86.71		76.60 ***	

52	-12	S	MFQ221	1.00x	01/14/93	21:49

	<-As->		<-Se->	
Burns (Conc)	0.863	1.727	5.527	2.341
Mean	1.2950		3.9340	
CV %	47.18		57.27	
Sample value	2.20U		3.93	

53	-12	AS	MFQ221A	1.00x	01/14/93	21:54

	<-As->		<-Se->	
Burns (Conc)	19.963	19.294	14.487	18.211
Mean	19.6285		16.3490	
CV %	2.41		16.11	
Sample value	19.63		16.35	
Spike added	20.00		10.00	
Spike recovery, %	98.14		124.15 ***	

54	X	X	ZZZZZZ	1.00x	01/14/93	21:59

	<-As->		<-Se->	
Burns (Conc)	0.863	1.079	-0.193	-0.579
Mean	0.9710		-0.3860	
CV %	15.73		70.71	
Sample value	2.20U		3.60U	

55	X	X	ZZZZZZ	1.00x	01/14/93	22:03

	<-As->		<-Se->	
Burns (Conc)	0.863	0.216	0.582	0.388
Mean	0.5395		0.4850	
CV %	84.80		28.28	
Sample value	2.20U		3.60U	

56	50 PPB	CCV 5	CCV	1.00x	01/14/93	22:08

	<-As->		<-Se->	
Burns (Conc)	51.440	48.373	48.424	47.541
Mean	49.9065		47.9825	
CV %	4.35		1.30	
Sample value	49.91		47.98	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	CAL BLK	CCB	5 CCB	1.00x	01/14/93	22:13

	<-As->		<-Se->	
Burns (Conc)	1.295	0.647	0.388	1.361
Mean	0.9710		0.8745	
CV %	47.19		78.68	
Sample value	2.20U		3.60U	

58	-13	S	MFQ222	1.00x	01/14/93 22:18

	<-As->		<-Se->	
Burns (Conc)	7.596	10.223	16.007	11.501
Mean	8.9095		13.7540	
CV %	20.85		23.17 ***	
Sample value	8.91		13.75	

59	-13	AS	MFQ222A	1.00x	01/14/93 22:23

	<-As->		<-Se->	
Burns (Conc)	23.547	24.672	20.683	21.138
Mean	24.1095		20.9105	
CV %	3.30		1.54	
Sample value	24.11		20.91	
Spike added	20.00		10.00	
Spike recovery, %	76.01 ***		71.56 ***	

60	-14	S	MFQ223	1.00x	01/14/93 22:28

	<-As->		<-Se->	
Burns (Conc)	9.127	9.127	-0.772	1.557
Mean	9.1270		0.3925	
CV %	0.00		419.58	
Sample value	9.13		3.60U	

61	-14	AS	MFQ223A	1.00x	01/14/93 22:32

	<-As->		<-Se->	
Burns (Conc)	27.381	27.155	8.583	10.870
Mean	27.2680		9.7265	
CV %	0.59		16.63	
Sample value	27.27		9.73	
Spike added	20.00		10.00	
Spike recovery, %	90.71		97.27	

62	-15	S	MFQ224	1.00x	01/14/93 22:37

	<-As->		<-Se->	
Burns (Conc)	5.198	6.286	14.056	13.199
Mean	5.7420		13.6275	
CV %	13.40		4.45	
Sample value	5.74		13.63	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
63	-15	AS	MFQ224A	1.00x	01/14/93	22:42

	<-As->		<-Se->	
Burns (Conc)	21.753	21.753	20.230	20.683
Mean	21.7530		20.4565	
CV %	0.00		1.57	
Sample value	21.75		20.46	
Spike added	20.00		10.00	
Spike recovery, %	80.06 ***		68.28 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
64	-16	S	MFQ225	1.00x	01/14/93	22:47

	<-As->		<-Se->	
Burns (Conc)	8.689	7.596	4.723	5.527
Mean	8.1425		5.1250	
CV %	9.49		11.09	
Sample value	8.14		5.13	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
65	-16	AS	MFQ225A	1.00x	01/14/93	22:52

	<-As->		<-Se->	
Burns (Conc)	27.155	28.060	13.841	15.136
Mean	27.6075		14.4885	
CV %	2.32		6.32	
Sample value	27.61		14.49	
Spike added	20.00		10.00	
Spike recovery, %	97.33		93.64	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
66	X	X	ZZZZZZ	1.00x	01/14/93	22:57

	<-As->		<-Se->	
Burns (Conc)	0.216	-0.216	0.776	0.582
Mean	0.0000		0.6790	
CV %	>9999.99		20.20	
Sample value	2.20U		3.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
67	X	X	ZZZZZZ	1.00x	01/14/93	23:02

	<-As->		<-Se->	
Burns (Conc)	1.295	-0.216	0.388	0.971
Mean	0.5395		0.6795	
CV %	198.04		60.67	
Sample value	2.20U		3.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
68	50 PPB	CCV 6	CCV	1.00x	01/14/93	23:06

	<-As->		<-Se->	
Burns (Conc)	50.258	50.494	43.808	46.666
Mean	50.3760		45.2370	
CV %	0.33		4.47	
Sample value	50.38		45.24	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
69	CAL BLK	CCB 6	CCB	1.00x	01/14/93	23:11

	<-As->		<-Se->	
Burns (Conc)	1.727	0.647	1.557	-1.731
Mean	1.1870		-0.0870	
CV %	64.34		2672.38	
Sample value	2.20U		3.60U	

70	-17	S	MFQ233	1.00x	01/14/93	23:16

	<-As->		<-Se->	
Burns (Conc)	20.634	21.529	0.776	-2.112
Mean	21.0815		~~-0.6680~~	
CV %	3.00	As only 1/15/93 KK	~~305.71~~	
Sample value	21.08		3.60U	

71	-17	AS	MFQ233A	1.00x	01/14/93	23:21

	<-As->		<-Se->	
Burns (Conc)	40.202	39.508	5.527	3.527
Mean	39.8550		4.5270	
CV %	1.23		31.24	
Sample value	39.85		~~4.53~~	
Spike added	20.00		10.00	
Spike recovery, %	93.87		45.27 ***	

72	-18	S	MFQ234	1.00x	01/14/93	23:26

	<-As->		<-Se->	
Burns (Conc)	22.201	20.634	-0.386	0.776
Mean	21.4175		0.1950	
CV %	5.17		421.36	
Sample value	21.42		~~3.60U~~	

73	-18	AS	MFQ234A	1.00x	01/14/93	23:31

	<-As->		<-Se->	
Burns (Conc)	38.121	39.739	5.125	10.243
Mean	38.9300		7.6840	
CV %	2.94		47.10 ***	
Sample value	38.93		7.68	
Spike added	20.00		~~10.00~~	
Spike recovery, %	87.57		76.84 ***	

74	-19	S	MFQ235	1.00x	01/14/93	23:35

	<-As->		<-Se->	
Burns (Conc)	32.611	36.048	-6.431	-4.382
Mean	34.3295		-5.4065	
CV %	7.08		~~26.80~~	
Sample value 165	34.33		3.60U	

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
75	-19	AS	MFQ235A	1.00x	01/14/93	23:40

	<-As->		<-Se->	
Burns (Conc)	51.913	53.574	-2.303	0.582
Mean	52.7435		-0.8605	
CV %	2.23		237.07	
Sample value	52.74		3.60U	
Spike added	20.00		10.00	
Spike recovery, %	92.07		0.00 ***	

As only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
76	-20	S	MFQ236	1.00x	01/14/93	23:45

	<-As->		<-Se->	
Burns (Conc)	5.633	5.633	-0.193	-1.922
Mean	5.6330		-1.0575	
CV %	0.00		115.61	
Sample value	5.63		3.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
77	-20	AS	MFQ236A	1.00x	01/14/93	23:50

	<-As->		<-Se->	
Burns (Conc)	25.574	23.547	4.924	4.924
Mean	24.5605		4.9240	
CV %	5.84		0.00	
Sample value	24.56		4.92	
Spike added	20.00		10.00	
Spike recovery, %	94.64		49.24 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
78	X	X	ZZZZZZ	1.00x	01/14/93	23:55

	<-As->		<-Se->	
Burns (Conc)	1.727	0.000	-1.156	2.538
Mean	0.8635		0.6910	
CV %	141.42		378.01	
Sample value	2.20U		3.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
79	X	X	ZZZZZZ	1.00x	01/15/93	00:00

	<-As->		<-Se->	
Burns (Conc)	1.295	-1.077	0.776	0.582
Mean	0.1090		0.6790	
CV %	1538.77		20.20	
Sample value	2.20U		3.60U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
80	50 PPB	CCV ?	CCV	1.00x	01/15/93	00:05

	<-As->		<-Se->	
Burns (Conc)	51.203	49.550	36.747	46.957
Mean	50.3765		41.8520	
CV %	2.32		17.25	
Sample value	50.38		41.85 ***	

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Jarrell-Ash Video 22
Run: F6 9301402 Analyst: LL Page 15

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
81	CAL BLK	CCB	CCB	1.00x	01/15/93	00:09

	<-As->		<-Se->	
Burns (Conc)	1.295	1.511	-0.964	0.388
Mean	1.4030		-0.2686	
CV %	10.89		331.95	
Sample value	2.20U		3.60U	

As only 1/15/93 ICU

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C L P M E T A L S 3.02e

ARSENIC

Run id: F6 9301501
THERMO JARRELL-ASH VIDEO 21
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1840
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:42
2	10 PPB	WS1	F			S10	01/15/93	08:47
3	50 PPB	WS2	F			S50	01/15/93	08:51
4	100 PPB	WS3	F			S100	01/15/93	08:56
5	ICV-2	ICV	F			ICV	01/15/93	09:09
6	CAL BLK	ICB	F			ICB	01/15/93	09:14
7	CRA	CRA0	F			CRA	01/15/93	09:19
8	50 PPB	CCV	F			CCV	01/15/93	09:23
9	CAL BLK	CCB	F			CCB	01/15/93	09:28
10	LCSFS	LCSS	F	2565	01/08/93	LCSS	01/15/93	09:33
11	LCSFS	ASLCSS	F	2565		LCSSA	01/15/93	09:38
12	X	X	F			ZZZZZZ	01/15/93	09:43
13	X	X	F			ZZZZZZ	01/15/93	09:48
14	X	X	F			ZZZZZZ	01/15/93	09:52
15	X	X	F			ZZZZZZ	01/15/93	09:57
16	X	X	F			ZZZZZZ	01/15/93	10:02
17	X	X	F			ZZZZZZ	01/15/93	10:11
18	X	X	F			ZZZZZZ	01/15/93	10:16
19	X	X	F			ZZZZZZ	01/15/93	10:21
20	50 PPB	CCV	F			CCV	01/15/93	10:26
21	CAL BLK	CCB	F			CCB	01/15/93	10:31
22	X	X	F			ZZZZZZ	01/15/93	10:36
23	X	X	F			ZZZZZZ	01/15/93	10:40
24	X	X	F			ZZZZZZ	01/15/93	10:45
25	X	X	F			ZZZZZZ	01/15/93	10:50
26	X	X	F			ZZZZZZ	01/15/93	10:55
27	X	X	F			ZZZZZZ	01/15/93	11:00
28	X	X	F			ZZZZZZ	01/15/93	11:05
29	X	X	F			ZZZZZZ	01/15/93	11:09
30	X	X	F			ZZZZZZ	01/15/93	11:14
31	X	X	F			ZZZZZZ	01/15/93	11:19
32	50 PPB	CCV	F			CCV	01/15/93	11:24
33	CAL BLK	CCB	F			CCB	01/15/93	11:29
34	X	X	F			ZZZZZZ	01/15/93	11:34
35	X	X	F			ZZZZZZ	01/15/93	11:39
36	50 PPB	CCV	F			CCV	01/15/93	11:43
37	CAL BLK	CCB	F			CCB	01/15/93	11:48
38	X	X	F			ZZZZZZ	01/15/93	12:14
39	X	X	F			ZZZZZZ	01/15/93	12:18
40	50 PPB	CCV	F			CCV	01/15/93	12:23
41	CAL BLK	CCB	F			CCB	01/15/93	12:28
42	S212197-01	M0S	F	2565		MFN6490	01/15/93	13:02
43	S212197-01	M1S	F	2565		MFN6491	01/15/93	13:04

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ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212197-01	M2S	F	2565		MFN6492	01/15/93	13:07
45	S212197-01	M3S	F	2565		MFN6493	01/15/93	13:10
46	S212197-01	M0S2	F	2565		MFN649D0	01/15/93	13:12
47	S212197-01	M1S2	F	2565		MFN649D1	01/15/93	13:15
48	S212197-01	M2S2	F	2565		MFN649D2	01/15/93	13:18
49	S212197-01	M3S2	F	2565		MFN649D3	01/15/93	13:20
50	X	M0S	F			ZZZZZZ0	01/15/93	13:23
51	X	M1S	F			ZZZZZZ1	01/15/93	13:26
52	X	M2S	F			ZZZZZZ2	01/15/93	13:29
53	X	M3S	F			ZZZZZZ3	01/15/93	13:31
54	X	M0S	F			ZZZZZZ0	01/15/93	13:34
55	X	M1S	F			ZZZZZZ1	01/15/93	13:37
56	X	M2S	F			ZZZZZZ2	01/15/93	13:39
57	X	M3S	F			ZZZZZZ3	01/15/93	13:42
58	X	X	F			ZZZZZZ	01/15/93	13:45
59	X	X	F			ZZZZZZ	01/15/93	13:47
60	50 PPB	CCV	F			CCV	01/15/93	13:50
61	CAL BLK	CCB	F			CCB	01/15/93	13:53
62	X	M0S	F			ZZZZZZ0	01/15/93	14:07
63	X	M1S	F			ZZZZZZ1	01/15/93	14:10
64	X	M2S	F			ZZZZZZ2	01/15/93	14:13
65	X	M3S	F			ZZZZZZ3	01/15/93	14:15
66	X	M0S	F			ZZZZZZ0	01/15/93	14:18
67	X	M1S	F			ZZZZZZ1	01/15/93	14:21
68	X	M2S	F			ZZZZZZ2	01/15/93	14:23
69	X	M3S	F			ZZZZZZ3	01/15/93	14:26
70	X	M0S	F			ZZZZZZ0	01/15/93	14:29
71	X	M1S	F			ZZZZZZ1	01/15/93	14:31
72	X	M2S	F			ZZZZZZ2	01/15/93	14:34
73	X	M3S	F			ZZZZZZ3	01/15/93	14:37
74	X	M0S	F			ZZZZZZ0	01/15/93	14:48
75	X	M1S	F			ZZZZZZ1	01/15/93	14:51
76	X	M2S	F			ZZZZZZ2	01/15/93	14:54
77	X	M3S	F			ZZZZZZ3	01/15/93	14:56
78	X	X	F			ZZZZZZ	01/15/93	14:59
79	X	X	F			ZZZZZZ	01/15/93	15:02
80	50 PPB	CCV	F			CCV	01/15/93	15:05
81	CAL BLK	CCB	F			CCB	01/15/93	15:07
82	S212197-03	M0S	F	2565		MFQ0260	01/15/93	15:10
83	S212197-03	M1S	F	2565		MFQ0261	01/15/93	15:13
84	S212197-03	M2S	F	2565		MFQ0262	01/15/93	15:15
85	S212197-03	M3S	F	2565		MFQ0263	01/15/93	15:18
86	S212197-04	M0S	F	2565		MFQ0270	01/15/93	15:21
87	S212197-04	M1S	F	2565		MFQ0271	01/15/93	15:24
88	S212197-04	M2S	F	2565		MFQ0272	01/15/93	15:26
89	S212197-04	M3S	F	2565		MFQ0273	01/15/93	15:29
90	S212197-05	M0S	F	2565		MFQ0280	01/15/93	15:32
91	S212197-05	M1S	F	2565		MFQ0281	01/15/93	15:34
92	S212197-05	M2S	F	2565		MFQ0282	01/15/93	15:37
93	S212197-05	M3S	F	2565		MFQ0283	01/15/93	15:40
94	S212197-06	M0S	F	2565		MFQ0290	01/15/93	15:42
95	S212197-06	M1S	F	2565		MFQ0291	01/15/93	15:45

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ARSENIC

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
96	S212197-06	M2S	F	2565		MFQ0292	01/15/93	15:48
97	S212197-06	M3S	F	2565		MFQ0293	01/15/93	15:50
98	X	X	F			ZZZZZZ	01/15/93	15:53
99	X	X	F			ZZZZZZ	01/15/93	15:56
100	50 PPB	CCV	F			CCV	01/15/93	15:58
101	CAL BLK	CCB	F			CCB	01/15/93	16:01
102	S212197-03	M0S	F	2565		MFQ0260	01/15/93	16:11
103	S212197-03	M1S	F	2565		MFQ0261	01/15/93	16:14
104	S212197-03	M2S	F	2565		MFQ0262	01/15/93	16:17
105	S212197-03	M3S	F	2565		MFQ0263	01/15/93	16:19
106	S212197-04	M0S	F	2565		MFQ0270	01/15/93	16:22
107	S212197-04	M1S	F	2565		MFQ0271	01/15/93	16:25
108	S212197-04	M2S	F	2565		MFQ0272	01/15/93	16:27
109	S212197-04	M3S	F	2565		MFQ0273	01/15/93	16:30
110	S212197-06	M0S	F	2565		MFQ0290	01/15/93	16:33
111	S212197-06	M1S	F	2565		MFQ0291	01/15/93	16:35
112	S212197-06	M2S	F	2565		MFQ0292	01/15/93	16:38
113	S212197-06	M3S	F	2565		MFQ0293	01/15/93	16:41
114	S212197-10	M0S	F	2565		MFQ2100	01/15/93	16:43
115	S212197-10	M1S	F	2565		MFQ2101	01/15/93	16:46
116	S212197-10	M2S	F	2565		MFQ2102	01/15/93	16:49
117	S212197-10	M3S	F	2565		MFQ2103	01/15/93	16:51
118	50 PPB	CCV	F			CCV	01/15/93	16:54
119	CAL BLK	CCB	F			CCB	01/15/93	16:57
120	S212197-13	M0S	F	2565		MFQ2220	01/15/93	17:03
121	S212197-13	M1S	F	2565		MFQ2221	01/15/93	17:06
122	S212197-13	M2S	F	2565		MFQ2222	01/15/93	17:08
123	S212197-13	M3S	F	2565		MFQ2223	01/15/93	17:11
124	S212197-10	M0S	F	2565		MFQ2100	01/15/93	17:14
125	S212197-10	M1S	F	2565		MFQ2101	01/15/93	17:16
126	S212197-10	M2S	F	2565		MFQ2102	01/15/93	17:19
127	S212197-10	M3S	F	2565		MFQ2103	01/15/93	17:22
128	50 PPB	CCV	F			CCV	01/15/93	17:24
129	CAL BLK	CCB	F			CCB	01/15/93	17:27

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C L P M E T A L S 3.02e

SELENIUM

Run id: F6 9301551
THERMO JARRELL-ASH VIDEO 21
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by JGS
Crunched: 01/15/93 by JGS
Time: 1844
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:42
2	5 PPB	WS1	F			S5	01/15/93	08:47
3	50 PPB	WS2	F			S50	01/15/93	08:51
4	100 PPB	WS3	F			S100	01/15/93	08:56
5	ICV-2	ICV	F			ICV	01/15/93	09:09
6	CAL BLK	ICB	F			ICB	01/15/93	09:14
7	CRA	CRA0	F			CRA	01/15/93	09:19
8	50 PPB	CCV	F			CCV	01/15/93	09:23
9	CAL BLK	CCB	F			CCB	01/15/93	09:28
10	X	X	F			ZZZZZZ	01/15/93	09:33
11	X	X	F			ZZZZZZ	01/15/93	09:38
12	S212197-17	S	F	2565	01/08/93	MFQ233	01/15/93	09:43
13	S212197-17	AS	F	2565		MFQ233A	01/15/93	09:48
14	S212197-18	S	F	2565	01/08/93	MFQ234	01/15/93	09:52
15	S212197-18	AS	F	2565		MFQ234A	01/15/93	09:57
16	S212197-19	S	F	2565	01/08/93	MFQ235	01/15/93	10:02
17	S212197-19	AS	F	2565		MFQ235A	01/15/93	10:11
18	S212197-20	S	F	2565	01/08/93	MFQ236	01/15/93	10:16
19	S212197-20	AS	F	2565		MFQ236A	01/15/93	10:21
20	50 PPB	CCV	F			CCV	01/15/93	10:26
21	CAL BLK	CCB	F			CCB	01/15/93	10:31
22	S212197-10	S	F	2565	01/08/93	MFQ210	01/15/93	10:36
23	S212197-10	AS	F	2565		MFQ210A	01/15/93	10:40
24	S212197-04	S	F	2565	01/08/93	MFQ027	01/15/93	10:45
25	S212197-04	AS	F	2565		MFQ027A	01/15/93	10:50
26	S212197-05	S	F	2565	01/08/93	MFQ028	01/15/93	10:55
27	S212197-05	AS	F	2565		MFQ028A	01/15/93	11:00
28	S212197-06	S	F	2565	01/08/93	MFQ029	01/15/93	11:05
29	S212197-06	AS	F	2565		MFQ029A	01/15/93	11:09
30	S212197-01	DS	F	2565	01/08/93	MFN649S	01/15/93	11:14
31	X	X	F			ZZZZZZ	01/15/93	11:19
32	50 PPB	CCV	F			CCV	01/15/93	11:24
33	CAL BLK	CCB	F			CCB	01/15/93	11:29
34	S212197-13	S	F	2565	01/08/93	MFQ222	01/15/93	11:34
35	S212197-13	AS	F	2565		MFQ222A	01/15/93	11:39
36	50 PPB	CCV	F			CCV	01/15/93	11:43
37	CAL BLK	CCB	F			CCB	01/15/93	11:48
38	S212197-20	S	F	2565	01/08/93	MFQ236	01/15/93	12:14
39	S212197-20	AS	F	2565		MFQ236A	01/15/93	12:18
40	50 PPB	CCV	F			CCV	01/15/93	12:23
41	CAL BLK	CCB	F			CCB	01/15/93	12:28
42	S212197-01	M0S	F	2565		MFN6490	01/15/93	13:02
43	S212197-01	M1S	F	2565		MFN6491	01/15/93	13:04

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SELENIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212197-01	M2S	F	2565		MFN6492	01/15/93	13:07
45	S212197-01	M3S	F	2565		MFN6493	01/15/93	13:10
46	S212197-01	M0S2	F	2565		MFN649D0	01/15/93	13:12
47	S212197-01	M1S2	F	2565		MFN649D1	01/15/93	13:15
48	S212197-01	M2S2	F	2565		MFN649D2	01/15/93	13:18
49	S212197-01	M3S2	F	2565		MFN649D3	01/15/93	13:20
50	S212197-13	M0S	F	2565		MFQ2220	01/15/93	13:23
51	S212197-13	M1S	F	2565		MFQ2221	01/15/93	13:26
52	S212197-13	M2S	F	2565		MFQ2222	01/15/93	13:29
53	S212197-13	M3S	F	2565		MFQ2223	01/15/93	13:31
54	S212197-15	M0S	F	2565		MFQ2240	01/15/93	13:34
55	S212197-15	M1S	F	2565		MFQ2241	01/15/93	13:37
56	S212197-15	M2S	F	2565		MFQ2242	01/15/93	13:39
57	S212197-15	M3S	F	2565		MFQ2243	01/15/93	13:42
58	X	X	F			ZZZZZZ	01/15/93	13:45
59	X	X	F			ZZZZZZ	01/15/93	13:47
60	50 PPB	CCV	F			CCV	01/15/93	13:50
61	CAL BLK	CCB	F			CCB	01/15/93	13:53
62	S212197-13	M0S	F	2565		MFQ2220	01/15/93	14:07
63	S212197-13	M1S	F	2565		MFQ2221	01/15/93	14:10
64	S212197-13	M2S	F	2565		MFQ2222	01/15/93	14:13
65	S212197-13	M3S	F	2565		MFQ2223	01/15/93	14:15
66	S212197-15	M0S	F	2565		MFQ2240	01/15/93	14:18
67	S212197-15	M1S	F	2565		MFQ2241	01/15/93	14:21
68	S212197-15	M2S	F	2565		MFQ2242	01/15/93	14:23
69	S212197-15	M3S	F	2565		MFQ2243	01/15/93	14:26
70	S212197-18	M0S	F	2565		MFQ2340	01/15/93	14:29
71	S212197-18	M1S	F	2565		MFQ2341	01/15/93	14:31
72	S212197-18	M2S	F	2565		MFQ2342	01/15/93	14:34
73	S212197-18	M3S	F	2565		MFQ2343	01/15/93	14:37
74	S212197-18	M0S	F	2565		MFQ2340	01/15/93	14:48
75	S212197-18	M1S	F	2565		MFQ2341	01/15/93	14:51
76	S212197-18	M2S	F	2565		MFQ2342	01/15/93	14:54
77	S212197-18	M3S	F	2565		MFQ2343	01/15/93	14:56
78	X	X	F			ZZZZZZ	01/15/93	14:59
79	X	X	F			ZZZZZZ	01/15/93	15:02
80	50 PPB	CCV	F			CCV	01/15/93	15:05
81	CAL BLK	CCB	F			CCB	01/15/93	15:07

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1609 GFAA ID: F1 F2 F3 F4 F5 (F6) Method: 150

Date: 1/15/93 Reviewed By: 1/15/93 Standards Prepared: 8:00 1/15/93
Operator: JSI

Disk # 6
Acq
SAMIN ✓

S212197

Standards Source
1. Calibration: 10 ppm
2. ICV: [X] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301501		RUN ID:	9301551	
Element:	[X] AS	[] PB	Element:	[X] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[X] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	LCSS	1:199	AS/only
	11	LCSSA		
	12	17		
	13	17A		
	14	18		
	15	18A		M(3)
	16	19		
	17	19A		
	18	20		
	19	20A		RSD
	20	CCV		
	21	CCB		
	22	10	1:4	
	23	10A		
	24	04		
	25	04A		
	26	05		
	27	05A		
	28	06		
	29	06A		
	30	01-S		
	31	X		
	32	CCV		
	33	CCB		
	34	13		M(17)
	35	13A		
	36	CCV		
	37	CCB		
	38	-20		
	39	-20A		

Se/only

Se/only

Se/only

Se/only

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1609
Page 2 of 3

	40	CW	
	41	CUB	
	42	Cr	
✓	43	+10 / +5	
	44	+20 / +10	✓
	45	+30 / +15	
✓	46	Cd	
	47	+10 / +5	✓
	48	+20 / +10	
	49	+30 / +15	
	50	13	
	51	~~+5~~ ~~+10~~	Rerun
	52	~~+10~~ ~~+20~~	
	53	~~+15~~ ~~+30~~	
Se only	54	15	
	55	+5	Rerun
	56	+10	
	57	+15	
	58	x	
	59	x	
	60	✓ CW	
	61	CUB	
	62	13 ✓	
	63	+10	
	64	+20	
Se only	65	+30	
	66	15 ✓	
	67	+5	
	68	+10	
	69	+15	
	70	18	
	71	+5	
	72	+10	
	73	+15	
	74	18	
	75	+5	
	76	+10	
	77	+15	
	78	x	
	79	x	
	80	✓ CW	
	81	CUB	
Rerun	82	03	
	83	+10	
	84	+20	
	85	+30	
rerun	86	04	
	87	+10	
	88	+20	
	89	+30	
✓	90	05	As only
	91	+10	
	92	+20	1-4
L174	93	+30	
	94	06	
Rerun	95	+10	

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1609
Page 3 of 3

96	+20
97	+30
98	X
99	X
100	CW
101	CCB
102	03
103	+10
104	+20
105	+30
106	04
107	+10
108	+20
109	+30
110	06
111	+10
112	+20
113	+30
114	10
115	+10
116	+20
117	+30
118	CW
119	CCB
120	13
121	~~+10~~ +5
122	Pillars +10
123	+15
124	10
125	+10
126	+20
127	+30
128	CW
129	CCB
130	
131	
132	
133	
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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/15/93	08:42

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/15/93	08:47

	<-As->		<-Se->	
Burns (Abs)	0.047 A	0.044 A	0.025A	0.023A
Mean	0.0455		0.0240	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/15/93	08:51

	<-As->		<-Se->	
Burns (Abs)	0.213 A	0.218 A	0.195A	0.203A
Mean	0.2155		0.1990	
CV %	1.64		2.84	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/15/93	08:56

	<-As->		<-Se->	
Burns (Abs)	0.440 A	0.418 A	0.344A	0.336A
Mean	0.4290		0.3400	
CV %	3.63		1.66	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.004359971	0.004571554
Coef[2]:	-7.15487e-007	-1.1722e-005
Correl. coef.:	1.0000	1.0000

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/15/93	09:09

	<-As->		<-Se->	
Burns (Conc)	52.284	49.951	55.007	52.291
Mean	51.1175		53.6490	
CV %	3.23		3.58	
Sample value	51.12		53.65	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/15/93	09:14

	<-As->		<-Se->	
Burns (Conc)	1.376	2.294	-0.219	-4.113
Mean	1.8350		-2.1660	
CV %	35.37		127.12	
Sample value	2.00U		3.80U	

7	CRA	CRA	CRA	1.00x	01/15/93	09:19

	<-As->		<-Se->	
Burns (Conc)	9.648	9.188	6.677	3.978
Mean	9.4180		5.3275	
CV %	3.45		35.82 ***	
Sample value	9.42		5.33	

8	50 PPB	CCV	CCV	1.00x	01/15/93	09:23

	<-As->		<-Se->	
Burns (Conc)	50.417	50.884	51.695	52.590
Mean	50.6505		52.1425	
CV %	0.65		1.21	
Sample value	50.65		52.14	

9	CAL BLK	CCB	CCB	1.00x	01/15/93	09:28

	<-As->		<-Se->	
Burns (Conc)	2.294	2.294	0.877	0.000
Mean	2.2940		0.4385	
CV %	0.00		141.42	
Sample value	2.29		3.80U	

10	LCSFS	LCSS	LCSS	200.00x	01/15/93	09:33

	<-As->		<-Se->	
Burns (Conc)	22.561	20.020	-1.091	1.758
Mean	21.2905		0.3335	
CV %	8.44		604.06	
Sample value	4258.00		760.00U	

Asady 3/1/93

11	LCSFS	ASLCSS	LCSSA	200.00x	01/15/93	09:38

	<-As->		<-Se->	
Burns (Conc)	42.266	38.314	7.813	9.185
Mean	40.2900		8.4990	
CV %	6.94		11.41	
Sample value	8058.00		1699.80	
Spike added	20.00		10.00	
Spike recovery, %	95.00		84.99 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	S212197-17	S	MFQ233	1.00x	01/15/93	09:43

	<-As->		<-Se->	
Burns (Conc)	20.944	19.558	2.643	0.877
Mean	20.2510		1.7600	
CV %	4.84		70.95	
Sample value	20.25		3.80U	

Sewell 1/15/93

13	-17	AS	MFQ233A	1.00x	01/15/93	09:48

	<-As->		<-Se->	
Burns (Conc)	38.547	37.850	8.041	8.269
Mean	38.1985		8.1550	
CV %	1.29		1.98	
Sample value	38.20		8.15	
Spike added	20.00		10.00	
Spike recovery, %	89.74		81.55 ***	

14	-18	S	MFQ234	1.00x	01/15/93	09:52

	<-As->		<-Se->	
Burns (Conc)	23.716	22.792	4.873	3.087
Mean	23.2540		3.9800	
CV %	2.81		31.73	
Sample value	23.25		3.98	

15	-18	AS	MFQ234A	1.00x	01/15/93	09:57

	<-As->		<-Se->	
Burns (Conc)	38.779	37.153	8.497	10.799
Mean	37.9660		9.6480	
CV %	3.03		16.87	
Sample value	37.97		9.65	
Spike added	20.00		10.00	
Spike recovery, %	73.56 ***		56.68 ***	

16	-19	S	MFQ235	1.00x	01/15/93	10:02

	<-As->		<-Se->	
Burns (Conc)	36.457	37.386	-2.392	-3.039
Mean	36.9215		-2.7155	
CV %	1.78		16.85	
Sample value	36.92		3.80U	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 4

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-19	AS	MFQ235A	1.00x	01/15/93	10:11

	<-As->		<-Se->	
Burns (Conc)	54.385	54.385	0.877	0.877
Mean	54.3850		0.8770	
CV %	0.00		0.00	
Sample value	54.38		3.80U	
Spike added	20.00		10.00	
Spike recovery, %	87.32		0.00 ***	

Scanty 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	-20	S	MFQ236	1.00x	01/15/93	10:16

	<-As->		<-Se->	
Burns (Conc)	5.050	4.820	-3.039	0.438
Mean	4.9350		-1.3005	
CV %	3.30		189.05	
Sample value	4.93		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
19	-20	AS	MFQ236A	1.00x	01/15/93	10:21

	<-As->		<-Se->	
Burns (Conc)	26.029	22.792	9.875	6.224
Mean	24.4105		8.0495	
CV %	9.38		32.07 ***	
Sample value	24.41		8.05	
Spike added	20.00		10.00	
Spike recovery, %	97.38		80.49 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
20	50 PPB	CCV	CCV	1.00x	01/15/93	10:26

	<-As->		<-Se->	
Burns (Conc)	49.951	49.252	51.101	51.993
Mean	49.6015		51.5470	
CV %	1.00		1.22	
Sample value	49.60		51.55	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
21	CAL BLK	CCB	CCB	1.00x	01/15/93	10:31

	<-As->		<-Se->	
Burns (Conc)	1.147	0.688	-2.175	-0.873
Mean	0.9175		-1.5240	
CV %	35.37		60.41	
Sample value	2.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
22	-10	S	MFQ210	5.00x	01/15/93	10:36

	<-As->		<-Se->	
Burns (Conc)	2.754	2.983	-1.308	-3.684
Mean	2.8685		-2.4960	
CV %	5.65		67.31	
Sample value	14.34		19.00U	

Se only

Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-10	AS	MFQ210A	5.00x	01/15/93	10:40

	<-As->		<-Se->	
Burns (Conc)	20.944	20.251	7.130	7.357
Mean	20.5975		7.2435	
CV %	2.38		2.22	
Sample value	102.99		36.22	
Spike added	20.00		10.00	
Spike recovery, %	88.65		72.44 ***	

Seady 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-04	S	MFQ027	1.00x	01/15/93	10:45

	<-As->		<-Se->	
Burns (Conc)	12.871	13.102	5.098	6.224
Mean	12.9865		5.6610	
CV %	1.26		14.06	
Sample value	12.99		5.66	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-04	AS	MFQ027A	1.00x	01/15/93	10:50

	<-As->		<-Se->	
Burns (Conc)	27.649	30.427	13.834	16.682
Mean	29.0380		15.2580	
CV %	6.76		13.20	
Sample value	29.04		15.26	
Spike added	20.00		10.00	
Spike recovery, %	80.26 ***		95.97	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	-05	S	MFQ028	1.00x	01/15/93	10:55

	<-As->		<-Se->	
Burns (Conc)	67.960	68.429	7.130	4.201
Mean	68.1945		5.6655	
CV %	0.49		36.56 ***	
Sample value	68.19		5.67	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	-05	AS	MFQ028A	1.00x	01/15/93	11:00

	<-As->		<-Se->	
Burns (Conc)	91.040	82.776	20.307	12.427
Mean	86.9080		16.3670	
CV %	6.72		34.04 ***	
Sample value	86.91		16.37	
Spike added	20.00		10.00	
Spike recovery, %	93.56		107.01	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	-06	S	MFQ029	1.00x	01/15/93	11:05

	<-As->		<-Se->	
Burns (Conc)	11.720	11.490	-4.541	-3.898
Mean	11.6050		-4.2195	
CV %	1.40		10.78	
Sample value	11.60		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	-06	AS	MFQ029A	1.00x	01/15/93	11:09

	<-As->		<-Se->	
Burns (Conc)	30.659	23.947	11.030	5.098
Mean	27.3030		8.0640	
CV %	17.38		52.02 ***	
Sample value	27.30		8.06	
Spike added	20.00		10.00	
Spike recovery, %	78.49 ***		80.64 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	-01	DS	MFN649S	1.00x	01/15/93	11:14

	<-As->		<-Se->	
Burns (Conc)	53.451	53.217	4.425	9.645
Mean	53.3340		7.0350	
CV %	0.31		52.47 ***	
Sample value	53.33		7.03	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	X	X	ZZZZZZ	1.00x	01/15/93	11:19

	<-As->		<-Se->	
Burns (Conc)	1.606	2.065	-3.254	0.219
Mean	1.8355		-1.5175	
CV %	17.68		161.83	
Sample value	2.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	50 PPB	CCV	CCV	1.00x	01/15/93	11:24

	<-As->		<-Se->	
Burns (Conc)	48.319	48.086	46.147	45.005
Mean	48.2025		45.5760	
CV %	0.34		1.77	
Sample value	48.20		45.58	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	CAL BLK	CCB	CCB	1.00x	01/15/93	11:29

	<-As->		<-Se->	
Burns (Conc)	0.918	2.065	-2.175	-0.655
Mean	1.4915		-1.4150	
CV %	54.38		75.96	
Sample value	2.00U		3.80U	

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POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
34	-13	S	MFQ222	1.00x	01/15/93	11:34

	<-As->		<-Se->	
Burns (Conc)	8.958	6.199	18.123	17.641
Mean	7.5785		17.8820	
CV %	25.74		1.91	
Sample value	7.58		17.88	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
35	-13	AS	MFQ222A	1.00x	01/15/93	11:39

	<-As->		<-Se->	
Burns (Conc)	20.482	22.561	22.024	27.029
Mean	21.5215		24.5265	
CV %	6.83		14.43	
Sample value	21.52		24.53	
Spike added	20.00		10.00	
Spike recovery, %	69.71 ***		66.45 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	50 PPB	CCV	CCV	1.00x	01/15/93	11:43

	<-As->		<-Se->	
Burns (Conc)	47.154	49.951	45.860	51.101
Mean	48.5525		48.4805	
CV %	4.07		7.64	
Sample value	48.55		48.48	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	CAL BLK	CCB	CCB	1.00x	01/15/93	11:48

	<-As->		<-Se->	
Burns (Conc)	0.229	1.376	-3.039	-0.655
Mean	0.8025		-1.8470	
CV %	101.07		91.27	
Sample value	2.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	-20	S	MFQ236	1.00x	01/15/93	12:14

	<-As->		<-Se->	
Burns (Conc)	4.591	4.820	-0.437	1.979
Mean	4.7055		0.7710	
CV %	3.44		221.58	
Sample value	4.70		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-20	AS	MFQ236A	1.00x	01/15/93	12:18

	<-As->		<-Se->	
Burns (Conc)	22.792	21.406	8.497	5.548
Mean	22.0990		7.0225	
CV %	4.44		29.69 ***	
Sample value	22.10		7.02	
Spike added	20.00		10.00	
Spike recovery, %	86.97		70.22 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	50 PPB	CCV	CCV	1.00x	01/15/93	12:23

	<-As->		<-Se->	
Burns (Conc)	47.853	49.951	50.509	45.860
Mean	48.9020		48.1845	
CV %	3.03		6.82	
Sample value	48.90		48.19	

41	CAL BLK	CCB	CCB	1.00x	01/15/93	12:28

	<-As->		<-Se->	
Burns (Conc)	1.835	2.754	-1.091	-3.039
Mean	2.2945		-2.0650	
CV %	28.32		66.70	
Sample value	2.30		3.80U	

42	-01	MOS	MFN6490	1.00x	01/15/93	13:02

	<-As->	<-Se->
Burns (Abs)	0.079 A	0.025A
Mean	0.0790	0.0250
CV %	---	---
Spike added:	0.00	0.00

43	-01	M1S	MFN6491	1.00x	01/15/93	13:04

	<-As->	<-Se->
Burns (Abs)	0.116 A	0.042A
Mean	0.1160	0.0420
CV %	---	---
Spike added:	10.00	5.00

44	-01	M2S	MFN6492	1.00x	01/15/93	13:07

	<-As->	<-Se->
Burns (Abs)	0.147 A	0.052A
Mean	0.1470	0.0520
CV %	---	---
Spike added:	20.00	10.00

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	-01	M3S	MFN6493	1.00x	01/15/93	13:10

	<-As->	<-Se->
Burns (Abs)	0.183 A	0.068A
Mean	0.1830	0.0680
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.07980	0.02590
Slope:	0.00343	0.00278
Correlation:	0.9995	0.9955
X intercept:	-23.265	-9.317
Sample value:	23.265	9.317

46	-01	M0S2	MFN649D0	1.00x	01/15/93	13:12

	<-As->	<-Se->
Burns (Abs)	0.075 A	0.020A
Mean	0.0750	0.0200
CV %	---	---
Spike added:	0.00	0.00

47	-01	M1S2	MFN649D1	1.00x	01/15/93	13:15

	<-As->	<-Se->
Burns (Abs)	0.108 A	0.031A
Mean	0.1080	0.0310
CV %	---	---
Spike added:	10.00	5.00

48	-01	M2S2	MFN649D2	1.00x	01/15/93	13:18

	<-As->	<-Se->
Burns (Abs)	0.145 A	0.045A
Mean	0.1450	0.0450
CV %	---	---
Spike added:	20.00	10.00

49	-01	M3S2	MFN649D3	1.00x	01/15/93	13:20

	<-As->	<-Se->
Burns (Abs)	0.173 A	0.058A
Mean	0.1730	0.0580
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.07560	0.01930
Slope:	0.00331	0.00256
Correlation:	0.9987	0.9989
X intercept:	-22.840	-7.539
Sample value:	22.840	7.539

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	-13	MOS	MFQ2220	1.00x	01/15/93	13:23

	<-As->	<-Se->
Burns (Abs)	0.043 A	0.068A
Mean	0.0430	0.0680
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	-13	M1S	MFQ2221	1.00x	01/15/93	13:26

	<-As->	<-Se->
Burns (Abs)	0.090 A	0.112A
Mean	0.0900	0.1120
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-13	M2S	MFQ2222	1.00x	01/15/93	13:29

	<-As->	<-Se->
Burns (Abs)	0.151 A	0.136A
Mean	0.1510	0.1360
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
53	-13	M3S	MFQ2223	1.00x	01/15/93	13:31

	<-As->	<-Se->
Burns (Abs)	0.197 A	0.164A
Mean	0.1970	0.1640
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.04180	0.07320
Slope:	0.00523	0.00312
Correlation:	0.9985	0.9906
X intercept:	-7.992	-23.462
Sample value:	7.992	23.462

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
54	-15	MOS	MFQ2240	1.00x	01/15/93	13:34

	<-As->	<-Se->
Burns (Abs)	0.037 A	0.067A
Mean	0.0370	0.0670
CV %	---	---
Spike added:	0.00	0.00

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SEWilly 1/21/93

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
55	-15	M1S	MFQ2241	1.00x	01/15/93	13:37

	<-As->	<-Se->
Burns (Abs)	0.057 A	0.084A
Mean	0.0570	0.0840
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
56	-15	M2S	MFQ2242	1.00x	01/15/93	13:39

	<-As->	<-Se->
Burns (Abs)	0.091 A	0.115A
Mean	0.0910	0.1150
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
57	-15	M3S	MFQ2243	1.00x	01/15/93	13:42

	<-As->	<-Se->
Burns (Abs)	0.119 A	0.132A
Mean	0.1190	0.1320
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.03400	0.06560
Slope:	0.00280	0.00452
Correlation:	0.9954	0.9924
X intercept:	-12.143	-14.513
Sample value:	12.143	14.513

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
58	X	X	ZZZZZZ	1.00x	01/15/93	13:45

	<-As->	<-Se->
Burns (Conc)	1.376	-0.219
Mean	1.3760	-0.2190
CV %	---	---
Sample value	2.00U	3.80U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
59	X	X	ZZZZZZ	1.00x	01/15/93	13:47

	<-As->	<-Se->
Burns (Conc)	1.147	-0.437
Mean	1.1470	-0.4370
CV %	---	---
Sample value	2.00U	3.80U

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
60	50 PPB	CCV	CCV	1.00x	01/15/93	13:50

	<-As->	<-Se->
Burns (Conc)	48.552	49.040
Mean	48.5520	49.0400
CV %	---	---
Sample value	48.55	49.04

61	CAL BLK	CCB	CCB	1.00x	01/15/93	13:53

	<-As->	<-Se->
Burns (Conc)	1.835	-0.437
Mean	1.8350	-0.4370
CV %	---	---
Sample value	2.00U	3.80U

62	-13	MOS	MFQ2220	1.00x	01/15/93	14:07

	<-As->	<-Se->
Burns (Abs)	0.040 A	0.093A
Mean	0.0400	0.0930
CV %	---	---
Spike added:	0.00	0.00

Sendy 4/15/93

63	-13	M1S	MFQ2221	1.00x	01/15/93	14:10

	<-As->	<-Se->
Burns (Abs)	0.088 A	0.108A
Mean	0.0880	0.1080
CV %	---	---
Spike added:	10.00	10.00

64	-13	M2S	MFQ2222	1.00x	01/15/93	14:13

	<-As->	<-Se->
Burns (Abs)	0.156 A	0.136A
Mean	0.1560	0.1360
CV %	---	---
Spike added:	20.00	20.00

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
65	-13	M3S	MFQ2223	1.00x	01/15/93	14:15

	<-As----->	<-Se----->
Burns (Abs)	0.206 A	0.151A
Mean	0.2060	0.1510
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.03760	0.09170
Slope:	0.00566	0.00202
Correlation:	0.9977	0.9918
X intercept:	-6.643	-45.396
Sample value:	6.643	45.396

Scaly 1/15/93

66	-15	MOS	MFQ2240	1.00x	01/15/93	14:18

	<-As----->	<-Se----->
Burns (Abs)	0.041 A	0.080A
Mean	0.0410	0.0800
CV %	---	---
Spike added:	0.00	0.00

67	-15	M1S	MFQ2241	1.00x	01/15/93	14:21

	<-As----->	<-Se----->
Burns (Abs)	0.057 A	0.082A
Mean	0.0570	0.0820
CV %	---	---
Spike added:	10.00	5.00

68	-15	M2S	MFQ2242	1.00x	01/15/93	14:23

	<-As----->	<-Se----->
Burns (Abs)	0.087 A	0.098A
Mean	0.0870	0.0980
CV %	---	---
Spike added:	20.00	10.00

69	-15	M3S	MFQ2243	1.00x	01/15/93	14:26

	<-As----->	<-Se----->
Burns (Abs)	0.120 A	0.119A
Mean	0.1200	0.1190
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.03620	0.07480
Slope:	0.00267	0.00266
Correlation:	0.9892	0.9506
X intercept:	-13.558	-28.120
Sample value:	13.558	28.120

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
70	-18	MOS	MFQ2340	1.00x	01/15/93	14:29

	<-As----->	<-Se----->
Burns (Abs)	0.104 A	0.007A
Mean	0.1040	0.0070
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
71	-18	M1S	MFQ2341	1.00x	01/15/93	14:31

	<-As----->	<-Se----->
Burns (Abs)	0.132 A	0.039A
Mean	0.1320	0.0390
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
72	-18	M2S	MFQ2342	1.00x	01/15/93	14:34

	<-As----->	<-Se----->
Burns (Abs)	0.166 A	0.038A
Mean	0.1660	0.0380
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
73	-18	M3S	MFQ2343	1.00x	01/15/93	14:37

	<-As----->	<-Se----->
Burns (Abs)	0.197 A	0.041A
Mean	0.1970	0.0410
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.10280	0.01610
Slope:	0.00313	0.00202
Correlation:	0.9994	0.8041
X intercept:	-32.843	-7.970
Sample value:	32.843	7.970

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
74	-18	MOS	MFQ2340	1.00x	01/15/93	14:48

	<-As----->	<-Se----->
Burns (Abs)	0.103 A	0.008A
Mean	0.1030	0.0080
CV %	---	---
Spike added:	0.00	0.00

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POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
75	-18	M1S	MFQ2341	1.00x	01/15/93	14:51

	<-As->	<-Se->
Burns (Abs)	0.137 A	0.014A
Mean	0.1370	0.0140
CV %	---	---
Spike added:	10.00	5.00

Seally 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
76	-18	M2S	MFQ2342	1.00x	01/15/93	14:54

	<-As->	<-Se->
Burns (Abs)	0.159 A	0.048A
Mean	0.1590	0.0480
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
77	-18	M3S	MFQ2343	1.00x	01/15/93	14:56

	<-As->	<-Se->
Burns (Abs)	0.196 A	0.048A
Mean	0.1960	0.0480
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.10360	0.00640
Slope:	0.00801	0.00308
Correlation:	0.9958	0.9246
X intercept:	-34.419	-2.078
Sample value:	34.419	2.078

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
78	X	X	ZZZZZZ	1.00x	01/15/93	14:59

	<-As->	<-Se->
Burns (Conc)	1.606	0.219
Mean	1.6060	0.2190
CV %	---	---
Sample value	2.00U	3.80U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
79	X	X	ZZZZZZ	1.00x	01/15/93	15:02

	<-As->	<-Se->
Burns (Conc)	0.229	-0.437
Mean	0.2290	-0.4370
CV %	---	---
Sample value	2.00U	3.80U

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
80	50 PPB	CCV	CCV	1.00x	01/15/93	15:05

	<-As->	<-Se->
Burns (Conc)	48.552	48.457
Mean	48.5520	48.4570
CV %	---	---
Sample value	48.55	48.46

81	CAL BLK	CCB	CCB	1.00x	01/15/93	15:07

	<-As->	<-Se->
Burns (Conc)	3.672	1.758
Mean	3.6720	1.7580
CV %	---	---
Sample value	3.67	3.80U

82	-03	MOS	MFQ0260	1.00x	01/15/93	15:10

	<-As->	<-Se->
Burns (Abs)	0.041 A	0.015A
Mean	0.0410	0.0150
CV %	---	---
Spike added:	0.00	0.00

83	-03	M1S	MFQ0261	1.00x	01/15/93	15:13

	<-As->	<-Se->
Burns (Abs)	0.078 A	0.035A
Mean	0.0780	0.0350
CV %	---	---
Spike added:	10.00	5.00

84	-03	M2S	MFQ0262	1.00x	01/15/93	15:15

	<-As->	<-Se->
Burns (Abs)	0.097 A	0.020A
Mean	0.0970	0.0200
CV %	---	---
Spike added:	20.00	10.00

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
85	-03	M3S	MFQ0263	1.00x	01/15/93	15:18

	<-As->	<-Se->
Burns (Abs)	0.137 A	0.051A
Mean	0.1370	0.0510
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.04220	0.01630
Slope:	0.00307	0.00186
Correlation:	0.9918	0.7395
X intercept:	-13.746	-8.763
Sample value:	13.746	8.763

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
86	-04	MOS	MFQ0270	1.00x	01/15/93	15:21

	<-As->	<-Se->
Burns (Abs)	0.064 A	0.024A
Mean	0.0640	0.0240
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
87	-04	M1S	MFQ0271	1.00x	01/15/93	15:24

	<-As->	<-Se->
Burns (Abs)	0.097 A	0.033A
Mean	0.0970	0.0330
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
88	-04	M2S	MFQ0272	1.00x	01/15/93	15:26

	<-As->	<-Se->
Burns (Abs)	0.127 A	0.057A
Mean	0.1270	0.0570
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
89	-04	M3S	MFQ0273	1.00x	01/15/93	15:29

	<-As->	<-Se->
Burns (Abs)	0.146 A	0.054A
Mean	0.1460	0.0540
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.06710	0.02490
Slope:	0.00276	0.00228
Correlation:	0.9932	0.9163
X intercept:	-24.312	-10.921
Sample value:	24.312	10.921

A Smalley 1/15/93

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
90	-05	MOS	MFQ0280	5.00x	01/15/93	15:32

	<-As----->	<-Se----->
Burns (Abs)	0.072 A	0.019A
Mean	0.0720	0.0190
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
91	-05	M1S	MFQ0281	5.00x	01/15/93	15:34

	<-As----->	<-Se----->
Burns (Abs)	0.107 A	0.029A
Mean	0.1070	0.0290
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
92	-05	M2S	MFQ0282	5.00x	01/15/93	15:37

	<-As----->	<-Se----->
Burns (Abs)	0.143 A	0.032A
Mean	0.1430	0.0320
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
93	-05	M3S	MFQ0283	5.00x	01/15/93	15:40

	<-As----->	<-Se----->
Burns (Abs)	0.177 A	0.050A
Mean	0.1770	0.0500
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.07210	0.01810
Slope:	0.00351	0.00192
Correlation:	0.9999	0.9590
X intercept:	-20.541	-9.427
Sample value:	102.707	47.135

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
94	-06	MOS	MFQ0290	1.00x	01/15/93	15:42

	<-As----->	<-Se----->
Burns (Abs)	0.047 A	0.003A
Mean	0.0470	0.0030
CV %	---	---
Spike added:	0.00	0.00

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 19

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
95	-06	M1S	MFQ0291	1.00x	01/15/93	15:45

	<-As->	<-Se->
Burns (Abs)	0.074 A	0.015A
Mean	0.0740	0.0150
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
96	-06	M2S	MFQ0292	1.00x	01/15/93	15:48

	<-As->	<-Se->
Burns (Abs)	0.117 A	0.017A
Mean	0.1170	0.0170
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
97	-06	M3S	MFQ0293	1.00x	01/15/93	15:50

	<-As->	<-Se->
Burns (Abs)	0.137 A	0.031A
Mean	0.1370	0.0310
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.04680	0.00360
Slope:	0.00313	0.00172
Correlation:	0.9911	0.9676
X intercept:	-14.952	-2.093
Sample value:	14.952	2.093

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
98	X	X	ZZZZZZ	1.00x	01/15/93	15:53

	<-As->	<-Se->
Burns (Conc)	1.376	-1.525
Mean	1.3760	-1.5250
CV %	---	---
Sample value	2.00U	3.80U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
99	X	X	ZZZZZZ	1.00x	01/15/93	15:56

	<-As->	<-Se->
Burns (Conc)	2.294	1.758
Mean	2.2940	1.7580
CV %	---	---
Sample value	2.29	3.80U

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 20

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
100	50 PPB	CCV	CCV	1.00x	01/15/93	15:58

	<-As->	<-Se->
Burns (Conc)	47.620	44.154
Mean	47.6200	44.1540
CV %	---	---
Sample value	47.62	44.15 ***

Resolve 1/21/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
101	CAL BLK	CCB	CCB	1.00x	01/15/93	16:01

	<-As->	<-Se->
Burns (Conc)	1.376	-0.219
Mean	1.3760	-0.2190
CV %	---	---
Sample value	2.00U	3.30U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
102	-03	MOS	MFQ0260	1.00x	01/15/93	16:11

	<-As->	<-Se->
Burns (Abs)	0.052 A	0.018A
Mean	0.0520	0.0180
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
103	-03	M1S	MFQ0261	1.00x	01/15/93	16:14

	<-As->	<-Se->
Burns (Abs)	0.082 A	0.009A
Mean	0.0820	0.0090
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
104	-03	M2S	MFQ0262	1.00x	01/15/93	16:17

	<-As->	<-Se->
Burns (Abs)	0.101 A	0.028A
Mean	0.1010	0.0280
CV %	---	---
Spike added:	20.00	10.00

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 21

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
105	-03	M3S	MFQ0263	1.00x	01/15/93	16:19

	<-As->	<-Se->
Burns (Abs)	0.137 A	0.049A
Mean	0.1370	0.0490
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.05190	0.00920
Slope:	0.00274	0.00224
Correlation:	0.9936	0.8414
X intercept:	-18.942	-4.107
Sample value:	18.942	4.107

Analy 1/15/93

106	-04	MOS	MFQ0270	1.00x	01/15/93	16:22

	<-As->	<-Se->
Burns (Abs)	0.063 A	0.032A
Mean	0.0630	0.0320
CV %	---	---
Spike added:	0.00	0.00

107	-04	M1S	MFQ0271	1.00x	01/15/93	16:25

	<-As->	<-Se->
Burns (Abs)	0.099 A	0.028A
Mean	0.0990	0.0280
CV %	---	---
Spike added:	10.00	5.00

108	-04	M2S	MFQ0272	1.00x	01/15/93	16:27

	<-As->	<-Se->
Burns (Abs)	0.120 A	0.054A
Mean	0.1200	0.0540
CV %	---	---
Spike added:	20.00	10.00

109	-04	M3S	MFQ0273	1.00x	01/15/93	16:30

	<-As->	<-Se->
Burns (Abs)	0.147 A	0.059A
Mean	0.1470	0.0590
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.06630	0.02720
Slope:	0.00273	0.00214
Correlation:	0.9944	0.8900
X intercept:	-24.286	-12.710
Sample value:	24.286	12.710

Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 22

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
110	-06	MOS	MFQ0290	1.00x	01/15/93	16:33

	<-As->	<-Se->
Burns (Abs)	0.047 A	-0.010A
Mean	0.0470	-0.0100
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
111	-06	M1S	MFQ0291	1.00x	01/15/93	16:35

	<-As->	<-Se->
Burns (Abs)	0.086 A	0.012A
Mean	0.0860	0.0120
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
112	-06	M2S	MFQ0292	1.00x	01/15/93	16:38

	<-As->	<-Se->
Burns (Abs)	0.116 A	0.015A
Mean	0.1160	0.0150
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
113	-06	M3S	MFQ0293	1.00x	01/15/93	16:41

	<-As->	<-Se->
Burns (Abs)	0.138 A	0.051A
Mean	0.1380	0.0510
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.05130	-0.01090
Slope:	0.00303	0.00372
Correlation:	0.9922	0.9507
X intercept:	-16.931	2.930
Sample value:	16.931	-2.930

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
114	-10	MOS	MFQ2100	1.00x	01/15/93	16:43

	<-As->	<-Se->
Burns (Abs)	0.051 A	0.000A
Mean	0.0510	0.0000
CV %	---	---
Spike added:	0.00	0.00

ARGOS MODEL SA4 Version 1.29

Asaley 1/21/93

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 23

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
115	-10	M1S	MFQ2101	1.00x	01/15/93	16:46

	<-As->	<-Se->
Burns (Abs)	0.095 A	0.007A
Mean	0.0950	0.0070
CV %	---	---
Spike added:	10.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
116	-10	M2S	MFQ2102	1.00x	01/15/93	16:49

	<-As->	<-Se->
Burns (Abs)	0.114 A	-0.014A
Mean	0.1140	-0.0140
CV %	---	---
Spike added:	20.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
117	-10	M3S	MFQ2103	1.00x	01/15/93	16:51

	<-As->	<-Se->
Burns (Abs)	0.152 A	0.036A
Mean	0.1520	0.0360
CV %	---	---
Spike added:	30.00	15.00
- MSA calculations -		
Intercept:	0.05470	-0.00580
Slope:	0.00322	0.00174
Correlation:	0.9899	0.5333
X intercept:	-16.988	3.333
Sample value:	16.988	-3.333

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
118	50 PPB	CCV	CCV	1.00x	01/15/93	16:54

	<-As->	<-Se->
Burns (Conc)	47.387	47.876
Mean	47.3870	47.8760
CV %	---	---
Sample value	47.39	47.88

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
119	CAL BLK	CCB	CCB	1.00x	01/15/93	16:57

	<-As->	<-Se->
Burns (Conc)	2.754	0.877
Mean	2.7540	0.8770
CV %	---	---
Sample value	2.75	3.80U

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 24

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
120	-13	MOS	MFQ2220	1.00x	01/15/93	17:03

	<-As->	<-Se->
Burns (Abs)	0.034 A	0.068A
Mean	0.0340	0.0680
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
121	-13	M1S	MFQ2221	1.00x	01/15/93	17:06

	<-As->	<-Se->
Burns (Abs)	0.054 A	0.070A
Mean	0.0540	0.0700
CV %	---	---
Spike added:	5.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
122	-13	M2S	MFQ2222	1.00x	01/15/93	17:08

	<-As->	<-Se->
Burns (Abs)	0.069 A	0.103A
Mean	0.0690	0.1030
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
123	-13	M3S	MFQ2223	1.00x	01/15/93	17:11

	<-As->	<-Se->
Burns (Abs)	0.084 A	0.079A
Mean	0.0840	0.0790
CV %	---	---
Spike added:	15.00	15.00
- MSA calculations -		
Intercept:	0.03550	0.07010
Slope:	0.00330	0.00132
Correlation:	0.9973	0.5305
X intercept:	-10.758	-53.106
Sample value:	10.758	53.106

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
124	-10	MOS	MFQ2100	1.00x	01/15/93	17:14

	<-As->	<-Se->
Burns (Abs)	0.056 A	-0.029A
Mean	0.0560	-0.0290
CV %	---	---
Spike added:	0.00	0.00

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Jarrell-Ash Video 22
Run: F6 9301501 Analyst: JST Page 25

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
125	-10	M1S	MFQ2101	1.00x	01/15/93	17:16

	<-As->	<-Se->
Burns (Abs)	0.093 A	0.009A
Mean	0.0930	0.0090
CV %	---	---
Spike added:	5.00	5.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
126	-10	M2S	MFQ2102	1.00x	01/15/93	17:19

	<-As->	<-Se->
Burns (Abs)	0.126 A	0.014A
Mean	0.1260	0.0140
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
127	-10	M3S	MFQ2103	1.00x	01/15/93	17:22

	<-As->	<-Se->
Burns (Abs)	0.167 A	0.010A
Mean	0.1670	0.0100
CV %	---	---
Spike added:	15.00	15.00
- MSA calculations -		
Intercept:	0.05560	-0.01730
Slope:	0.00732	0.00244
Correlation:	0.9992	0.7830
X intercept:	-7.596	7.090
Sample value:	7.596	-7.090

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
128	50 PPB	CCV	10 CCV	1.00x	01/15/93	17:24

	<-As->	<-Se->
Burns (Conc)	49.951	41.909
Mean	49.9510	41.9090
CV %	---	---
Sample value	49.95	41.91 ***

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
129	CAL BLK	CCB	10 CCB	1.00x	01/15/93	17:27

	<-As->	<-Se->
Burns (Conc)	1.835	-3.254
Mean	1.8350	-3.2540
CV %	---	---
Sample value	2.00U	3.80U

JS 01/15/93

200

C L P M E T A L S 3.02e

selenium

Run id: F6 9301552
THERMO JARRELL-ASH VIDEO 21
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by DNP
Crunched: 01/18/93 by DNP
Time: 0858
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	19:04
2	5 PPB	WS1	F			S5	01/15/93	19:09
3	50 PPB	WS2	F			S50	01/15/93	19:14
4	100 PPB	WS3	F			S100	01/15/93	19:19
5	ICV-2	ICV	F			ICV	01/15/93	19:31
6	CAL BLK	ICB	F			ICB	01/15/93	19:36
7	CRA	CRA0	F			CRA	01/15/93	19:41
8	50 PPB	CCV	F			CCV	01/15/93	19:46
9	CAL BLK	CCB	F			CCB	01/15/93	19:51
10	S212197-19	S	F	2565	01/08/93	MFQ235	01/15/93	19:56
11	S212197-19	AS	F	2565		MFQ235A	01/15/93	20:01
12	X	X	F			ZZZZZZ	01/15/93	20:05
13	X	X	F			ZZZZZZ	01/15/93	20:10
14	50 PPB	CCV	F			CCV	01/15/93	20:15
15	CAL BLK	CCB	F			CCB	01/15/93	20:20

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 1610 GFAA ID: F1 F2 F3 F4 F5 (F6) Method: 150

Date: 1/15/93 Reviewed By: [illegible] Standards Prepared: 800 1/15/93
Operator: SG

Disk # F6
Acq ✓
SAMIN ✓ 5212197

Standards Source
1. Calibration: 10 ppm
2. ICV: [X] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301502		RUN ID:	9301552	
Element:	[X] AS	[] PB	Element:	[X] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[X] 10,5 [] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
Se only	10	19	1:4	
	11	19A		
	12	X		
	13	X		
	14	CCV		
	15	CCB		
	16			
	17			
	18			
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202	36			
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	38			
	39			

Jarrell-Ash Video 22
Run: F6 9301502 Analyst: SGJ Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/15/93	19:04

	<-As->		<-Se->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(10,5)	WS1	S	1.00x	01/15/93	19:09

	<-As->		<-Se->	
Burns (Abs)	0.044 A	0.044 A	0.029A	0.025A
Mean	0.0440		0.0270	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/15/93	19:14

	<-As->		<-Se->	
Burns (Abs)	0.197 A	0.199 A	0.193A	0.188A
Mean	0.1980		0.1905	
CV %	0.00		1.86	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/15/93	19:19

	<-As->		<-Se->	
Burns (Abs)	0.392 A	0.388 A	0.307A	0.303A
Mean	0.3900		0.3050	
CV %	0.00		0.00	

- Calibration coefficients -

	<-As->	<-Se->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.004072451	0.004605127
Coef[2]:	-1.752113e-006	-1.557091e-005
Correl. coef.:	0.9999	0.9998

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-2	ICV	ICV	1.00x	01/15/93	19:31

	<-As->		<-Se->	
Burns (Conc)	51.735	49.938	50.880	48.590
Mean	50.8365		49.7350	
CV %	2.50		3.26	
Sample value	50.84		49.74	

Se only 1/15/93

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F6 9301502 Analyst: SGJ Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/15/93	19:36

	<-As->		<-Se->	
Burns (Conc)	1.228	0.983	3.072	0.653
Mean	1.1055		1.8625	
CV %	15.67		91.84	
Sample value	2.00U		3.80U	

7	CRA	CRA	CRA	1.00x	01/15/93	19:41

	<-As->		<-Se->	
Burns (Conc)	11.103	10.112	5.984	6.892
Mean	10.6075		6.4380	
CV %	6.41		9.97	
Sample value	10.61		6.44	

8	50 PPB	CCV	CCV	1.00x	01/15/93	19:46

	<-As->		<-Se->	
Burns (Conc)	49.168	50.965	47.624	49.565
Mean	50.0665		48.5945	
CV %	2.54		2.82	
Sample value	50.07		48.60	

Dr only 1/15/93 DG

9	CAL BLK	CCB	CCB	1.00x	01/15/93	19:51

	<-As->		<-Se->	
Burns (Conc)	0.491	0.246	2.850	1.090
Mean	0.3685		1.9700	
CV %	47.01		63.17	
Sample value	2.00U		3.80U	

10	S212197-19	S	MFQ235	5.00x	01/15/93	19:56

	<-As->		<-Se->	
Burns (Conc)	8.626	8.626	3.516	3.739
Mean	8.6260		3.6275	
CV %	0.00		4.35	
Sample value	43.13		19.00U	

11	-19	AS	MFQ235A	5.00x	01/15/93	20:01

	<-As->		<-Se->	
Burns (Conc)	28.590	26.327	8.957	9.189
Mean	27.4585		9.0730	
CV %	5.83		1.81	
Sample value	137.29		45.36	
Spike added	20.00		10.00	
Spike recovery, %	94.16		90.73	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F6 9301502 Analyst: SGJ Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	X	X	ZZZZZZ	1.00x	01/15/93	20:05

	<-As->		<-Se->	
Burns (Conc)	-0.736	-0.491	1.090	3.739
Mean	-0.6135		2.4145	
CV %	28.24		77.58	
Sample value	2.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	X	X	ZZZZZZ	1.00x	01/15/93	20:10

	<-As->		<-Se->	
Burns (Conc)	-0.491	-0.246	0.871	1.528
Mean	-0.3685		1.1995	
CV %	47.01		38.73	
Sample value	2.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	50 PPB	CCV	CCV	1.00x	01/15/93	20:15

	<-As->		<-Se->	
Burns (Conc)	50.708	48.656	48.267	50.550
Mean	49.6820		49.4085	
CV %	2.92		3.27	
Sample value	49.68		49.41	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	CAL BLK	CCB	CCB	1.00x	01/15/93	20:20

	<-As->		<-Se->	
Burns (Conc)	-0.491	-1.227	2.188	2.850
Mean	-0.8590		2.5190	
CV %	60.59		18.58	
Sample value	2.00U		3.80U	

Jenny 1/15/93

:205

'C L P M E T A L S 3.02e

S212197--LEAD

Run id: F2 9301403
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1732
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	09:11
2	3 PPB	WS1	F			S3	01/14/93	09:16
3	50 PPB	WS2	F			S50	01/14/93	09:20
4	100 PPB	WS3	F			S100	01/14/93	09:24
5	ICV-4	ICV	F			ICV	01/14/93	09:31
6	CAL BLK	ICB	F			ICB	01/14/93	09:35
7	CRA	CRA0	F			CRA	01/14/93	09:39
8	50 PPB	CCV	F			CCV	01/14/93	09:44
9	CAL BLK	CCB	F			CCB	01/14/93	09:48
10	X	X	F			ZZZZZZ	01/14/93	09:52
11	X	X	F			ZZZZZZ	01/14/93	09:57
12	50 PPB	CCV	F			CCV	01/14/93	10:01
13	CAL BLK	CCB	F			CCB	01/14/93	10:05
14	X	X	F			ZZZZZZ	01/14/93	10:16
15	X	X	F			ZZZZZZ	01/14/93	10:20
16	X	X	F			ZZZZZZ	01/14/93	10:24
17	X	X	F			ZZZZZZ	01/14/93	10:29
18	X	X	F			ZZZZZZ	01/14/93	10:33
19	X	X	F			ZZZZZZ	01/14/93	10:37
20	X	X	F			ZZZZZZ	01/14/93	10:42
21	X	X	F			ZZZZZZ	01/14/93	10:46
22	X	X	F			ZZZZZZ	01/14/93	10:50
23	X	X	F			ZZZZZZ	01/14/93	10:55
24	50 PPB	CCV	F			CCV	01/14/93	10:59
25	CAL BLK	CCB	F			CCB	01/14/93	11:03
26	X	X	F			ZZZZZZ	01/14/93	11:08
27	X	X	F			ZZZZZZ	01/14/93	11:12
28	X	X	F			ZZZZZZ	01/14/93	11:16
29	X	X	F			ZZZZZZ	01/14/93	11:21
30	X	X	F			ZZZZZZ	01/14/93	11:25
31	X	X	F			ZZZZZZ	01/14/93	11:29
32	50 PPB	CCV	F			CCV	01/14/93	11:34
33	CAL BLK	CCB	F			CCB	01/14/93	11:38
34	PB	PBS	F	2565	01/08/93	PBS	01/14/93	12:04
35	PB	ASPBS	F	2565		PBSA	01/14/93	12:09
36	LCSFS	LCSS	F			LCSS	01/14/93	12:13
37	LCSFS	ASLCSS	F			LCSSA	01/14/93	12:17
38	LCSFS	LCSS	F	2565	01/08/93	LCSS	01/14/93	12:22
39	LCSFS	ASLCSS	F	2565		LCSSA	01/14/93	12:26
40	S212197-01	S	F	2565	01/08/93	MFN649	01/14/93	12:30
41	S212197-01	AS	F	2565		MFN649A	01/14/93	12:35
42	S212197-01	DS	F	2565	01/08/93	MFN649S	01/14/93	12:39
43	X	X	F			ZZZZZZ	01/14/93	12:43

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S212197--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	12:48
45	CAL BLK	CCB	F			CCB	01/14/93	12:52
46	S212197-01	S2	F	2565	01/08/93	MFN649D	01/14/93	12:56
47	S212197-01	ASS2	F	2565		MFN649DA	01/14/93	13:01
48	S212197-02	S	F	2565	01/08/93	MFN650	01/14/93	13:05
49	S212197-02	AS	F	2565		MFN650A	01/14/93	13:09
50	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	13:14
51	S212197-03	AS	F	2565		MFQ026A	01/14/93	13:18
52	S212197-04	S	F	2565	01/08/93	MFQ027	01/14/93	13:22
53	S212197-04	AS	F	2565		MFQ027A	01/14/93	13:27
54	X	X	F			ZZZZZZ	01/14/93	13:36
55	X	X	F			ZZZZZZ	01/14/93	13:40
56	50 PPB	CCV	F			CCV	01/14/93	13:45
57	CAL BLK	CCB	F			CCB	01/14/93	13:49
58	S212197-06	S	F	2565	01/08/93	MFQ029	01/14/93	13:53
59	S212197-06	AS	F	2565		MFQ029A	01/14/93	13:58
60	S212197-07	S	F	2565	01/08/93	MFQ030	01/14/93	14:02
61	S212197-07	AS	F	2565		MFQ030A	01/14/93	14:06
62	S212197-08	S	F	2565	01/08/93	MFQ031	01/14/93	14:11
63	S212197-08	AS	F	2565		MFQ031A	01/14/93	14:15
64	S212197-09	S	F	2565	01/08/93	MFQ205	01/14/93	14:19
65	S212197-09	AS	F	2565		MFQ205A	01/14/93	14:24
66	S212197-10	S	F	2565	01/08/93	MFQ210	01/14/93	14:28
67	S212197-10	AS	F	2565		MFQ210A	01/14/93	14:32
68	50 PPB	CCV	F			CCV	01/14/93	14:37
69	CAL BLK	CCB	F			CCB	01/14/93	14:41
70	S212197-11	S	F	2565	01/08/93	MFQ211	01/14/93	14:45
71	S212197-11	AS	F	2565		MFQ211A	01/14/93	14:50
72	S212197-12	S	F	2565	01/08/93	MFQ221	01/14/93	14:54
73	S212197-12	AS	F	2565		MFQ221A	01/14/93	14:58
74	S212197-13	S	F	2565	01/08/93	MFQ222	01/14/93	15:03
75	S212197-13	AS	F	2565		MFQ222A	01/14/93	15:07
76	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	15:11
77	S212197-14	AS	F	2565		MFQ223A	01/14/93	15:16
78	S212197-15	S	F	2565	01/08/93	MFQ224	01/14/93	15:20
79	S212197-15	AS	F	2565		MFQ224A	01/14/93	15:24
80	50 PPB	CCV	F			CCV	01/14/93	15:29
81	CAL BLK	CCB	F			CCB	01/14/93	15:33
82	S212197-16	S	F	2565	01/08/93	MFQ225	01/14/93	15:37
83	S212197-16	AS	F	2565		MFQ225A	01/14/93	15:42
84	S212197-17	S	F	2565	01/08/93	MFQ233	01/14/93	15:46
85	S212197-17	AS	F	2565		MFQ233A	01/14/93	15:51
86	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	15:55
87	S212197-18	AS	F	2565		MFQ234A	01/14/93	15:59
88	S212197-19	S	F	2565	01/08/93	MFQ235	01/14/93	16:04
89	S212197-19	AS	F	2565		MFQ235A	01/14/93	16:08
90	S212197-20	S	F	2565	01/08/93	MFQ236	01/14/93	16:12
91	S212197-20	AS	F	2565		MFQ236A	01/14/93	16:17
92	50 PPB	CCV	F			CCV	01/14/93	16:21
93	CAL BLK	CCB	F			CCB	01/14/93	16:25
94	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	17:02
95	S212197-05	AS	F	2565		MFQ028A	01/14/93	17:06

S212197--LEAD

Pos	Sample	Code	Preparation			Client ID	Date	Time
			Meth	Batch	Date			
96	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	17:10
97	S212197-14	AS	F	2565		MFQ223A	01/14/93	17:15
98	S212197-16	S	F	2565	01/08/93	MFQ225	01/14/93	17:19
99	S212197-16	AS	F	2565		MFQ225A	01/14/93	17:23
100	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	17:28
101	S212197-03	AS	F	2565		MFQ026A	01/14/93	17:32
102	S212197-04	S	F	2565	01/08/93	MFQ027	01/14/93	17:37
103	S212197-04	AS	F	2565		MFQ027A	01/14/93	17:41
104	50 PPB	CCV	F			CCV	01/14/93	17:45
105	CAL BLK	CCB	F			CCB	01/14/93	17:50
106	S212197-06	S	F	2565	01/08/93	MFQ029	01/14/93	17:54
107	S212197-06	AS	F	2565		MFQ029A	01/14/93	17:58
108	S212197-07	S	F	2565	01/08/93	MFQ030	01/14/93	18:03
109	S212197-07	AS	F	2565		MFQ030A	01/14/93	18:07
110	S212197-08	S	F	2565	01/08/93	MFQ031	01/14/93	18:11
111	S212197-08	AS	F	2565		MFQ031A	01/14/93	18:16
112	S212197-10	S	F	2565	01/08/93	MFQ210	01/14/93	18:20
113	S212197-10	AS	F	2565		MFQ210A	01/14/93	18:24
114	S212197-17	S	F	2565	01/08/93	MFQ233	01/14/93	18:29
115	S212197-17	AS	F	2565		MFQ233A	01/14/93	18:33
116	50 PPB	CCV	F			CCV	01/14/93	18:37
117	CAL BLK	CCB	F			CCB	01/14/93	18:42
118	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	18:59
119	S212197-18	AS	F	2565		MFQ234A	01/14/93	19:03
120	S212197-19	S	F	2565	01/08/93	MFQ235	01/14/93	19:08
121	S212197-19	AS	F	2565		MFQ235A	01/14/93	19:12
122	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	19:17
123	S212197-14	AS	F	2565		MFQ223A	01/14/93	19:21
124	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	19:43
125	S212197-14	AS	F	2565		MFQ223A	01/14/93	19:47
126	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	19:51
127	S212197-03	AS	F	2565		MFQ026A	01/14/93	19:56
128	50 PPB	CCV	F			CCV	01/14/93	20:00
129	CAL BLK	CCB	F			CCB	01/14/93	20:04

208

C L P M E T A L S 3.02e

S212197--THALLIUM

Run id: F2 9301453
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1055
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	09:11
2	10 PPB	WS1	F			S10	01/14/93	09:16
3	50 PPB	WS2	F			S50	01/14/93	09:20
4	100 PPB	WS3	F			S100	01/14/93	09:24
5	ICV-4	ICV	F			ICV	01/14/93	09:31
6	CAL BLK	ICB	F			ICB	01/14/93	09:35
7	CRA	CRA0	F			CRA	01/14/93	09:39
8	50 PPB	CCV	F			CCV	01/14/93	09:44
9	CAL BLK	CCB	F			CCB	01/14/93	09:48
10	X	X	F			ZZZZZZ	01/14/93	09:52
11	X	X	F			ZZZZZZ	01/14/93	09:57
12	50 PPB	CCV	F			CCV	01/14/93	10:01
13	CAL BLK	CCB	F			CCB	01/14/93	10:05
14	X	X	F			ZZZZZZ	01/14/93	10:16
15	X	X	F			ZZZZZZ	01/14/93	10:20
16	X	X	F			ZZZZZZ	01/14/93	10:24
17	X	X	F			ZZZZZZ	01/14/93	10:29
18	X	X	F			ZZZZZZ	01/14/93	10:33
19	X	X	F			ZZZZZZ	01/14/93	10:37
20	X	X	F			ZZZZZZ	01/14/93	10:42
21	X	X	F			ZZZZZZ	01/14/93	10:46
22	X	X	F			ZZZZZZ	01/14/93	10:50
23	X	X	F			ZZZZZZ	01/14/93	10:55
24	50 PPB	CCV	F			CCV	01/14/93	10:59
25	CAL BLK	CCB	F			CCB	01/14/93	11:03
26	X	X	F			ZZZZZZ	01/14/93	11:08
27	X	X	F			ZZZZZZ	01/14/93	11:12
28	X	X	F			ZZZZZZ	01/14/93	11:16
29	X	X	F			ZZZZZZ	01/14/93	11:21
30	X	X	F			ZZZZZZ	01/14/93	11:25
31	X	X	F			ZZZZZZ	01/14/93	11:29
32	50 PPB	CCV	F			CCV	01/14/93	11:34
33	CAL BLK	CCB	F			CCB	01/14/93	11:38
34	PB	PBS	F	2565	01/08/93	PBS	01/14/93	12:04
35	PB	ASPBS	F	2565		PBSA	01/14/93	12:09
36	LCSFS	LCSS	F	2565	01/08/93	LCSS	01/14/93	12:13
37	LCSFS	ASLCSS	F	2565		LCSSA	01/14/93	12:17
38	LCSFS	LCSS	F			LCSS	01/14/93	12:22
39	LCSFS	ASLCSS	F			LCSSA	01/14/93	12:26
40	S212197-01	S	F	2565	01/08/93	MFN649	01/14/93	12:30
41	S212197-01	AS	F	2565		MFN649A	01/14/93	12:35
42	S212197-01	DS	F	2565	01/08/93	MFN649S	01/14/93	12:39
43	X	X	F			ZZZZZZ	01/14/93	12:43

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S212197--THALLIUM

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	50 PPB	CCV	F			CCV	01/14/93	12:48
45	CAL BLK	CCB	F			CCB	01/14/93	12:52
46	S212197-01	S2	F	2565	01/08/93	MFN649D	01/14/93	12:56
47	S212197-01	ASS2	F	2565		MFN649DA	01/14/93	13:01
48	S212197-02	S	F	2565	01/08/93	MFN650	01/14/93	13:05
49	S212197-02	AS	F	2565		MFN650A	01/14/93	13:09
50	S212197-03	S	F	2565	01/08/93	MFQ026	01/14/93	13:14
51	S212197-03	AS	F	2565		MFQ026A	01/14/93	13:18
52	S212197-04	S	F	2565	01/08/93	MFQ027	01/14/93	13:22
53	S212197-04	AS	F	2565		MFQ027A	01/14/93	13:27
54	X	X	F			ZZZZZZ	01/14/93	13:36
55	X	X	F			ZZZZZZ	01/14/93	13:40
56	50 PPB	CCV	F			CCV	01/14/93	13:45
57	CAL BLK	CCB	F			CCB	01/14/93	13:49
58	S212197-06	S	F	2565	01/08/93	MFQ029	01/14/93	13:53
59	S212197-06	AS	F	2565		MFQ029A	01/14/93	13:58
60	S212197-07	S	F	2565	01/08/93	MFQ030	01/14/93	14:02
61	S212197-07	AS	F	2565		MFQ030A	01/14/93	14:06
62	S212197-08	S	F	2565	01/08/93	MFQ031	01/14/93	14:11
63	S212197-08	AS	F	2565		MFQ031A	01/14/93	14:15
64	S212197-09	S	F	2565	01/08/93	MFQ205	01/14/93	14:19
65	S212197-09	AS	F	2565		MFQ205A	01/14/93	14:24
66	S212197-10	S	F	2565	01/08/93	MFQ210	01/14/93	14:28
67	S212197-10	AS	F	2565		MFQ210A	01/14/93	14:32
68	50 PPB	CCV	F			CCV	01/14/93	14:37
69	CAL BLK	CCB	F			CCB	01/14/93	14:41
70	S212197-11	S	F	2565	01/08/93	MFQ211	01/14/93	14:45
71	S212197-11	AS	F	2565		MFQ211A	01/14/93	14:50
72	S212197-12	S	F	2565	01/08/93	MFQ221	01/14/93	14:54
73	S212197-12	AS	F	2565		MFQ221A	01/14/93	14:58
74	S212197-13	S	F	2565	01/08/93	MFQ222	01/14/93	15:03
75	S212197-13	AS	F	2565		MFQ222A	01/14/93	15:07
76	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	15:11
77	S212197-14	AS	F	2565		MFQ223A	01/14/93	15:16
78	S212197-15	S	F	2565	01/08/93	MFQ224	01/14/93	15:20
79	S212197-15	AS	F	2565		MFQ224A	01/14/93	15:24
80	50 PPB	CCV	F			CCV	01/14/93	15:29
81	CAL BLK	CCB	F			CCB	01/14/93	15:33
82	S212197-16	S	F	2565	01/08/93	MFQ225	01/14/93	15:37
83	S212197-16	AS	F	2565		MFQ225A	01/14/93	15:42
84	S212197-17	S	F	2565	01/08/93	MFQ233	01/14/93	15:46
85	S212197-17	AS	F	2565		MFQ233A	01/14/93	15:51
86	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	15:55
87	S212197-18	AS	F	2565		MFQ234A	01/14/93	15:59
88	S212197-19	S	F	2565	01/08/93	MFQ235	01/14/93	16:04
89	S212197-19	AS	F	2565		MFQ235A	01/14/93	16:08
90	S212197-20	S	F	2565	01/08/93	MFQ236	01/14/93	16:12
91	S212197-20	AS	F	2565		MFQ236A	01/14/93	16:17
92	50 PPB	CCV	F			CCV	01/14/93	16:21
93	CAL BLK	CCB	F			CCB	01/14/93	16:25

-210

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2236 GFAA ID: F1 (F2) F3 F4 F5 F6 Method: 160

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8:00 1/14/93
Operator: JRS

Disk # 54
Acq
SAMIN ✓

5212197
~~5212190~~
~~5212150~~

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [✓] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	93014010203		RUN ID:	93014075253	
Element:	[] AS	[✓] PB	Element:	[] SE	[✓] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[] 10,5 [✓] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
	10	~~13D~~	1:99	Pb/
	11	~~13DA~~		MIJ
	12	CCV		
	13	CCB		
	14	~~PBW~~		
	15	PBWA		
	16	LCSW		
	17	LCSWA		
	18	01		
	19	01A		
	20	02		
	21	02A		
	22	02D		
	23	~~02DA~~		
	24	CCV		
	25	CCB		
	26	~~02B~~		
	27	X		New Cases
	28	03		1/14/93
	29	03A		KN
	30	04		
	31	~~04A~~		
	32	CCV		
	33	CCB		
211	34	PBS		
	35	PBSA		
Tl only	36	LCSS	1:4	
	37	LCSSA		
	38	LCSS	1:19	Pb only
	39	LCSSA270		

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2236
Page 2 of 3

	40	01		
	41	01A		
	42	01S		
	43	X		
	44	CCV		
	45	CCB		
	46	01D		
	47	01DA		
	48	02		
	49	02A		
1:19 dil	50	03		
	51	03A		
1:19	52	04		
	53	04A		
	54	~~05~~ X	1/14/93	
	55	05A X	TCH	
	56	CCV		
	57	CCB		
1:19 Dil.	58	06		
	59	06A		
1:19	60	07		
	61	07A		
1:19	62	08		
	63	08A		
	64	09		
	65	09A		
1:19 Dil.	66	10		
	67	10A		
	68	CCV		
	69	CCB		
	70	11		
	71	11A		
	72	12		
	73	12A		
M(17)	74	13		
	75	13A		
D 1:9	76	14		RSD
	77	14A		
	78	15		
	79	15A		
	80	CCV		
	81	CCB		
D 1:9	82	16		
	83	16A		
D 1:19	84	17		
	85	17A		
D 1:19	86	18		
	87	18A		
D 1:19	88	19		
	89	19A		
	90	20		
212	91	20A		
	92	CCV		
	93	CCB		
D 1:19	94	05		
	95	05A		

TCH
1/14/93

TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2236
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RSD	96	14	J1:9	
	97	14A		
	98	16	J1:9	
	99	16A		Pb / only
RSD	100	03	J1:19	
	101	03A		
M(16)	102	04	J1:19	
	103	04A		
	104	CCV		
	105	CCB		
	106	06	J1:19	
	107	06A		
M(32)	108	07	J1:19	
	109	07A		Pb / only
	110	08	J1:19	
	111	08A		
	112	10	J1:19	
	113	10A		
M(31)	114	17	J1:19	
	115	17A		
	116	CCV		
	117	CCB		
→ dil more	118	18	J1:19	
	119	18A		Pb / only
	120	19	J1:19	
	121	19A		
Tl / only	122	14		
	123	14A		
M(12)	124	14	J1:9	
	125	14A		Tl
M(12)	126	03	J1:19	
	127	03A		
	128	CCV		CCV
	129	CCB		only
	130			
	131			
	132			1/14/93
	133			
	134			50g
	135			
	136			
	137			
	138			
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	142			
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213	147			
	148			
	149			
	150			
	151			

Jarrell-Ash Video 22
Run: F2 9301401 Analyst: JS Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	09:11

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(3,10)	WS1	S	1.00x	01/14/93	09:16

	<-Pb->		<-Tl->	
Burns (Abs)	0.026 A	0.028 A	0.045A	0.035A
Mean	0.0270		0.0400	
CV %	0.00		17.68	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/14/93	09:20

	<-Pb->		<-Tl->	
Burns (Abs)	0.343 A	0.342 A	0.171A	0.174A
Mean	0.3425		0.1725	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/14/93	09:24

	<-Pb->		<-Tl->	
Burns (Abs)	0.585 A	0.587 A	0.288A	0.297A
Mean	0.5860		0.2925	
CV %	0.00		2.18	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.00785781	0.003992395
Coef[2]:	-1.998827e-005	-1.06831e-005
Correl. coef.:	1.0000	1.0000

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-4	ICV	ICV	2.00x	01/14/93	09:31

	<-Pb->		<-Tl->	
Burns (Conc)	47.811	49.673	53.144	52.098
Mean	48.7420		52.6210	
CV %	2.70		1.40	
Sample value	97.48		105.24	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	09:35

	<-Pb->		<-Tl->	
Burns (Conc)	0.637	0.637	1.762	0.000
Mean	0.6370		0.8810	
CV %	0.00		141.42	
Sample value	1.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
7	CRA	CRA	CRA	1.00x	01/14/93	09:39

	<-Pb->		<-Tl->	
Burns (Conc)	3.856	3.337	10.568	8.457
Mean	3.5965		9.5125	
CV %	10.20		15.69	
Sample value	3.60		9.51	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
8	50 PPB	CCV	CCV	1.00x	01/14/93	09:44

	<-Pb->		<-Tl->	
Burns (Conc)	47.643	50.184	50.716	48.330
Mean	48.9135		49.5230	
CV %	3.67		3.41	
Sample value	48.91		49.52	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
9	CAL BLK	CCB	CCB	1.00x	01/14/93	09:48

	<-Pb->		<-Tl->	
Burns (Conc)	0.382	0.382	-0.500	0.000
Mean	0.3820		-0.2500	
CV %	0.00		141.42	
Sample value	1.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
10	X	X	ZZZZZZ	100.00x	01/14/93	09:52

	<-Pb->		<-Tl->	
Burns (Conc)	52.077	51.386	0.502	-0.500
Mean	51.7315		0.0010	
CV %	0.95		>9999.99	
Sample value	5173.10		380.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
11	X	X	ZZZZZZ	100.00x	01/14/93	09:57

	<-Pb->		<-Tl->	
Burns (Conc)	72.172	70.971	19.559	18.166
Mean	71.5715		18.8625	
CV %	1.19		5.22	
Sample value	7157.20		1886.20	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	50 PPB	CCV	CCV	1.00x	01/14/93	10:01

	<-Pb->		<-Tl->	
Burns (Conc)	50.184	48.654	51.060	49.008
Mean	49.4190		50.0340	
CV %	2.19		2.90	
Sample value	49.42		50.03	

13	CAL BLK	CCB	CCB	1.00x	01/14/93	10:05

	<-Pb->		<-Tl->	
Burns (Conc)	0.127	0.510	1.509	1.257
Mean	0.3185		1.3830	
CV %	85.03		12.88	
Sample value	1.00U		3.80U	

14	X	X	ZZZZZZ	1.00x	01/14/93	10:16

	<-Pb->		<-Tl->	
Burns (Conc)	0.893	0.255	0.502	0.753
Mean	0.5740		0.6275	
CV %	78.59		28.28	
Sample value	1.00U		3.80U	

15	X	X	ZZZZZZ	1.00x	01/14/93	10:20

	<-Pb->		<-Tl->	
Burns (Conc)	21.400	23.122	20.119	20.119
Mean	22.2610		20.1190	
CV %	5.47		0.00	
Sample value	22.26		20.12	

16	X	X	ZZZZZZ	1.00x	01/14/93	10:24

	<-Pb->		<-Tl->	
Burns (Conc)	50.870	52.077	50.030	52.098
Mean	51.4735		51.0640	
CV %	1.66		2.86	
Sample value	51.47		51.06	

17	X	X	ZZZZZZ	1.00x	01/14/93	10:29

	<-Pb->		<-Tl->	
Burns (Conc)	71.171	71.570	72.379	71.159
Mean	71.3705		71.7690	
CV %	0.40		1.20	
Sample value	71.37		71.77	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	X	X	ZZZZZZ	1.00x	01/14/93	10:33

	<-Pb->		<-Tl->	
Burns (Conc)	36.472	37.098	1.762	0.000
Mean	36.7850		0.8810	
CV %	1.20		141.42	
Sample value	36.78		3.80U	

19	X	X	ZZZZZZ	1.00x	01/14/93	10:37

	<-Pb->		<-Tl->	
Burns (Conc)	57.547	59.358	21.529	18.444
Mean	58.4525		19.9865	
CV %	2.19		10.91	
Sample value	58.45		19.99	

20	X	X	ZZZZZZ	1.00x	01/14/93	10:42

	<-Pb->		<-Tl->	
Burns (Conc)	5.944	5.813	-0.750	1.005
Mean	5.8785		0.1275	
CV %	1.58		973.31	
Sample value	5.88		3.80U	

21	X	X	ZZZZZZ	1.00x	01/14/93	10:46

	<-Pb->		<-Tl->	
Burns (Conc)	25.738	25.445	18.166	18.444
Mean	25.5915		18.3050	
CV %	0.81		1.07	
Sample value	25.59		18.31	

22	X	X	ZZZZZZ	1.00x	01/14/93	10:50

	<-Pb->		<-Tl->	
Burns (Conc)	39.628	39.469	1.762	0.000
Mean	39.5485		0.8810	
CV %	0.29		141.42	
Sample value	39.55		3.80U	

23	X	X	ZZZZZZ	1.00x	01/14/93	10:55

	<-Pb->		<-Tl->	
Burns (Conc)	60.273	62.121	19.279	19.559
Mean	61.1970		19.4190	
CV %	2.14		1.02	
Sample value	61.20		19.42	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	50 PPB	CCV 3	CCV	1.00x	01/14/93	10:59

	<-Pb->		<-Tl->	
Burns (Conc)	49.673	48.485	48.669	49.348
Mean	49.0790		49.0085	
CV %	1.71		0.98	
Sample value	49.08		49.01	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	CAL BLK	CCB 3	CCB	1.00x	01/14/93	11:03

	<-Pb->		<-Tl->	
Burns (Conc)	0.510	0.255	0.502	0.753
Mean	0.3825		0.6275	
CV %	47.14		28.28	
Sample value	1.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	X	X	ZZZZZZ	1.00x	01/14/93	11:08

	<-Pb->		<-Tl->	
Burns (Conc)	26.177	25.738	45.653	44.006
Mean	25.9575		44.8295	
CV %	1.20		2.60	
Sample value	25.96		44.83	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	X	X	ZZZZZZ	1.00x	01/14/93	11:12

	<-Pb->		<-Tl->	
Burns (Conc)	15.501	15.225	15.961	14.869
Mean	15.3630		15.4150	
CV %	1.27		5.01	
Sample value	15.36		15.41	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	X	X	ZZZZZZ	1.00x	01/14/93	11:16

	<-Pb->		<-Tl->	
Burns (Conc)	5.028	5.158	-0.999	2.015
Mean	5.0930		0.5080	
CV %	1.80		419.53	
Sample value	5.09		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	X	X	ZZZZZZ	1.00x	01/14/93	11:21

	<-Pb->		<-Tl->	
Burns (Conc)	25.445	25.153	18.722	20.682
Mean	25.2990		19.7020	
CV %	0.82		7.03	
Sample value	25.30		19.70	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	X	X	ZZZZZZ	1.00x	01/14/93	11:25

	<-Pb->		<-Tl->	
Burns (Conc)	2.820	2.949	2.268	0.502
Mean	2.8845		1.3850	
CV %	3.16		90.16	
Sample value	2.88		3.80U	

31	X	X	ZZZZZZ	1.00x	01/14/93	11:29

	<-Pb->		<-Tl->	
Burns (Conc)	22.546	21.972	18.722	19.000
Mean	22.2590		18.8610	
CV %	1.82		1.04	
Sample value	22.26		18.86	

32	50 PPB	CCV	CCV	1.00x	01/14/93	11:34

	<-Pb->		<-Tl->	
Burns (Conc)	49.502	48.824	49.348	48.669
Mean	49.1630		49.0085	
CV %	0.98		0.98	
Sample value	49.16		49.01	

33	CAL BLK	CCB	CCB	1.00x	01/14/93	11:38

	<-Pb->		<-Tl->	
Burns (Conc)	0.127	0.893	0.251	0.000
Mean	0.5100		0.1255	
CV %	106.20		141.42	
Sample value	1.00U		3.80U	

34	PB	PBS	PBS	1.00x	01/14/93	12:04

	<-Pb->		<-Tl->	
Burns (Conc)	0.255	0.255	0.000	-0.750
Mean	0.2550		-0.3750	
CV %	0.00		141.42	
Sample value	1.00U		3.80U	

35	PB	ASPBS	PBSA	1.00x	01/14/93	12:09

	<-Pb->		<-Tl->	
Burns (Conc)	22.258	21.400	21.246	21.529
Mean	21.8290		21.3875	
CV %	2.78		0.93	
Sample value	21.83		21.39	
Spike added	20.00		20.00	
Spike recovery, %	109.15		106.93	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
36	LCSFS	LCSS	LCSS	5.00x	01/14/93	12:13

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	42.701	42.701
Mean	999.9990		42.7010	
CV %	0.02		0.00	
Sample value	5000.00		213.51	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
37	LCSFS	ASLCSS	LCSSA	5.00x	01/14/93	12:17

Tl only 11/14/93 SG

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	56.332	53.846
Mean	999.9990		55.0890	
CV %	0.02		3.19	
Sample value	5000.00		275.45	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		61.94 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	LCSFS	LCSS	LCSS	20.00x	01/14/93	12:22

	<-Pb->		<-Tl->	
Burns (Conc)	70.177	53.119	11.634	10.038
Mean	61.6480		10.8360	
CV %	19.57		10.41	
Sample value	1232.96		216.72	

Pb only

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	LCSFS	ASLCSS	LCSSA	20.00x	01/14/93	12:26

	<-Pb->		<-Tl->	
Burns (Conc)	88.764	76.470	29.655	28.469
Mean	82.6170		29.0620	
CV %	10.52		2.89	
Sample value	1652.34		581.24	
Spike added	20.00		20.00	
Spike recovery, %	104.84		91.13	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	S212197-01	S	MFN649	1.00x	01/14/93	12:30

	<-Pb->		<-Tl->	
Burns (Conc)	39.469	40.107	0.502	0.753
Mean	39.7880		0.6275	
CV %	1.13		28.28	
Sample value	39.79		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-01	AS	MFN649A	1.00x	01/14/93	12:35

	<-Pb->		<-Tl->	
Burns (Conc)	62.867	59.906	22.380	20.119
Mean	61.3865		21.2495	
CV %	3.41		7.52	
Sample value	61.39		21.25	
Spike added	20.00		20.00	
Spike recovery, %	108.00		106.25	

42	-01	DS	MFN649S	1.00x	01/14/93	12:39

	<-Pb->		<-Tl->	
Burns (Conc)	57.727	57.908	50.716	53.144
Mean	57.8175		51.9300	
CV %	0.22		3.31	
Sample value	57.82		51.93	

43	X	X	ZZZZZZ	1.00x	01/14/93	12:43

	<-Pb->		<-Tl->	
Burns (Conc)	1.277	0.255	0.753	0.753
Mean	0.7660		0.7530	
CV %	94.34		0.00	
Sample value	1.00U		3.80U	

44	50 PPB	CCV 5	CCV	1.00x	01/14/93	12:48

	<-Pb->		<-Tl->	
Burns (Conc)	51.904	52.077	54.906	52.098
Mean	51.9905		53.5020	
CV %	0.23		3.71	
Sample value	51.99		53.50	

45	CAL BLK	CCB 5	CCB	1.00x	01/14/93	12:52

	<-Pb->		<-Tl->	
Burns (Conc)	0.893	1.021	-0.250	-0.750
Mean	0.9570		-0.5000	
CV %	9.46		70.71	
Sample value	1.00U		3.80U	

46	-01	S2	MFN649D	1.00x	01/14/93	12:56

	<-Pb->		<-Tl->	
Burns (Conc)	32.459	33.683	1.005	1.762
Mean	33.0710		1.3835	
CV %	2.62		38.69	
Sample value	33.07		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-01	ASS2	MFN649DA	1.00x	01/14/93	13:01

	<-Pb->		<-Tl->	
Burns (Conc)	55.582	53.818	24.097	19.559
Mean	54.7000		21.8280	
CV %	2.28		14.70	
Sample value	54.70		21.83	
Spike added	20.00		20.00	
Spike recovery, %	108.15		109.14	

48	-02	S	MFN650	1.00x	01/14/93	13:05

	<-Pb->		<-Tl->	
Burns (Conc)	11.267	11.133	0.502	1.005
Mean	11.2000		0.7535	
CV %	0.85		47.20	
Sample value	11.20		3.80U	

49	-02	AS	MFN650A	1.00x	01/14/93	13:09

	<-Pb->		<-Tl->	
Burns (Conc)	31.699	30.942	21.812	21.246
Mean	31.3205		21.5290	
CV %	1.71		1.86	
Sample value	31.32		21.53	
Spike added	20.00		20.00	
Spike recovery, %	100.60		107.64	

50	-03	S	MFQ026	1.00x	01/14/93	13:14

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	0.000	1.005
Mean	999.9990		0.5025	
CV %	0.02		141.42	
Sample value	1000.00		3.80U	

51	-03	AS	MFQ026A	1.00x	01/14/93	13:18

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	17.889	18.444
Mean	999.9990		18.1665	
CV %	0.02		2.16	
Sample value	1000.00		18.17	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		90.83	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
52	-04	S	MFQ027	1.00x	01/14/93	13:22

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	2.268	2.015
Mean	999.9990		2.1415	
CV %	0.02		8.35	
Sample value	1000.00		3.80U	

53	-04	AS	MFQ027A	1.00x	01/14/93	13:27

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	19.559	18.722
Mean	999.9990		19.1405	
CV %	0.02		3.09	
Sample value	1000.00		19.14	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		95.70	

54	X	X	ZZZZZZ	1.00x	01/14/93	13:36

	<-Pb->		<-Tl->	
Burns (Conc)	4.636	2.691	-0.500	0.251
Mean	3.6635		-0.1245	
CV %	37.54 ***		426.54	
Sample value	3.66		3.80U	

55	X	X	ZZZZZZ	1.00x	01/14/93	13:40

	<-Pb->		<-Tl->	
Burns (Conc)	1.021	0.510	1.005	-0.250
Mean	0.7655		0.3775	
CV %	47.20		235.08	
Sample value	1.00U		3.80U	

56	50 PPB	CCV	6 CCV	1.00x	01/14/93	13:45

	<-Pb->		<-Tl->	
Burns (Conc)	56.472	51.558	52.098	50.030
Mean	54.0150		51.0640	
CV %	6.43		2.86	
Sample value	54.01		51.06	

57	CAL BLK	CCB	6 CCB	1.00x	01/14/93	13:49

	<-Pb->		<-Tl->	
Burns (Conc)	2.175	1.277	0.251	1.762
Mean	1.7260		1.0065	
CV %	36.79		106.15	
Sample value	1.73		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
58	-06	S	MFQ029	1.00x	01/14/93	13:53

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	-0.750	-0.500
Mean	999.9990		-0.6250	
CV %	0.02		28.28	
Sample value	1000.00		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
59	-06	AS	MFQ029A	1.00x	01/14/93	13:58

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	19.839	19.839
Mean	999.9990		19.8390	
CV %	0.02		0.00	
Sample value	1000.00		19.84	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		99.20	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
60	-07	S	MFQ030	1.00x	01/14/93	14:02

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	0.251	0.502
Mean	999.9990		0.3765	
CV %	0.02		47.14	
Sample value	1000.00		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
61	-07	AS	MFQ030A	1.00x	01/14/93	14:06

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	24.384	20.682
Mean	999.9990		22.5330	
CV %	0.02		11.62	
Sample value	1000.00		22.53	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		112.67	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
62	-08	S	MFQ031	1.00x	01/14/93	14:11

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	1.509	1.509
Mean	999.9990		1.5090	
CV %	0.02		0.00	
Sample value	1000.00		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
63	-08	AS	MFQ031A	1.00x	01/14/93	14:15

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	19.279	21.246
Mean	999.9990		20.2625	
CV %	0.02		6.86	
Sample value	1000.00		20.26	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		101.32	

64	-09	S	MFQ205	1.00x	01/14/93	14:19

	<-Pb->		<-Tl->	
Burns (Conc)	17.306	15.777	1.005	0.251
Mean	16.5415		0.6280	
CV %	6.54		84.90	
Sample value	16.54		3.80U	

65	-09	AS	MFQ205A	1.00x	01/14/93	14:24

	<-Pb->		<-Tl->	
Burns (Conc)	41.230	34.299	25.251	20.964
Mean	37.7645		23.1075	
CV %	12.98		13.12	
Sample value	37.76		23.11	
Spike added	20.00		20.00	
Spike recovery, %	106.11		115.54 ***	

66	-10	S	MFQ210	1.00x	01/14/93	14:28

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	1.005	0.000
Mean	999.9990		0.5025	
CV %	0.02		141.42	
Sample value	1000.00		3.80U	

67	-10	AS	MFQ210A	1.00x	01/14/93	14:32

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	18.166	21.246
Mean	999.9990		19.7060	
CV %	0.02		11.05	
Sample value	1000.00		19.71	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		98.53	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
68	50 PPB	CCV	CCV	1.00x	01/14/93	14:37

	<-Pb->		<-Tl->	
Burns (Conc)	51.558	49.163	47.656	46.651
Mean	50.3605		47.1535	
CV %	3.36		1.51	
Sample value	50.36		47.15	

69	CAL BLK	CCB	CCB	1.00x	01/14/93	14:41

	<-Pb->		<-Tl->	
Burns (Conc)	1.405	1.918	0.502	-0.500
Mean	1.6615		0.0010	
CV %	21.83		>9999.99	
Sample value	1.66		3.80U	

70	-11	S	MFQ211	1.00x	01/14/93	14:45

	<-Pb->		<-Tl->	
Burns (Conc)	36.785	36.941	2.776	0.251
Mean	36.8630		1.5135	
CV %	0.30		117.97	
Sample value	36.86		3.80U	

71	-11	AS	MFQ211A	1.00x	01/14/93	14:50

	<-Pb->		<-Tl->	
Burns (Conc)	57.008	54.874	19.000	20.119
Mean	55.9410		19.5595	
CV %	2.70		4.05	
Sample value	55.94		19.56	
Spike added	20.00		20.00	
Spike recovery, %	95.39		97.80	

72	-12	S	MFQ221	1.00x	01/14/93	14:54

	<-Pb->		<-Tl->	
Burns (Conc)	11.538	11.403	0.251	1.762
Mean	11.4705		1.0065	
CV %	0.83		106.15	
Sample value	11.47		3.80U	

73	-12	AS	MFQ221A	1.00x	01/14/93	14:58

	<-Pb->		<-Tl->	
Burns (Conc)	33.991	29.588	22.950	19.000
Mean	31.7895		20.9750	
CV %	9.79		13.32	
Sample value	31.79		20.98	
Spike added	20.00		20.00	
Spike recovery, %	101.60		104.88	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
74	-13	S	MFQ222	1.00x	01/14/93	15:03

	<-Pb->		<-Tl->	
Burns (Conc)	16.471	17.306	-0.250	0.000
Mean	16.8885		-0.1250	
CV %	3.50		141.42	
Sample value	16.89		3.80U	

75	-13	AS	MFQ222A	1.00x	01/14/93	15:07

	<-Pb->		<-Tl->	
Burns (Conc)	33.530	33.223	18.444	20.682
Mean	33.3765		19.5630	
CV %	0.65		8.09	
Sample value	33.38		19.56	
Spike added	20.00		20.00	
Spike recovery, %	82.44 ***		97.82	

76	-14	S	MFQ223	1.00x	01/14/93	15:11

	<-Pb->		<-Tl->	
Burns (Conc)	124.683	130.108	1.509	0.251
Mean	127.3955		0.8800	
CV %	3.01		101.08	
Sample value	127.39		3.80U	

77	-14	AS	MFQ223A	1.00x	01/14/93	15:16

	<-Pb->		<-Tl->	
Burns (Conc)	164.717	128.988	26.414	18.722
Mean	146.8525		22.5680	
CV %	17.20		24.10 ***	
Sample value	146.85		22.57	
Spike added	20.00		20.00	
Spike recovery, %	97.29		112.84	

78	-15	S	MFQ224	1.00x	01/14/93	15:20

	<-Pb->		<-Tl->	
Burns (Conc)	22.115	21.114	0.000	0.753
Mean	21.6145		0.3765	
CV %	3.27		141.42	
Sample value	21.61		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
79	-15	AS	MFQ224A	1.00x	01/14/93	15:24

	<-Pb->		<-Tl->	
Burns (Conc)	40.427	39.469	19.000	19.839
Mean	39.9480		19.4195	
CV %	1.70		3.05	
Sample value	39.95		19.42	
Spike added	20.00		20.00	
Spike recovery, %	91.67		97.10	

80	50 PPB	CCV	CCV	1.00x	01/14/93	15:29

	<-Pb->		<-Tl->	
Burns (Conc)	50.355	46.806	49.688	45.322
Mean	48.5805		47.5050	
CV %	5.17		6.50	
Sample value	48.58		47.51	

81	CAL BLK	CCB	CCB	1.00x	01/14/93	15:33

	<-Pb->		<-Tl->	
Burns (Conc)	1.149	0.510	1.509	0.000
Mean	0.8295		0.7545	
CV %	54.47		141.42	
Sample value	1.00U		3.80U	

82	-16	S	MFQ225	1.00x	01/14/93	15:37

	<-Pb->		<-Tl->	
Burns (Conc)	155.764	164.717	0.753	0.753
Mean	160.2405		0.7530	
CV %	3.95		0.00	
Sample value	160.24		3.80U	

83	-16	AS	MFQ225A	1.00x	01/14/93	15:42

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	21.529	18.166
Mean	999.9990		19.8475	
CV %	0.02		11.98	
Sample value	1000.00		19.85	
Spike added	20.00		20.00	
Spike recovery, %	4198.79 ***		99.24	

84	-17	S	MFQ233	1.00x	01/14/93	15:46

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	1.762	2.522
Mean	999.9990		2.1420	
CV %	0.02		25.09	
Sample value	1000.00		3.80U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
85	-17	AS	MFQ233A	1.00x	01/14/93	15:51

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	20.400	21.529
Mean	999.9990		20.9645	
CV %	0.02		3.81	
Sample value	1000.00		20.97	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		104.82	

86	-18	S	MFQ234	1.00x	01/14/93	15:55

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	0.251	1.005
Mean	999.9990		0.6280	
CV %	0.02		84.90	
Sample value	1000.00		3.80U	

87	-18	AS	MFQ234A	1.00x	01/14/93	15:59

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	21.812	19.279
Mean	999.9990		20.5455	
CV %	0.02		8.72	
Sample value	1000.00		20.55	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		102.73	

88	-19	S	MFQ235	1.00x	01/14/93	16:04

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	1.509	1.509
Mean	999.9990		1.5090	
CV %	0.02		0.00	
Sample value	1000.00		3.80U	

89	-19	AS	MFQ235A	1.00x	01/14/93	16:08

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	20.119	21.529
Mean	999.9990		20.8240	
CV %	0.02		4.79	
Sample value	1000.00		20.82	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		104.12	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
90	-20	S	MFQ236	1.00x	01/14/93	16:12

	<-Pb->		<-Tl->	
Burns (Conc)	75.639	73.995	1.005	1.257
Mean	74.8170		1.1310	
CV %	1.55		15.76	
Sample value	74.82		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
91	-20	AS	MFQ236A	1.00x	01/14/93	16:17

	<-Pb->		<-Tl->	
Burns (Conc)	96.715	91.824	21.529	16.784
Mean	94.2695		19.1565	
CV %	3.67		17.51	
Sample value	94.27		19.16	
Spike added	20.00		20.00	
Spike recovery, %	97.26		95.78	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
92	50 PPB	CCV	CCV	1.00x	01/14/93	16:21

	<-Pb->		<-Tl->	
Burns (Conc)	50.527	49.332	47.656	46.651
Mean	49.9295		47.1535	
CV %	1.69		1.51	
Sample value	49.93		47.15	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
93	CAL BLK	CCB	CCB	1.00x	01/14/93	16:25

	<-Pb->		<-Tl->	
Burns (Conc)	2.562	2.562	1.509	0.000
Mean	2.5620		0.7545	
CV %	0.00		141.42	
Sample value	2.56		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
94	-05	S	MFQ028	1.00x	01/14/93	17:02

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	-1.745	-0.750
Mean	999.9990		-1.2475	
CV %	0.02		56.40	
Sample value	1000.00		3.80U	

RD only 1/14/93 Sg

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
95	-05	AS	MFQ028A	1.00x	01/14/93	17:06

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	18.166	19.559
Mean	999.9990		18.8625	
CV %	0.02		5.22	
Sample value	1000.00		18.86	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		94.31	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
96	-14	S	MFQ223	10.00x	01/14/93	17:10

	<-Pb->		<-Tl->	
Burns (Conc)	25.738	15.916	0.753	0.502
Mean	20.8270		0.6275	
CV %	33.35 ***		28.28	
Sample value	208.27		38.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
97	-14	AS	MFQ223A	10.00x	01/14/93	17:15

	<-Pb->		<-Tl->	
Burns (Conc)	40.427	34.145	25.251	18.444
Mean	37.2860		21.8475	
CV %	11.91		22.03 ***	
Sample value	372.86		218.47	
Spike added	20.00		20.00	
Spike recovery, %	82.29 ***		109.24	

Pb only 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
98	-16	S	MFQ225	10.00x	01/14/93	17:19

	<-Pb->		<-Tl->	
Burns (Conc)	21.685	16.609	-1.497	1.257
Mean	19.1470		-0.1200	
CV %	18.75		1622.81	
Sample value	191.47		38.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
99	-16	AS	MFQ225A	10.00x	01/14/93	17:23

	<-Pb->		<-Tl->	
Burns (Conc)	43.829	35.382	23.522	20.400
Mean	39.6055		21.9610	
CV %	15.08		10.05	
Sample value	396.05		219.61	
Spike added	20.00		20.00	
Spike recovery, %	102.29		109.81	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
100	-03	S	MFQ026	20.00x	01/14/93	17:28

	<-Pb->		<-Tl->	
Burns (Conc)	23.700	15.639	0.000	0.502
Mean	19.6695		0.2510	
CV %	28.98 ***		141.42	
Sample value	393.38		76.00U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
101	-03	AS	MFQ026A	20.00x	01/14/93	17:32

	<-Pb->		<-Tl->	
Burns (Conc)	46.472	34.917	23.809	18.166
Mean	40.6945		20.9875	
CV %	20.08 ***		19.01	
Sample value	813.88		419.76	
Spike added	20.00		20.00	
Spike recovery, %	105.13		104.94	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
102	-04	S	MFQ027	20.00x	01/14/93	17:37

	<-Pb->		<-Tl->	
Burns (Conc)	17.445	15.087	0.251	1.005
Mean	16.2660		0.6280	
CV %	10.25		84.90	
Sample value	325.32		76.00U	

Pb outlier 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
103	-04	AS	MFQ027A	20.00x	01/14/93	17:41

	<-Pb->		<-Tl->	
Burns (Conc)	44.979	34.453	25.541	17.336
Mean	39.7160		21.4385	
CV %	18.74		27.06 ***	
Sample value	794.32		428.76	
Spike added	20.00		20.00	
Spike recovery, %	117.25 ***		107.19	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
104	50 PPB	CCV 10	CCV	1.00x	01/14/93	17:45

	<-Pb->		<-Tl->	
Burns (Conc)	45.973	48.148	42.053	43.026
Mean	47.0605		42.5395	
CV %	3.27		1.62	
Sample value	47.06		42.54 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
105	CAL BLK	CCB 10	CCB	1.00x	01/14/93	17:50

	<-Pb->		<-Tl->	
Burns (Conc)	0.637	1.277	-0.250	0.753
Mean	0.9570		0.2515	
CV %	47.29		282.00	
Sample value	1.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
106	-06	S	MFQ029	20.00x	01/14/93	17:54

	<-Pb->		<-Tl->	
Burns (Conc)	29.139	27.208	-0.250	-0.750
Mean	28.1735		-0.5000	
CV %	4.85		70.71	
Sample value	563.48		76.00U	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
107	-06	AS	MFQ029A	20.00x	01/14/93	17:58

	<-Pb->		<-Tl->	
Burns (Conc)	50.870	45.475	20.682	18.166
Mean	48.1725		19.4240	
CV %	7.92		9.16	
Sample value	963.44		388.48	
Spike added	20.00		20.00	
Spike recovery, %	99.99		97.12	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
108	-07	S	MFQ030	20.00x	01/14/93	18:03

	<-Pb->		<-Tl->	
Burns (Conc)	33.377	32.155	0.502	0.502
Mean	32.7660		0.5020	
CV %	2.64		0.00	
Sample value	655.32		76.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
109	-07	AS	MFQ030A	20.00x	01/14/93	18:07

	<-Pb->		<-Tl->	
Burns (Conc)	64.752	53.818	23.522	19.279
Mean	59.2850		21.4005	
CV %	13.04		14.02	
Sample value	1185.70		428.02	
Spike added	20.00		20.00	
Spike recovery, %	132.60 ***		107.00	

Pb only 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
110	-08	S	MFQ031	20.00x	01/14/93	18:11

	<-Pb->		<-Tl->	
Burns (Conc)	19.129	18.005	0.251	-0.250
Mean	18.5670		0.0005	
CV %	4.28		>9999.99	
Sample value	371.34		76.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
111	-08	AS	MFQ031A	20.00x	01/14/93	18:16

	<-Pb->		<-Tl->	
Burns (Conc)	38.516	35.537	17.336	16.509
Mean	37.0265		16.9225	
CV %	5.69		3.46	
Sample value	740.54		338.44	
Spike added	20.00		20.00	
Spike recovery, %	92.30		84.61 ***	

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
112	-10	S	MFQ210	20.00x	01/14/93	18:20

	<-Pb->		<-Tl->	
Burns (Conc)	14.262	13.031	-0.250	-0.750
Mean	13.6465		-0.5000	
CV %	6.38		70.71	
Sample value	272.92		76.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
113	-10	AS	MFQ210A	20.00x	01/14/93	18:24

	<-Pb->		<-Tl->	
Burns (Conc)	36.628	34.145	19.559	19.559
Mean	35.3865		19.5590	
CV %	4.96		0.00	
Sample value	707.72		391.18	
Spike added	20.00		20.00	
Spike recovery, %	108.70		97.79	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
114	-17	S	MFQ233	20.00x	01/14/93	18:29

	<-Pb->		<-Tl->	
Burns (Conc)	33.223	29.289	2.015	0.000
Mean	31.2560		1.0075	
CV %	8.90		141.42	
Sample value	625.12		76.00U	

Pb only 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
115	-17	AS	MFQ233A	20.00x	01/14/93	18:33

	<-Pb->		<-Tl->	
Burns (Conc)	63.618	53.294	23.522	21.529
Mean	58.4560		22.5255	
CV %	12.49		6.26	
Sample value	1169.12		450.52	
Spike added	20.00		20.00	
Spike recovery, %	136.00 ***		112.63	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
116	50 PPB	CCV //	CCV	1.00x	01/14/93	18:37

	<-Pb->		<-Tl->	
Burns (Conc)	47.308	47.979	46.985	46.651
Mean	47.6435		46.8180	
CV %	1.00		0.50	
Sample value	47.64		46.82	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
117	CAL BLK	CCB //	CCB	1.00x	01/14/93	18:42

	<-Pb->		<-Tl->	
Burns (Conc)	1.149	0.510	1.509	-0.250
Mean	0.8295		0.6295	
CV %	54.47		197.59	
Sample value	1.00U		3.80U	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9301401 Analyst: JS Page 22

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
118	-18	S	MFQ234	50.00x	01/14/93	18:59

	<-Pb->		<-Tl->	
Burns (Conc)	168.032	149.500	-0.750	0.251
Mean	158.7660		-0.2495	
CV %	8.25		283.49	
Sample value	7938.30		190.00U	

119	-18	AS	MFQ234A	50.00x	01/14/93	19:03

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	8.457	8.720
Mean	999.9990		8.5885	
CV %	0.02		2.17	
Sample value	49999.95		429.40	
Spike added	20.00		20.00	
Spike recovery, %	4206.17 ***		42.94 ***	

Pb only 1/14/93 GG

120	-19	S	MFQ235	20.00x	01/14/93	19:08

	<-Pb->		<-Tl->	
Burns (Conc)	9.788	9.120	-0.500	1.509
Mean	9.4540		0.5045	
CV %	5.00		281.58	
Sample value	189.08		76.00U	

121	-19	AS	MFQ235A	20.00x	01/14/93	19:12

	<-Pb->		<-Tl->	
Burns (Conc)	32.307	27.504	21.246	16.784
Mean	29.9055		19.0150	
CV %	11.36		16.59	
Sample value	598.10		380.30	
Spike added	20.00		20.00	
Spike recovery, %	102.26		95.07	

122	-14	S	MFQ223	1.00x	01/14/93	19:17

	<-Pb->		<-Tl->	
Burns (Conc)	114.907	111.310	-0.999	0.502
Mean	113.1085		-0.2485	
CV %	2.25		427.11	
Sample value	113.11		3.80U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
123	-14	AS	MFQ223A	1.00x	01/14/93	19:21

	<-Pb->		<-Tl->	
Burns (Conc)	141.196	127.523	20.400	16.784
Mean	134.3595		18.5920	
CV %	7.20		13.75	
Sample value	134.36		18.59	
Spike added	20.00		20.00	
Spike recovery, %	106.25		92.96	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
124	-14	S	MFQ223	10.00x	01/14/93	19:43

	<-Pb->		<-Tl->	
Burns (Conc)	12.895	12.215	1.509	2.522
Mean	12.5550		2.0155	
CV %	3.83		35.54	
Sample value	125.55		38.00U	

Pb only 1/14/93 SG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
125	-14	AS	MFQ223A	10.00x	01/14/93	19:47

	<-Pb->		<-Tl->	
Burns (Conc)	28.097	27.061	16.784	14.325
Mean	27.5790		15.5545	
CV %	2.66		11.18	
Sample value	275.79		155.55	
Spike added	20.00		20.00	
Spike recovery, %	75.12 ***		77.78 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
126	-03	S	MFQ026	20.00x	01/14/93	19:51

	<-Pb->		<-Tl->	
Burns (Conc)	13.850	12.079	2.776	-0.500
Mean	12.9645		1.1380	
CV %	9.66		203.56	
Sample value	259.30		76.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
127	-03	AS	MFQ026A	20.00x	01/14/93	19:56

	<-Pb->		<-Tl->	
Burns (Conc)	30.339	27.948	12.974	14.869
Mean	29.1435		13.9215	
CV %	5.80		9.63	
Sample value	582.88		278.42	
Spike added	20.00		20.00	
Spike recovery, %	80.89 ***		69.60 ***	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301401 Analyst: JS Page 24

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
128	50 PPB	CCV	CCV	1.00x	01/14/93	20:00

	<-Pb->		<-Tl->	
Burns (Conc)	45.475	45.310	44.662	40.766
Mean	45.3925		42.7140	
CV %	0.26		6.45	
Sample value	45.39		42.71 ***	

Pb only 1/14/93 SG

129	CAL BLK	CCB	CCB	1.00x	01/14/93	20:04

	<-Pb->		<-Tl->	
Burns (Conc)	0.382	0.127	1.257	1.509
Mean	0.2545		1.3830	
CV %	70.85		12.88	
Sample value	1.00U		3.80U	

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C L P M E T A L S 3.02e

S212197--LEAD

Run id: F2 9301404
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1739
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:07
2	3 PPB	WS1	F			S3	01/14/93	21:11
3	50 PPB	WS2	F			S50	01/14/93	21:16
4	100 PPB	WS3	F			S100	01/14/93	21:20
5	ICV-4	ICV	F			ICV	01/14/93	21:41
6	CAL BLK	ICB	F			ICB	01/14/93	21:45
7	CRA	CRA0	F			CRA	01/14/93	21:50
8	50 PPB	CCV	F			CCV	01/14/93	21:54
9	CAL BLK	CCB	F			CCB	01/14/93	21:58
10	X	X	F			ZZZZZZ	01/14/93	22:03
11	X	X	F			ZZZZZZ	01/14/93	22:07
12	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	22:12
13	S212197-05	AS	F	2565		MFQ028A	01/14/93	22:16
14	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	22:20
15	S212197-18	AS	F	2565		MFQ234A	01/14/93	22:25
16	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	22:36
17	S212197-05	AS	F	2565		MFQ028A	01/14/93	22:40
18	S212197-18	S	F	2565	01/08/93	MFQ234	01/14/93	22:44
19	S212197-18	AS	F	2565		MFQ234A	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:53
21	CAL BLK	CCB	F			CCB	01/14/93	22:57

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C L P M E T A L S 3.02e

S212197--THALLIUM

Run id: F2 9301454
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 01/14/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1100
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/14/93	21:07
2	10 PPB	WS1	F			S10	01/14/93	21:11
3	50 PPB	WS2	F			S50	01/14/93	21:16
4	100 PPB	WS3	F			S100	01/14/93	21:20
5	ICV-4	ICV	F			ICV	01/14/93	21:41
6	CAL BLK	ICB	F			ICB	01/14/93	21:45
7	CRA	CRA0	F			CRA	01/14/93	21:50
8	50 PPB	CCV	F			CCV	01/14/93	21:54
9	CAL BLK	CCB	F			CCB	01/14/93	21:58
10	S212197-14	S	F	2565	01/08/93	MFQ223	01/14/93	22:03
11	S212197-14	AS	F	2565		MFQ223A	01/14/93	22:07
12	X	X	F			ZZZZZZ	01/14/93	22:12
13	X	X	F			ZZZZZZ	01/14/93	22:16
14	X	X	F			ZZZZZZ	01/14/93	22:20
15	X	X	F			ZZZZZZ	01/14/93	22:25
16	X	X	F			ZZZZZZ	01/14/93	22:36
17	X	X	F			ZZZZZZ	01/14/93	22:40
18	X	X	F			ZZZZZZ	01/14/93	22:44
19	X	X	F			ZZZZZZ	01/14/93	22:49
20	50 PPB	CCV	F			CCV	01/14/93	22:53
21	CAL BLK	CCB	F			CCB	01/14/93	22:57
22	S212197-05	S	F	2565	01/08/93	MFQ028	01/14/93	23:06
23	S212197-05	AS	F	2565		MFQ028A	01/14/93	23:11
24	50 PPB	CCV	F			CCV	01/14/93	23:15
25	CAL BLK	CCB	F			CCB	01/14/93	23:19

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2237 GFAA ID: F1 (F2) F3 F4 F5 F6 Method: 160

Date: 1/14/93 Reviewed By: MS Standards Prepared: 8 00 1/14/93

Operator: SG

Disk # 1

Acq

SAMIN ✓

6212197

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [✓] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301404		RUN ID:	9301454	
Element:	[] AS	[✓] PB	Element:	[] SE	[✓] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
	STD1 1	0 PPB		
	STD2 2	[] 10,5 [✓] 3,10		
	STD3 3	50 PPB		
	STD4 4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
Tl / only	10	14		
	11	14A		
Dil more	12	05		
	13	05A	1:19	
Dil more	14	18		Pb / only
	15	18A	1:99	
	16	05		
	17	05A	1:49	
	18	18		
	19	18A	1:199	
	20	CCV		
	21	CCB		
Tl / only	22	06		
	23	05A		
	24	CCV		
	25	CCB		
	26			
	27			
	28			
	29			
	30			
	31			
	32			
240	33			
	34			
	35			
	36			
	37			
	38			
	39			

Jarrell-Ash Video 22
Run: F2 9301404 Analyst: SGJ Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/14/93	21:07

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

2	STD2(3,10)	WS1	S	1.00x	01/14/93	21:11

	<-Pb->		<-Tl->	
Burns (Abs)	0.033 A	0.030 A	0.043A	0.044A
Mean	0.0315		0.0435	
CV %	0.00		0.00	

3	STD3(50)	WS2	S	1.00x	01/14/93	21:16

	<-Pb->		<-Tl->	
Burns (Abs)	0.329 A	0.329 A	0.165A	0.166A
Mean	0.3290		0.1655	
CV %	0.00		0.00	

4	STD4(100)	WS3	S	1.00x	01/14/93	21:20

	<-Pb->		<-Tl->	
Burns (Abs)	0.581 A	0.593 A	0.270A	0.281A
Mean	0.5870		0.2755	
CV %	1.44		2.82	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.007337502	0.003944747
Coef[2]:	-1.470215e-005	-1.193944e-005
Correl. coef.:	0.9997	0.9994

5	ICV-4	ICV	ICV	2.00x	01/14/93	21:41

	<-Pb->		<-Tl->	
Burns (Conc)	50.662	52.380	50.222	50.587
Mean	51.5210		50.4045	
CV %	2.36		0.51	
Sample value	103.04		100.81	

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301404 Analyst: SGJ Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/14/93	21:45

	<-Pb->		<-Tl->	
Burns (Conc)	0.682	0.409	-0.506	0.762
Mean	0.5455		0.1280	
CV %	35.39		700.48	
Sample value	1.00U		3.80U	

7	CRA	CRA	CRA	1.00x	01/14/93	21:50

	<-Pb->		<-Tl->	
Burns (Conc)	3.846	3.846	9.932	9.393
Mean	3.8460		9.6625	
CV %	0.00		3.94	
Sample value	3.85		9.66	

8	50 PPB	CCV	CCV	1.00x	01/14/93	21:54

	<-Pb->		<-Tl->	
Burns (Conc)	49.129	49.980	48.775	50.222
Mean	49.5545		49.4985	
CV %	1.21		2.07	
Sample value	49.55		49.50	

9	CAL BLK	CCB	CCB	1.00x	01/14/93	21:58

	<-Pb->		<-Tl->	
Burns (Conc)	0.136	0.682	0.762	0.000
Mean	0.4090		0.3810	
CV %	94.40		141.42	
Sample value	1.00U		3.80U	

10	S212197-14	S	MFQ223	1.00x	01/14/93	22:03

	<-Pb->		<-Tl->	
Burns (Conc)	112.650	115.919	-0.506	-0.253
Mean	114.2845		-0.3795	
CV %	2.02		47.14	
Sample value	114.29		3.80U	

Tl only JCS 1/15/93

11	-14	AS	MFQ223A	1.00x	01/14/93	22:07

	<-Pb->		<-Tl->	
Burns (Conc)	130.739	122.441	17.677	15.703
Mean	126.5900		16.6900	
CV %	4.64		8.36	
Sample value	126.59		16.69	
Spike added	20.00		20.00	
Spike recovery, %	61.52 ***		83.45 ***	

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9301404 Analyst: SGJ Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-05	S	MFQ028	20.00x	01/14/93	22:12

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	127.631	121.375	-0.253	1.017
Mean	124.5030		0.3820	
CV %	3.55		235.09	
Sample value	2490.06		76.00U	

Pb only JLS 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-05	AS	MFQ028A	20.00x	01/14/93	22:16

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	146.038	143.122	17.110	15.423
Mean	144.5800		16.2665	
CV %	1.43		7.33	
Sample value	2891.60		325.34	
Spike added	20.00		20.00	
Spike recovery, %	100.39		81.33 ***	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-18	S	MFQ234	100.00x	01/14/93	22:20

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	82.240	72.944	1.017	0.000
Mean	77.5920		0.5085	
CV %	8.47		141.42	
Sample value	7759.20		380.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-18	AS	MFQ234A	100.00x	01/14/93	22:25

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	108.973	91.008	20.833	17.393
Mean	99.9905		19.1130	
CV %	12.70		12.73	
Sample value	9999.00		1911.30	
Spike added	20.00		20.00	
Spike recovery, %	111.99		95.57	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-05	S	MFQ028	50.00x	01/14/93	22:36

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	53.418	48.114	1.272	0.254
Mean	50.7660		0.7630	
CV %	7.39		94.34	
Sample value	2538.30		190.00U	

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-05	AS	MFQ028A	50.00x	01/14/93	22:40

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	72.367	65.217	18.531	18.531
Mean	68.7920		18.5310	
CV %	7.35		0.03	
Sample value	3439.60		926.55	
Spike added	20.00		20.00	
Spike recovery, %	90.13		92.65	

Pb only JLS 1/15/93

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	-18	S	MFQ234	200.00x	01/14/93	22:44

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	38.871	36.623	1.272	1.784
Mean	37.7470		1.5280	
CV %	4.21		23.69	
Sample value	7549.40		760.00U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
19	-18	AS	MFQ234A	200.00x	01/14/93	22:49

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	59.047	53.765	19.103	16.828
Mean	56.4060		17.9655	
CV %	6.62		8.95	
Sample value	11281.20		3593.00	
Spike added	20.00		20.00	
Spike recovery, %	93.29		89.82	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
20	50 PPB	CCV	2 CCV	1.00x	01/14/93	22:53

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	50.150	48.960	49.496	47.345
Mean	49.5550		48.4205	
CV %	1.70		3.14	
Sample value	49.56		48.42	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
21	CAL BLK	CCB	2 CCB	1.00x	01/14/93	22:57

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	0.682	0.000	0.254	0.508
Mean	0.3410		0.3810	
CV %	141.42		47.14	
Sample value	1.00U		3.80U	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
22	-05	S	MFQ028	1.00x	01/14/93	23:06

	<-Pb---------->		<-Tl---------->	
Burns (Conc)	999.999	999.999	0.508	0.508
Mean	999.9990		0.5080	
CV %	0.02		0.00	
Sample value	1000.00		3.80U	

244 Tl only

ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9301404 Analyst: SGJ Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-05	AS	MFQ028A	1.00x	01/14/93	23:11

	<-Pb->		<-Tl->	
Burns (Conc)	999.999	999.999	17.393	16.828
Mean	999.9990		17.1105	
CV %	0.02		2.33	
Sample value	1000.00		17.11	
Spike added	20.00		20.00	
Spike recovery, %	0.00 ***		85.55	

Tl only JLS

24	50 PPB	CCV 3	CCV	1.00x	01/14/93	23:15

1/15/93

	<-Pb->		<-Tl->	
Burns (Conc)	70.268	57.094	46.636	48.415
Mean	63.6810		47.5255	
CV %	14.63		2.65	
Sample value	63.68 ***		47.53	

25	CAL BLK	CCB 3	CCB	1.00x	01/14/93	23:19

	<-Pb->		<-Tl->	
Burns (Conc)	1.915	1.367	1.272	1.784
Mean	1.6410		1.5280	
CV %	23.61		23.69	
Sample value	1.64		3.80U	

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C L P M E T A L S 3.02e

S212212--LEAD

Run id: F2 9301501
THERMO JARRELL-ASH VIDEO 22E (#2511)
Analytical method: F
Element: Multi-Element

Acquired: 01/15/93 by MAS
Crunched: 01/15/93 by MAS
Time: 1740
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	F			S0	01/15/93	08:56
2	3 PPB	WS1	F			S3	01/15/93	09:01
3	50 PPB	WS2	F			S50	01/15/93	09:05
4	100 PPB	WS3	F			S100	01/15/93	09:09
5	ICV-4	ICV	F			ICV	01/15/93	09:46
6	CAL BLK	ICB	F			ICB	01/15/93	09:49
7	CRA	CRA0	F			CRA	01/15/93	09:51
8	50 PPB	CCV	F			CCV	01/15/93	09:54
9	CAL BLK	CCB	F			CCB	01/15/93	09:56
10	S212197-03	M0S	F	2565		MFQ0260	01/15/93	09:58
11	S212197-03	M1S	F	2565		MFQ0261	01/15/93	10:01
12	S212197-03	M2S	F	2565		MFQ0262	01/15/93	10:03
13	S212197-03	M3S	F	2565		MFQ0263	01/15/93	10:06
14	S212197-04	M0S	F	2565		MFQ0270	01/15/93	10:08
15	S212197-04	M1S	F	2565		MFQ0271	01/15/93	10:11
16	S212197-04	M2S	F	2565		MFQ0272	01/15/93	10:13
17	S212197-04	M3S	F	2565		MFQ0273	01/15/93	10:16
18	S212197-07	M0S	F	2565		MFQ0300	01/15/93	10:18
19	S212197-07	M1S	F	2565		MFQ0301	01/15/93	10:21
20	S212197-07	M2S	F	2565		MFQ0302	01/15/93	10:23
21	S212197-07	M3S	F	2565		MFQ0303	01/15/93	10:26
22	S212197-13	M0S	F	2565		MFQ2220	01/15/93	10:28
23	S212197-13	M1S	F	2565		MFQ2221	01/15/93	10:31
24	S212197-13	M2S	F	2565		MFQ2222	01/15/93	10:33
25	S212197-13	M3S	F	2565		MFQ2223	01/15/93	10:36
26	X	X	F			ZZZZZZ	01/15/93	10:38
27	X	X	F			ZZZZZZ	01/15/93	10:40
28	50 PPB	CCV	F			CCV	01/15/93	10:43
29	CAL BLK	CCB	F			CCB	01/15/93	10:45
30	S212197-14	M0S	F	2565		MFQ2230	01/15/93	10:48
31	S212197-14	M1S	F	2565		MFQ2231	01/15/93	10:50
32	S212197-14	M2S	F	2565		MFQ2232	01/15/93	10:53
33	S212197-14	M3S	F	2565		MFQ2233	01/15/93	10:55
34	S212197-17	M0S	F	2565		MFQ2330	01/15/93	10:58
35	S212197-17	M1S	F	2565		MFQ2331	01/15/93	11:00
36	S212197-17	M2S	F	2565		MFQ2332	01/15/93	11:03
37	S212197-17	M3S	F	2565		MFQ2333	01/15/93	11:05
38	S212197-03	M0S	F	2565		MFQ0260	01/15/93	11:10
39	S212197-03	M1S	F	2565		MFQ0261	01/15/93	11:12
40	S212197-03	M2S	F	2565		MFQ0262	01/15/93	11:14
41	S212197-03	M3S	F	2565		MFQ0263	01/15/93	11:17
42	S212197-04	M0S	F	2565		MFQ0270	01/15/93	11:19
43	S212197-04	M1S	F	2565		MFQ0271	01/15/93	11:22

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S212212--LEAD

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	S212197-04	M2S	F	2565		MFQ0272	01/15/93	11:24
45	S212197-04	M3S	F	2565		MFQ0273	01/15/93	11:27
46	S212197-17	M0S	F	2565		MFQ2330	01/15/93	11:29
47	S212197-17	M1S	F	2565		MFQ2331	01/15/93	11:32
48	S212197-17	M2S	F	2565		MFQ2332	01/15/93	11:34
49	S212197-17	M3S	F	2565		MFQ2333	01/15/93	11:37
50	50 PPB	CCV	F			CCV	01/15/93	11:39
51	CAL BLK	CCB	F			CCB	01/15/93	11:42

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 0238 GFAA ID: F1 F2 F3 F4 F5 F6 Method: 1050

Date: 1/15/93 Reviewed By: MS Standards Prepared: 2:00 1/15/93
Operator: [illegible]

Disk # 300
Acq ____
SAMIN ✓ 5212497

Standards Source
1. Calibration: 10 ppm
2. ICV: [] ICV-2 [] ICV-4(1:1)
3. CCV: 50 ppb

Channel A:			Channel B:		
RUN ID:	9301501		RUN ID:	9301551	
Element:	[] AS	[] PB	Element:	[] SE	[] TL
Background:	BS	BS	Background:	BS	BS
Wavelength (nm):	197.2	283.3	Wavelength (nm):	196.0	276.8
Slitwidth (nm):	2.0	1.0	Slitwidth (nm):	2.0	1.0
Integ Time (sec):	3.0	3.0	Integ Time (sec):	3.0	3.0

Comments		Sample ID	Dilution	Comments
STD1	1	0 PPB		
STD2	2	[] 10,5 [] 3,10		
STD3	3	50 PPB		
STD4	4	100 PPB		
	5	ICV		
	6	ICB		
	7	CRA		
	8	CCV		
	9	CCB		
RERUN	10	03		
	11	+10		
	12	+20		
	13	+30		
RERUN	14	04		
	15	+10	1:19	
	16	+20		
	17	+30		
✓	18	07		
	19	+10		
	20	+20		
	21	+30		
✓	22	13		
	23	+10		
	24	+20		
	25	+30		
	26	X		
	27	X		
	28	CCV		
	29	CCB		
✓	30	14		
	31	+10	1:19	
	32	+20		
	33	+30		
RERUN	34	17		
	35	+10	1:19	
	36	+20		
	37	+30		
	38	03	1:19	
	39	+30		

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TMA/SKINNER & SHERMAN LABORATORIES, INC.
GRAPHITE FURNACE AA RUN BENCH SHEET

AA Sequence # 2238
Page 2 of 2

40	+20		
41	+30		
42	04		
43	+10		Pb
44	+20	1:19	Alloy
45	+30		
46	17		
47	+10		
48	+20		
49	+30		
50	CCV		
51	CCB		
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Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 1

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
1	STD1(0)	XWS0	S0	1.00x	01/15/93	08:56

	<-Pb->		<-Tl->	
Burns (Abs)	[0]A	[0]A	[0]A	[0]A
Mean	0.0000		0.0000	
CV %	---		---	

Pb only 1/15/93 KA

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
2	STD2(3,10)	WS1	S	1.00x	01/15/93	09:01

	<-Pb->		<-Tl->	
Burns (Abs)	0.024 A	0.026 A	0.029A	0.032A
Mean	0.0250		0.0305	
CV %	0.00		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
3	STD3(50)	WS2	S	1.00x	01/15/93	09:05

	<-Pb->		<-Tl->	
Burns (Abs)	0.322 A	0.330 A	0.155A	0.156A
Mean	0.3260		0.1555	
CV %	1.74		0.00	

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
4	STD4(100)	WS3	S	1.00x	01/15/93	09:09

	<-Pb->		<-Tl->	
Burns (Abs)	0.555 A	0.567 A	0.273A	0.273A
Mean	0.5610		0.2730	
CV %	1.51		0.00	

- Calibration coefficients -

	<-Pb->	<-Tl->
Order:	2	2
Coef[0]:	0	0
Coef[1]:	0.007443991	0.003441296
Coef[2]:	-1.83479e-005	-7.087322e-006
Correl. coef.:	1.0000	0.9998

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
5	ICV-4	ICV	ICV	2.00x	01/15/93	09:46

	<-Pb->	<-Tl->
Burns (Conc)	49.763	53.939
Mean	49.7630	53.9390
CV %	---	---
Sample value	99.53	107.88

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 2

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
6	CAL BLK	ICB	ICB	1.00x	01/15/93	09:49

	<-Pb---------->	<-Tl---------->
Burns (Conc)	0.673	-1.160
Mean	0.6730	~~-1.1600~~
CV %	---	---
Sample value	1.20U	2.60U

Pb only 1/15/93 CH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
7	CRA	CRA	CRA	1.00x	01/15/93	09:51

	<-Pb---------->	<-Tl---------->
Burns (Conc)	3.114	8.278
Mean	3.1140	~~8.2780~~
CV %	---	---
Sample value	3.11	8.28

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
8	50 PPB	CCV	CCV	1.00x	01/15/93	09:54

	<-Pb---------->	<-Tl---------->
Burns (Conc)	46.766	48.053
Mean	46.7660	~~48.0530~~
CV %	---	---
Sample value	46.77	48.05

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
9	CAL BLK	CCB	CCB	1.00x	01/15/93	09:56

	<-Pb---------->	<-Tl---------->
Burns (Conc)	0.673	-0.290
Mean	0.6730	~~-0.2900~~
CV %	---	---
Sample value	1.20U	2.60U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
10	S212197-03	MOS	MFQ0260	20.00x	01/15/93	09:58

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.111 A	-0.009A
Mean	0.1110	~~-0.0090~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
11	-03	MIS	MFQ0261	20.00x	01/15/93	10:01

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.194 A	0.023A
Mean	0.1940	~~0.0230~~
CV %	---	---
Spike added:	10.00	10.00

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 3

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
12	-03	M2S	MFQ0262	20.00x	01/15/93	10:03

	<-Pb->	<-Tl->
Burns (Abs)	0.224 A	0.049A
Mean	0.2240	~~0.0490~~
CV %	---	---
Spike added:	20.00	20.00

Pb only 1/15/93 KCA

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
13	-03	M3S	MFQ0263	20.00x	01/15/93	10:06

	<-Pb->	<-Tl->
Burns (Abs)	0.299 A	0.087A
Mean	0.2990	0.0870
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.11790	~~-0.00960~~
Slope:	0.00594	0.00314
Correlation:	0.9862	0.9975
X intercept:	-19.848	3.057
Sample value:	396.970	-61.146

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
14	-04	M0S	MFQ0270	20.00x	01/15/93	10:08

	<-Pb->	<-Tl->
Burns (Abs)	0.092 A	-0.003A
Mean	0.0920	~~-0.0030~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
15	-04	M1S	MFQ0271	20.00x	01/15/93	10:11

	<-Pb->	<-Tl->
Burns (Abs)	0.167 A	0.026A
Mean	0.1670	~~0.0260~~
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
16	-04	M2S	MFQ0272	20.00x	01/15/93	10:13

	<-Pb->	<-Tl->
Burns (Abs)	0.240 A	0.071A
Mean	0.2400	0.0710
CV %	---	---
Spike added:	20.00	20.00

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
17	-04	M3S	MFQ0273	20.00x	01/15/93	10:16

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.282 A	0.088A
Mean	0.2820	0.0880
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.09880	~~-0.00220~~
Slope:	0.00643	0.00318
Correlation:	0.9925	0.9871
X intercept:	-15.365	0.692
Sample value:	307.309	-13.836

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
18	-07	M0S	MFQ0300	20.00x	01/15/93	10:18

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.231 A	-0.008A
Mean	0.2310	~~-0.0080~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
19	-07	M1S	MFQ0301	20.00x	01/15/93	10:21

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.293 A	0.029A
Mean	0.2930	~~0.0290~~
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
20	-07	M2S	MFQ0302	20.00x	01/15/93	10:23

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.347 A	0.059A
Mean	0.3470	~~0.0590~~
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
21	-07	M3S	MFQ0303	20.00x	01/15/93	10:26

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.405 A	0.092A
Mean	0.4050	0.0920
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.23260	-0.00650
Slope:	0.00576	0.00330
Correlation:	0.9997	0.9992
X intercept:	-40.382	1.970
Sample value:	807.639	-39.394

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 5

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
22	-13	MOS	MFQ2220	1.00x	01/15/93	10:28

	<-Pb->	<-Tl->
Burns (Abs)	0.122 A	-0.001A
Mean	0.1220	~~-0.0010~~
CV %	---	---
Spike added:	0.00	0.00

Pb only 1/15/93 EK

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
23	-13	M1S	MFQ2221	1.00x	01/15/93	10:31

	<-Pb->	<-Tl->
Burns (Abs)	0.172 A	0.027A
Mean	0.1720	~~0.0270~~
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
24	-13	M2S	MFQ2222	1.00x	01/15/93	10:33

	<-Pb->	<-Tl->
Burns (Abs)	0.233 A	0.064A
Mean	0.2330	~~0.0640~~
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
25	-13	M3S	MFQ2223	1.00x	01/15/93	10:36

	<-Pb->	<-Tl->
Burns (Abs)	0.270 A	0.084A
Mean	0.2700	0.0840
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.12350	~~-0.00030~~
Slope:	0.00505	~~0.00292~~
Correlation:	0.9960	0.9942
X intercept:	-24.455	0.103
Sample value:	24.455	-0.103

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
26	X	X	ZZZZZZ	1.00x	01/15/93	10:38

	<-Pb->	<-Tl->
Burns (Conc)	0.134	-1.160
Mean	0.1340	-1.1600
CV %	---	---
Sample value	1.20U	2.60U

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 6

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
27	X	X	ZZZZZZ	1.00x	01/15/93	10:40

	<-Pb---------->	<-Tl---------->
Burns (Conc)	-0.134	-2.601
Mean	-0.1340	-2.6010
CV %	---	---
Sample value	1.20U	2.60U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
28	50 PPB	CCV 2	CCV	1.00x	01/15/93	10:43

	<-Pb---------->	<-Tl---------->
Burns (Conc)	50.120	49.873
Mean	50.1200	~~49.8730~~
CV %	---	---
Sample value	50.12	49.87

Pb only 1/15/93 KG

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
29	CAL BLK	CCB 2	CCB	1.00x	01/15/93	10:45

	<-Pb---------->	<-Tl---------->
Burns (Conc)	0.808	-1.737
Mean	0.8080	~~-1.7370~~
CV %	---	---
Sample value	1.20U	2.60U

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
30	-14	MOS	MFQ2230	10.00x	01/15/93	10:48

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.085 A	-0.006A
Mean	0.0850	~~-0.0060~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
31	-14	M1S	MFQ2231	10.00x	01/15/93	10:50

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.145 A	0.027A
Mean	0.1450	~~0.0270~~
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
32	-14	M2S	MFQ2232	10.00x	01/15/93	10:53

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.211 A	0.061A
Mean	0.2110	~~0.0610~~
CV %	---	---
Spike added:	20.00	20.00

ARGOS MODEL SA4 Version 1.29

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Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
33	-14	M3S	MFQ2233	10.00x	01/15/93	10:55

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.280 A	0.094A
Mean	0.2800	0.0940
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.08260	-0.00610
Slope:	0.00651	0.00334
Correlation:	0.9995	1.0000
X intercept:	-12.688	1.826
Sample value:	126.882	-18.263

Pb only 1/15/93 KA

34	-17	M0S	MFQ2330	20.00x	01/15/93	10:58

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.204 A	-0.009A
Mean	0.2040	-0.0090
CV %	---	---
Spike added:	0.00	0.00

35	-17	M1S	MFQ2331	20.00x	01/15/93	11:00

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.255 A	0.028A
Mean	0.2550	0.0280
CV %	---	---
Spike added:	10.00	10.00

36	-17	M2S	MFQ2332	20.00x	01/15/93	11:03

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.336 A	0.065A
Mean	0.3360	0.0650
CV %	---	---
Spike added:	20.00	20.00

37	-17	M3S	MFQ2333	20.00x	01/15/93	11:05

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.378 A	0.084A
Mean	0.3780	0.0840
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.20280	-0.00540
Slope:	0.00603	0.00316
Correlation:	0.9930	0.9904
X intercept:	-33.632	1.709
Sample value:	672.637	-34.177

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ARGOS MODEL SA4 Version 1.29

Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 8

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
38	-03	MOS	MFQ0260	20.00x	01/15/93	11:10

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.104 A	-0.003A
Mean	0.1040	-0.0030
CV %	---	---
Spike added:	0.00	0.00

Pb only 1/15/93 KM

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
39	-03	M1S	MFQ0261	20.00x	01/15/93	11:12

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.157 A	0.024A
Mean	0.1570	0.0240
CV %	---	---
Spike added:	10.00	10.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
40	-03	M2S	MFQ0262	20.00x	01/15/93	11:14

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.219 A	0.049A
Mean	0.2190	0.0490
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
41	-03	M3S	MFQ0263	20.00x	01/15/93	11:17

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.265 A	0.077A
Mean	0.2650	0.0770
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.10450	-0.00300
Slope:	0.00545	0.00265
Correlation:	0.9985	0.9998
X intercept:	-19.174	1.132
Sample value:	383.486	-22.642

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
42	-04	MOS	MFQ0270	20.00x	01/15/93	11:19

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.089 A	-0.001A
Mean	0.0890	-0.0010
CV %	---	---
Spike added:	0.00	0.00

ARGOS MODEL SA4 Version 1.29

-257

Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 9

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
43	-04	M1S	MFQ0271	20.00x	01/15/93	11:22

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.150 A	0.027A
Mean	0.1500	~~0.0270~~
CV %	---	---
Spike added:	10.00	10.00

Pb only 1/15/93 KH

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
44	-04	M2S	MFQ0272	20.00x	01/15/93	11:24

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.203 A	0.054A
Mean	0.2030	~~0.0540~~
CV %	---	---
Spike added:	20.00	20.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
45	-04	M3S	MFQ0273	20.00x	01/15/93	11:27

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.251 A	0.084A
Mean	0.2510	0.0840
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.09240	-0.00130
Slope:	0.00539	0.00282
Correlation:	0.9985	0.9998
X intercept:	-17.143	0.461
Sample value:	342.857	-9.220

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
46	-17	MOS	MFQ2330	20.00x	01/15/93	11:29

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.189 A	-0.003A
Mean	0.1890	~~-0.0030~~
CV %	---	---
Spike added:	0.00	0.00

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
47	-17	M1S	MFQ2331	20.00x	01/15/93	11:32

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.243 A	0.017A
Mean	0.2430	0.0170
CV %	---	---
Spike added:	10.00	10.00

ARGOS MODEL SA4 Version 1.29

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Jarrell-Ash Video 22
Run: F2 9301501 Analyst: JST Page 10

Concentrations/Absorbances

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
48	-17	M2S	MFQ2332	20.00x	01/15/93	11:34

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.298 A	0.055A
Mean	0.2980	0.0550
CV %	---	---
Spike added:	20.00	20.00

Y Davis 1/15/93 KCA

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
49	-17	M3S	MFQ2333	20.00x	01/15/93	11:37

	<-Pb---------->	<-Tl---------->
Burns (Abs)	0.344 A	0.086A
Mean	0.3440	0.0860
CV %	---	---
Spike added:	30.00	30.00
- MSA calculations -		
Intercept:	0.19050	-0.00700
Slope:	0.00520	0.00305
Correlation:	0.9992	0.9935
X intercept:	-36.635	2.295
Sample value:	732.692	-45.902

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
50	50 PPB	CCV 3	CCV	1.00x	01/15/93	11:39

	<-Pb---------->	<-Tl---------->
Burns (Conc)	46.592	46.609
Mean	46.5920	46.6090
CV %	---	---
Sample value	46.59	46.61

POS	SAMPLE ID	CODE	CLIENT ID	DILUTION	DATE	TIME
51	CAL BLK	CCB 3	CCB	1.00x	01/15/93	11:42

	<-Pb---------->	<-Tl---------->
Burns (Conc)	0.403	-0.290
Mean	0.4030	-0.2900
CV %	---	---
Sample value	1.20U	2.60U

259

C L P M E T A L S 3.02e

S212197--MERCURY

Run id: M3 9235205
LDC ANALYTICAL #050941
Analytical method: CV
Element: Hg

Acquired: 12/17/92 by MAS
Crunched: 01/15/93 by MAS
Time: 0950
Processing protocol: 3/90

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
1	0 PPB	WS0	CV			S0	12/17/92	10:37
2	0.2 PPB	WS1	CV			S0.2	12/17/92	10:42
3	1.0 PPB	WS2	CV			S1.0	12/17/92	10:46
4	2.0 PPB	WS3	CV			S2.0	12/17/92	10:50
5	5.0 PPB	WS4	CV			S5.0	12/17/92	10:54
6	ICV-5	ICV	CV			ICV	12/17/92	11:03
7	CAL BLK	ICB	CV			ICB	12/17/92	11:07
8	2 PPB	CCV	CV			CCV	12/17/92	11:12
9	CAL BLK	CCB	CV			CCB	12/17/92	11:16
10	X	X	CV			ZZZZZZ	12/17/92	11:20
11	X	X	CV			ZZZZZZ	12/17/92	11:25
12	X	X	CV			ZZZZZZ	12/17/92	11:29
13	X	X	CV			ZZZZZZ	12/17/92	11:33
14	X	X	CV			ZZZZZZ	12/17/92	11:38
15	X	X	CV			ZZZZZZ	12/17/92	11:42
16	X	X	CV			ZZZZZZ	12/17/92	11:46
17	X	X	CV			ZZZZZZ	12/17/92	11:51
18	X	X	CV			ZZZZZZ	12/17/92	11:55
19	X	X	CV			ZZZZZZ	12/17/92	11:59
20	2 PPB	CCV	CV			CCV	12/17/92	12:03
21	CAL BLK	CCB	CV			CCB	12/17/92	12:08
22	X	X	CV			ZZZZZZ	12/17/92	12:12
23	X	X	CV			ZZZZZZ	12/17/92	12:16
24	X	X	CV			ZZZZZZ	12/17/92	12:21
25	X	X	CV			ZZZZZZ	12/17/92	12:25
26	X	X	CV			ZZZZZZ	12/17/92	12:29
27	X	X	CV			ZZZZZZ	12/17/92	12:34
28	X	X	CV			ZZZZZZ	12/17/92	12:38
29	X	X	CV			ZZZZZZ	12/17/92	12:42
30	X	X	CV			ZZZZZZ	12/17/92	12:47
31	X	X	CV			ZZZZZZ	12/17/92	12:51
32	2 PPB	CCV	CV			CCV	12/17/92	12:55
33	CAL BLK	CCB	CV			CCB	12/17/92	13:00
34	X	X	CV			ZZZZZZ	12/17/92	13:04
35	X	X	CV			ZZZZZZ	12/17/92	13:08
36	X	X	CV			ZZZZZZ	12/17/92	13:13
37	X	X	CV			ZZZZZZ	12/17/92	13:17
38	X	X	CV			ZZZZZZ	12/17/92	13:21
39	X	X	CV			ZZZZZZ	12/17/92	13:25
40	X	X	CV			ZZZZZZ	12/17/92	13:30
41	X	X	CV			ZZZZZZ	12/17/92	13:34
42	X	X	CV			ZZZZZZ	12/17/92	13:38
43	X 260	X	CV			ZZZZZZ	12/17/92	13:43

S212197--MERCURY

Pos	Sample	Code	Preparation Meth	Batch	Date	Client ID	Date	Time
44	2 PPB	CCV	CV			CCV	12/17/92	13:47
45	CAL BLK	CCB	CV			CCB	12/17/92	13:51
46	X	X	CV			ZZZZZZ	12/17/92	13:56
47	X	X	CV			ZZZZZZ	12/17/92	14:00
48	X	X	CV			ZZZZZZ	12/17/92	14:04
49	X	X	CV			ZZZZZZ	12/17/92	14:09
50	X	X	CV			ZZZZZZ	12/17/92	14:13
51	X	X	CV			ZZZZZZ	12/17/92	14:17
52	X	X	CV			ZZZZZZ	12/17/92	14:22
53	X	X	CV			ZZZZZZ	12/17/92	14:26
54	X	X	CV			ZZZZZZ	12/17/92	14:30
55	X	X	CV			ZZZZZZ	12/17/92	14:34
56	2 PPB	CCV	CV			CCV	12/17/92	14:39
57	CAL BLK	CCB	CV			CCB	12/17/92	14:43
58	PB	PBS	CV	2565	12/16/92	PBS	12/17/92	14:47
59	LCSHG	LCSS	CV	2565	12/16/92	LCSS	12/17/92	14:52
60	S212197-01	S	CV	2565	12/16/92	MFN649	12/17/92	14:56
61	S212197-01	S2	CV	2565	12/16/92	MFN649D	12/17/92	15:00
62	S212197-01	DS	CV	2565	12/16/92	MFN649S	12/17/92	15:05
63	S212197-02	S	CV	2565	12/16/92	MFN650	12/17/92	15:09
64	S212197-03	S	CV	2565	12/16/92	MFQ026	12/17/92	15:13
65	S212197-04	S	CV	2565	12/16/92	MFQ027	12/17/92	15:18
66	S212197-05	S	CV	2565	12/16/92	MFQ028	12/17/92	15:22
67	S212197-06	S	CV	2565	12/16/92	MFQ029	12/17/92	15:26
68	2 PPB	CCV	CV			CCV	12/17/92	15:31
69	CAL BLK	CCB	CV			CCB	12/17/92	15:35
70	S212197-07	S	CV	2565	12/16/92	MFQ030	12/17/92	15:39
71	S212197-08	S	CV	2565	12/16/92	MFQ031	12/17/92	15:44
72	S212197-09	S	CV	2565	12/16/92	MFQ205	12/17/92	15:48
73	S212197-10	S	CV	2565	12/16/92	MFQ210	12/17/92	15:52
74	S212197-11	S	CV	2565	12/16/92	MFQ211	12/17/92	15:56
75	S212197-12	S	CV	2565	12/16/92	MFQ221	12/17/92	16:01
76	S212197-13	S	CV	2565	12/16/92	MFQ222	12/17/92	16:05
77	S212197-14	S	CV	2565	12/16/92	MFQ223	12/17/92	16:09
78	S212197-15	S	CV	2565	12/16/92	MFQ224	12/17/92	16:14
79	S212197-16	S	CV	2565	12/16/92	MFQ225	12/17/92	16:18
80	2 PPB	CCV	CV			CCV	12/17/92	16:22
81	CAL BLK	CCB	CV			CCB	12/17/92	16:27
82	S212197-17	S	CV	2565	12/16/92	MFQ233	12/17/92	16:31
83	S212197-18	S	CV	2565	12/16/92	MFQ234	12/17/92	16:35
84	S212197-19	S	CV	2565	12/16/92	MFQ235	12/17/92	16:40
85	S212197-20	S	CV	2565	12/16/92	MFQ236	12/17/92	16:44
86	X	X	CV			ZZZZZZ	12/17/92	16:48
87	X	X	CV			ZZZZZZ	12/17/92	16:53
88	2 PPB	CCV	CV			CCV	12/17/92	16:57
89	CAL BLK	CCB	CV			CCB	12/17/92	17:01

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TMA/Skinner & Sherman Labs
MERCURY BENCH SHEET

SEQ NO: 143
RUN IDS:
Reviewed

9235201 02 03 04 05

ANALYST JLS
INSTR: M3(auto)
METHOD: HG
WAVELENGTH 253.7 mm

CALIBRATION TIME 10:37

RUN DATE 12/17/92
STANDARDS PREPPED
DATE: 12/17/92
STANDARD SOURCE
CALIB: 10 ppm MV
ICV: ICV-5 CCV: 2 ppb

CALIBRANTS
01 BLANK
02 0.2 PPB
03 1.0 PPB
04 2.0 PPB
05 5.0 PPB

	SAMPLE ID	CLIENT ID	DILUTION FACTOR	COMMENT
06	ICV-5	ICV	2X	
07	CAL BLK	ICB		
08	2 PPB	CCV		
09	CAL BLK	CCB		
10	PB			
11	LCSS		10X	
12	5212150-01			
13	02			
14	03			
15	04			
16	05			
17	06			
18	07			
19	08			
20	CCV			
21	CCB			
22	10			
23	11			
24	12			
25	13			
26	13D			
27	13S			
28	PB			
29	LCSS		10X	
30	5212161-01			
31	02			
32	CCV			
33	CCB			
34	02D			
35	02S			
36	PB			
37	LCSS		10X	
38	5212159-01			
39	01D			

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revised 07/92

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TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: 143

	SAMPLE ID	CLIENT ID	DILUTION FACTOR	COMMENT
40	01S			
41	02			Dil
42	03			Dil
43	04			
44	CCV			
45	CCB			
46	05			
47	06			
48	PB			
49	LCSS		10X	
50	5212151-01			
51	01D			
52	01S			
53	02			
54	03			
55	04			
56	CCV			
57	CCB			
58	PB			
59	LCSS		10X	
60	5212197-01			
61	01D			
62	01S			
63	02			
64	03			
65	04			
66	05			
67	06			
68	CCV			
69	CCB			
70	07			
71	08			
72	09			
73	10			
74	11			
75	12			
76	13			
77	14			
78	15			
79	16			
80	CCV			
81	CCB			
82	17			
83	18			
84	19			
85	20			

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TMA/Skinner & Sherman Labs
COLD VAPOR ATOMIC ABSORPTION
MERCURY BENCH SHEET

SEQ: 143

	SAMPLE ID	CLIENT ID	DILUTION FACTOR	COMMENT
86	5212154-02		2X	
87	03		2X	
88	CCV			
89	CCB			
90				
91				
92				
93				
94				
95				
96				
97				
98				
99				
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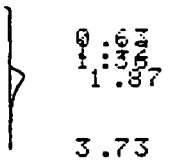
CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 10:37



INJ NO. OF STD : 1 / 1 REP , 1st level

D-2500 12/17/92 10:37

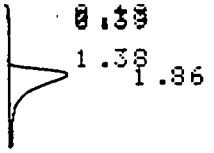
METHOD: MERCURY TAG: 1 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.87	89	0.000		HG

RAW DATA STORAGE NO. 1

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 10:42



INJ NO. OF STD : 1 / 1 REP , 2nd level

D-2500 12/17/92 10:42

METHOD: MERCURY TAG: 2 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	381	0.200		HG

265

RAW DATA STORAGE NO. 2

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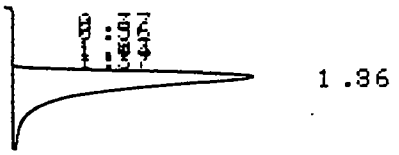
CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 10:46



INJ NO. OF STD : 1 / 1 REP , 3rd level

D-2500 12/17/92 10:46

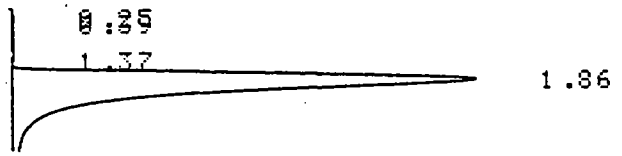
METHOD: MERCURY TAG: 3 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.86	1570	1.000		HG

RAW DATA STORAGE NO. 3

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 10:50



INJ NO. OF STD : 1 / 1 REP , 4th level

D-2500 12/17/92 10:50

METHOD: MERCURY TAG: 4 CH: 1

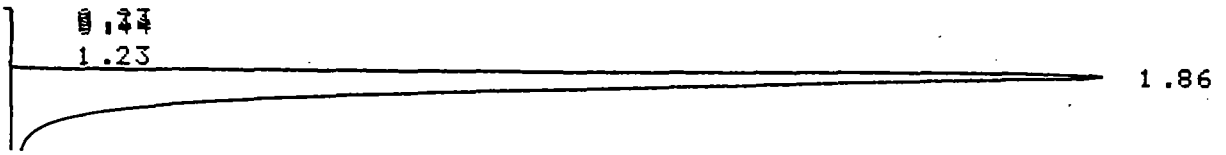
FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

266

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	3030	2.000		HG

RAW DATA STORAGE NO. 4

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 10:54



INJ NO. OF STD : 1 / 1 REP , 5th level

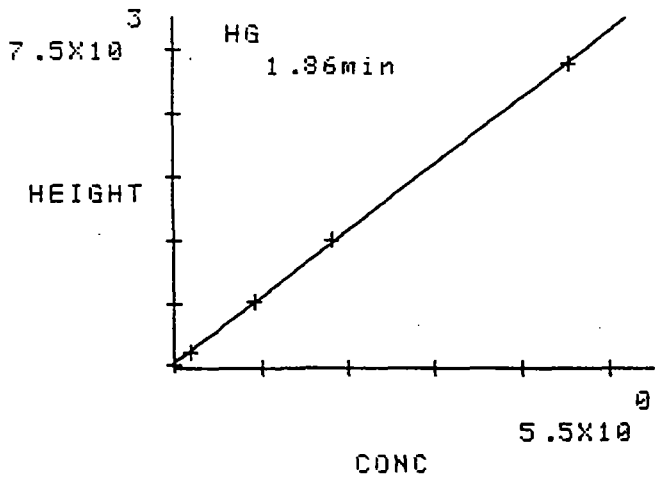
D-2500 12/17/92 10:54

METHOD: MERCURY TAG: 5 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	7173	5.000		HG

TABLE NO. = 1
NO. OF LEVELS = 5
CALIB TYPE = LINEAR



267 RAW DATA STORAGE NO. 5

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:03

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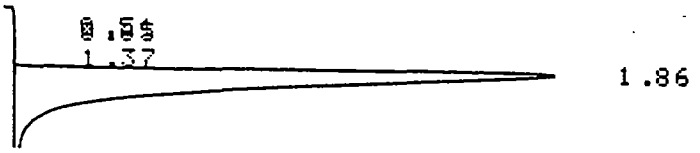


D-2500 12/17/92 11:03

METHOD: MERCURY TAG: 6 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	3539	2.410		HG
TOTAL					
		3539	2.410		

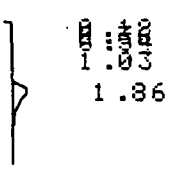
ICV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

2X

RAW DATA STORAGE NO. 6

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:07



D-2500 12/17/92 11:07

METHOD: MERCURY TAG: 7 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	93	-0.023		HG
TOTAL					
		93	-0.023		

ICB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 7

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:12

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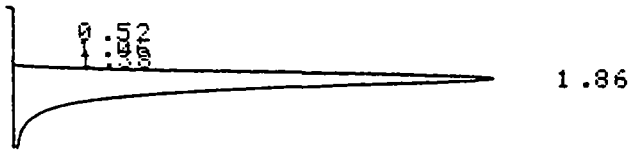


D-2500 12/17/92 11:12

METHOD: MERCURY TAG: 8 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	3150	2.135		HG
TOTAL					
		3150	2.135		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 8

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:16

D-2500 12/17/92 11:16

METHOD: MERCURY TAG: 9 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

269

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	93	-0.023		HG
TOTAL					
		93	-0.023		

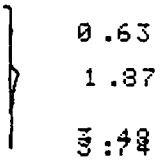
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

328

RAW DATA STORAGE NO. 9

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:20 Copy 19205/MABH51
Original is filed in CSF



D-2500 12/17/92 11:20

METHOD: MERCURY TAG: 10 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

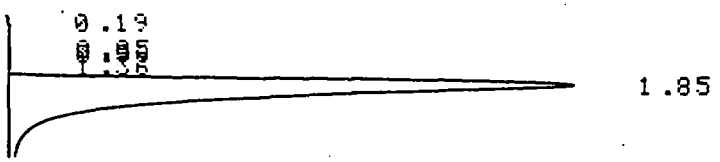
NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.87	42	-0.059		HG
TOTAL		42	-0.059		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

PB

RAW DATA STORAGE NO. 10

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:25



D-2500 12/17/92 11:25

METHOD: MERCURY TAG: 11 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

270

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.85	3709	2.530		HG
TOTAL		3709	2.530		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

LCSS 10X

RAW DATA STORAGE NO. 11

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:29

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Original is filed in CSF _____

D-2500 12/17/92 11:29

METHOD: MERCURY TAG: 12 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

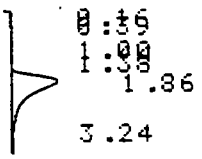
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.92	50	-0.054		HG
TOTAL		50	-0.054		

5212150-01
MDDZ53

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 12

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:33



D-2500 12/17/92 11:33

METHOD: MERCURY TAG: 13 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

271

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	295	0.119		HG
TOTAL		295	0.119		

02
MDDZ55

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 13

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:38

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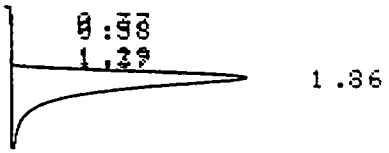
Original is filed in CSF



D-2500 12/17/92 11:38

METHOD: MERCURY TAG: 14 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

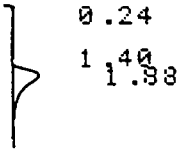
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	1547	1.003		HG
TOTAL					
		1547	1.003		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 14

03
MDDZ56

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:42



D-2500 12/17/92 11:42

METHOD: MERCURY TAG: 15 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

272

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.88	170	0.031		HG
TOTAL					
		170	0.031		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

331

04
MDDZ57

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:46

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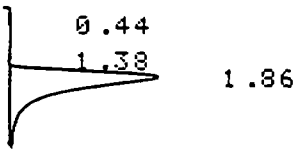
Original is filed in CSF _____



D-2500 12/17/92 11:46

METHOD: MERCURY TAG: 16 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

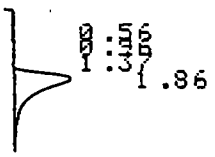
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	965	0.592		HG
TOTAL					
		965	0.592		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

05
MDDZ58

RAW DATA STORAGE NO. 16

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:51



D-2500 12/17/92 11:51

METHOD: MERCURY TAG: 17 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

273

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	364	0.168		HG
TOTAL					
		364	0.168		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

06
MDDZ59

332

RAW DATA STORAGE NO. 17

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:55

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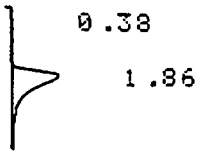
Original is filed in CSF _____



D-2500 12/17/92 11:55

METHOD: MERCURY TAG: 18 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

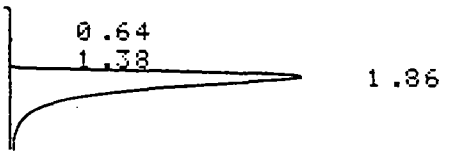
NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	295	0.119		HG
TOTAL					
		295	0.119		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

07
MDDZ60

RAW DATA STORAGE NO. 18

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 11:59



D-2500 12/17/92 11:59

METHOD: MERCURY TAG: 19 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

274

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	1905	1.256		HG
TOTAL					
		1905	1.256		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

08
MDDZ61

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:03

Copy 19205/MABH51
Original is filed in CSF _____

D-2500 12/17/92 12:03

METHOD: MERCURY TAG: 20 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

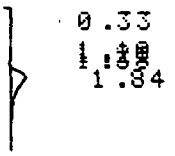
NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	3102	2.101		HG
TOTAL					
		3102	2.101		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 20

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:08



D-2500 12/17/92 12:08

METHOD: MERCURY TAG: 21 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

275

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.84	95	-0.022		HG
TOTAL					
		95	-0.022		

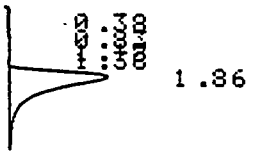
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 21

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:12

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 12:12

METHOD: MERCURY TAG: 22 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

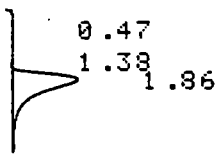
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	644	0.366		HG
TOTAL		644	0.366		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

10
MDDZ63

RAW DATA STORAGE NO. 22

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:16



D-2500 12/17/92 12:16

METHOD: MERCURY TAG: 23 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

276

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	426	0.212		HG
TOTAL		426	0.212		

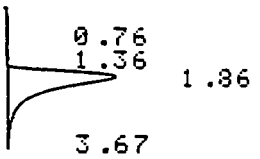
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

11
MDDZ64

RAW DATA STORAGE NO. 23

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:21 Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 12:21

METHOD: MERCURY TAG: 24 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

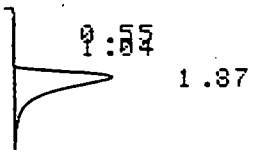
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	699	0.405		HG
TOTAL					
		699	0.405		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

12
MDDZ65

RAW DATA STORAGE NO. 24

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:25



D-2500 12/17/92 12:25

METHOD: MERCURY TAG: 25 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

277

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.87	631	0.357		HG
TOTAL					
		631	0.357		

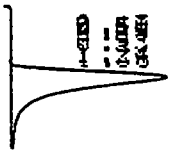
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

13
MDDZ66

RAW DATA STORAGE NO. 25

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:29 Copy 19205/MABH51

Original is filed in CSF



D-2500 12/17/92 12:29

METHOD: MERCURY TAG: 26 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.86	1014	0.627		HG
TOTAL					
		1014	0.627		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

13D
MDDZ66D

RAW DATA STORAGE NO. 26

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:34

D-2500 12/17/92 12:34

METHOD: MERCURY TAG: 27 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

278

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	2099	1.393		HG
TOTAL					
		2099	1.393		

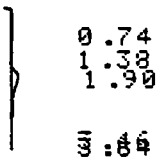
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

13S
MDDZ66S

RAW DATA STORAGE NO. 27

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:38

Copy
Original is filed in CSF 19205/MABH51



D-2500 12/17/92 12:38

METHOD: MERCURY TAG: 28 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

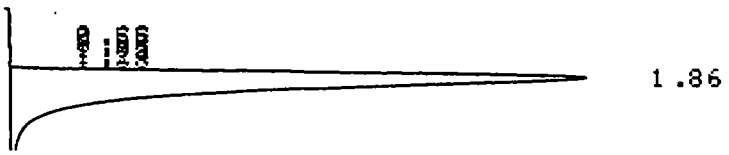
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.90	40	-0.061		HG
TOTAL					
		40	-0.061		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 28

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:42



D-2500 12/17/92 12:42

METHOD: MERCURY TAG: 29 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

279

NO.	RT	HEIGHT	UG/L	BC	NAME
7	1.86	3784	2.583		HG
TOTAL					
		3784	2.583		

LESS 10X

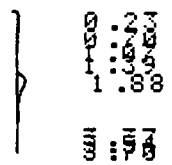
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

338

RAW DATA STORAGE NO. 29

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:47

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 12:47

METHOD: MERCURY TAG: 30 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

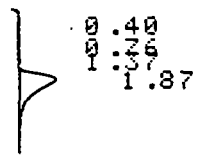
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.88	52	-0.052		HG
TOTAL		52	-0.052		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 30

5212161-01
MDDZ38

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:51



D-2500 12/17/92 12:51

METHOD: MERCURY TAG: 31 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

280

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.87	234	0.076		HG
TOTAL		234	0.076		

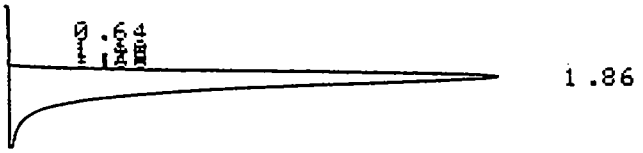
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 31

02
MDDZ41

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 12:55

Copy
Original is filed in CSF 19205/MABH51



D-2500 12/17/92 12:55

METHOD: MERCURY TAG: 32 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

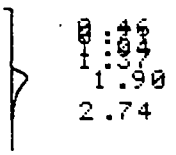
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	3204	2.173		HG
TOTAL					
		3204	2.173		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 32

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:00



D-2500 12/17/92 13:00

METHOD: MERCURY TAG: 33 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

281

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.90	93	-0.023		HG
TOTAL					
		93	-0.023		

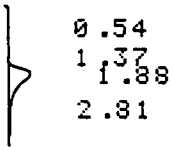
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 33

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:04 Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 13:04

METHOD: MERCURY TAG: 34 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.88	138	0.009		HG
TOTAL					
		138	0.009		

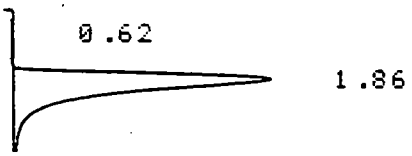
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

02D

MDDZ41D

RAW DATA STORAGE NO. 34

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:08



D-2500 12/17/92 13:08

METHOD: MERCURY TAG: 35 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

232

NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	1692	1.106		HG
TOTAL					
		1692	1.106		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

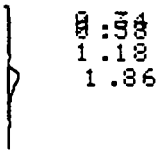
02S

MDDZ41S

RAW DATA STORAGE NO. 35

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:13

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 13:13

METHOD: MERCURY TAG: 36 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

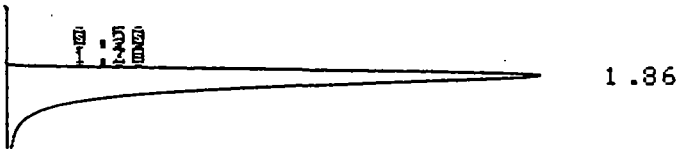
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	63	-0.044		HG
TOTAL		63	-0.044		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 36

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:17



D-2500 12/17/92 13:17

METHOD: MERCURY TAG: 37 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

283

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	3493	2.377		HG
TOTAL		3493	2.377		

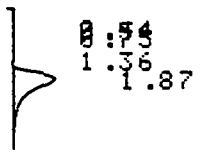
LCSS 10X

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 37

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:21

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 13:21

METHOD: MERCURY TAG: 38 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

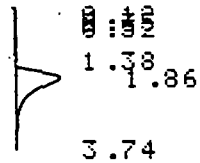
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.87	262	0.096		HG
TOTAL		262	0.096		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 38

5212154-01
MCGX36

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:25



D-2500 12/17/92 13:25

METHOD: MERCURY TAG: 39 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

284

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	285	0.112		HG
TOTAL		285	0.112		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

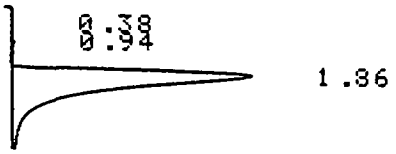
343

RAW DATA STORAGE NO. 39

01D
MCGX36D

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:30 Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 13:30

METHOD: MERCURY TAG: 40 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	1554	1.008		HG
TOTAL		1554	1.008		

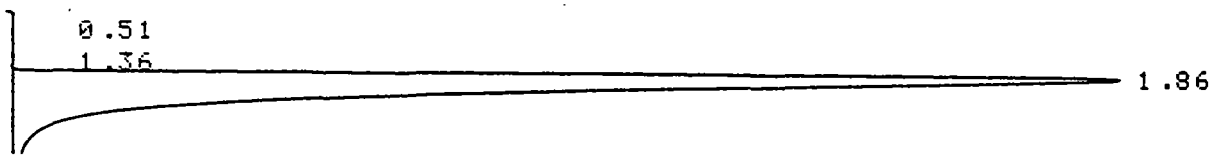
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 40

01 S

mcg x 36 S

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:34



D-2500 12/17/92 13:34

METHOD: MERCURY TAG: 41 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

285

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	7284	5.054		HG
TOTAL		7284	5.054		

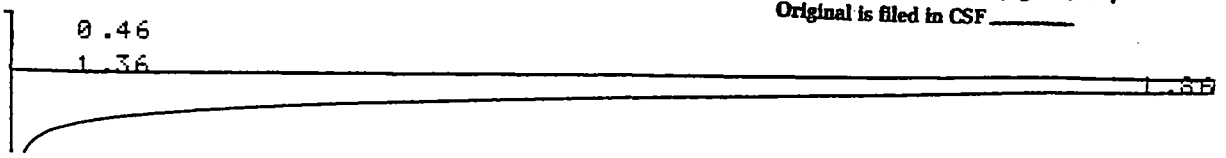
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 41

02

mcg x 37

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:38 Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 13:38

METHOD: MERCURY TAG: 42 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	11983	8.372		HG
TOTAL					
		11983	8.372		

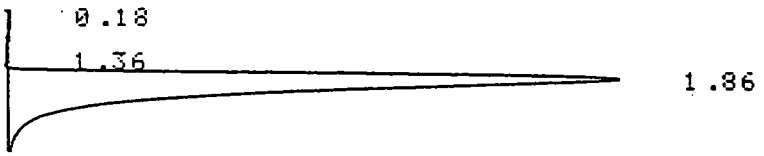
03

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

MCGX 38

RAW DATA STORAGE NO. 42

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:43



D-2500 12/17/92 13:43

METHOD: MERCURY TAG: 43 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

286

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	4021	2.750		HG
TOTAL					
		4021	2.750		

04

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

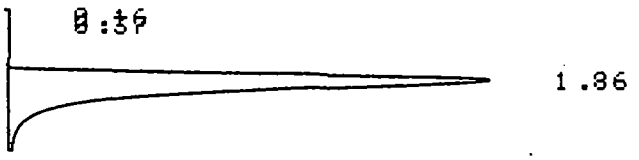
MCGX 39

345

RAW DATA STORAGE NO. 43

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:47

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 13:47

METHOD: MERCURY TAG: 44 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

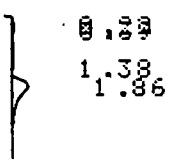
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	3181	2.157		HG
TOTAL					
		3181	2.157		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 44 .

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:51



D-2500 12/17/92 13:51

METHOD: MERCURY TAG: 45 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

287

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	98	-0.020		HG
TOTAL					
		98	-0.020		

CCB

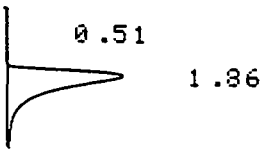
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 45

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 13:56

Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 13:56

METHOD: MERCURY TAG: 46 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

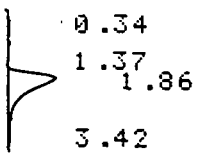
NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	752	0.442		HG
TOTAL					
		752	0.442		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

D5
mcg X 40

RAW DATA STORAGE NO. 46

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:00



D-2500 12/17/92 14:00

METHOD: MERCURY TAG: 47 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

288

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	300	0.123		HG
TOTAL					
		300	0.123		

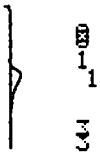
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

06
mcg X 41

RAW DATA STORAGE NO. 47

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:04

Copy 19205/MABH51
Original is filed in CSF



D-2500 12/17/92 14:04

METHOD: MERCURY TAG: 48 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

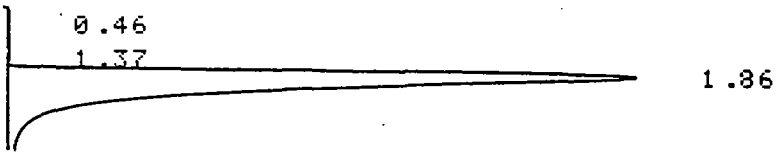
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.89	63	-0.044		HG
TOTAL		63	-0.044		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 48

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:09



D-2500 12/17/92 14:09

METHOD: MERCURY TAG: 49 CH: 1

P283 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	4136	2.831		HG
TOTAL		4136	2.831		

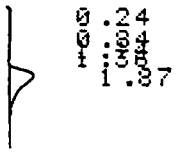
LCSS 10X

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 49

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:13 Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 14:13

METHOD: MERCURY TAG: 50 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.87	155	0.021		HG
TOTAL					
		155	0.021		

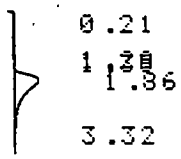
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 50

S212151-01

MABH51

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:17



D-2500 12/17/92 14:17

METHOD: MERCURY TAG: 51 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

290

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	158	0.023		HG
TOTAL					
		158	0.023		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

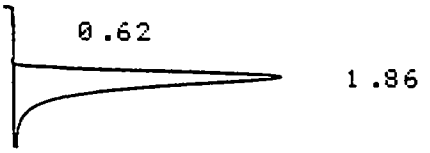
RAW DATA STORAGE NO. 51

OID

MABH51D

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:22

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 14:22

METHOD: MERCURY TAG: 52 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

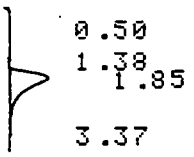
NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	1764	1.157		HG
TOTAL		1764	1.157		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 52

01S
MABH51S

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:26



D-2500 12/17/92 14:26

METHOD: MERCURY TAG: 53 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

231

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.85	249	0.087		HG
TOTAL		249	0.087		

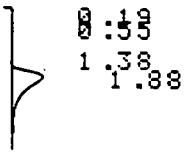
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 53

02
MABH57

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:30

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 14:30

METHOD: MERCURY TAG: 54 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

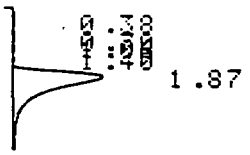
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.88	195	0.049		HG
TOTAL		195	0.049		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

03
MABH61

RAW DATA STORAGE NO. 54

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:34



D-2500 12/17/92 14:34

METHOD: MERCURY TAG: 55 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

092

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.87	577	0.319		HG
TOTAL		577	0.319		

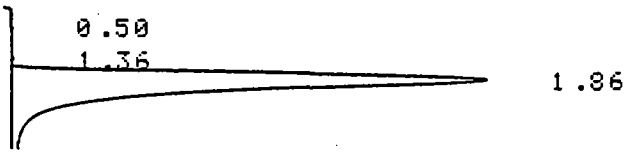
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

04
MABH63

RAW DATA STORAGE NO. 55

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:39

Copy
Original is filed in CSF 19205/MABH51



D-2500 12/17/92 14:39

METHOD: MERCURY TAG: 56 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

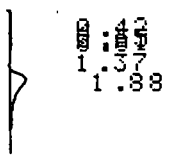
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	3129	2.120		HG
TOTAL					
		3129	2.120		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 56

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:43



D-2500 12/17/92 14:43

METHOD: MERCURY TAG: 57 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

283

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.88	100	-0.018		HG
TOTAL					
		100	-0.018		

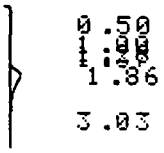
CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 57

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:47

Copy Original is filed in CSF 19205/MABH51



D-2500 12/17/92 14:47

METHOD: MERCURY TAG: 58 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

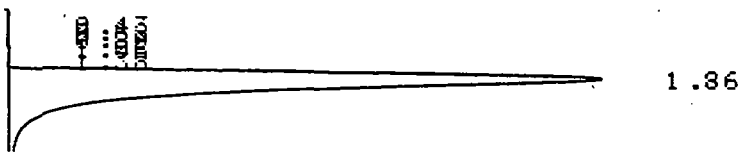
NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	66	-0.042		HG
TOTAL					
		66	-0.042		

PB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 58

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:52



D-2500 12/17/92 14:52

METHOD: MERCURY TAG: 59 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

294

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.86	3886	2.655		HG
TOTAL					
		3886	2.655		

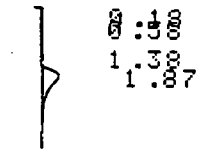
LCSS 10X

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

353

RAW DATA STORAGE NO. 59

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 14:56



Copy
Original is filed in CSF 19205/MABH51

D-2500 12/17/92 14:56

METHOD: MERCURY TAG: 60 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

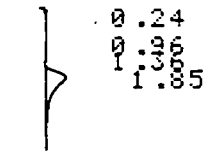
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.87	107	-0.013		HG
TOTAL		107	-0.013		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

S212197-01
MFN649

RAW DATA STORAGE NO. 60

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:00



D-2500 12/17/92 15:00

METHOD: MERCURY TAG: 61 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

295

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.85	127	0.001		HG
TOTAL		127	0.001		

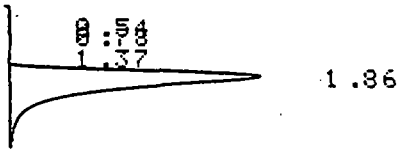
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

OID
MFN649D

RAW DATA STORAGE NO. 61

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:05

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 15:05

METHOD: MERCURY TAG: 62 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

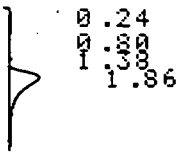
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	1661	1.084		HG
TOTAL					
		1661	1.084		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 62

015
MFN649S

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:09



D-2500 12/17/92 15:09

METHOD: MERCURY TAG: 63 CH: 1

296 FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	188	0.044		HG
TOTAL					
		188	0.044		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

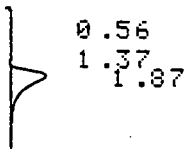
355

RAW DATA STORAGE NO. 63

02
~~MFN649~~
MFN650

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:13

Copy 19205/MABH51
Original is filed in CSF _____



D-2500 12/17/92 15:13

METHOD: MERCURY TAG: 64 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

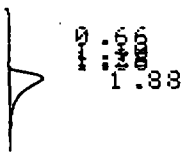
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.87	229	0.073		HG
TOTAL					
		229	0.073		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 64

03
MFQ026

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:18



D-2500 12/17/92 15:18

METHOD: MERCURY TAG: 65 CH: 1

297 FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.88	214	0.062		HG
TOTAL					
		214	0.062		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

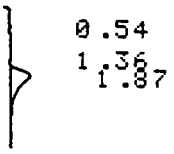
356

RAW DATA STORAGE NO. 65

04
MFQ027

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:22

Copy Original is filed in CSF 19205/MABH51



D-2500 12/17/92 15:22

METHOD: MERCURY TAG: 66 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

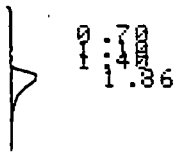
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.87	129	0.002		HG
TOTAL					
		129	0.002		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO.. 66

05
MFQ028

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:26



D-2500 12/17/92 15:26

METHOD: MERCURY TAG: 67 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	168	0.030		HG
TOTAL					
		168	0.030		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

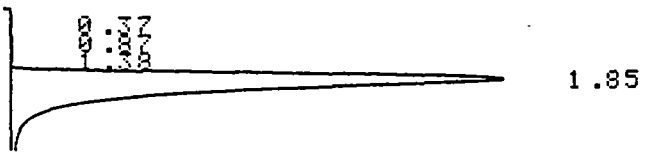
RAW DATA STORAGE NO.. 67

06
MFQ029

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:31

Copy 19205/MABH51

Original is filed in CSF _____



D-2500 12/17/92 15:31

METHOD: MERCURY TAG: 68 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

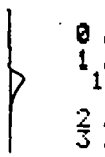
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.85	3223	2.187		HG
TOTAL					
		3223	2.187		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 68

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:35



D-2500 12/17/92 15:35

METHOD: MERCURY TAG: 69 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

299

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	87	-0.027		HG
TOTAL					
		87	-0.027		

CCB

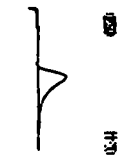
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

358

RAW DATA STORAGE NO. 69

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:39

Copy
Original is filed in CSF 19205/MABH51



D-2500 12/17/92 15:39

METHOD: MERCURY TAG: 70 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.87	180	0.038		HG
TOTAL					
		180	0.038		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 70

07
MFQ030

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:44

D-2500 12/17/92 15:44

METHOD: MERCURY TAG: 71 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

300

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.86	119	-0.005		HG
TOTAL					
		119	-0.005		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 71

08
MFQ031

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:48

Copy
Original is filed in CSF 19205/MABH51

0.33
1.38
1.88

D-2500 12/17/92 15:48

METHOD: MERCURY TAG: 72 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.88	105	-0.015		HG
TOTAL					
		105	-0.015		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 72

09
MFQ205

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:52

0.50
1.86
3.64

D-2500 12/17/92 15:52

METHOD: MERCURY TAG: 73 CH: 1

301 FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
2	1.86	88	-0.027		HG
TOTAL					
		88	-0.027		

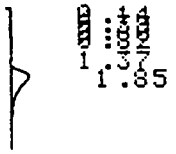
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 73

10
MFQ210

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 15:56

Copy
Original is filed in CSF 19205/MABH51



D-2500 12/17/92 15:56

METHOD: MERCURY TAG: 74 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

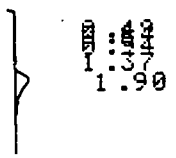
NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.85	113	-0.009		HG
TOTAL					
		113	-0.009		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

11
MFQ211

RAW DATA STORAGE NO. 74

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:01



D-2500 12/17/92 16:01

METHOD: MERCURY TAG: 75 CH: 1

302 FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.90	82	-0.031		HG
TOTAL					
		82	-0.031		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

12
MFQ221

RAW DATA STORAGE NO. 75

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:05

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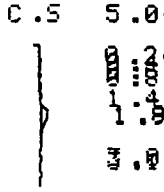
Original is filed in CSF



D-2500 12/17/92 16:05

METHOD: MERCURY TAG: 76 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
6	1.86	46	-0.056		HG
TOTAL		46	-0.056		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

13
MFQ 222

RAW DATA STORAGE NO. 76

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:09

D-2500 12/17/92 16:09

METHOD: MERCURY TAG: 77 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

-303

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.87	68	-0.041		HG
TOTAL		68	-0.041		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

14
MFQ 223

RAW DATA STORAGE NO. 77

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:14

Copy 19205/MABH51
Original is filed in CSF

0.16
1.40
1.88
3.51

D-2500 12/17/92 16:14

METHOD: MERCURY TAG: 78 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.88	77	-0.035		HG
TOTAL		77	-0.035		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

15
MFQ 224

RAW DATA STORAGE NO. 78

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:18

0.50
1.06
1.86
2.96

D-2500 12/17/92 16:18

METHOD: MERCURY TAG: 79 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

304

NO.	RT	HEIGHT	UG/L	BC	NAME
5	1.86	84	-0.030		HG
TOTAL		84	-0.030		

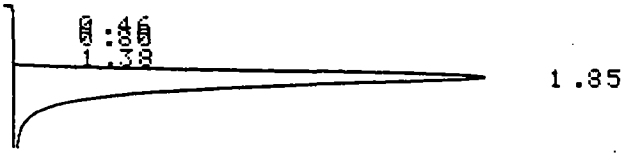
PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

16
MFQ 225

RAW DATA STORAGE NO. 79

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:22 Copy 19205/MABH51

Original is filed in CSF



D-2500 12/17/92 16:22

METHOD: MERCURY TAG: 80 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

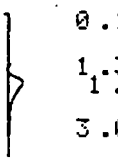
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.85	3082	2.087		HG
TOTAL					
		3082	2.087		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 80

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:27



D-2500 12/17/92 16:27

METHOD: MERCURY TAG: 81 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

-305

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	87	-0.027		HG
TOTAL					
		87	-0.027		

CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 81

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:31

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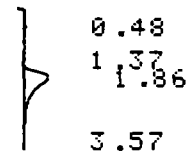
Original is filed in CSF



D-2500 12/17/92 16:31

METHOD: MERCURY TAG: 82 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

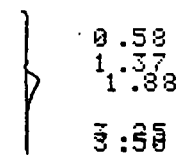
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.86	155	0.021		HG
TOTAL		155	0.021		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

17
MFQ 233

RAW DATA STORAGE NO. 82

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:35



D-2500 12/17/92 16:35

METHOD: MERCURY TAG: 83 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

-306

NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.88	74	-0.037		HG
TOTAL		74	-0.037		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

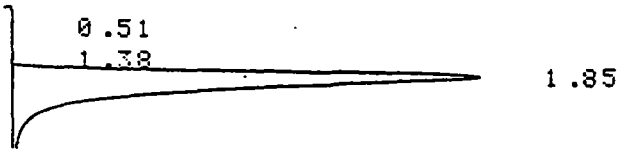
18
MFQ 234

RAW DATA STORAGE NO. 83

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:40

Copy 19205/MAoH51

Original is filed in CSF _____



D-2500 12/17/92 16:40

METHOD: MERCURY TAG: 84 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

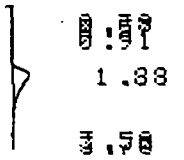
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.85	3063	2.074		HG
TOTAL					
		3063	2.074		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

19
MFQ235

RAW DATA STORAGE NO. 84

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:44



D-2500 12/17/92 16:44

METHOD: MERCURY TAG: 85 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

307

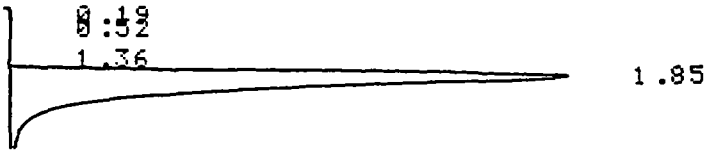
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.88	107	-0.013		HG
TOTAL					
		107	-0.013		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

20
MFQ236

RAW DATA STORAGE NO. 85

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:48



Copy 19205/MABH51
Original is filed in CSF

D-2500 12/17/92 16:48

METHOD: MERCURY TAG: 86 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

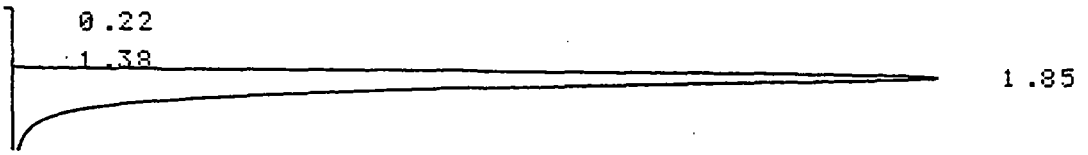
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.85	3670	2.502		HG
TOTAL		3670	2.502		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 86

S212154-02 2X
MCGX37

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:53



D-2500 12/17/92 16:53

METHOD: MERCURY TAG: 87 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

308

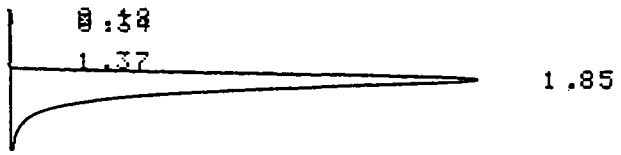
NO.	RT	HEIGHT	UG/L	BC	NAME
3	1.85	6085	4.208		HG
TOTAL		6085	4.208		

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 87

03 2X
MCGX38

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 16:57



Copy 19205/MABH51
Original is filed in CSF

D-2500 12/17/92 16:57

METHOD: MERCURY TAG: 88 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

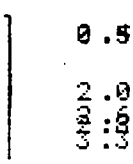
NO.	RT	HEIGHT	UG/L	BC	NAME
4	1.85	3066	2.076		HG
TOTAL		3066	2.076		

CCV

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 88

CH. 1 C.S 5.00 ATT 3 OFFS 0 12/17/92 17:01



D-2500 12/17/92 17:01

METHOD: MERCURY TAG: 89 CH: 1

FILE: 1 CALC-METHOD: EXT-STD TABLE: 1 CONC: HEIGHT

-309

NO.	RT	HEIGHT	UG/L	BC	NAME
3	2.00	8	-0.083		HG
TOTAL		8	-0.083		

CCB

PEAK REJ : 0
SF : 1.000
SAMP-AMT : 1.000

RAW DATA STORAGE NO. 89

Prep batch: 2565 Date: 01/18/93
Printed by DNP Approved: 01/18/93

MOISTURE DETERMINATION

Sample ID	Lab code	Cont wt	Cont + wet smpl	Cont + dry smpl	Wet wt, g	Dry wt, g	% solids	% water
S212197-01	S	1.340	10.590	9.830	9.250	8.490	91.8	8.2
S212197-01	S2	1.340	10.600	9.820	9.260	8.480	91.6	8.4
S212197-02	S	1.350	10.550	9.990	9.200	8.640	93.9	6.1
S212197-03	S	1.350	10.240	7.960	8.890	6.610	74.4	25.6
S212197-04	S	1.330	10.600	9.160	9.270	7.830	84.5	15.5
S212197-05	S	1.330	10.650	8.590	9.320	7.260	77.9	22.1
S212197-06	S	1.330	10.440	9.580	9.110	8.250	90.6	9.4
S212197-07	S	1.340	10.450	7.550	9.110	6.210	68.2	31.8
S212197-08	S	1.340	10.790	9.500	9.450	8.160	86.3	13.7
S212197-09	S	1.340	10.520	9.210	9.180	7.870	85.7	14.3
S212197-10	S	1.340	10.290	9.130	8.950	7.790	87.0	13.0
S212197-11	S	1.340	10.450	9.160	9.110	7.820	85.8	14.2
S212197-12	S	1.340	10.770	9.650	9.430	8.310	88.1	11.9
S212197-13	S	1.340	10.560	9.860	9.220	8.520	92.4	7.6
S212197-14	S	1.330	10.260	8.690	8.930	7.360	82.4	17.6
S212197-15	S	1.330	10.440	9.140	9.110	7.810	85.7	14.3
S212197-16	S	1.320	10.880	9.710	9.560	8.390	87.8	12.2
S212197-17	S	1.330	10.750	8.150	9.420	6.820	72.4	27.6
S212197-18	S	1.320	10.820	10.220	9.500	8.900	93.7	6.3
S212197-19	S	1.320	10.820	9.260	9.500	7.940	83.6	16.4
S212197-20	S	1.320	10.400	8.330	9.080	7.010	77.2	22.8

310

Prep batch: 2565 Date: 01/18/93

Printed by DNP Approved: 1/18/93

Prep code CV (Mercury)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSHG	LCSS	0.20 W	100	12/16/92 0800	JLS	500.0
	PB	PBS	0.20 W	100	12/16/92 0800	JLS	500.0
MFN649S	S212197-01	DS	0.20 W	100	12/16/92 0800	JLS	500.0
MFN649	S212197-01	S	0.21 W	100	12/16/92 0800	JLS	518.8
MFN649D	S212197-01	S2	0.21 W	100	12/16/92 0800	JLS	520.0
MFN650	S212197-02	S	0.21 W	100	12/16/92 0800	JLS	507.1
MFQ026	S212197-03	S	0.20 W	100	12/16/92 0800	JLS	672.5
MFQ027	S212197-04	S	0.21 W	100	12/16/92 0800	JLS	563.8
MFQ028	S212197-05	S	0.22 W	100	12/16/92 0800	JLS	583.5
MFQ029	S212197-06	S	0.21 W	100	12/16/92 0800	JLS	525.8
MFQ030	S212197-07	S	0.20 W	100	12/16/92 0800	JLS	733.5
MFQ031	S212197-08	S	0.21 W	100	12/16/92 0800	JLS	551.5
MFQ205	S212197-09	S	0.22 W	100	12/16/92 0800	JLS	530.2
MFQ210	S212197-10	S	0.23 W	100	12/16/92 0800	JLS	499.5
MFQ211	S212197-11	S	0.22 W	100	12/16/92 0800	JLS	529.5
MFQ221	S212197-12	S	0.21 W	100	12/16/92 0800	JLS	540.4
MFQ222	S212197-13	S	0.22 W	100	12/16/92 0800	JLS	491.9
MFQ223	S212197-14	S	0.22 W	100	12/16/92 0800	JLS	551.5
MFQ224	S212197-15	S	0.23 W	100	12/16/92 0800	JLS	507.2
MFQ225	S212197-16	S	0.20 W	100	12/16/92 0800	JLS	569.7
MFQ233	S212197-17	S	0.21 W	100	12/16/92 0800	JLS	657.7
MFQ234	S212197-18	S	0.21 W	100	12/16/92 0800	JLS	508.3
MFQ235	S212197-19	S	0.23 W	100	12/16/92 0800	JLS	520.2
MFQ236	S212197-20	S	0.21 W	100	12/16/92 0800	JLS	616.8

311

Prep batch: 2565 Date: 01/18/93

Printed by DNP Approved: 1/18/93

Prep code F (Furnace)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSFS	LCSS	1.00 W	200	01/08/93 0800	JLS	200.0
	PB	PBS	1.00 W	200	01/08/93 0800	JLS	200.0
MFN649S	S212197-01	DS	1.01 W	200	01/08/93 0800	JLS	198.0
MFN649	S212197-01	S	1.04 W	200	01/08/93 0800	JLS	209.5
MFN649D	S212197-01	S2	1.04 W	200	01/08/93 0800	JLS	210.0
MFN650	S212197-02	S	1.01 W	200	01/08/93 0800	JLS	210.9
MFQ026	S212197-03	S	1.02 W	200	01/08/93 0800	JLS	263.7
MFQ027	S212197-04	S	1.02 W	200	01/08/93 0800	JLS	232.1
MFQ028	S212197-05	S	1.03 W	200	01/08/93 0800	JLS	249.3
MFQ029	S212197-06	S	1.01 W	200	01/08/93 0800	JLS	218.7
MFQ030	S212197-07	S	1.04 W	200	01/08/93 0800	JLS	282.1
MFQ031	S212197-08	S	1.06 W	200	01/08/93 0800	JLS	218.5
MFQ205	S212197-09	S	1.10 W	200	01/08/93 0800	JLS	212.1
MFQ210	S212197-10	S	1.07 W	200	01/08/93 0800	JLS	214.7
MFQ211	S212197-11	S	1.06 W	200	01/08/93 0800	JLS	219.8
MFQ221	S212197-12	S	1.04 W	200	01/08/93 0800	JLS	218.2
MFQ222	S212197-13	S	1.04 W	200	01/08/93 0800	JLS	208.1
MFQ223	S212197-14	S	1.05 W	200	01/08/93 0800	JLS	231.1
MFQ224	S212197-15	S	1.05 W	200	01/08/93 0800	JLS	222.2
MFQ225	S212197-16	S	1.01 W	200	01/08/93 0800	JLS	225.6
MFQ233	S212197-17	S	1.08 W	200	01/08/93 0800	JLS	255.8
MFQ234	S212197-18	S	1.05 W	200	01/08/93 0800	JLS	203.3
MFQ235	S212197-19	S	1.01 W	200	01/08/93 0800	JLS	236.9
MFQ236	S212197-20	S	1.06 W	200	01/08/93 0800	JLS	244.4

312

Prep batch: 2565 Date: 01/18/93

Printed by DNP Approved: [illegible]

Prep code P (ICP)

Client ID	Sample ID	Lab Code	Sample wt, g	Final vol,ml	Date Prep.	Ana-lyst	Overall Dilution
	LCSPS	LCSS	1.00 W	200	01/08/93 0800	JLS	200.0
	PB	PBS	1.00 W	200	01/08/93 0800	JLS	200.0
MFN649S	S212197-01	DS	1.02 W	200	01/08/93 0800	JLS	196.1
MFN649	S212197-01	S	1.04 W	200	01/08/93 0800	JLS	209.5
MFN649D	S212197-01	S2	1.05 W	200	01/08/93 0800	JLS	208.0
MFN650	S212197-02	S	1.04 W	200	01/08/93 0800	JLS	204.8
MFQ026	S212197-03	S	1.02 W	200	01/08/93 0800	JLS	263.7
MFQ027	S212197-04	S	1.08 W	200	01/08/93 0800	JLS	219.2
MFQ028	S212197-05	S	1.04 W	200	01/08/93 0800	JLS	246.9
MFQ029	S212197-06	S	1.02 W	200	01/08/93 0800	JLS	216.5
MFQ030	S212197-07	S	1.07 W	200	01/08/93 0800	JLS	274.2
MFQ031	S212197-08	S	1.11 W	200	01/08/93 0800	JLS	208.7
MFQ205	S212197-09	S	1.07 W	200	01/08/93 0800	SRP	218.0
MFQ210	S212197-10	S	1.03 W	200	01/08/93 0800	JLS	223.1
MFQ211	S212197-11	S	1.07 W	200	01/08/93 0800	JLS	217.7
MFQ221	S212197-12	S	1.04 W	200	01/08/93 0800	JLS	218.2
MFQ222	S212197-13	S	1.08 W	200	01/08/93 0800	JLS	200.4
MFQ223	S212197-14	S	1.01 W	200	01/08/93 0800	JLS	240.3
MFQ224	S212197-15	S	1.04 W	200	01/08/93 0800	JLS	224.3
MFQ225	S212197-16	S	1.03 W	200	01/08/93 0800	JLS	221.3
MFQ233	S212197-17	S	1.05 W	200	01/08/93 0800	JLS	263.1
MFQ234	S212197-18	S	1.10 W	200	01/08/93 0800	JLS	194.1
MFQ235	S212197-19	S	1.04 W	200	01/08/93 0800	JLS	230.1
MFQ236	S212197-20	S	1.03 W	200	01/08/93 0800	JLS	251.5

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[redacted] FOR GFAA/ICP

SOIL PREP LOG

DATE [redacted] ANALYST [redacted] FOR MERCURY

PREP BATCH # 565

REVIEWED BY [illegible] 10/1/93

CLIENT	SAM WORK #	GFAA (HNO3) INITIAL WT. (g)	GFAA (HNO3) FINAL VOL mL	ICP (HNO3/HCL) INITIAL WT (g)	ICP (HNO3/HCL) FINAL VOL mL	MERCURY DIG. INITIAL WT (g)	MERCURY DIG. FINAL VOL mL	SOLIDS ANALYSIS DISH WT G	SOLIDS ANALYSIS + SMPL WT (g)	SOLIDS ANALYSIS + DRY (g) SMPL WT.	SAMPLE DESCRIPTION
MFN 649	S212197-01	1.04	200	1.04	200			1.34	10.59	9.83	Brown, fine
D	01:S2	1.04		1.05				1.34	10.60	9.82	
S	01:DS	1.01		1.02				—	—	—	
650	02	1.01		1.04				1.35	10.55	9.99	Black
MFQ 026	03	1.02		1.02				1.35	10.24	7.96	Brown, med, stones
027	04	1.02		1.08				1.33	10.60	9.16	"
028	05	1.03		1.04				1.33	10.65	8.59	
029	06	1.01		1.02				1.33	10.44	9.58	stones
030	07	1.04		1.07				1.34	10.45	7.55	fine roots
031	08	1.06		1.11				1.34	10.79	9.50	med roots stones
205	09	1.10		1.07				1.34	10.52	9.21	Black fine
210	10	1.07		1.03				1.34	10.29	9.13	Brown, med, stones
211	11	1.06		1.07				1.34	10.45	9.16	" " "
221	12	1.04		1.04				1.34	10.77	9.65	Lt. brown, fine
222	13	1.01		1.08				1.34	10.56	9.86	Brown "
223	14	1.05		1.01				1.33	10.26	8.69	" coarse
224	15	1.05		1.04				1.33	10.44	9.14	Grey-brown, med, stones
225	16	1.01		1.03				1.32	10.88	9.71	Brown, coarse, stones
233	17	1.08		1.05				1.33	10.75	8.15	fine stones
234	18	1.05		1.10				1.32	10.82	10.22	fine
235	19	1.01		1.04				1.32	10.82	9.26	Red-brown, coarse, stones
236	20	1.06		1.03				1.32	10.40	8.33	Brown, med, roots
	LCS	1.00		1.00				1.32	5.00	5.00	
	[illegible]										

Page:

Thermo Analytical/SKINNER AND SHERMAN LABORATORIES

TMA/SKINNER & SHERMAN LABORATORIES
MERCURY PREPARATION LOG

DATE 12/16/92

5212197

PREPARED BY JLS

WORK ORDER

SKINNER & SHERMAN ID	CLIENT ID	INITIAL VOL (ML)	INITIAL WT (GM)	FINAL VOL (ML)	COMMENTS
PB			–	100	
LCSHG	LCSS	XXXX	.20		
01	MFN649		.21		
01:D2	D		.21		
01:D5	S		.20		
02	MFN650		.21		
03	MFQ026		.20		
04	027		.21		
05	028		.22		
06	029		.21		
07	030		.20		
08	031		.21		
09	205		.22		
10	210		.23		
11	211		.22		
12	221		.21		
13	222		.22		
14	223		.22		
15	224		.23		
16	225		.20		
17	233		.21		
18	234		.21		
315 19	235		.23		
20	236		.21		

REVIEWED BY: KDJ 12/16/92

PAGE: 028

(1)

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD B

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
=======	======	====	==========	======	==========

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(2)

STANDARD PREPARATION LOG
++++++++++++++++++++

STANDARD IDENTITY: STANDARD 1

DATE PREPARED: 1/7/93
PREPARED BY: LP

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3	1000 ppm	5 ml	5 ppm
As	HPAs-2	1000 ppm	5 ml	5 ppm
Ba	HPBa-1	1000 ppm	5 ml	5 ppm
Be	HPBe-1	1000 ppm	1 ml	1 ppm
Cd	HPCd-1	1000 ppm	5 ml	5 ppm
Cr	HPCr-1	1000 ppm	5 ml	5 ppm
Co	HPCo-1	1000 ppm	5 ml	5 ppm
Cu	HPCu-1	1000 ppm	5 ml	5 ppm
Pb	HPPb-1	1000 ppm	5 ml	5 ppm
Mn	MVMn-3	1000 ppm	5 ml	5 ppm
Ni	MVNi-3	1000 ppm	5 ml	5 ppm
Se	HPSe-1	1000 ppm	5 ml	5 ppm
Tl	HPTl-1	1000 ppm	5 ml	5 ppm
V	HPV-1	1000 ppm	5 ml	5 ppm
Zn	HPZn-1	1000 ppm	5 ml	5 ppm
Ti	HPTi-1	1000 ppm	5 ml	5 ppm

317 SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(3)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 2

DATE PREPARED: 12/23/92
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 20 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Ag	HPAg-1		1000 ppm	1 ml	1.0 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

318

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(4)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: STANDARD 3

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
AL	HPAL-1		10,000ppm	5 ml	50 ppm
Ca	HPCa-1		10,000ppm	5 ml	50 ppm
Fe	HPFe-1		10,000 ppm	2 ml	20 ppm
Mg	HPMg-1		10,000 ppm	5 ml	50 ppm
K	HPK-1		10000ppm	5.0 ml	50 ppm
Na	HPNa-1		10000 ppm	5.0 ml	50 ppm

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

319

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(5)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Initial Calibration Verification Solutions

DATE PREPARED: 12/31/92
PREPARED BY: SRP

FINAL VOLUME:

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4/2 HNO3 ← ICV 2
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICV-1	QCICV1	-200		20ml → 200ml	
b) ICV-2	QCICV2	-152		20ml → 100ml	
c) ICV-3	QCICV3	-179		20ml → 200ml	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

320

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(6)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Interference Check Sample Solutions

DATE PREPARED: 1/7/93
PREPARED BY: LP

FINAL VOLUME: 200 ml

MATRIX: 2 %HNO3
___%HCl
___Other

MLS ADDED: 4 HNO3
___HCl
___Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
a) ICSAA	QCICSA-84			20 ml → 200 ml	
b) ICSABB	QCICSA-84			20 ml → 200 ml	
	QCICSB-47			20 ml →	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

321

7A

SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: 2X CONTRACT REQUIRED DETECTION LIMIT SOLUTION P2

DATE PREPARED: 1/5/93
PREPARED BY: [illegible]

FINAL VOLUME: 1000 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: 10 HNO3
50 HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
Sb	MVSb-3		1000 PPm	120 ul	120 PPb
As	HPAs-2		1000 PPm	30 ul	30 PPb
Be	HPBe-1		1000 PPm	10 ul	10 PPb
Cd	HPCd-1		1000 PPm	10 ul	10 ppb
Cr	HPCr-1		1000 PPm	20 ul	20 ppb
Co	HPCo-1		1000 PPm	100 ul	100 ppb
Cu	HPCu-1		1000 PPm	50 ul	50 ppb
Pb	HPPb-1		1000 PPm	30 ul	30 PPb
Mn	MVMn-3		1000 PPm	30 ul	30 ppb
Ni	MVNi-3		1000 PPm	80 ul	80 ppb
Se	HPSe-1		1000 PPm	100 ul	100 ppb
V	HPV-1		1000 PPm	100 ul	100 ppb
Tl	HPTl-1		1000 PPm	500 ul	500 ppb
Ag	HPAg-1		1000 PPm	20 ul	20 ppb
Zn	HPZn-1		1000 PPm	40 ul	40 ppb
Ti	HPTi-1		1000 PPm	100 ul	100 ppb
Sr	MVSr-3		1000 PPM	400 ul	400 ppb
Mo	MVMo-3		1000 PPm	400 ul	400 ppb
Sn	MVSn-2		1000 PPm	400 ul	400 ppb
Li	MVLi-3		1000 PPm	200 ul	200 ppb

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

DOCUMENT# _____
(BOOK# - PAGE#)

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SKINNER AND SHERMAN LABORATORIES, INC
SUBSIDIARY OF THERMO ANALYTICAL, INC.

(8)

STANDARD PREPARATION LOG
++++++++++++++++++++++++

STANDARD IDENTITY: Continuing Calibration Verification Solution (HalfSTD)

DATE PREPARED: 1/7/93
PREPARED BY: [illegible]

FINAL VOLUME: 500 ml

MATRIX: 1 %HNO3
5 %HCl
___ Other

MLS ADDED: ___ HNO3
___ HCl
___ Other

ELEMENT	SOURCE	LOT#	STOCK CONC	VOLUME	FINAL CONC
STD1	In House			250 ml	500 ml
STD3	In House			250 ml	
Ag	AP Ag-1		1000 ppm	250 ul	

SOURCES: S=Spex F=Fisher B=Baker R=Ricca O=Other (identify)

323

TMA/SKINNER & SHERMAN LABORATORIES, INC.
STANDARDS TRACKING LOG BOOK -- SECTION 2
STANDARD PREPARATION LOG

STANDARD IDENTITY Hg Working Standard

DATE PREPARED: PREPARED BY:

FINAL VOLUME: 100 ml

MATRIX: 2 %HNO3 ____ %HCL ____ Other

MLS ADDED: 2 HNO3 ____ HCl ____ Other

ELEMENT	SOURCE/LOT#	STOCK CONC	VOLUME ADDED	FINAL CONC
12/1/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
12/2/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
12/3/92	MV-Hg-3	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
JW 12/8/92	Hp Lot# 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/9/92	Hp Lot# 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/10/92	Hp Lot # 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/11/92	Hp Lot # 290930	10 ppm	MS 12/11/92 1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/14/92	Hp Lot # 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/15/92	Hp Lot # 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/16/92	Hp Lot # 290930	10 ppm	1 ml	100 ppb
	Cr	5%	25 ul	—
MS 12/17/92	Hp Lot # 290930	10 ppm	1 ml	100 ppb
324	Cr	5%	25 ul	—

SOURCE: QC=USEPA ICV=USEPA MV=METALS VENTURES S=SPEX OTHER=IDENTIFY

ver 1.1 04/17/91

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column D)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: NHED

Sampler (Name): Stephen Wurst

Sampler Signature: Stephen Wurst

4. Type of Activity

Lead	Pre-Remedial	Remedial	Removal
SF		RIFS	CLEM
PRP	PA	RD	REMA
ST	SSI	RA	REM
FED	LSI ☒	O&M	OIL
		NPLD	UST

5. Date Shipped: 12-9-92

Carrier: Fed Ex

Airbill Number: 6159041556

6. Ship To: Skinner & Sherman, 35 Second Avenue, Waltham MA 02254

ATTN: Jeff Lapinski

7. Date Received -- Received by: 12-10-92 J. Deboldo

Laboratory Contract Number: 68D00108

Unit Price: 106.00

8. Transfer to:

Date Received:

Received by:

Contract Number:

Price:

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/ Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water -- MIS Liq.	Non Water -- Mis Liq.
✓ MFN650	5	Low	Grab	6	X							6-005326	0925-MG	12/7/92 1215	SDN			--		
✓ MFQ205	5	Low	Grab	6	X							6-005444	0925-MG2	12/7/92 1215	SDN			--		
✓ MFQ210	5	Low	Grab	6	X							6-005467	0925-MG6	12/8/92 0940	SDN			--		
384																				

Samples on Inventory

Shipment for Case complete? (Y/N): N

Page 1 of 3

Sample used for a spike and/or duplicate:

Additional Sampler Signatures: [illegible]

Chain of Custody Seal Number:

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Stephen Wurst	12-9-92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		J. Deboldo	12/10/92 9:30		

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

DISTRIBUTION:
Green - Region Copy Pink - SMO Copy White - Lab Copy for Return to Region Yellow - Lab Copy for Return to SMO

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS

Copy Original is filed in CSF MFX49

2-Dorg

L 340105

EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (High only)
   7. Waste (High only)
   8. Other (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO_3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: NMED

5. Date Shipped: 12-9-92

Carrier: Fed Ex

7. Date Received -- Received by: 12-10-92 D. DeLuolo

Sampler (Name): Stephen West

Airbill Number: 6159041556

Laboratory Contract Number: 68D00108

Unit Price: 106.00

Sampler Signature: [signature]

6. Ship To: Skinner & Sherman, 300 Second Avenue, Waltham, MA 02254, ATTN: Jeff Deluolo

8. Transfer to

Date Received

Received by

Contract Number

Price

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI		O&M		OIL	
				NPLD		UST	

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. only: Nitrate/Nitrite	Fluoride	High only: pH	Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MIS Liq.	Non Water - Mis Liq.
												Sample Log-In Info Agrees								
MFQ218	4	Low	Grab	2/6	X							6-005915	C0920-MW3	12/8/92 1250	SDN					
MFQ201	2	Low	Grab	2/6	X							6-005199	C0920-MW1	12/7/92 1325	SDN					
MFN651	2	Low	Grab	2/6	X							6-005477	C0920-MW1	12/7/92 1325	SDN					
MFQ206	2	Low	Grab	2/6	X							6-005431	C0920-MW4	12/7/92 1700	SDN					
MFQ207	2	Low	Grab	2/6	X							6-005440	C0920-MW4	12/7/92 1700	SDN					
MFQ202	2	Low	Grab	2/6	X							6-005277	C0920-B	12/7/92 1325	SDN					
MFQ203	1	Low	Grab	2/6	X							6-005178	C0920-MT1	12/7/92 1530	SDN					
MFQ204	1	Low	Grab	2/6	X							6-005178	C0920-MT2	12/7/92 1535	SDN					
MFN649	5	Low	Comp	6	X							6-005377	C0925-MT	12/7/92 1110	SDN					
MFQ211	5	Low	Comp	6	X							6-005450	C0925-FCC	12/8/92 1020	SDN					

Shipment for Case complete? (Y/N): N

Page 2 of 3

Sample used for a spike and/or duplicate

Additional Sampler Signatures: Mary C. Martz

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	12.9.92 14:00				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	
		D. DeLuolo	12/10/92 9:30		

Split Samples: ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (SAS) (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: FED EX

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92 J. Dubeolo

Sampler (Name): STEPHEN WUST

Airbill Number: 615904157 1

Laboratory Contract Number: 68D00108

Unit Price: 106.00

Sampler Signature: Stephen Wust

6. Ship To: Skinner & Sherman, 300 Second Ave., Waltham, MA 02254

8. Transfer to

Date Received

Received by

Contract Number

Price

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI	✓	O&M		OIL	
				NPLD		UST	

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./Grab	D Preservative from Box 6	E RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers (Samples on, Initials)	G Station Location Number	H Mo/Day/Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MS Liq.	Non Water - Ms Liq.
✓ MFQ221	5	LOW	Comp	6	X							6-005446	CH92S-TP6	12/9/92 11:25	SJL					
✓ MFQ222	5	Low	Comp	6	X							6-039951	CH92S-TP7	12/9/92 13:15	SJL					
✓ MFQ223	5	Low	Comp	6	X							6-039937	CH92S-DIV	12/9/92 13:45	SJL					
✓ MFQ224	5	Low	Comp	6	X							6-039924	CH92S-SD	12/9/92 15:00	SJL					
✓ MFQ225	5	Low	Comp	6	X							6-039946	CH92S-WD	12/9/92 15:45	SJL					
✓ MFQ028	5	Low	Comp	6	X							6-039964	CH92S-BF1	12/10/92 11:30	SLW					
✓ MFQ235	5	Low	Comp	6	X							6-039921	CH92S-HCT	12/10/92 13:55	SLW					
✓ MFQ026	5	Low	Comp	6	X							6-039684	CH92S-HV1	12/10/92 10:00	SLW					
✓ MFQ029	5	Low	Comp	6	X							6-039685	CH92S-BF2	12/10/92 [illegible]	SLW					
✓ MFQ027	5	Low	Comp	6	X							6-039686	CH92S-HV2	12/10/92 10:40	SLW					

Shipment for Case complete? (Y/N) Y

Page 1 of 4 (PAGE 2 of 4)

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature) J. Dubeolo	Date / Time 12/14/92 9:30	Remarks Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 8110-1 (Rev 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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EPA

United States Environmental Protection Agency
Contract Laboratory Program Sample Management Office
PO Box 818 Alexandria, VA 22313
703-557-2490 FTS 557-2490

Inorganic Traffic Report & Chain of Custody Record

(For Inorganic CLP Analysis)

SAS No. (if applicable):

Case No.: 19220

1. Sample Description (Enter in Column A)
   1. Surface Water
   2. Ground Water
   3. Leachate
   4. Rinsate
   5. Soil/Sediment
   6. Oil (SAS)
   7. Waste (SAS)
   8. Other (SAS) (Specify)

2. Preservative (Enter in Column D)
   1. HCl
   2. HNO_3
   3. NaOH
   4. H_2SO_4
   5. $K_2CR_2O_7$
   6. Ice only
   7. Other (SAS) (Specify)
   N. Not preserved

3. Region No.: 6

Sampling Co.: Fed Ex

5. Date Shipped: 12/11/92

Carrier: FED EX

7. Date Received -- Received by: 12-14-92

Sampler (Name): STEPHEN WUST

Airbill Number: 6159041571

Laboratory Contract Number: 68D00108

Unit Price: 106.00

Sampler Signature:

6. Ship To: Skinner : Sherman, 300 Second Ave., Waltham, MA 02254

8. Transfer to

Date Received

Received by

Contract Number

Price

4. Type of Activity

Lead		Pre-Remedial		Remedial		Removal	
SF				RIFS		CLEM	
PRP		PA		RD		REMA	
ST		SSI		RA		REM	
FED		LSI	✓	O&M		OIL	
				NPLD		UST	

CLP Sample Numbers (from labels)	A Enter # from Box 1	B Conc. Low Med High	C Sample Type: Comp./ Grab	D Preservative from Box 6	E - RAS Analysis: Metals Total	Metals Dissolved	Cyanide	Low Conc. Nitrate/ Nitrite	Low Conc. Fluoride	High pH	High Conductivity	F Regional Specific Tracking Number or Tag Numbers	G Station Location Number	H Mo/Day/ Year/Time Sample Collection	I Sampler Initials	J Corresp. CLP Org. Samp. No.	K Sample Condition on Receipt	L High Conc. Phases (Check below): Solids	Water - MIS Liq.	Non Water - Mis Liq.
MFQ233	5	Low	Comp	6	X							6-039959	CH925-BFBG	12/10/92 10:20	SLW					
MFQ234	5	Low	Comp	6	X							6-039960	CH925-BH	12/10/92 12:15	SLW					
MFQ236	5	Low	Comp	6	X							6-039961	CH925-LB	12/10/92 15:45	SLW					
MFQ030	5	Low	Comp	6	X							6-039588	CH925-BH1	12/10/92 13:38	SLW					
MFQ031	5	Low	Comp	6	X							6-039589	CH925-BH2	12/10/92 14:05	SLW					
MFQ242	1	Low	grab	2/6	X							6-039600	CH92W-HCWD	12/10/92 11:20	SLW					
MFQ238	1	Low	grab	2/6	X							6-039587	CH92W-HCBU	12/10/92 12:18	SLW					
MFQ237	1	Low	grab	2/6	X							6-039963	CH92N-LB	12/10/92 15:35	SLW					
MFQ-239	1	Low	grab	2/6	X							6-005385	CH92W-HCBH	12/10/92 11:50	SLW					
MFQ-240	2	Low	grab	2/6	X							6-005383	CH92W-SW	12/10/92 15:10	SLW					

Sample Shipment Tracking Numbers

Shipment for Case complete? (Y/N)

Page 1 of ___ Page 3 of 4

Sample used for a spike and/or duplicate

Additional Sampler Signatures

Chain of Custody Seal Number

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Received by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time: 12/14/92 9:30	Remarks: Is custody seal intact? Y/N/none	

Split Samples ☐ Accepted (Signature) ☐ Declined

EPA Form 9110-1 (Rev. 5-91) Replaces EPA Form (2075-6), previous edition which may be used

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I 015646

Copy
Original is filed in CSF MFN649

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE
TRACKING NUMBER 6159041556

23114 6159041556

RECIPIENT'S COPY

1 Date 12-9-92

From (Your Name) Please Print: Maura Hanning
Your Phone Number (Very Important): 505-827-2911
Company: NEW MEXICO ENVIRONMENT BUREAU
Department/Floor No.
Street Address: 1190 ST FRANCIS DR
City: SANTA FE State: NM ZIP Required: 87501

2 To (Recipient's Name) Please Print: Jeff DePaolo
Recipient's Phone Number (Very Important): (617) 890-7200
Company: Sherman & Sherman
Department/Floor No.
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 Second Ave.
City: Waltham State: MA ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.): 8X57 1149-173

H IF HOLD FOR PICK-UP: Print FEDEX Address Here
Street Address
City State ZIP Required

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [ ] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 [X] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOV'T LETTER
41 [ ] GOV'T PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**
† Delivery commitment may be later in some areas.
*Declared Value Limit $500. **Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill in Box H) 1 [ ] WEEKDAY or 31 [ ] SATURDAY
DELIVER 2 [ ] WEEKDAY or 3 [ ] SATURDAY (Extra charge) (Not available to all locations)
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845 ..... X ..... kg. III
7 [ ] OTHER SPECIAL SERVICE
9 [ ] SATURDAY PICK-UP (Extra charge)
[ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	70	0
Total	Total 70	Total 0

DIM SHIPMENT (Chargeable Weight) [ ] lbs.
L x W x H

Received At: 1 [ ] Regular Stop 3 [ ] Drop Box 4 [ ] B.S.C. 5 [ ] Station [ ] Call-In-Call/Stop

Emp. No. Date
[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold
Street Address
City State Zip
Received By: X 12-10-92 9:30
Date/Time Received FedEx Employee Number

7 Release Signature

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #136
136
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329

330

389

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL
PACKAGE TRACKING NUMBER 6159041571

6159041571

RECIPIENT'S COPY

1 Date 12-11-92

From (Your Name) Please Print: STEPHEN INGET
Your Phone Number (Very Important): 505-827-2911
Company: NEW MEXICO ENVIRONMENT BUREAU
Department/Floor No.:
Street Address: 1190 ST FRANCIS DR PO BOX 2996
City: SANTA FE State: NM ZIP Required: 87501

2 To (Recipient's Name) Please Print: JEFF DEPIOLO
Recipient's Phone Number (Very Important): (617) 890-2200
Company: SKINNER + SHERMAN
Department/Floor No.:
Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 300 SETON AVENUE
City: WALTHAM State: MA ZIP Required: 02254

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on Invoice.): 5157 1149 1123

H IF HOLD FOR PICK-UP, Print FEDEX Address Here
Street Address:
City: State: ZIP Required:

3 PAYMENT 1 [X] Bill Sender 2 [ ] Bill Recipient's FedEx Acct. No. 3 [ ] Bill 3rd Party FedEx Acct. No. 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)
11 [X] OTHER PACKAGING
16 [ ] FEDEX LETTER*
12 [ ] FEDEX PAK*
13 [ ] FEDEX BOX
14 [ ] FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery†)
51 [ ] OTHER PACKAGING
56 [ ] FEDEX LETTER*
52 [ ] FEDEX PAK*
53 [ ] FEDEX BOX
54 [ ] FEDEX TUBE

Economy Two-Day (Delivery by second business day †)
30 [ ] ECONOMY

Government Overnight (Restricted for authorized users only)
46 [ ] GOVT LETTER
41 [ ] GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 [ ] OVERNIGHT FREIGHT** (Confirmed reservation required)
80 [ ] TWO-DAY FREIGHT**

† Delivery commitment may be later in some areas.
*Declared Value Limit $500.
**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

HOLD FOR PICK-UP (Fill In Box H) 1 [ ] WEEKDAY or 31 [ ] SATURDAY
DELIVER 2 [ ] WEEKDAY or 3 [X] SATURDAY (Extra charge) (Not available to all locations)
4 [ ] DANGEROUS GOODS (Extra charge)
5 [ ]
6 [ ] DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice, 9, UN 1845, ... X ..... kg. III
7 [ ] OTHER SPECIAL SERVICE
9 [ ] SATURDAY PICK-UP (Extra charge)
[ ]
12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT In Pounds Only	YOUR DECLARED VALUE (See right)
1	70	0
Total	Total	Total
1	70	0

DIM SHIPMENT (Chargeable Weight) [ ] lbs.
L x W x H

Received At: 1 [ ] Regular Stop 2 [ ] On-Call Stop 3 [ ] Drop Box 4 [ ] B.S.C. 5 [ ] Station

Emp. No. Date
[ ] Cash Received
[ ] Return Shipment
[ ] Third Party [ ] Chg. To Del. [ ] Chg. To Hold
Street Address
City State Zip
Received By: x 12-14-92 9:30
Date/Time Received FedEx Employee Number

7 Release Signature:

Federal Express Use
Base Charges
Declared Value Charge
Other 1
Other 2
Total Charges

REVISION DATE 6/92
PART #137204 FXEM 10/92
FORMAT #136
136
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SAMPLE LOG-IN SHEET

Lab Name: Skinner & Sherman	Page 1 of 2
Received By (Print Name): J. DePolo	Log-in Date: 12-10-92
Received By (Signature): J. DePolo	
Case Number: 19220	Sample Delivery Group No.: MFN649, 651
SAS Number: NA	

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* Intact ☑ Broken ☐
2. Custody Seal Nos. NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* Present ☑ Absent ☐
6. Airbill No. 6159041556
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ ~~No~~ ☐*
10. Date Received at Lab: 12-10-92
11. Time Received: 9:30

Sample Transfer	
Fraction	Fraction
Area #	Area #
By	By
On	On

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFN649	6005377	S212197 01	OK
650	6005324	02	
651	6005447	S212134 01	
MFQ201	6005199	02	
202	6005297	03	
203	6005178	04	
204	6005198	05	
205	6005444	S212197 09	
206	6005439	S212134 06	
207	6005440	07	
208	6005442	08	
209	6005448	09	
210	6005469	S212197 10	
211	6005450	11	
212	6005391	S212134 10	
213	6005389	11	
214	6005393 6005395	12	
215	6005394	13	
216	6005396 6039913	14	

*Contact SMO and attach record of resolution

Received By: 100/1/15/93	Logbook No.
Date	Logbook Page No.

331

FORM DC-1 ILM02.0

SAMPLE LOG-IN SHEET

Lab Name: Chemner Alleman	Page 1 of 2
Received By (Print Name): J. DePAOLO	Log-in Date: 12-14-92
Received By (Signature): J. DePaolo	
Case Number: 19220	Sample Delivery Group No: MFQ026, 226 (MFQ649) / SAS Number: NA

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* — Intact ☑ Broken ☐
2. Custody Seal Nos. NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* — Present ☑ Absent ☐
6. Airbill No. 6159041571
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-14-92
11. Time Received: 9:30

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFQ026	6039654	S212197 03	OK
027	6039686	04	
028	6039964	05	
029	6039965	06	
030	6039588	07	
031	6039589	08	
221	6005446	02	
222	6039951	18	
223	6039937	17	
224	6039924	15	
225	6039946	S212196 [illegible]	
226	6039943	S212196 08	
227	6039940	02	
228	6039957	03	
229	6039955	04	
230	6039945	05	
231	6039942	06	
232	6039952	07	
233	6039959	S212197 17	

Sample Transfer

Fraction	Fraction
Area #	Area #
By	By
On	On

*Contact SMO and attach record of resolution

Received By: [illegible] 1/15/93	Logbook No.
Date	Logbook Page No.

332

FORM DC-1

ILM02.0

SAMPLE LOG-IN SHEET

Lab Name: Skinner Alleman	Page 2 of 2
Received By (Print Name): J. DeRado	Log-in Date: 12-14-92
Received By (Signature): J. DeRado	
Case Number: 19220	Sample Delivery Group No: MFQ02 (MFQ226) / SAS Number: NA

Remarks:

1. Custody Seal(s) — Present ☑ Absent ☐* Intact ☑ Broken ☐
2. Custody Seal Nos. NA
3. Chain-of-Custody Records — Present ☑ Absent ☐*
4. Traffic Reports or Packing Lists — Present ☑ Absent ☐*
5. Airbill — Airbill ☑ Sticker ☐* Present ☑ Absent ☐
6. Airbill No. (615904157)
7. Sample Tags — Present ☑ Absent ☐*
   Sample Tag Nos. — Listed ☑ Not Listed ☐ on Chain-of-Custody
8. Sample Condition: Intact ☑ Broken ☐* Leaking ☐
9. Does information on custody records, traffic reports, and sample tags agree? Yes ☑ No ☐*
10. Date Received at Lab: 12-14-92
11. Time Received: 9:30

EPA Sample #	Corresponding Sample Tag #	Corresponding Assigned Lab #	Remarks: Condition of Sample Shipment, etc.
MFQ234	6039960	SQ12197 18	OK
235	6039921	19	
236	6039961	20	
237	6039963	SQ12196 08	
238	6039587	09	
239	6005385	10	
240	6005383	11	
241	6039947	12	
242	6039600	13	
342	6039944	14	
343	6039953	15	
344	6039954	16	

Sample Transfer

Fraction	Fraction
Area #	Area #
By	By
On	On

*Contact SMO and attach record of resolution

Received By: KOJ 1/15/93	Logbook No.
Date	Logbook Page No.

333

FORM DC-1 ILM02.0

TMA/Skinner & Sherman Labs **SAMPLE LOG-IN**

WORKORDER 5212197 CLIENT U.S. EPA No. SAMPLES:

PROTCL CLP TURNARND 35DD/5 20

COOLER TEMP: 4 oC, or NA (Soil) (Water) (Specify Other)

CUSTODIAN J. DeRodio SDG/BATCH MFN649

CUSTODY SEAL: PRESENT/ABSENT/INTACT/NOT CLIENT CASE 19220

SHIPER & # Fedex #615904571 PO/CONTRACT# 68D00108

TAGS: PRESENT/ABSENT/NA/SEE COC CONTACT Nina Smith

CHAIN OF CUSTODY: PRESENT/ABSENT/NA, # NA COMMENTS:

SAMPLE CONTAINERS- INTACT/BROKEN COMMENTS

CLIENT COMMENT? YES/NO

SAMPLE LABELS AGREE WITH CHAIN OF CUSTODY INFO? YES/NO (COMMENT)

CLIENT PAPERWORK AGREES WITH SAMPLES & COC? YES/NO (COMMENT)

SHIPMENT DATES 12-10-92 12-14-92

LIST ANY DATE WITH PAPERWORK/SHIPMENT PROBLEMS & SPECIFY THE PROBLEM:

N/A

	CLIENT ID	MATRIX	RECEIVED	PH*	TEST(S) & QC	HOLD TIME UP
1	MFN649	Soil	12-10-92		Total Metals D.S.	
2	650					
3	MFQ026		12-14-92			
4	027					
5	028					
6	029					
7	030					
8	031					
9	205		12-10-92			
10	210					
11	211					
12	221		12-14-92			
13	222					
14	223					
15	224					
16	225					
17	233					
18	234					
19	235					
20	236					
21						
22						
23						
24						
25						
26						
27		Completed	12-14-92			

Samples are from site known to have Rad-Contamination: YES ___ NO NA

Samples have detectable amounts of Radioactive Material: YES ___ NO NA

SUBCONTRACT: YES/NO TO: DATE: 12-14-92

REVIEWED 12/15/92

* EPA/CLP required

Sample Delivery Group (SDG)
Traffic Report (TR) Cover Sheet

Lab Name: Shiner Sherman Contract No.: 68-D00108

Lab Code: Shiner Case No.: 19220 SAS No.: NA -

Full Sample Analysis Price in Contract: $ 106.00

SDG No./First Sample in SDG: MFN649 Sample Receipt Date: 12-10-92
(Lowest EPA Sample Number in first shipment of samples received under SDG) (MM / DD / YY)

Last Sample in SDG: MFQ236 Sample Receipt Date: 12-14-92
(Highest EPA Sample Number in last shipment of samples received under SDG) (MM / DD / YY)

EPA Sample Numbers in the SDG (listed in alphanumeric order):

1	MFN649	11	MFQ211
2	650	12	221
3	MFQ026	13	222
4	027	14	223
5	028	15	224
6	029	16	225
7	030	17	233
8	031	18	234
9	205	19	235
10	210	20	236

Note: There are a maximum of 20 field samples in an SDG.

Attach Traffic Reports to this form in alphanumeric order
(i.e., the order listed on this form)

335 J. Debcolo 12-14-92

Sample Custodian Date

REFERENCE 20

Dames & Moore, 1977
Report on tailings system for Continental Mine

REPORT ON TAILINGS
DISPOSAL SYSTEM DESIGN

DAMES & MOORE
8/10/77

DAMES & MOORE

ENVIRONMENTAL AND
APPLIED EARTH SCIENCES

Subsurface conditions consist of a thin veneer of residual soil overlying granodiorite bedrock. Bedrock weathering is extensive to a depth of about 30 feet, below which weathering is confined mainly to joints and fractures. Pressure-testing indicated that bedrock permeability was generally low. Ground water was encountered in only two borings in the bottom of the valley.

To construct the proposed tailings disposal system, three earth-rockfill embankments would be required: a tailings dam with a partition to form two ponds; a dam to protect the conveyor system from the mine to the mill; and, a saddle dam to close the western rim of the main tailings pond. All embankments would be constructed of locally occurring materials including mine waste, sand tailings and residual soil.

The pond for magnetite tailings is required to be in operation first. The embankment containing this pond would consist of a starter dam constructed of compacted residual soil to Elevation 6680 feet, providing one-half year's initial storage. Subsequent construction would consist of build-up dikes composed of compacted sand tailings and/or mine waste constructed by the Upstream Method. The first build-up dike would be a maximum of 20 feet high. Additional dikes would be constructed as tailings deposition progressed and would not exceed 15 feet in height. The recommended final crest elevation of the embankment to contain two million tons of magnetite tailings would be Elevation 6745 feet, which would allow for freeboard and a slope of two percent on the tailings surface.

To retain 12.6 million tons of tailings, the crest of the final embankment for the Proposed Main Tailings Pond would reach Elevation 6760 feet. The embankment would consist of an 80 foot high starter dam compsed of a Random Mine Waste core and an impervious seal of compacted residual soil to mid-height. On the slope above the residual soil zone, a filter zone of compacted sand tailings would be required to prevent piping of tailings into the embankment. During construction of the mine waste core, finer mine waste should be selectively excavated and placed on the upstream side of the core. Above the crest of the starter dam at Elevation 6675 feet, build-up dikes would be constructed by the Upstream Method with vertical increments not exceeding 25 feet.

The overall downstream slope of the tailings dam varies from 2 to 2.5:1. The overall upstream slope varies from 1.5 to 2:1. The individual build-up dikes would have sideslopes no steeper than 1.5:1 and would have intervening berms at least 20 feet wide. The starter dams will require 12,700 cubic yards of excavation, 488,000 cubic yards of mine waste, 18,000 cubic yards of sand tailings and 102,000 cubic yards of residual soil.

The Upstream Retention Dam is designed as a water-retaining structure with a downstream slope (relative to the tailings pond) of 2:1 and an upstream slope varying from 2 to 2.25:1. At final crest Elevation 6760 feet, the dam would be about 760 feet long and would be about 70 feet high at maximum section. The dam will require 4,300 cubic yards of excavation, 132,000 cubic yards of mine waste and 18,500 cubic yards of residual soil.

the decant tower and dropping to a 24-inch diameter decant line leading under the tailings to a sump at the downstream toe of the existing embankment where it is collected and pumped back to the mill.

The Existing Magnetite Tailings Pond, though much smaller than the Existing Main Tailings Pond, operates on the same principles. The existing pond covers about nine acres at the head of a secondary drainage system. The existing embankment is approximately 1,000 feet long at crest Elevation 6820 feet. The downstream toe of the embankment is at about Elevation 6700 feet. Runoff area to this pond is approximately 0.048 square miles (30 acres).

Along the western side of the valley and forming the right abutment of the Proposed Main Tailings Dam is a stockpile of low grade ore and mine waste. The maximum elevation of the stockpile area is about 6,835 feet. The toe of the stockpile varies from about Elevation 6650 feet at the downstream end of the Proposed Main Tailings Pond to Elevation 6700 feet at the upstream end. We understand that the low grade ore will be removed for processing.

Along the centerline of the Proposed Main Tailings Dam the minimum ground elevation is about 6600 feet. The Proposed Main Tailings Pond would have a final surface area in the order of 56 acres.

Minimum ground elevation along the centerline of the Proposed Magnetite Tailings Dam is about 6,655 feet. Final surface area of the Proposed Magnetite Tailings Pond would be in the order of 14 acres.

The area of the proposed tailings ponds is presently covered in sparse natural vegetation including scrub grass, cedars, oak and pine trees.

SUBSURFACE CONDITIONS

The site area is covered by a veneer of residual soil derived from the in-situ weathering of granodiorite. Locally in stream beds, sandy gravelly alluvium overlies the bedrock. As observed in the trenches, the composition of the residual soil is gradational varying from a clayey or silty sand with a natural moisture content of 8 to 14 percent at the ground surface to a silty gravelly sand and finally to moderately to slightly weathered bedrock. Where the original ground surface has not been disturbed or covered by mining-related debris or tailings, the transition from residual soil to moderately to slightly weathered bedrock occurs over a vertical interval of 18 to 30 feet. At a depth of about 12 feet, the weathered bedrock becomes difficult to rip with a ripper tooth mounted on a D-8 bulldozer. However, blading and crushing by the tracks of the bulldozer cause a rapid breakdown of the ripped material to a silty fine sand and gravel. In the samples tested, the residual soil was generally well-graded between an average of 85 percent passing the No. 4 U. S. Standard

REFERENCE 21

NMED, Superfund Section
Field notes

COMP BOOK

Whitewater Creek
AKA Kennecott
and Chino Mines

80 SHEETS • 10 x 7⅞ • COLLEGE & MARGIN • 43-461

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Book 1 of 3
Cracks Sites
Winchester Canyon

000001

12-9-92

0800 - NMED personnel (Stephen West, Maura Hanning, Dave Morgan, and Mary Ann Martinez) met with Chino at Chino office to discuss days activities for LSI.

0900 - Sampling team went to Well 165 to set up Bennet pump for sampling well.

Sampled well
Water level in well is 77'. Total depth appears to be 89'.

1005 Turned on pump - silted up immediately. Pulled pump to clean out silt.

Reset pump at ~ 80'. Water level measured at ~ 73'.

Took field parameters at well 165.
Conductivity = 2,500 umhos
pH = 5.12
temp = 5°C

11:36 Collected sample from well 165.

MM

5L

12:00 Mary Ann Moncthy & David Trujillo left to sample Well 765

[illegible] Arrived at Well 765. set up to start purging
typical water level is 200
screened at 240' TD = 253

1240 Started pump. - pump rate is ~ [illegible] gpm

1310 Ran field parameters
Conductivity = 2650 umhos
Temp = 16.2°C
pH = 7.06

1320 field parameters
conductivity = 2850 umhos
pH = 7.29
temp = 17.0 °C

1340 Sampled well 765

1500 Arrival at site of WD10. Set up to sample
Water level is 17'. 80' deep
Started pumping at 1500. Pumping about 5 gpm

1505 Field parameters are:
Conductivity = 3750 umhos, 3850 umhos
pH = 3.83, 3.58
Temp = 15.0°C, 14.6°C

1520 Collected sample from WD10 (pumped 5 gpm for 20 min)

1540 Arrived at site of well CB6D

1545 Turned on pump for CB6D (Discharge is on other side of dam)

- water level should be ~ 32' TD = 86'
- screened interval 45-60'

Field parameters:

Conductivity = 3,350 µmhos
pH = 15.66
Temp = 14°C

1605 Collected sample from CB6D (ran pump 20 min at 5 gpm)
- Sampled UF metals, Gen Chem
  filled cubit for filtered metals
- Split sample with Chino Mine Co.

1645 Collected Sample from WD4 Water blue (prob Cu)

Field parameters:

Pumped 3 volumes - shut off to wait for samples - then 10 gal before sampling
Sampled as CB6D
SOW

Conductivity = 75.0 x 100 µmho
pH = 3.39
temp = 13.5

5B

10/7/92 [illegible]

11:25 Sampled tailings at Tailing Pile 1 (oldest) on SE corner ~1/3 up from bottom

Too much ayor - no XRF run

~~Ran portable XRF in 3 areas to look for variability - none seen~~

5 ⊃ W

Sampled composite over 10' interval of trench dug ~6" deep with shovel

Use scoop to collect 8 scoops over interval into zip-lock - mixed - split sample with Eddie Humphry

CH925-TP1 = MFQ221 = 6-005446

13:15 Sampled tailings at tailing pile 7. (youngest) at SW corner ~1/3 way up

Ran portable XRF in 3 areas to look for variability - none seen

Sampled composite as at TP1

CH925-TP7 = MFQ222 = 6-039951

13:45 Sample sediment in diversion channel where dirt road crosses ~250M above confluence with Whitewater Creek

Sample 4 medial bars with scoop - mix in ziplock - split sample with Eddie Humphry

Sed med-to sand with mud

000005

5 ⊃ W

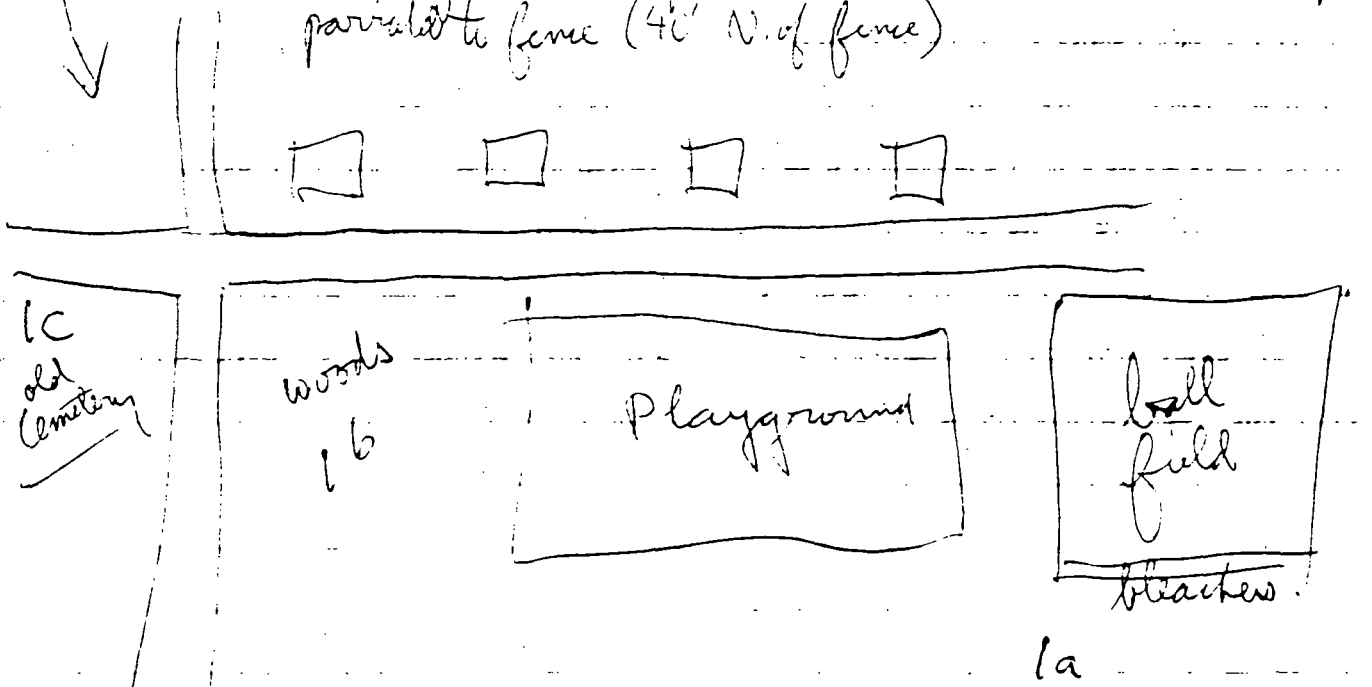
15:00 Sampled on South Dumps ~ 1/3 up on west face above well W04
Ran XRF in two locations (diff colors and rock types) to check variability - little even
Collected composite from the two areas - mixed in gigalopak - split sample with Eddie Humphry

15:45 Sampled from West Dumps on west face at bottom by well W08 overlooking Hanover Creek
Ran XRF + sampled as at South Dumps
Note: High Tl (1000 ppm)

SPN

HU-1a - S. side of ball field next to bleachers
1b - wooded area W. of playground, 100' S. of trailers.
1c - on N. edge of old cemetery (to W. of ball field ~ 300'-400')

HU-2 samples one or north side of Hurley, in old golf course approx 150' N. of row of trailers, native grasses, appears undisturbed except for sand traps (which we avoided). Ran 3 sample transect parallel to fence (40' N. of fence)



Chino soil sampling 12-10-92
D. Slifer, M. Hanning, R. Vendrely

KAOS
MH

	Cu	Zn	As	Pb	Hg	Cd
~~CH925HU-1~~						
CH925HU-1a	898	511	—	37	25	244
" " 1b	1667	74	—	40	—	44
1c	845	92	36	33	4	—

collected sample at 1b because this area appears undisturbed - the ball park area is driven on, may have imported fill dirt. Sample was labeled as CH925-HU1 at 10:00 (MFQ026)

CH925HU2a	7667	186	20	69	—	—
2b	3677	209	43	16	67	—
2c	6744	103	12	78	—	—

(collected # 2c) at 10:40 CH925HU2 (MFQ027)

CH925 BF1

(b) (6) [redacted] only [redacted] is within 200' of tailings on property. At least 3 people live in Gallegos home.

(b) (6) [redacted] Property - approx 4 or 5 residences
collected sample at 11:30, from low point of property where tailings went onto property from Bullfrog Mine approx. 150' W of houses near wire mesh fence.
CH925-BF1 (MFQ028) Did not use XRF here.

CH925BF2 MFQ029 - on hill NW of houses at old Cobre (NW of Groundhog Mine),

	Cu	Zn	As	Hg	Pb	Cd
a	133	158	—	—	70	—
b	220	340	21	—	63	—

000008

collected BF2b at 12:00, approx 100' NW of houses on ~~the~~ E. side of hill. Wind probably blows down the canyon here, not towards the houses.

Area of visible soil contamination at least 50' x 50'. EAS

62

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SZW

LWS

63

CH925-BH1 - (Bull Hill) - at Winsatteville/Turnerville
MFQ030 @ 13:38
Composite from grassy area S. of houses, did not use XRF.

CH925-BH2 (Bull Hill) at Hanover Outport, near small shrine/cemetary on hill at SW intersection (SW of Bull Hill Tailings)
Porky said wind blows tailings in this direction - not north of the tailings (he has photos). Took XRF readings.
Collected sample at ~~[illegible]~~ 2:05 (BH 2d)

	Cu	Zn	As	Hg	Pb	Cd
BH 2a	111	841	4	2	35	170
BH 2b	20	460	-	-	26	197
BH 2c	6	331	37	12	28	77
BH 2d	65	895	-	-	45	-

COMP BOOK

WHITEWATER + HANOVER
CREEKS SITE
BOOK 2 OF 3

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10/24/88 Hanover Creek Blackhawk Tailings site
Ron Conrad / Cora Halasan
Background sample taken above tailings along power line 150 feet W of 2nd pole from road. Sample scraped with spatula into 8oz glass bottle. Radiation counts did well against background. Hot HNO_3 + Icap-AES for Cd + Pb.
Approximately 5:30 PM sample taken

12/7/92
0830 Meeting at Hanover Creek site w/ mine representatives (Al Gonzales), Don Canser (ATEC), and CDM (Steven Brewer, Pete Maggiore), and NMED (Stephen Kirst, David Trujillo, Dave Morgan, + Mary Ann Menetrey)

- Discussed reason for sampling program at the site - (basically, to determine site boundaries) Plan on sampling 4 monitoring wells, tailings, potential seps, and Hanover Creek

- Mine would like copy of latest report (Ron Conrad's) showing most recent analytical data results.
- Bayard requests analytical data from the LSI as soon as it is received.
- Explained rationale for well sampling + methodology

MA

- CDM needs to know each compound to be analyzed for.

9:05 Left to sample wells

0920 Arrival at well MW-1 set up pumper truck to start purging well.

- Water level is 19.38 to top of stel shroud (=18.2" to measuring mark)

19.38	19.38
- 18.20	1.18
1.18	18.2

- water level = 18.2'
TD of well is 203'

- Submersible pump will not fit down 4" well will switch to Bennet pump.

- Set up Bennet pump over MW-1

10:20 - Sounded total depth of hole using CDM's Sounder Feels clean (non-sedimented) to at least 200'

10:53 Had trouble lowering hose of pump lower than 200' Decided to pump existing water from well & then try to lower hose again

MPL

- Pumping at a rate of ~ 1.5 gpm (1.46 was calculated)
(5 gallons in 3 minutes 25 sec)

11:40 -

St. No. - CO 925 - MI Sample taken Soil from the main tailings pile, EAST slip face Approximately 10 feet from top. Composit sample collected as a from 15' horizontal trench. (Sample area across from surge tank.) Three sample volumes taken with dedicated scoop (1 ED - 1 CDM - 1 ATEC), by Steve West. Sample composit collected from 3-6 inches depth along the 15' horizontal trench.

RAS Sample MFN649 tag 6-00537 TAL-METALS
Case No. 19220

12:15 pm

St. No. - CO-925-MG (DIKE) Soil sample taken from magnitite pile on South side. Sample composited from a area that appears to be a surface water drainage channel approximately 20 feet up from toe of the pile. Toe defined by vegitation. The other sample area located approximately 30' west of channel. A five-six foot (horizontal) trench was dug approx 3-6 depth. Both sample areas were composit combined in a zip lock bag to provide 3 sample sets. The sample area in drainage channel approx 4 feet in length horizontal approximately 20 feet from top of dike.

RAS Sample MFN65X tag 6-005326 TAL-METALS
Composite in zip lock and split with CDM & ATEC

1300 Set up to sample MW-1

Conductivity = 320 umhos

Temperature = 13.9 °C

1310 2nd conductivity reading = 340 umhos

Temp. = 13.8°

pH = 10.52

1325 Collected samples from well MW-1 for metals & general chemistry

Samples were collected as follows:

	Sample Station	Lab Sample #
	CC92W-B (Gen Chem)	7655-F2
MW-1	Total Metals (F)	MFQ201
	CC92W-B (metals)	MFQ202
MW-1	Total Metals (uF)	MFN651
MW-1	Gen Chem	7655-F1

1430 well MW-4

Depth to water (from mark) = 138'

- Set the pump where it appeared to bottom out (~190') Total depth of well is 193'

3575 gallons = casing volume

1530 Proposed to sample "decant area" (seep)

C092W - MT1, 2 -

1530 sampled standing pond seep by "decant area" location of seep as indicated by Richard Bertram was wet but not flowing (Sample C092W - MT1)

32" concrete pipe from top of tailings pond to toe of tailings dam. At end of pipe is 3' 24" aluminum outlet pipe emptying onto concrete drainway. Sample collected from flowing portion just below concrete (Samples C092W - MT2)

- Samples were collected as follows:

(Gen Chem)	C092W - MT1	=	7655 - F3
(Metals)	C092W - MT1	=	MFQ203
(Gen Chem)	C092W - MT2	=	7655 - F4
(metals)	C092W - MT2	=	MFQ204

000016

SDW
RAA

16:10 Swampy area at the toe of Magnetite pile
Sediment collected - sediment is wet, possibly from runoff or snowmelt.
Sample = C092S-MG2

16:18 Sample C092S-MG-2 collected
sample is black & appears high in magnetite

Sample #	Lab #
C092S-MG2	MFQ205

16:45 Arrived back at well MW-4
Well had pumped dry in 20 min. (1.4 gpm)
Pumped another 12 min - decided to sample.

Took sample for conductivity, temp., & pH

Conductivity = 900 umhos
Temp = 13.4 °C
pH = 7.70

1700 Collected sample from Well MW-4
C092W-MW4
MFQ206 = 6-005439 (METALS - UF)
MFQ207 = 6-005440 (METALS - F)
7655-F5 = 6-005441 (GEN CHEM)

Pumping Record 15:10 Pumping
15:30 Dropped pump 5' - pumping some air, shut off pump
MM SDW 16:00 Sounded well - WL = 160'

16:36 WL = 150' Started pump
Some bubbles in water stream
16:40 Turbid water along ~20 sec
17:00 Sampled

12-3-92

0800 Met at site office to discuss days activities

0830 Went to well MW-3 to set up for sampling. Water level is approximately 6" above hatch mark on steel shroud

0915 Arrived at residential well site for background sample
- Residential well sampled (b) (6) [redacted]
- possibly ~ 30' deep (b) (6) [redacted]
- plenty of water
- faucet is 20' from well head (b) (6) [redacted]

- ~~collected~~ Turned on pump & started purging well at 0925

0940 Collected sample for pH & conductivity at residential well

Conductivity = 1800 umhos, 1850
pH = 7.35, 7.32
Temp = 12.6°C, 12.9°C

0950 - Collected sample from (b) (6) [redacted] well
Sample - C092WESC

MM

1:10 collected sample from Hanover Creek
(.1 mile from (b) (6) [redacted] /house)
Sample = C092WHC-UH
(b) (6) [redacted] house is 0.6 mile from bar
1.4 miles to mine gate

location
- sample is across from union Hill tailings
in area where there appears to
be runoff from tailings

Sample #s are as follows:

Station	Lab #
C092WESC (metals)	MFQ213
C092WESC (G.C.)	7655-F8
C092WHC-UH (metals)	MFQ212
C092WHC-UH (G.C.)	7655-F9

MM

C092W-SPR
9:40 Collect GW sample from Fire Spring
Spring box is concrete goes 2' below
ground level + 2' above - steel (?)
manhole cap (metal only through
concrete top) Water comes up
above ground surface ~1'
No outflow seen
Richard Buchan says locals
nearby use spring ~~for~~ for DW
(they collect water in containers)
Sample by dipping bottles into pool
(box about 4' x 4') with gloved hand
Consultants also took samples
Total Metals (UF) = MFQ208 = 6-005442
Gen Chem = 7655-F6 = 6-005449
Pres metals at site
Same time D. Slifer takes soil
composite over 100 ft² area in
flat area above spring - composite
in zip-lock and split w/ consultant
C09DS-HCBG = MFQ210 = 6-005469

SDL

9:50 Sample Hanover Creek SW 100' above spring where water cascades over ledge flow is low
CO924-HCBG-MFQ209-6-005448 (metals UF)
7655-F7-6-005468 (Gen Chem
Pres metals at site
Sample by holding bottle under water overfall w/ gloved hand
Consultants also sample
~~Sample time~~

10:20 Sample soil behind Fiero Catholic Church Composite over 100 ft^2 into zip-lock; split w/ consultant
CO925-FCC-MFQ211-6-005450

MN

12:35 Collected groundwater sample from well MW-3. Equipment blank taken at 12:50.

Purged 90 gallons/hr for 3 hrs (270 gal.).

→ Also collected double volume and duplicate samples from MW-3

- Field parmeters were measured inside mine office. Conductivity = 1200 umhos
pH = 7.68
temp = 14.8°C

Sample #'s are as follows:

Sample	Lab #
C092W-MW3 (total metals uf)	MFQ216
C092W-MW3 (total metals -uf)	MFQ216
C092W-MW3 (total metals-uf)	MFQ217
C092W-MW3 (total metals -f)	MFQ214
C092W-MW3 (total metals -f)	MFQ214
C092W-MW3 (total metals-f)	MFQ215
C092W-EQB (total metals-uf)	MFQ218
C092W-MW3 (Gen Chem)	7655-F10
C092W-MW3 (Gen chem)	7655-F10
C092W-MW3 (Gen Chem)	7655-F11

MM

36

1600 Collected groundwater sample from well MW-2
- pumped for 110 minutes at 1.5 gpm
Field parameters were measured in the mine office and were as follows:

Conductivity = 1250 µmhos
pH = 10.0
temp = 13.9°C

Sample #'s are as follows:

Sample	Lab #
C092W-MW2 (metals UF)	MFQ219
C092W-MW2 (metals F)	MFQ220
C092W-MW2 (Cancham.)	7655-F12

Started pumping at 2:00
at 3:30 lowered pump, hit bottom + pump clogged w/sediment - pulled pump, cleaned screen using well bore discharge water. Then lowered pump and started pumping again at 3:40.

Bayard Mining Corporation
303 Fierro Road
P.O. Box 406
Hanover, New Mexico 88041
Telephone (505) 537-3391
FAX No. (505) 537-3144

MW

12/10/92 Samplers: Susan Morris, David Trujillo

11:20 AM - collected surface water sample downstream of Blackhawk tailing in Hanover Creek

~~HOC~~ HOC-SL3 (unfiltered, metals) Preserved (HNO_3)

HOC-SL3 (Gen Chem, uf) CH92W-HCWD

Sample #

Temp. = 7° - C HOC-SL3 (uf Metals) - MFQ242 = 6-039600

pH = 6.71 HOC-SL3 (Chem, UP) = 7655-F01 = 6-039596

Conductivity = 1600 umhos

Sample collected IN stream flow SM

11:50 AM - collected surface water sample. Streamflow is at surface where overhead Powerlines cross the stream, NEAR Junc 152 App 1/10 mile

Sample location identification HOC-SL2 CH92W-HC3H

Sample collected SM IN stream flow

Temp = 11°C

pH = 7.23 SM

Conductivity = 1600 umhos

HOC-SL2 (uf, Metals preserved (HNO_3) = MFQ-239 6-005385

HOC-SL2 (Gen Chem, uf) = 7655-F19 = 6-005384

12:18 ~~PM~~ SAM pm sample HOC-SL1 collected North of the Bridge crossing HANOVER CREEK (NEAR MONUMENT) CH92W-HCBU

HOC-SL1 (uf, metals preserved (HNO_3) - MFQ238 6-039587

HOC-SL1 (uf, Gen Chem) - 7655-F18 6-005386

Temp = 14°C

pH = 7.97 Sample collected IN stream flow.

Conductivity = 1200 umhos

SM

12/10/92
35

3:10 Met [redacted] (b) (6) son of [redacted] (b) (6)

Hurley, NM 88043

Sample well on property.
Well was on property when [redacted] (b) (6) bought property in 1976. Well was never used for drinking by [redacted] (b) (6). They are on city water

Depth from ground surface to water - 9.7 ft to water
total depth of the well - 21.5 ft to water

* well contains debris and has a wooden cover.

Temp = 13.5°C
pH = 3.84
Conductivity = 1550 µmhos

CH92W-SW

Sample #
[redacted] (b) (6) Well - North Hurley

SSW-NH1 (metals, f, NH_4OH_3) = MF0241 = 6-038947
SSW-NH1 (metals, uf, NHO_3) = MF0240 = 6-005383
SSW-NH1 (Gen Chem)

[redacted] (b) (6) said that
There is another well like the one on this property. On the property next door to the North. It is the vacant land next their house - in between homes.

- Note: Chino isn't allowed to sample this well.
[redacted] (b) (6) said that they don't do things with Chino so they are the only property around that actually has retained the mineral rights and they won't let Chino sample their well

Left home 4:30 pm

SAM

National Brand

COMP BOOK

Book 3 of 3

WHITEWATER +
HANOVER CREEKS
SITE

80 SHEETS • 10 x 7⅞ • COLLEGE & MARGIN • 43-461

0 73333 43461 3

DENNISON STATIONERY PRODUCTS CO.
FRAMINGHAM, MA 01701-0344
Made in USA

000026

12/10/72 JDN

10:20 Sample BG made on W side of high ridge W of Bull Frog

No visible effect fumaroles (no mining waste on W side of ridge or visible to W)

From tailings appears predominant wind is from S up drainage.

Sample with scoop - scrape away pebble veneer + take fines

Sample 5 spots over 25m interval in line of contour

Rock unit here is U. Magdalena ls (overlain here by Alb, ~~[illegible]~~ shaly ls) on E side of ridge by Bartlett JDN

Taken on nose of ridge (S nose) about 15m from crest

CH92S - BFBG = MFQ233 = 6-039959

Went up ridge ~W from section corner (?) marker [illegible] Maybe a corner claim marker

with Dick Graeme, Dennis Boyd, Bill Worthington

Photos: Sampling pit in main Bull Frog pile

Smaller of two later BF piles (used these after first got too high for piping to);

Dennis Boyd pointing to pipeline from mill to larger of later BF piles at SE corner of pile - note wind ripples on surface

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4

10/10/92

1215 Sample from Bull Hill Tailings from largest pile on ~~E~~ SW S Face at SW corner ~1/3 way up (Face over E-W (152) Hwy
Sample composite over 2 locations over 10' intervals each - dig 4" with shovel + sample with scoop
Composite into jar
CH925-BH = MFQ 234 = 6-039960

Photos: Bull Hill Shaft + workings up Buckhorn Gulch; Leach spray on S dumps of China; Face where sampled (looking E)

1345 Tailings up Hanover Creek 0.4 mi from road split with road to Continental Mine
Unknown origin + owner (Richard Buckhorn + Dick Greene Did Not Know either)
2 piles: Smaller is 1/10 mi x 27 yd deep x 4 yd high Face along Hanover Cr
Larger is 0.15 mi long x 9 yd deep x 11 yd high

1355 Sampled larger pile at S ~~side~~ SW end of E face over Hanover Creek
Sampled at 5 spots over 12 yd interval - dig 4-6" with shovel + sample w/ scoop
Composite in jar
CD925-HCT = MFQ 235 = 6-039921

000030

JDL

CH92W-LB

15:35 Sample SW from stream flowing in Lucky Bill Canyon - no animals seen

UF Metals MFG237 = 6-039963
Gen Chem = 7655-F17-6-039962

Sampled 30 m upstream from explosives shack. 0.75 mi from where road up Lucky Bill turns off from road running by San Jose Mtn

Filled bottles where water flows over rocks. UF Metals & Gen Chem

Eddie Humphry took sample also

15:45 Sample soil for background up along N of water sample location - sample above floodplain of creek - take composite with auger in 11 spots over 100 m interval - surface soil just under leaves. Fill ziplock & mix; split sample with Eddie Humphry

CH92S-LB = MFG236-6-039961

JDL

6

6-1-93

Additional site observations from field investigations:

1) No sources have any type of HRS containment - for Huley tailings, the diversion channel is only on E side

2) GW is used for drinking water, irrigation, and livestock in the site area

SW is not used for these

3) Both Hanover + Whitewater Creeks are intermittent, flows vary 0-10 cfs normal flow

4) West + South dumps are mine dumps; other sources are tailings piles

SOH

REFERENCE 22

NMED, Drinking Water Section
Excerpts from public water supply files

N-Av - Not Available
Est. - Estimated

Community Water Supply System

Inspection Form

NM Health and Environment Department
Environmental Improvement Division

Section A - GENERAL INFORMATION

Inspection Date:	May 9, 1990

WSS CODE:	WATER SUPPLY SYSTEM NAME	COUNTY:
223-09	HANOVER MDWCA	Grant

System Address/LOCATION: Hanover, NM 88041

OWNER:	OWNER ADDRESS (if different than above)	PHONE
Hanover MDWCA		537-6153

Population Served	# Connections	# Meters	Max. System Production	Average System Production
300	100	100	108,000 GPD Poten. [XX] Actual [ ]	13,300 GPD

System Source (check Approp. Boxes): Distribution Only [ ] Well(s) [XX] # of Wells 1
Spring(s) [ ] Infiltration Gallery [ ] Surface [ ]

Additional or Qualifying Information:

System Personnel - Name/Classification	Level of Certification Required	Level of Certification Obtained
John Fleming President MDWCA	N/A	
Jesus Loera, Operator		

Information furnished by: Jesus Loera	Business Phone: 537-6153
Survey Performed by: Rock L. Vendrely, Environmentalist	Business Phone: 538-5310

New Mexico [redacted]ment Department
Drinking Water Section

RECEIVED
JUN 30 1992
DRINKING WATER SECTION
LAS CRUCES FIELD OFFICE

☒ Community Water Supply System
☐ Nontransient Noncommunity System
☐ Noncommunity System

Season Begin Date (MM/DD)	Season End Date (MM/DD)

SECTION A - GENERAL INFORMATION

WSS Code #:	Water Supply System Name:	Service Area Type: (See Appendix B, Table 1)	County:
224-09	TOWN OF HURLEY	S4	Grant

System Location:	System Phone #
Chino Mines, Hurley New Mexico 88043	(505) 537-3381

System Mailing Address:	Street / P.O. Box	City	State	Zip Code
	P.O. Box 65	Hurley	NM	88043

Name of System Owner:	Type of Owner: (See Appendix B, Table 2)	Owner Phone #
Phelps Dodge Corp. (Chino Mines Co.)	2	( )

Owner's Mailing Address:	Street / P.O. Box	City	State	Zip Code

Population Served	# of Connections	# of Meters	Avg. System Production (Circle one)	Cost/mo. for 4,500 gal. or Flat Rate/mo. if used: (Circle which is used)
1600	630	630	1.4 MGD or GPD	$

System Source Information
Enter All Applicable Information

- XXX Well(s) - #____
- ☐ - Spring(s) - #____
- ☐ - Infilt. Galleries(s) - #____
- ☐ - Surface Intake(s)
  - Lake - #____
  - Stream - #____

% Ground 100 % — % Surface ____ %
% Purchased Ground ____ % — % Purchased Surface ____ %
(If any water is purchased, please provide information on seller below)

Seller's Code #:	Seller's Name:

SECTION B - SYSTEM PERSONNEL INFORMATION
(Please include information on Water System Officials, Board Members, Operator(s), etc.)

Name / Title	Phone #	Certification Level Required	Certification Level Obtained
Chino Mines Co. Chief Operator / Contact	(505) 537-3381	N/A	
	( )		
	( )		
	( )		
	( )		
	( )		
	( )		
	( )		

Information Furnished By:	Business Phone:
Benny Placencio	(505) 537-3381

Survey Performed By:	Survey Date:	Business Phone:
Rock L. Vendrely, Environmentalist	06/25-26/91	(505) 388-1934

N/A - Not Applicable
N-Av - Not Available
Est. - Estimated

NM Health and Environment Department
Environmental Improvement Division

Community Water Supply System

Inspection Form

Section A - GENERAL INFORMATION

Inspection Date:	June 13, 1989

WSS CODE:	WATER SUPPLY SYSTEM NAME	COUNTY:
225-09	NORTH HURLEY MDWCA	Grant

System Address/LOCATION: P.O. Box 583, Hurley, NM 88043

OWNER:	OWNER ADDRESS (if different than above)	PHONE
North Hurley MDWCA		537-2877

Population Served	# Connections	# Meters	Max. System Production	Average System Production
375 - 400	104	104	* GPD Poten. ☐ Actual ☐	32,000 GPD

System Source (check Approp. Boxes): Distribution Only ☒ Well(s) ☐ # of Wells _____ Spring(s) ☐ Infiltration Gallery ☐ Surface ☐

Additional or Qualifying Information:

*Maximum System Production: Water pruchased from Town of Hurley.

System Personnel - Name/Classification	Level of Certification Required	Level of Certification Obtained
Silvestre Macias, President	None	
Richard Padilla, Secretary		
Willie Padilla, Vice President		
Manuel Peru, Board Member		
Lorenzo Munoz, Board Member		

Information furnished by: Richard Padilla	Business Phone: 537-5456
Survey Performed by: Rock L. Vendrely, Environmentalist	Business Phone: 538-5310

☐ Nontransient Noncommunity System
☐ Noncommunity System

Season Begin Date (MM/DD)	Season End Date (MM/DD)

SECTION A - GENERAL INFORMATION

WSS Code #:	Water Supply System Name:	Service Area Type: (See Appendix B, Table 1)	County:
382-09	FT. BAYARD MEDICAL CENTER		Grant

System Location:	System Phone #
Fort Bayard, New Mexico	(505) 537-3302

System Mailing Address:	Street / P.O. Box	City	State	Zip Code
	P.O. Box 219	Ft. Bayard	New Mexico	88036

Name of System Owner:	Type of Owner: (See Appendix B, Table 2)	Owner Phone #
State of New Mexico		(505) 537-3302

Owner's Mailing Address:	Street / P.O. Box	City	State	Zip Code
	P.O. Box 219	Ft. Bayard	New Mexico	88036

Population Served	# of Connections	# of Meters	Avg. System Production (Circle one)	Cost/mo. for 4,500 gal. or Flat Rate/mo. if used: (Circle which is used)
600	50	0	156,600 MGD or GPD	$ None

System Source Information

Enter All Applicable Information

☐ - Well(s) - #____
☒ - Spring(s) - # 19
☐ - Infilt. Galleries(s) - #____
☐ - Surface Intake(s)
Lake - #____
Stream - #____

% Ground 100 %
% Purchased Ground ____ %
% Surface ____ %
% Purchased Surface ____ %

(If any water is purchased, please provide information on seller below)

Seller's Code #:	Seller's Name:

SECTION B - SYSTEM PERSONNEL INFORMATION

(Please include information on Water System Officials, Board Members, Operator(s), etc.)

Name / Title	Phone #	Certification Level Required	Certification Level Obtained
Chief Operator / Contact	( )		
Bob Flores	(505) 537-3302	None	
	( )		
	( )		
	( )		
	( )		
	( )		
	( )		

Information Furnished By:	Business Phone:
	( )

Survey Performed By:	Survey Date:	Business Phone:
Rock L. Vendrely, Environmentalist	May 14, 1991	(505) 388-1934

N-Av - Not Available
Est. - Estimated

Inspection Form

NM Health and Environment Department
Environmental Improvement Division

Section A - GENERAL INFORMATION

Inspection Date:	June 12, 1990

WSS CODE:	WATER SUPPLY SYSTEM NAME	COUNTY:
221-09	BAYARD MUNICIPAL WATER SYSTEM	Grant

System Address/LOCATION: P.O. Drawer "T", Bayard, NM 88023

OWNER:	OWNER ADDRESS (if different than above)	PHONE
City of Bayard		537-3327

Population Served	# Connections	# Meters	Max. System Production	Average System Production
3,300	970	970	655,200 GPD; Poten. [XXX] Actual [ ]	.3 MGD GPD

System Source (check Approp. Boxes): Distribution Only [ ] Well(s) [XXX] # of Wells 6; Spring(s) [ ] Infiltration Gallery [ ] Surface [ ]

Additional or Qualifying Information:

Abandoned Well #3 went dry.

System Personnel - Name/Classification	Level of Certification Required	Level of Certification Obtained
Eddie Sedillos	W-II	Water-IV, WW-III
Avalino Altimirano		Water I

Information furnished by: Eddie Sedillos, Utility Supervisor	Business Phone:
Survey Performed by: Rock L. Vendrely, Environmentalist	Business Phone: 538-5310

☒ Community Water Supply System
☐ Nontransient Noncommunity System
☐ Noncommunity System

Season Begin Date (MM/DD)	Season End Date (MM/DD)

SECTION A - GENERAL INFORMATION

WSS Code #:	Water Supply System Name:	Service Area Type: (See Appendix B, Table 1)	County:
222-09	CENTRAL WATER SUPPLY	RI	Grant

System Location:	System Phone #
Central, NM	(505) 537-2443

System Mailing Address:	Street / P.O. Box	City	State	Zip Code
	P.O. Box 316	Central	NM	88026

Name of System Owner:	Type of Owner: (See Appendix B, Table 2)	Owner Phone #
Village of Central	4	(505) 537-2443

Owner's Mailing Address:	Street / P.O. Box	City	State	Zip Code
	Same as above			

Population Served	# of Connections	# of Meters	Avg. System Production (Circle one)	Cost/mo. for 4,500 gal. or Flat Rate/mo. if used: (Circle which is used)
1,900	580	597	AV-169,000 MGD or GPD	$ 3,000/$9.00 $1.50 per 1000 after

System Source Information — Enter All Applicable Information

- ☒ Well(s) - # 3
- ☐ - Spring(s) - #
- ☒ Infilt. Galleries(s) - # 1
- ☐ - Surface Intake(s)
  - Lake - #
  - Stream - #

% Ground 75 % — % Surface 25 %
% Purchased Ground ____ % — % Purchased Surface ____ %
(If any water is purchased, please provide information on seller below)

Seller's Code #:	Seller's Name:

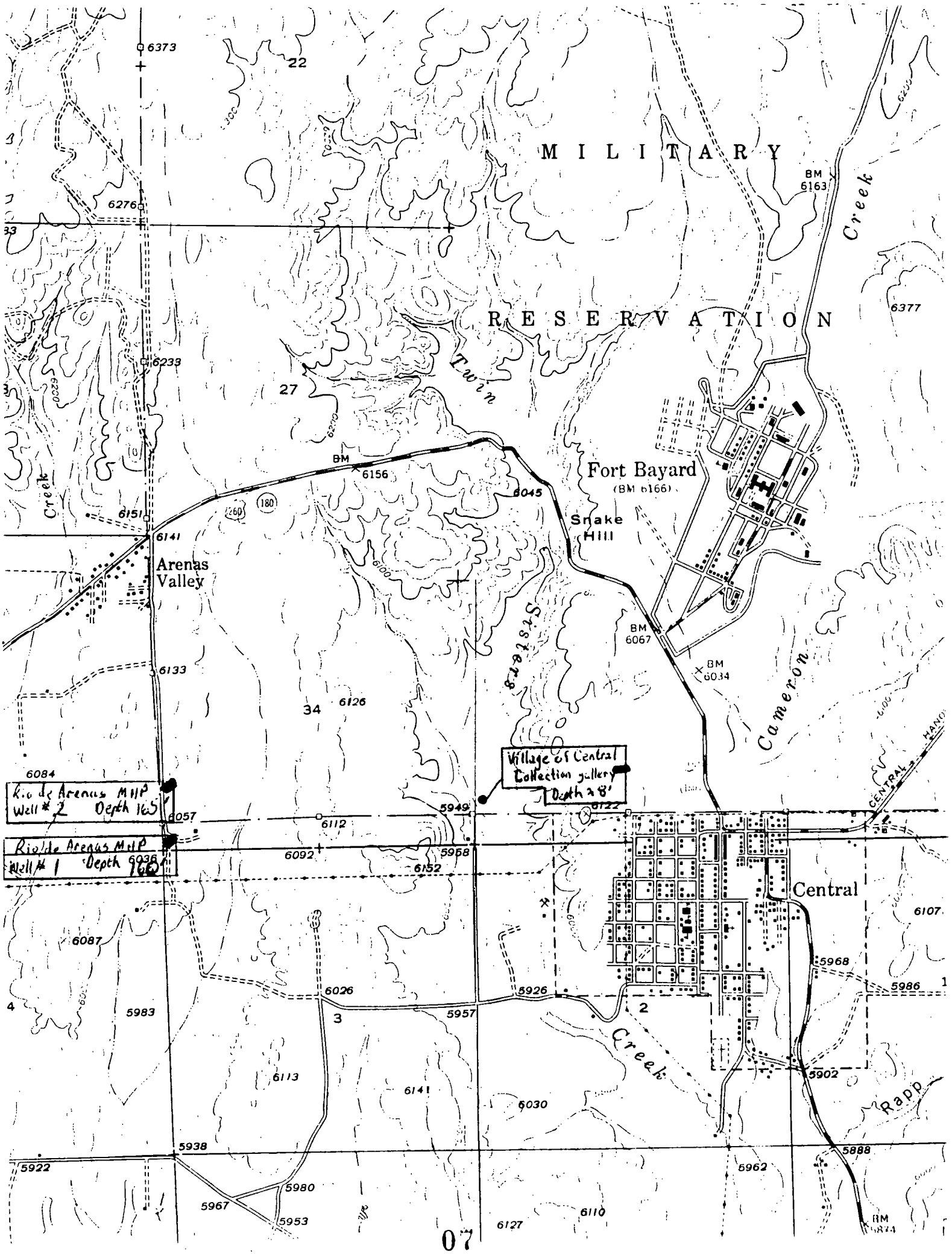
SECTION B - SYSTEM PERSONNEL INFORMATION

Please include information on Water System Officials, Board Members, Operator(s), etc.)

Name / Title		Phone #	Certification Level Required	Certification Level Obtained
Marcelino Sandoval	Superintendent Chief Operator / Contact	( ) 537-2443		Class I
Richard Portillo	Relief Supertindent	( ) 537-2443	None	None
Mario Sososaya	Utilityman	( ) 537-2443	None	None
		( )		
		( )		
		( )		
		( )		
		( )		

Information Furnished By:	Business Phone:
Marcelino Sandoval, Superintendent	( ) 537-2443

Survey Performed By:	Survey Date:	Business Phone:
Jody Pugh, Environmental Trainee	08/27/91	( ) 388-1934


MILITARY
RESERVATION
Fort Bayard
(BM 6166)
Snake Hill
Arenas Valley
Twin
Creek
Cameron
Central
Rapp
Creek
Village of Central Collection gallery Depth 28'
Rio de Arenas MWP Well # 2 Depth 165'
Rio de Arenas MWP Well # 1 Depth 160'
BM 6163
BM 6156
BM 6067
BM 6034
6373
6276
6233
6151
6141
6133
6126
6084
6057
6112
6092
6087
6045
5949
5958
6152
6122
5968
5986
5926
5957
6026
5983
6113
6141
6030
5938
5922
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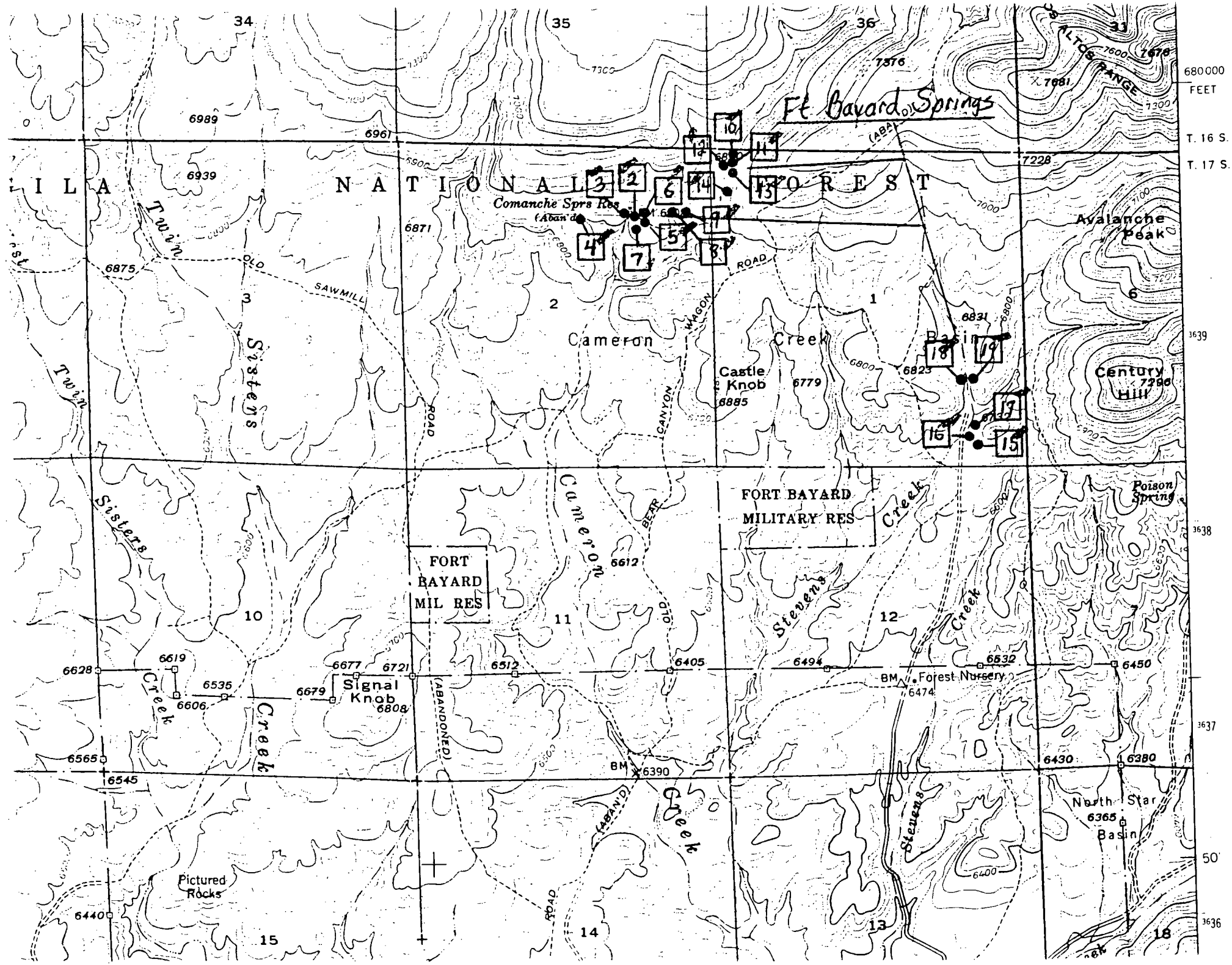
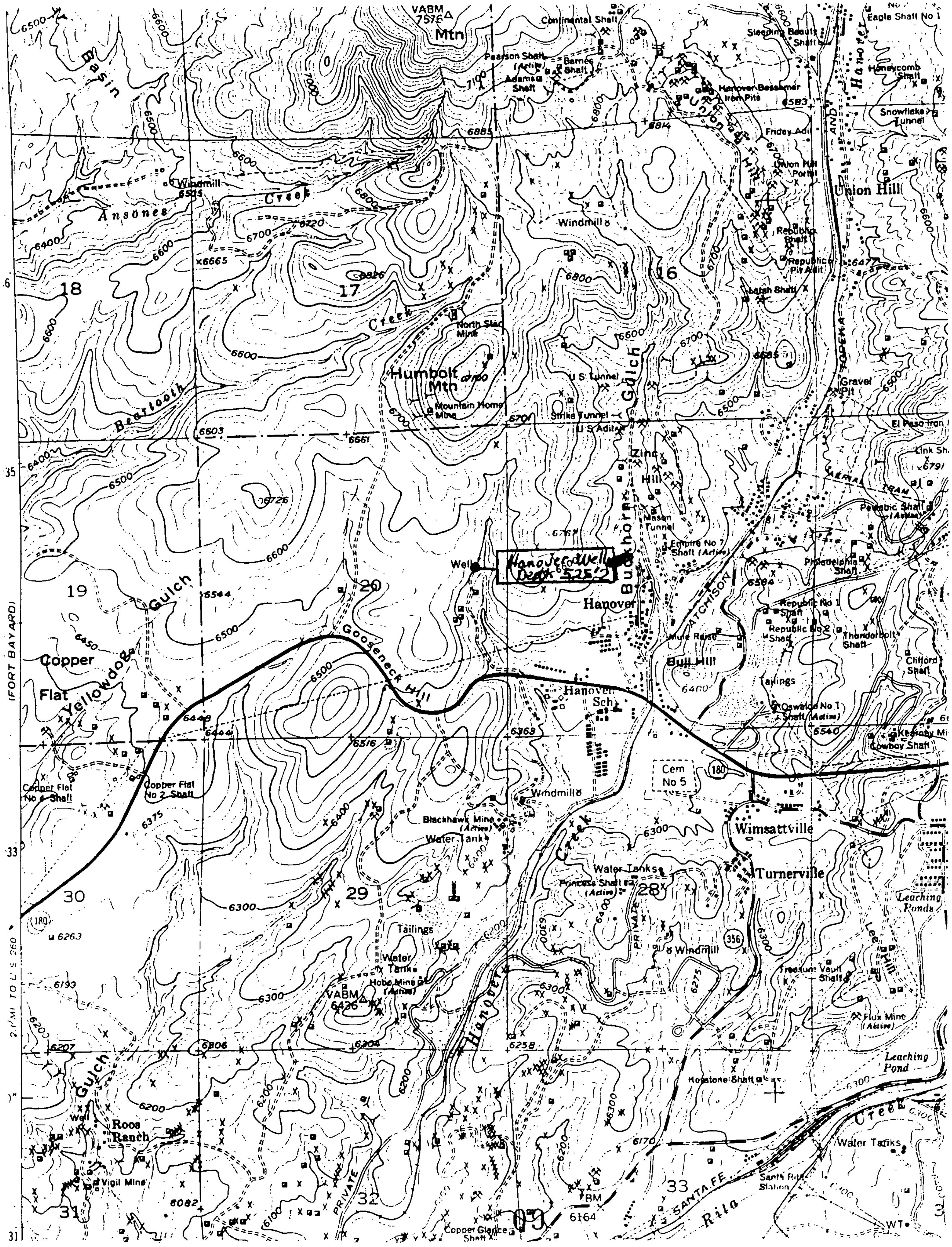
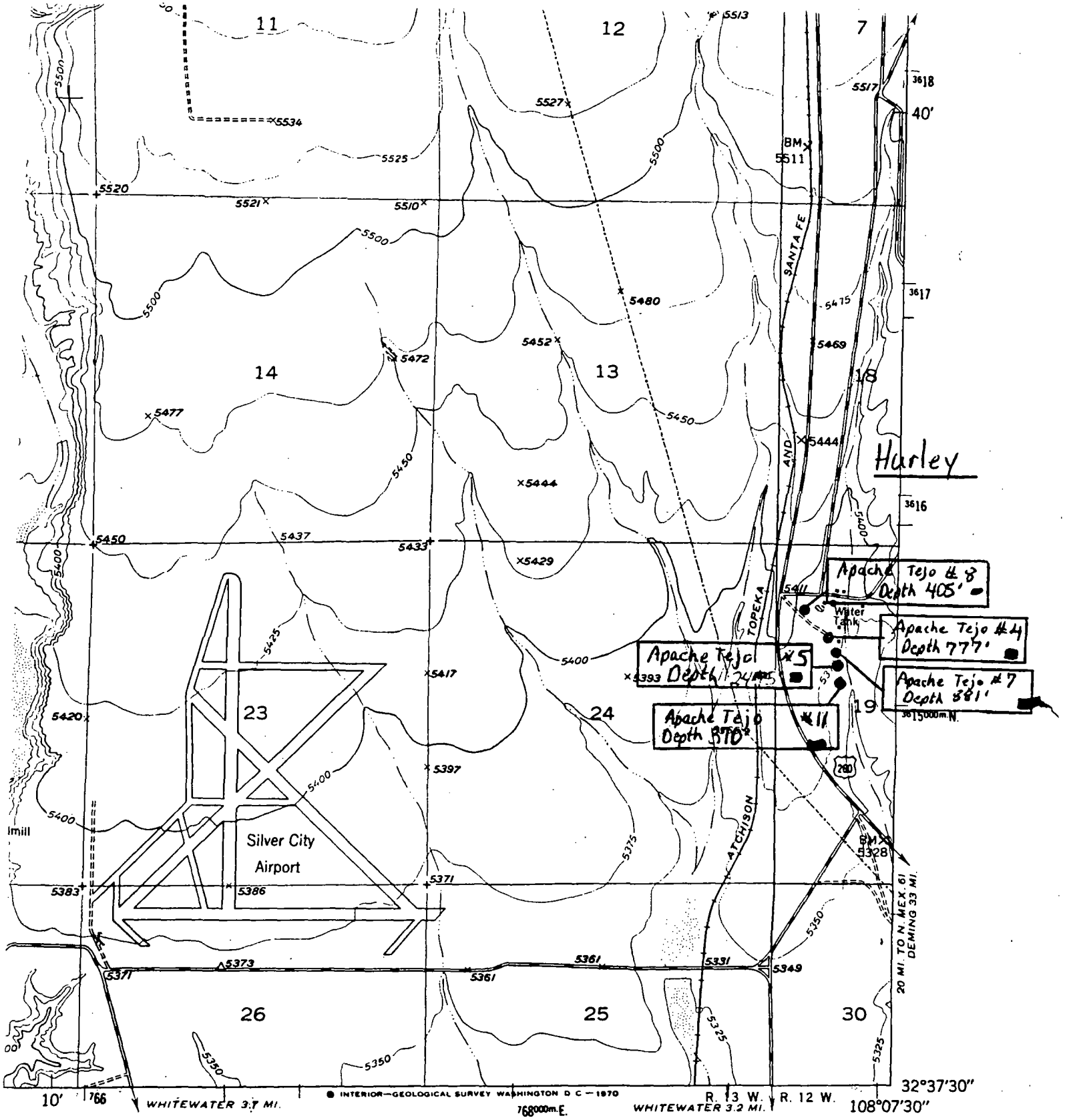
6377
6107
22
27
34
3
2
4


Ft Bayard Springs
(Aban'd)
Comanche Sprs Res
(Aban'd)
I L A N A T I O N A L F O R E S T
Twin Sisters
Cameron Creek
Castle Knob
6885
Signal Knob
6808
(ABANDONED)
FORT BAYARD MILITARY RES
FORT BAYARD MIL RES
Stevens Creek
Forest Nursery
BM
6474
Avalanche Peak
Century Hill
7296
Poison Spring
North Star Basin
Pictured Rocks
OLD SAWMILL ROAD
WAGON ROAD
BEAR CANYON
OLD ROAD
(ABAND'D)
ALTOS RANGE
680000 FEET
T. 16 S.
T. 17 S.
3639
3638
3637
3636
50'



VABM 7576
Mtn
Continental Shaft
Sleeping Beauty Shaft
Eagle Shaft No 1
Basin
Pearson Shaft (Active)
Barnes Shaft
Adams Shaft
Hanover Bessemer Iron Pits
Honeycomb Shaft
Snowflake Tunnel
Union Hill
Friday Adit
Union Hill Portal
Windmill
Ansones Creek
Windmill
Republic Shaft
Republic Pit Adit
18
17
16
Larsh Shaft
Creek
North Star Mine
Humbolt Mtn
Mountain Home Mine
U S Tunnel
Strike Tunnel
U S Adit
Gravel Pit
El Paso Iron
Link Shaft
Beartooth
Gulch
Zinc Hill
Mason Tunnel
Empire No 7 Shaft (Active)
Republic Shaft (Active)
Philadelphia Shaft
Buckhorn
Well
Hanover Jeco Well Depth 525'2
19
20
Gulch
Hanover
ATCHISON
Republic No 1 Shaft
Republic No 2 Shaft
Thunderbolt Shaft
Mule Raise
Bull Hill
Clifford Shaft
(FORT BAYARD)
Copper Flat
Yellowdog
Gooseneck Hill
Hanover Sch
Tailings
Oswaldo No 1 Shaft (Active)
Kearney Mine
Cowboy Shaft
Copper Flat No 4 Shaft
Copper Flat No 2 Shaft
Cem No 5
180
Windmill
Blackhawk Mine (Active)
Water Tank
Creek
Wimsattville
Water Tanks
Turnerville
30
29
Princess Shaft (Active)
28
Leaching Ponds
180
Tailings
PRIVATE
356
Windmill
Lee Hill
Water Tank
Hobo Mine (Active)
VABM 6436
Treasure Vault Shaft
Hanover
Flux Mine (Active)
Leaching Pond
Keystone Shaft
Gulch
Well
Roos Ranch
Creek
Water Tanks
Vigil Mine
33
Santa Rita Station
SANTA FE
Rita
31
32
PRIVATE
BM
Copper Glance Shaft
09
WT



ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS		DRY WEATHER ROADS
Heavy-duty	4 LANE 16 LANE	Improved dirt
Medium-duty	4 LANE 16 LANE	Unimproved dirt

Loose-surface, graded, or narrow hard-surface

U. S. Route State Route

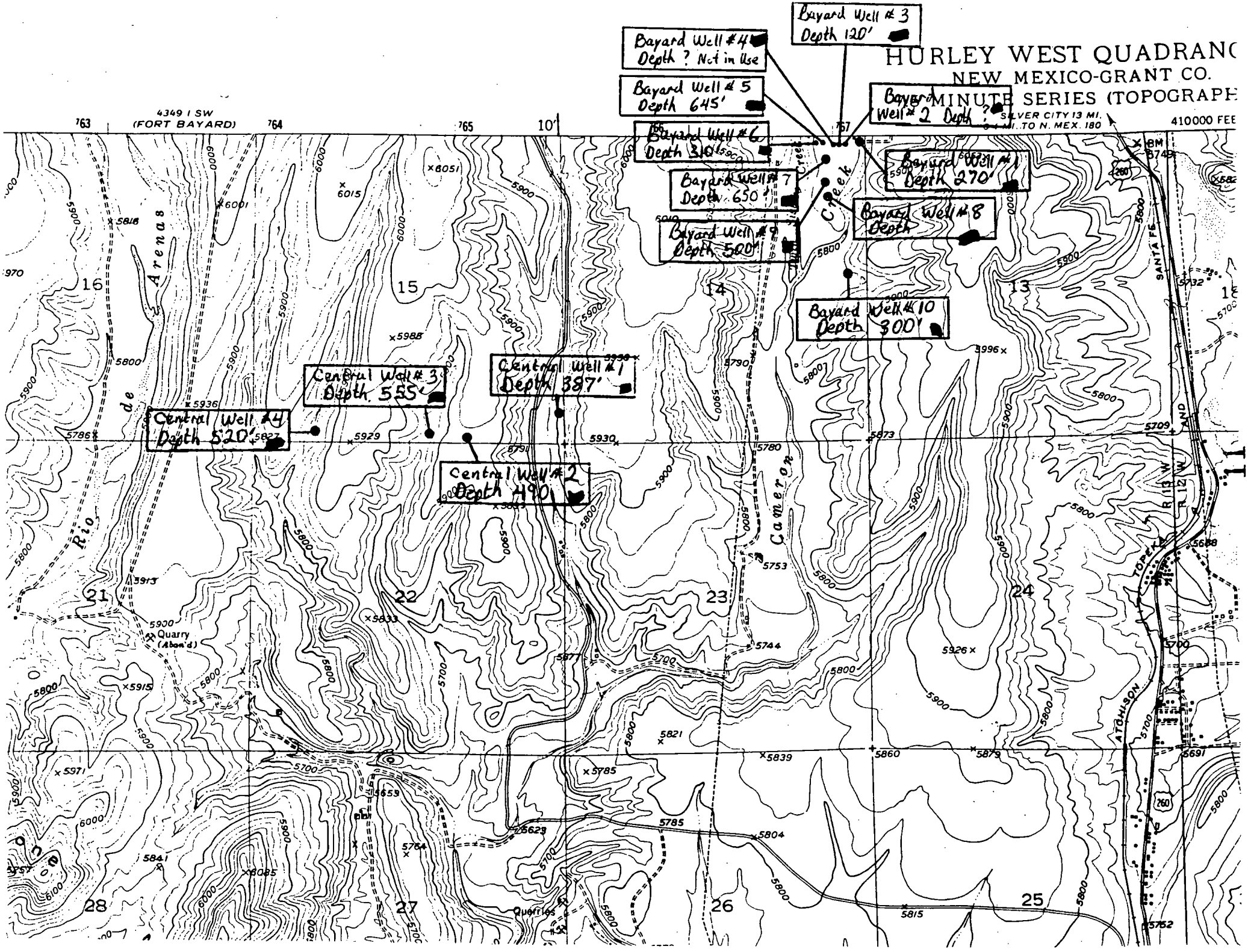
(FAYWOOD STATION) 4349 11 SE

HURLEY WEST, N. MEX.

N3237.5—W10807.5/7.5

10

COUNTY NAME # USGS TOPO MAP NAME 1949


HURLEY WEST QUADRANG
NEW MEXICO-GRANT CO.
MINUTE SERIES (TOPOGRAPH
4349 I SW
(FORT BAYARD)
410000 FEE
Bayard Well #3
Depth 120'
Bayard Well #4
Depth ? Not in Use
Bayard Well #5
Depth 645'
Bayard Well #2 Depth ?
Bayard Well #6
Depth 310'
Bayard Well #7
Depth 650'
Bayard Well #1
Depth 270'
Bayard Well #8
Depth
Bayard Well #9
Depth 500'
Bayard Well #10
Depth 300'
Central Well #3
Depth 555'
Central Well #1
Depth 387'
Central Well #4
Depth 520'
Central Well #2
Depth 490'
Rio de Arenas
Cameron Creek
Quarry
(Abon'd)
Quarries
SANTA FE
ATCHISON
TOPEKA
R 12 W
R 11 W

REFERENCE 23

Record of Communication
D. Slifer and R. Vendrely

STATE OF NEW MEXICO
HEALTH & ENVIRONMENT

RECORD OF TELEPHONE CONVERSATION

Time: 14:00	Date: 1-23-92
Originating Party: Dennis Slifer	Other Parties: Rocky Vendrely
NMED, Superfund Section	NMED, Silver City Office

Subject: Community water systems in vicinity of Hanover and Whitewater Creek's NM

Discussion:

There are six community water systems (groundwater) in the site area:

① Hanover system serves Hanover, Vanadium, and dwellings north toward Fierro. There are 100 connections serving 300 people. Well is 525' deep, located approx ½ mi. NW of Hanover.

② Bayard system serves Bayard via 970 connections, with 3300 people. There are 10 wells in Cameron Creek drainage, ½ mi. SW of Bayard, at depths ranging from 270' to 645'.

③ Central system serves 1900 people via 580 connections. The well field consists of 4 deep wells (387' to 555') located 2½ mi. SW of Central

④ Hurley system has 630 connections to 1600 people. Water is from a number of well fields on Chino Mines land between Hurley and Deming, located west of the highway. Closest well fields are Apache Tejo and Stark.

⑤ North Hurley system has 104 connections to 400 people. Water is from same source as Hurley water.

⑥ Fort Bayard system has 50 connections to a population of 600. This is a State Hospital with many permanent residents + staff. Source is 19 spring boxes located 4 to 5 miles N. of Fort Bayard and 3 miles W. of the Continental mine.

Total population served by groundwater from these community systems = 8100
This is the most current data available, and was taken in 1990 or 1991

I copied sections of topo. maps from NMED Drinking Water Section which show locations and depths of all these wells.

Dennis Slifer
Signed

REFERENCE 24

Tuan et al., 1973

THE CLIMATE OF NEW MEXICO - Revised Edition

by

Yi-Fu Tuan, Cyril E. Everard,

Jerold G. Widdison and Iven Bennett

Graphics: Judith Bateman

Bruce King, Governor

David W. King, State Planning Officer

The preparation of this report was financially aided through a federal grant from the Department of Housing and Urban Development under the Urban Planning Assistance Program authorized by Section 701 of the Housing Act of 1954 as amended.

State Planning Office, Santa Fe, 87501

1973

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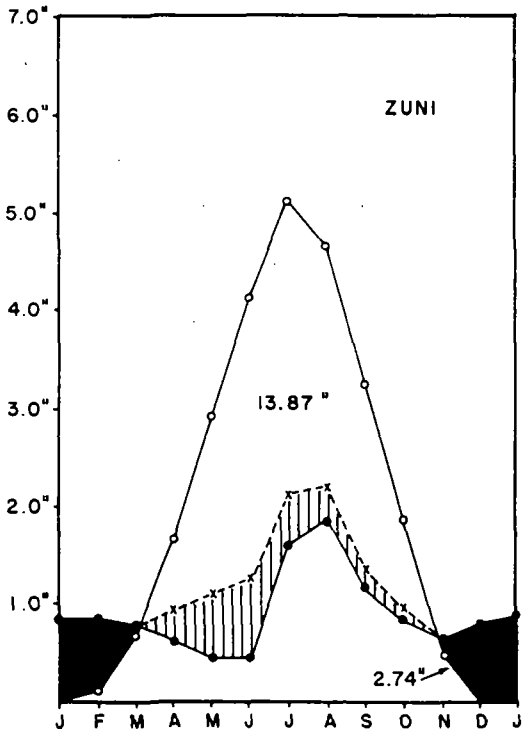
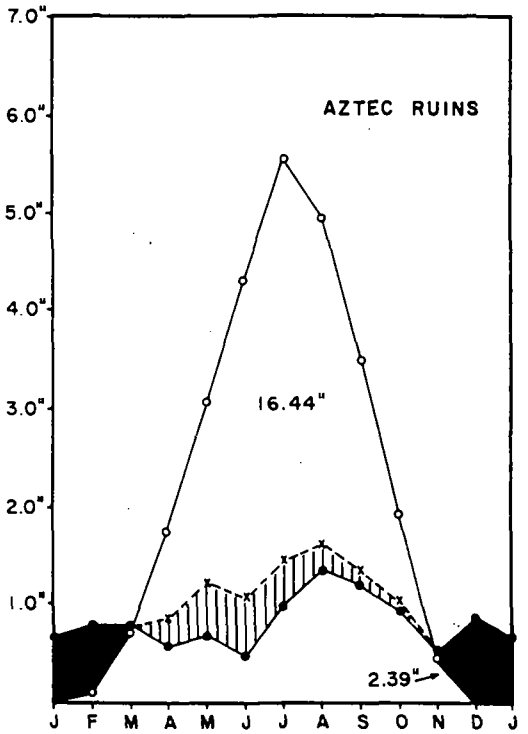
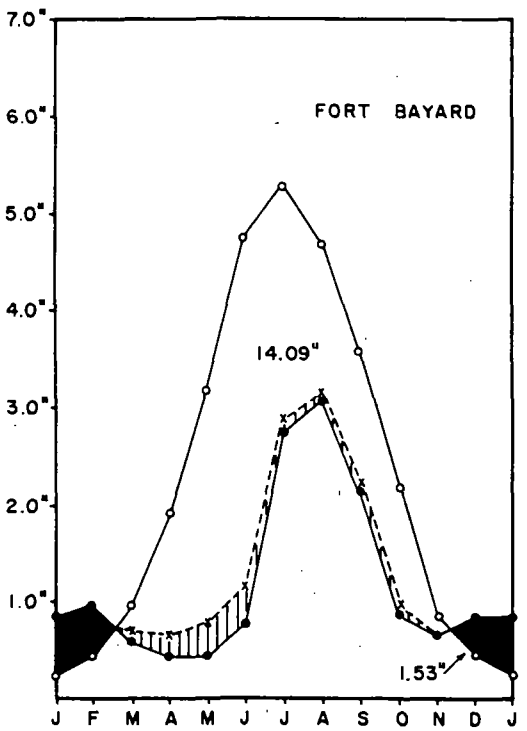




P-E GRAPHS: NORTHWESTERN PLATEAU



P-E GRAPHS: SOUTHWESTERN MOUNTAINS

Figure 53

REFERENCE 25

Miller et al., 1973

Precipitation-Frequency Atlas of the Western United S

J. F. Miller, R. H. Frederick, and R. J. Tracey

Volume IV–New Mexico

U.S. DEPARTMENT OF COMMERCE
Frederick B. Dent, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
Robert M. White, Administrator

NATIONAL WEATHER SERVICE
George P. Cressman, Director
Silver Spring, Maryland – 1973

Prepared for U.S. Department of Agriculture, Soil Conservation Service, Engineering Division

For sale by the Superintendent of Documents, U.S. Government Printing Office

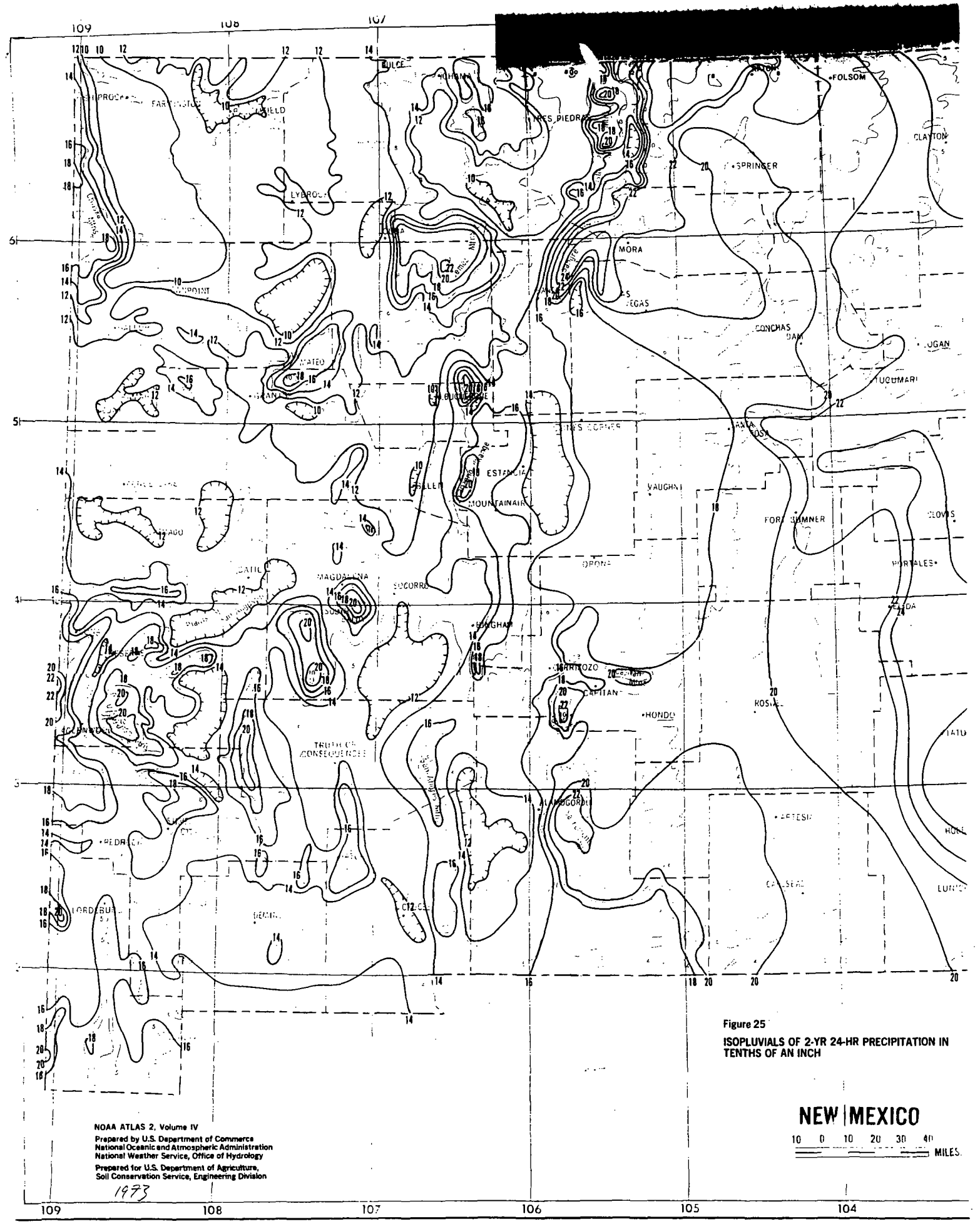


Figure 25

ISOPLUVIALS OF 2-YR 24-HR PRECIPITATION IN TENTHS OF AN INCH

NEW MEXICO

10 0 10 20 30 40 MILES

NOAA ATLAS 2, Volume IV

Prepared by U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service, Office of Hydrology

Prepared for U.S. Department of Agriculture,
Soil Conservation Service, Engineering Division

1973

REFERENCE 26

Bouwer, 1978

GROUNDWATER HYDROLOGY

Herman Bouwer

Director, U.S. Water Conservation Laboratory
Agricultural Research Service
United States Department of Agriculture
Phoenix, Arizona

and

Lecturer in Groundwater Hydrology
Geology Department
Arizona State University
Tempe, Arizona

McGraw-Hill Book Company

New York St. Louis San Francisco Auckland Bogotá Düsseldorf
Johannesburg London Madrid Mexico Montreal New Delhi Panama
Paris São Paulo Singapore Sydney Tokyo Toronto

point in the flow system is called the *total head* H. Thus, $h_1 + z_1$ in Eq. (3.1) is the total head H_1 at point 1, and $h_2 + z_2$ is the total head H_2 at point 2. The distance L between points 1 and 2 must be measured along the streamline on which the points are located. The ratio $(H_1 - H_2)/L$ is called the *hydraulic gradient* of the flow.

Darcy's law basically states that v is directly proportional to hydraulic gradient [Eq. (3.1)]. The factor of proportionality K is a property of the soil or rock material, and it is called the *hydraulic conductivity*. Thus, K is the Darcy velocity at unit gradient. Since the hydraulic gradient is dimensionless, K has the same dimension as v, or length divided by time. A convenient unit for K is meters per day. The value of K depends on the size and number of pores in the soil or aquifer material. Orders of magnitudes for K of granular materials are:

Clay soils (surface)	0.01–0.2 m/day
Deep clay beds	10^{-8}–10^{-2} m/day
Loam soils (surface)	0.1–1 m/day
Fine sand	1–5 m/day
Medium sand	5–20 m/day
Coarse sand	20–100 m/day
Gravel	100–1 000 m/day
Sand and gravel mixes	5–100 m/day
Clay, sand, and gravel mixes (till)	0.001–0.1 m/day

The hydraulic conductivity of sandstone is considerably less than that of unconsolidated sand with the same grain sizes, due to cementation and higher density of the sandstone. K values of other consolidated materials depend entirely on the secondary porosity of the rock (fractures, weathering, solution channels in carbonate rock, etc.). General ranges of K for consolidated materials are:

Sandstone	0.001–1 m/day
Carbonate rock with secondary porosity	0.01–1 m/day
Shale	10^{-7} m/day
Dense, solid rock	$< 10^{-5}$ m/day
Fractured or weathered rock (aquifers)	0.001–10 m/day
Fractured or weathered rock (core samples)	almost 0–300 m/day
Volcanic rock	almost 0–1 000 m/day

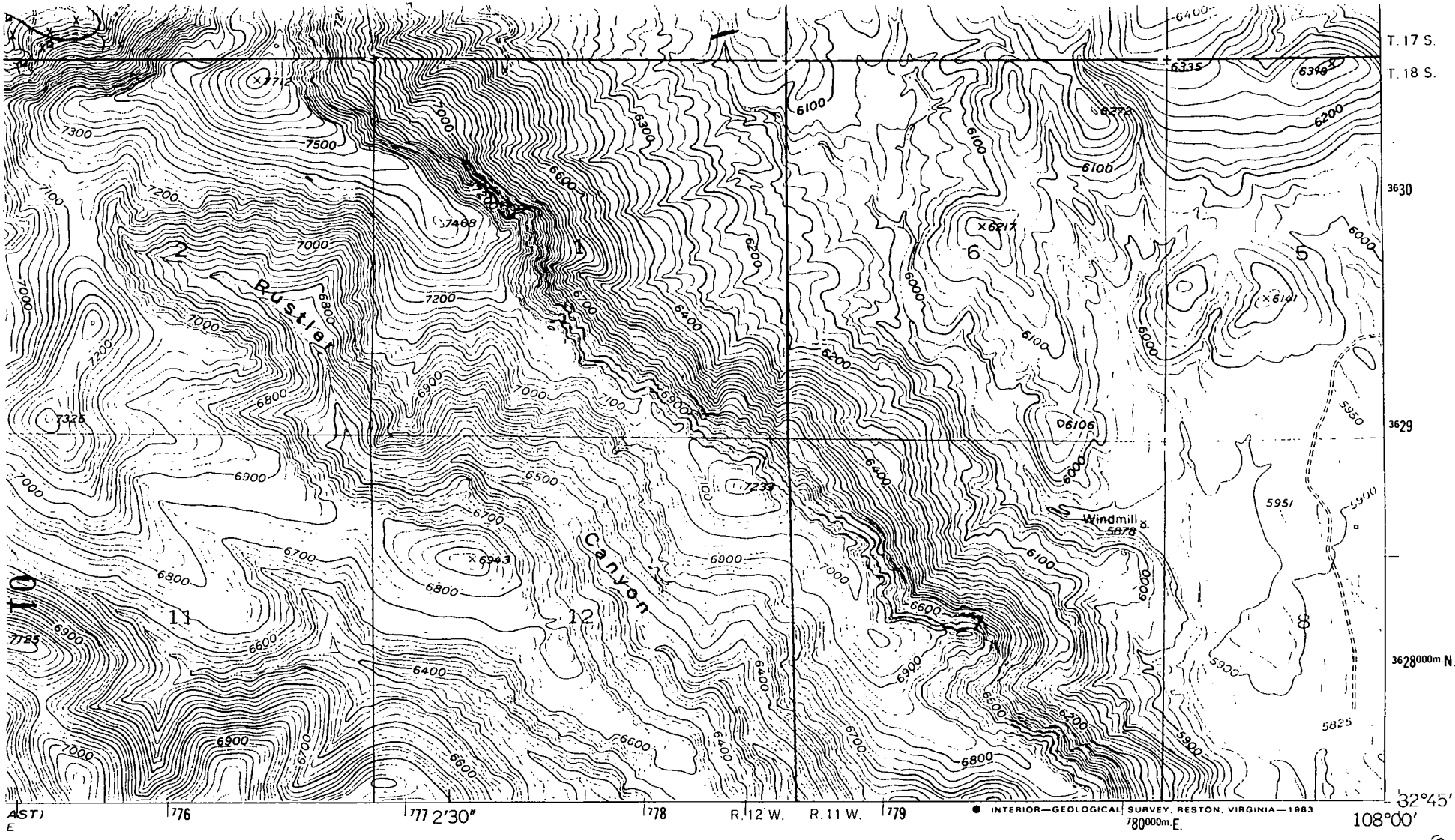
Specific values of K for various consolidated and unconsolidated materials were given by Davis (1969).

Since v in Eq. (3.1) is the velocity as if the water were moving through the entire porous material, solids as well as pores, the volume rate of flow through a given cross-sectional area perpendicular to the flow is simply calculated as

$$Q = vA \tag{3.2}$$

REFERENCE 27

US Geological Survey
7.5' topographic maps



4000

1 MILE

4000 5000 6000 7000 FEET

1 KILOMETER

/AL 25 FEET
:AL DATUM OF 1929

. MAP ACCURACY STANDARDS
OLORADO 80225, OR RESTON, VIRGINIA 22092
ID SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty — Light-duty

Medium-duty — Unimproved dirt

State Route

(DWYER 1:62 500)
4449 III

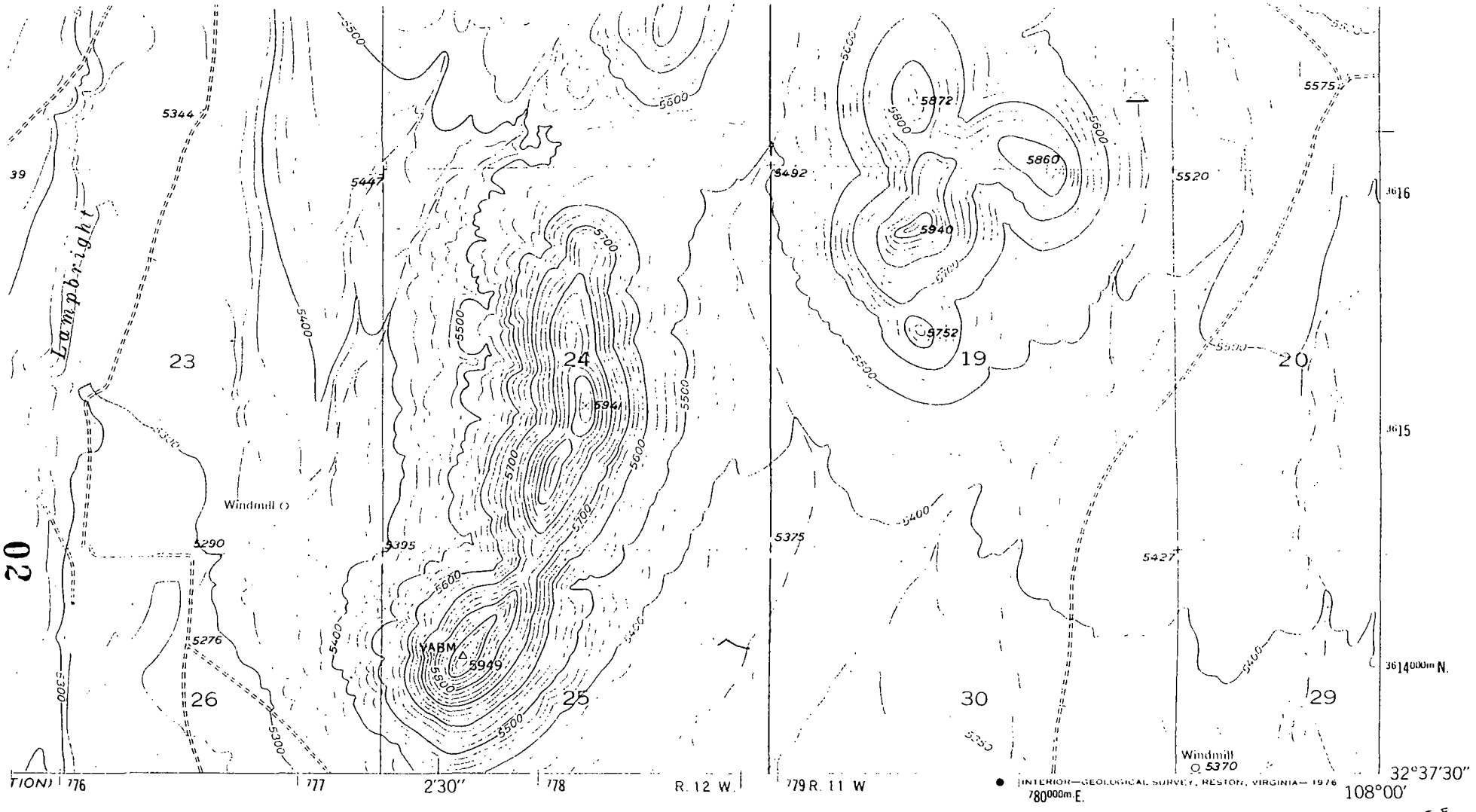
SANTA RITA, N. MEX.

N3245-W10800/7.5

1951

DMA 4349 I SE—SERIES V881

1626



)00

1 MILE

4000 5000 6000 7000 FEET

1 KILOMETRE

. 25 FEET
. DATUM OF 1929

MAP ACCURACY STANDARDS
ORADO 80225, OR RESTON, VIRGINIA 22092
SYMBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS		DRY WEATHER ROADS
Heavy-duty	4 LANE / 6 LANE	Improved dirt
Medium-duty	4 LANE / 6 LANE	Unimproved dirt
Loose-surface, graded, or narrow hard-surface		

U. S. Route State Route

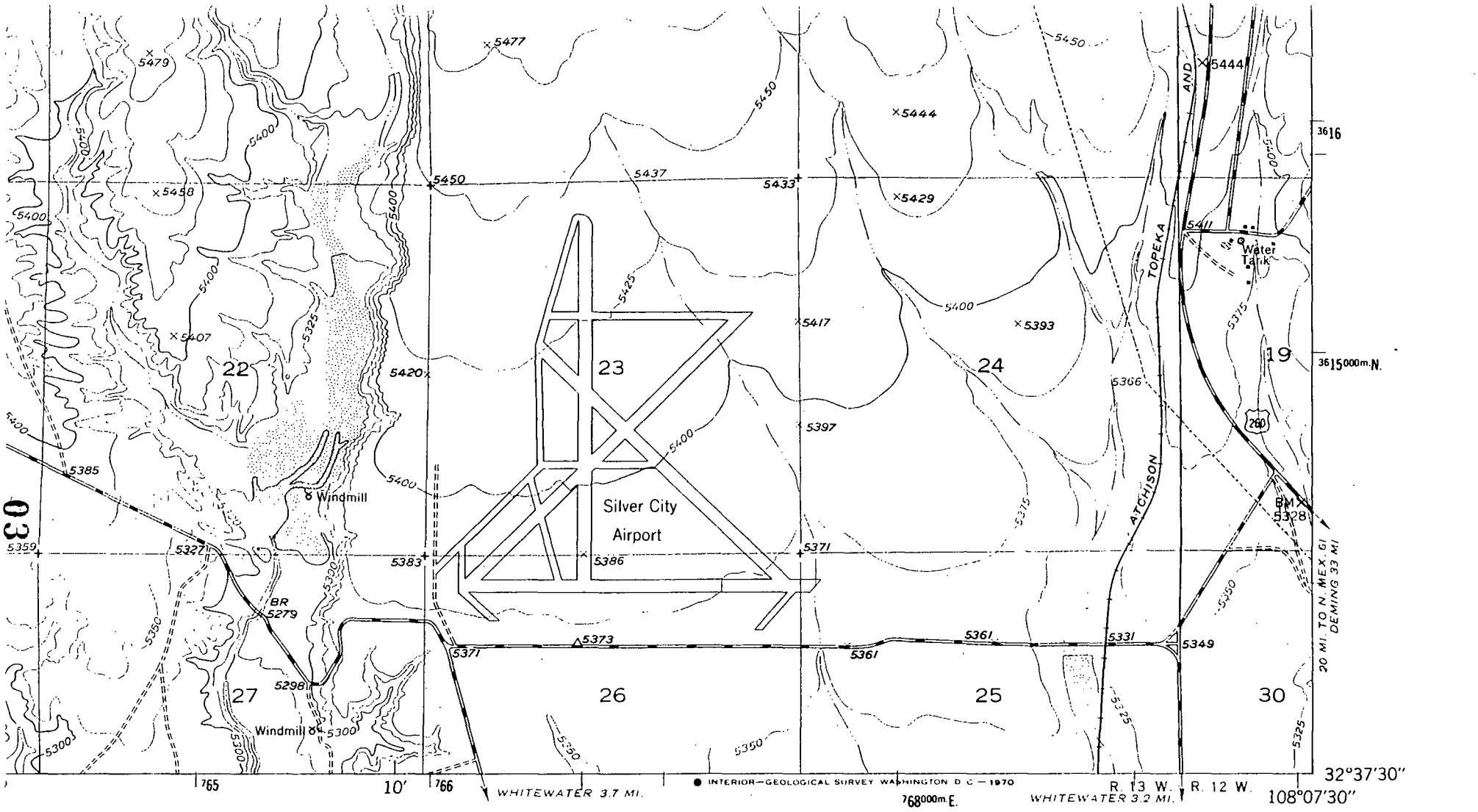
HURLEY EAST, N. MEX.

N3237.5—W10800/7.5

1948

AMS 4349 II NE—SERIES V881

02



● INTERIOR—GEOLOGICAL SURVEY WASHINGTON D. C.—1970

1 MILE

000 5000 6000 7000 FEET

1 KILOMETER

5 FEET
EVEL

ACCURACY STANDARDS
RADO 80225 OR WASHINGTON, D. C. 20242
MBOLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS		DRY WEATHER ROADS
Heavy-duty	4 LANE 16 LANE	Improved dirt
Medium-duty	4 LANE 16 LANE	Unimproved dirt

Loose-surface, graded, or narrow hard-surface

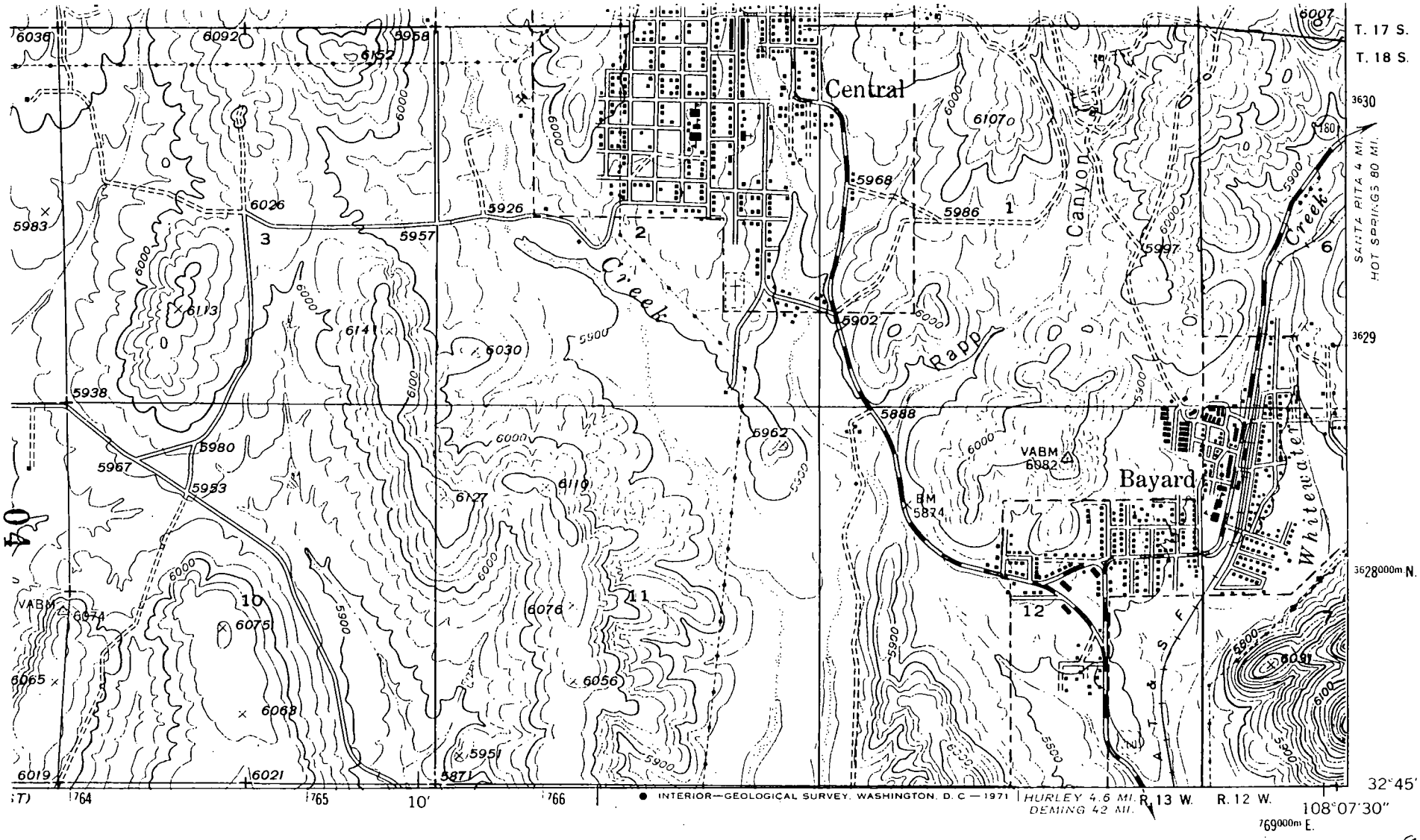
U. S. Route State Route

HURLEY WEST, N. MEX.

N3237.5--W10807.5/7.5

1949

AMS 4349 II NW—SERIES V881



(HURLEY EAST)
4349 II NE

0

1 MILE

4000 5000 6000 7000 FEET

1 KILOMETER

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS		DRY WEATHER ROADS
Heavy-duty	4 LANE 6 LANE	Improved dirt
Medium-duty	4 LANE 6 LANE	Unimproved dirt

Loose-surface, graded, or narrow hard-surface

U. S. Route State Route

25 FEET
LEVEL

MP ACCURACY STANDARDS
ORADO 80225, OR WASHINGTON, D. C. 20242
SYMBOLS IS AVAILABLE ON REQUEST

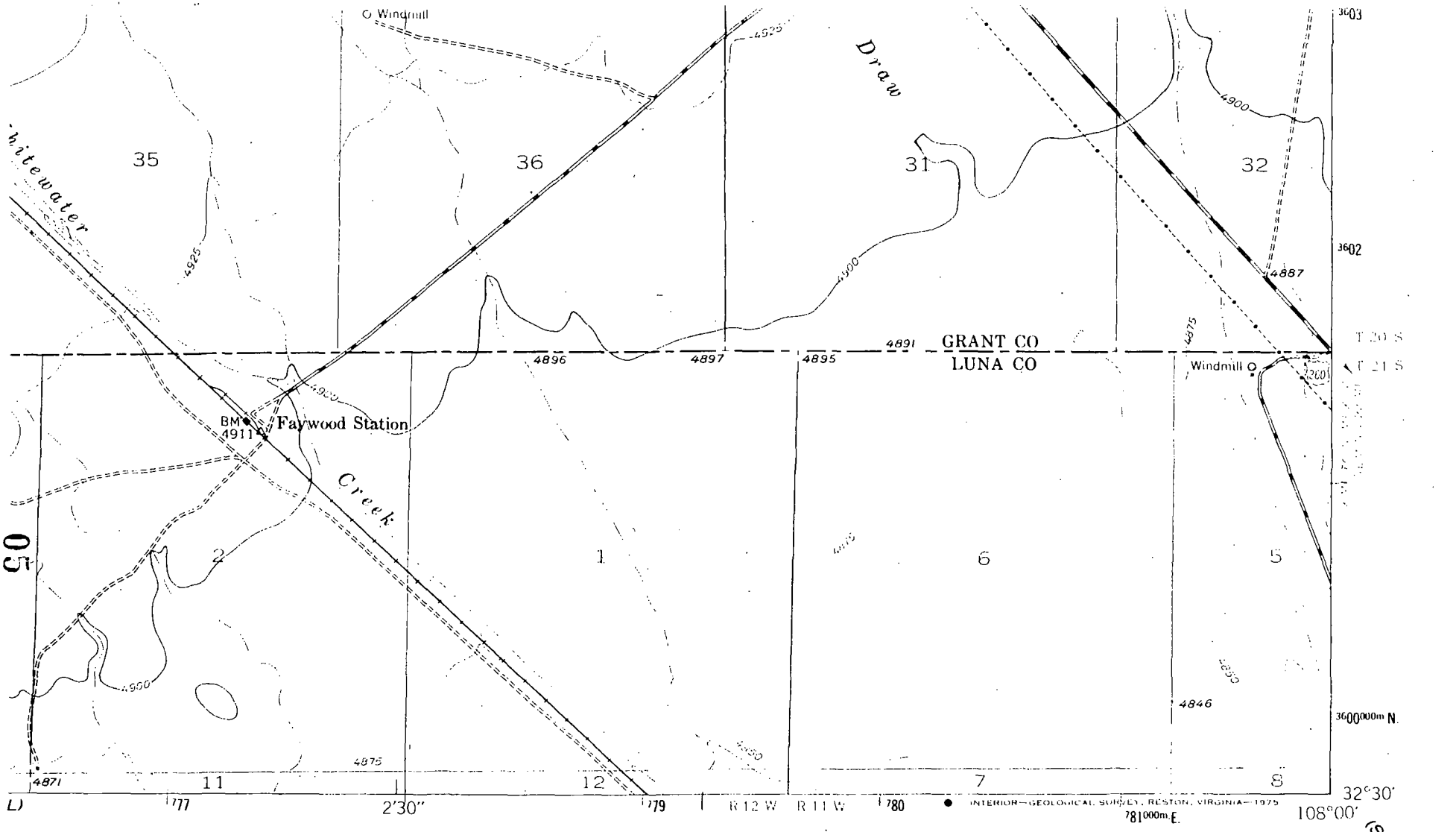
FORT BAYARD, N. MEX.

N 3245—W 10807.5/7.5

1947

AMS 4349 I SW—SERIES V881

1604-A



1 MILE

5000 6000 7000 FEET

1 KILOMETRE

FEET
TUM OF 1929

ACCURACY STANDARDS
O 80225, OR RESTON, VIRGINIA 22092
OLS IS AVAILABLE ON REQUEST

ROAD CLASSIFICATION

HARD-SURFACE ALL WEATHER ROADS		DRY WEATHER ROADS
Heavy-duty	4 LANE 6 LANE	Improved dirt
Medium-duty	4 LANE 6 LANE	Unimproved dirt

Loose-surface, graded, or narrow hard-surface

U. S. Route State Route

FAYWOOD STATION, N. MEX.

N3230—W10800/7.5

1947

AMS 4349 II SE—SERIES V881

1724

REFERENCE 28

NM Interstate Stream Commission, 1975

COUNTY PROFILE

GRANT COUNTY, NEW MEXICO

Water Resources Assessment for

Planning Purposes

By

The New Mexico Interstate Stream Commission

and

The New Mexico State Engineer Office

Santa Fe, New Mexico

1975

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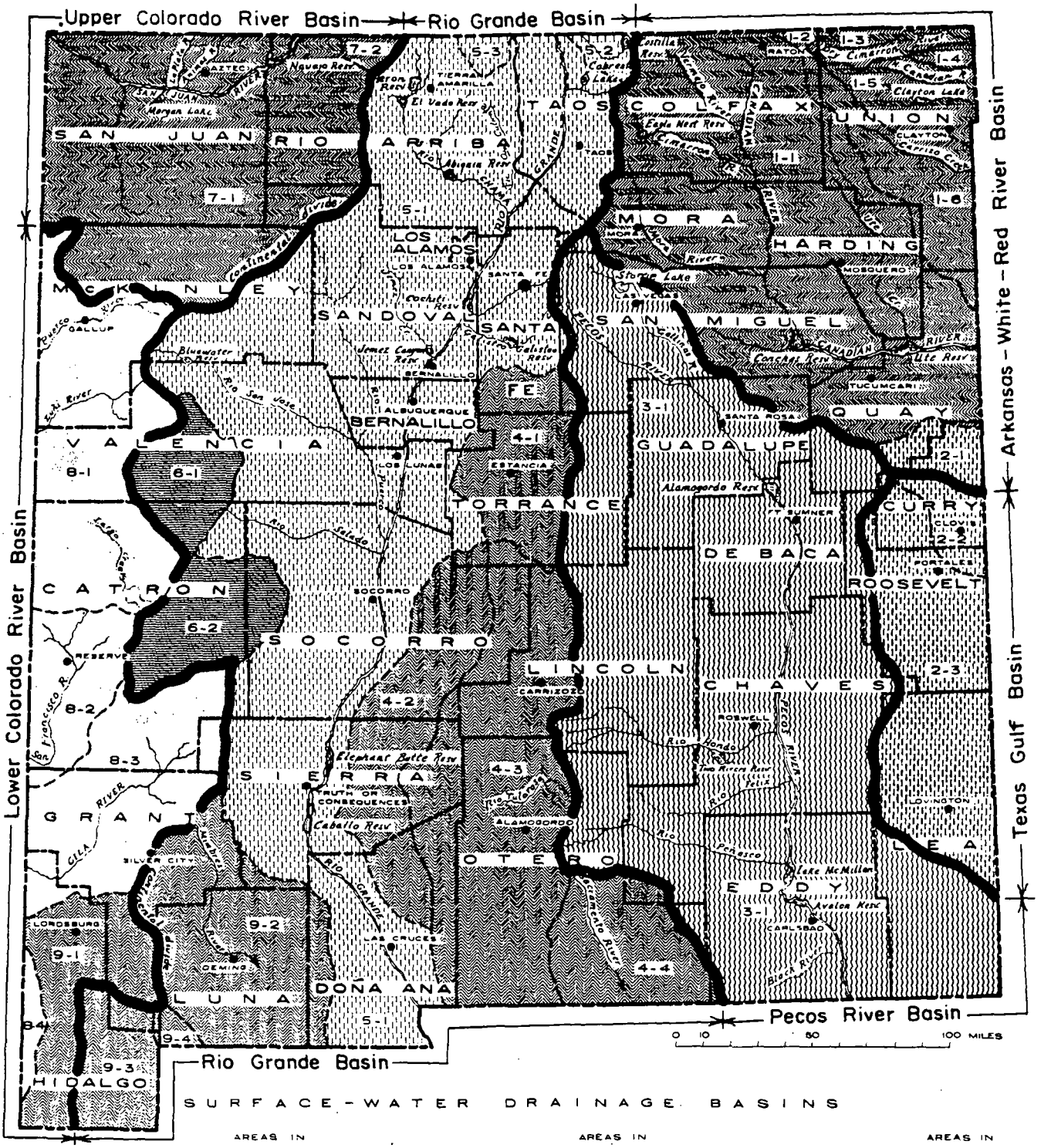

BASIN	AREAS IN SQ. MILES
ARKANSAS RIVER BASIN	
1-1, CANADIAN RIVER	13,056
1-2, PURGATOIRE RIVER	90
1-3, DRY CIMARRON RIVER	710
1-4, CARRIZOZO CREEK	220
1-5, NORTH CANADIAN RIVER	1,040
1-6, CARRIZO CREEK	1,950
TOTAL	17,066
SOUTHERN HIGH PLAINS	
2-1, RED RIVER	656
2-2, BRAZOS RIVER	721
2-3, LEA PLATEAU	4,766
TOTAL	6,143
PECOS RIVER BASIN	
3-1, PECOS RIVER	25,922

BASIN	AREAS IN SQ. MILES
CENTRAL CLOSED BASINS	
4-1, ESTANCIA BASIN	2,220
4-2, JORNADA DEL MUERTO	3,475
4-3, TULAROSA BASIN	6,540
4-4, SALT BASIN	2,370
TOTAL	14,605
RIO GRANDE BASIN	
5-1, RIO GRANDE	25,390
5-2, COSTILLA CREEK	230
5-3, RIO SAN ANTONIO	260
TOTAL	25,880
WESTERN CLOSED BASINS	
6-1, NORTH PLAINS	1,000
6-2, SAN AGUSTIN PLAINS	1,965
TOTAL	2,965

BASIN	AREAS IN SQ. MILES
SAN JUAN RIVER BASIN	
7-1, SAN JUAN RIVER	9,495
7-2, NAVAJO RIVER	245
TOTAL	9,740
LOWER COLORADO RIVER BASIN	
8-1, LITTLE COLORADO RIVER	5,310
8-2, SAN FRANCISCO RIVER	1,905
8-3, GILA RIVER	3,490
8-4, SAN SIMON CREEK	220
TOTAL	10,925
SOUTHWESTERN CLOSED BASINS	
9-1, ANIMAS BASIN	2,430
9-2, MIMBRES BASIN	4,410
9-3, PLAYAS BASIN	1,410
9-4, WAMEL BASIN	170
TOTAL	8,420
STATE TOTAL	121,666

FIGURE A-1 - MAJOR RIVER BASINS IN NEW MEXICO

REFERENCE 29

Golder Associates, 1991

Golder Associates Inc.
CONSULTING ENGINEERS

RECEIVED
SEP 06 1991
GROUND WATER BUREAU

Aug. 28, 1991

WHITEWATER LEACH DUMPS WATER QUALITY EVALUATION

DP-526

For:

Chino Mines Company
Hurley, New Mexico

By:

Golder Associates Inc.
4104 148th Avenue N.E.
Redmond, Washington 98052

David Banton
Associate

Mark Birch
Staff Hydrogeologist

August 28, 1991

913-1164

01

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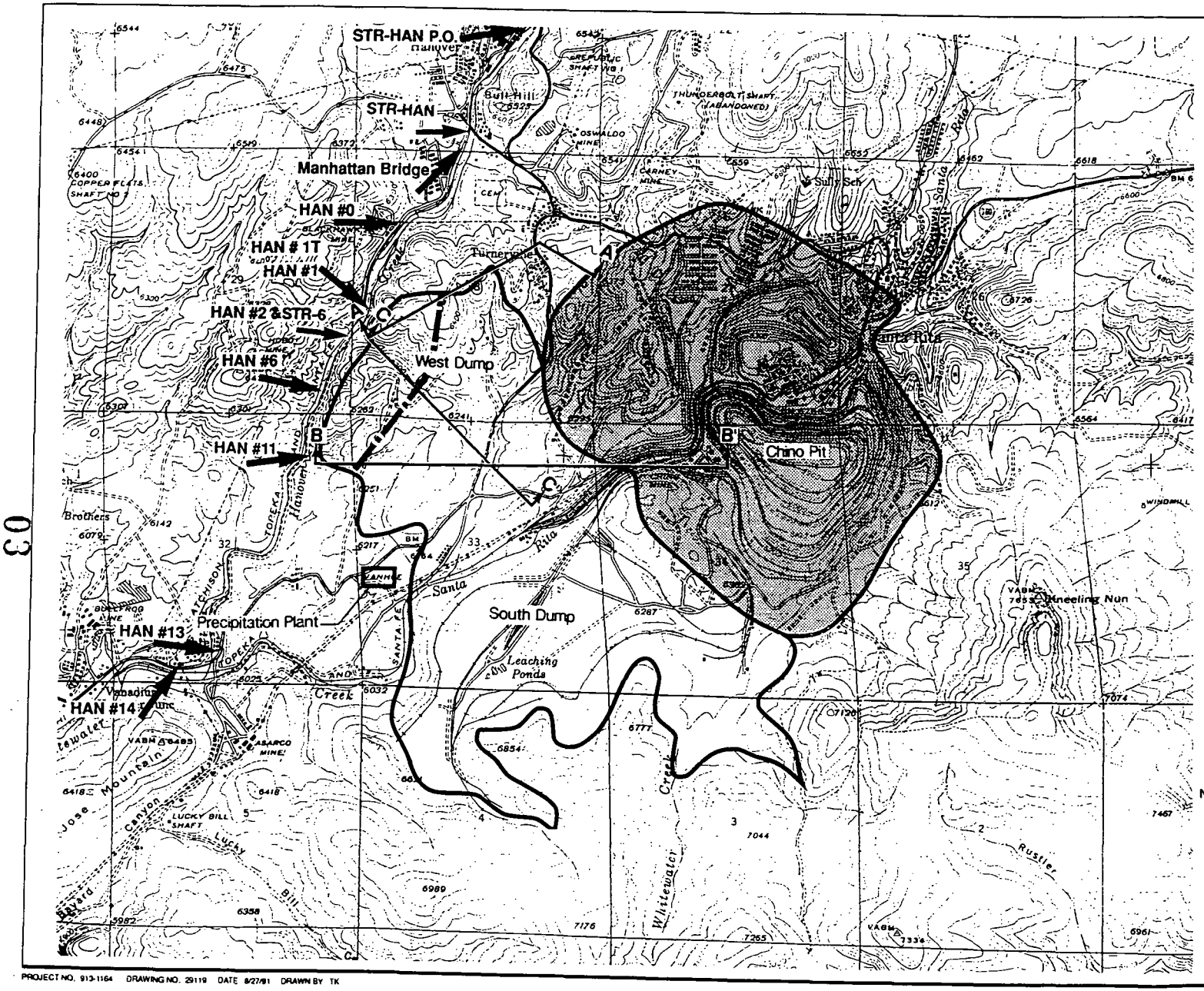


EXPLANATION

- Approximate Location of Leach Dumps
- Approximate Location of Chino Open-Pit Mine
- Approximate Location of Surface Water Drainage Divide in West Dump Area
- Location of Schematic Geologic Cross-Section
- Surface Water Sampling Locations

N

0 2000 4000
Feet

Note: Topography mapped by the United States Geological Survey in 1947.

FIGURE 1
SITE LOCATION MAP
CHINO/WHITE WATER REMEDIATION/NM

PROJECT NO. 913-1164 DRAWING NO. 29119 DATE 8/27/91 DRAWN BY TK

Golder Associates

03

TABLE 4

SUMMARY OF SURFACE WATER QUALITY

SOURCE	DATE	PH (Std. Units)	SPEC. COND. (µS)	AL (mg/L)	NH3 (mg/L)	AS (mg/L)	HCO3 (mg/L)	BR (mg/L)	CD (mg/L)	CA (mg/L)	CO3 (mg/L)	CL (mg/L)
STR-6	24-Aug-89	6.87	2630.00				196.0		0.011	426.0	-1.5	77.2
STR-6	09-Mar-90	7.40	2430.72				200.0		-0.001	483.0	-4.0	67.5
STR-6	31-May-90	7.40	3286.00				166.0		0.012	549.0	-4.0	113.0
STR-HAN	24-Aug-89	7.26	2700.00				198.0		-0.007	374.0	-1.5	64.6
STR-HAN	31-May-90	7.80	3000.00				172.0		0.006	557.0	-4.0	113.0
HAN #0	12-Jul-90	7.60	350.00				33.1		-0.001	59.2		6.1
HAN #0	23-Jul-90	7.00	450.00			-0.005	46.2		-0.001	75.8		7.5
HAN #1T	12-Jul-90						-4.0		1.470	364.0		12.7
HAN 1T	02-Mar-91	1.80	12000.00			0.236	-4.0		0.565	268.0	-4.0	4.9
HAN #1	15-Jun-90	7.60	3000.00				148.0		-0.003	598.0	-4.0	114.0
HAN #1	11-Jul-90	3.90	4500.00				-4.0		1.120	785.0		38.0
HAN #1	12-Jul-90	6.10	750.00				58.0		0.009	158.0		6.0
HAN #1	23-Jul-90	7.20	2950.00			-0.005	138.0		0.012	497.0		87.7
HAN #2	11-Jul-90	2.60	6000.00				-4.0		0.602	543.0		106.0
HAN #2	12-Jul-90	5.10	1300.00				24.0		0.044	303.0		5.4
HAN #2	23-Jul-90	6.70	2900.00			-0.005	164.0		0.041	559.0		56.2
HAN #2	07-Mar-91	6.90	1550.00				158.0			323.0	-4.0	62.7
HAN #6	11-Jul-90	2.50	4750.00				-4.0		0.710	664.0		114.0
HAN #11	18-Jun-90	6.80	3100.00				160.0		0.010	628.0	-4.0	107.0
HAN #13	12-Jul-90	2.20	4200.00				-4.0		3.660	586.0		12.4
HAN #13	07-Mar-91	7.20	1600.00				153.0			335.0	-4.0	62.2
HAN #14	12-Jul-90	2.60	2700.00				-4.0		0.136	628.0		9.1
HAN #14	07-Mar-91	6.90	1650.00				137.0			376.0	-4.0	57.9
MANHATTAN BRIDGE	07-Mar-91	6.90	1400.00				163.0			256.0	-4.0	60.1
HANOVER P OFFICE	18-Jun-90	7.10	2650.00				194.0		0.004	575.0	-4.0	112.0
CONTINENT MINE	02-Aug-90					-0.005	105.0		0.002	79.9		6.5

- Indicates constituent was undetected at the specified detection level

TABLE 4

SUMMARY OF SURFACE WATER QUALITY

SOURCE	DATE	CR (mg/L)	CO (mg/L)	CU (mg/L)	F (mg/L)	I (mg/L)	FE (mg/L)	PB (mg/L)	LI (mg/L)	MG (mg/L)	MN (mg/L)	MO (mg/L)
STR-6	24-Aug-89	0.043		0.067	0.50		3.070	-0.080		105.0	1.500	-0.040
STR-6	09-Mar-90	-0.002		0.780	0.39		0.140	-0.020		116.0	0.067	0.070
STR-6	31-May-90	0.078		0.184	0.60		0.020	-0.020		135.0	1.510	0.061
STR-HAN	24-Aug-89	0.035		0.031	0.45		0.100	-0.080		116.0	0.100	0.050
STR-HAN	31-May-90	0.064		0.065	0.40		0.014	-0.020		132.0	0.033	0.047
HAN #0	12-Jul-90	0.013		0.012	0.30		0.088	-0.020		3.3	0.018	-0.040
HAN #0	23-Jul-90	0.015		0.052	0.40		0.373	-0.020		10.6	0.244	-0.040
HAN #1T	12-Jul-90	3.860		126.000	-0.20		2118.000	-0.020		57.7	239.000	3.160
HAN 1T	02-Mar-91	0.086		66.500	-0.20		1045.000	0.040		106.0	145.000	1.020
HAN #1	15-Jun-90	0.049		0.030	0.50		0.022	-0.020		143.0	0.083	0.015
HAN #1	11-Jul-90	1.120		95.600	-0.20		2.500	-0.020		84.2	253.000	1.010
HAN #1	12-Jul-90	0.037		0.076	0.30		0.204	-0.020		15.6	1.790	0.070
HAN #1	23-Jul-90	0.040		0.042	0.50		0.025	-0.020		95.4	1.450	0.060
HAN #2	11-Jul-90	0.840		35.500	-0.20		459.000	0.391		60.7	96.600	1.340
HAN #2	12-Jul-90	0.037		0.655	0.30		0.043	-0.020		27.7	17.700	0.120
HAN #2	23-Jul-90	0.092		38.100	0.40		6.350	-0.020		87.3	185.000	0.180
HAN #2	07-Mar-91			0.054						101.0	0.212	
HAN #6	11-Jul-90	0.882		51.000	-0.20		509.000	0.227		80.0	120.000	1.840
HAN #11	18-Jun-90	-0.003		0.074	0.60		0.033	-0.020		154.0	0.047	0.027
HAN #13	12-Jul-90	0.023		68.000	-0.20		279.000	0.436		86.0	176.000	0.590
HAN #13	07-Mar-91			0.033						101.0	0.172	
HAN #14	12-Jul-90	-0.003		16.800	1.30		29.700	-0.020		76.7	56.400	0.240
HAN #14	07-Mar-91			0.074						108.0	0.889	
MANHATTAN BRIDGE	07-Mar-91			0.031						87.3	0.033	
HANOVER P OFFICE	18-Jun-90	-0.003		0.046	0.60		0.030	-0.020		191.0	0.064	0.057
CONTINENT MINE	02-Aug-90	0.031		0.407	0.40		1.440	-0.020		18.9	0.152	0.106

- indicates constituent was undetected at the specified detection level

TABLE 4

SUMMARY OF SURFACE WATER QUALITY

SOURCE	DATE	NI (mg/L)	K (mg/L)	NA (mg/L)	SO4 (mg/L)	SN (mg/L)	TDS (mg/L)	V (mg/L)	ZN (mg/L)	SIO2 (mg/L)	SE (mg/L)	TEMP (Deg C.)
STR-6	24-Aug-89	-0.030	6.75	96.0	1460.0		2460		1.600	27.40		
STR-6	09-Mar-90	0.040	7.25	88.3	1580.0		2580		1.400			
STR-6	31-May-90	0.039	9.00	74.3	1680.0		3170		0.960			
STR-HAN	24-Aug-89	-0.030	7.12	74.1	1220.0		2260		1.170			
STR-HAN	31-May-90	0.017	9.16	76.0	1769.0		3120		0.400			
HAN #0	12-Jul-90	-0.004	2.45	5.1	136.0		296		0.022			
HAN #0	23-Jul-90	-0.004	3.27	10.4	185.0		395		0.036		-0.005	21.0
HAN #1T	12-Jul-90	0.890	0.52	1.9	12900.0		26480					
HAN 1T	02-Mar-91	0.355	1.43	4.1	5680.0		8880		314.000		-0.005	
HAN #1	15-Jun-90	0.010	10.20	98.6	1760.0		3180		0.502			26.0
HAN #1	11-Jul-90	0.660	5.43	40.0	7070.0		13440		454.000			23.0
HAN #1	12-Jul-90	0.030	3.23	6.9	449.0		770		2.280			
HAN #1	23-Jul-90	0.010	9.07	103.0	1870.0		3420		2.040		-0.005	28.0
HAN #2	11-Jul-90	0.410	4.41	83.9	4870.0		7010		193.000			23.0
HAN #2	12-Jul-90	0.048	3.73	17.3	887.0		1435		16.500			
HAN #2	23-Jul-90	0.681	7.70	58.1	1861.0		3440		20.400		-0.005	28.0
HAN #2	07-Mar-91		6.48	61.1	1020.0		1745					12.5
HAN #6	11-Jul-90	0.440	5.32	99.0	7090.0		17340		284.000			23.0
HAN #11	18-Jun-90	0.025	9.60	88.3	1950.0		3310		1.250			22.0
HAN #13	12-Jul-90	0.250	5.60	13.3	4410.0		8480		0.128			
HAN #13	07-Mar-91		6.31	61.9	1110.0		1810					14.0
HAN #14	12-Jul-90	0.148	4.39	10.1	2340.0		4225		6.300			
HAN #14	07-Mar-91		6.59	65.6	1160.0		1945					14.0
MANHATTAN BRIDGE	07-Mar-91		6.29	61.6	955.0		1680					
HANOVER P OFFICE	18-Jun-90	0.018	9.40	72.3	1890.0		3050		0.061			19.0
CONTINENT MINE	02-Aug-90	0.016	4.07	21.2	244.0		635		0.564		-0.005	

- indicates constituent was undetected at the specified detection level

TABLE 5

SURFACE WATER SAMPLING LOCATIONS

Sample	Location	Chino Mine Coordinates or Section Number
HAN #0	Hanover Creek by Fleming Well	W7,780, N2,270
HAN #1T	Stream runoff from old tailing piles running into Hanover Creek from the west	W8,600, N900
HAN #1	Hanover Creek north of WD-6	W8,830, N60
HAN #2 (STR-6)	Hanover Creek south of WD-6	W9,420, S610
HAN #6	Downstream from WD-7	W9,760, S1,610
HAN #11	Downstream from WD-8	W9,970, S2,630
HAN #13	Upstream from Whitewater Creek confluence at bridge	W12,080, S7,150
HAN #14	Downstream from Whitewater Creek confluence	W12,250 S7,270
Manhattan Bridge	Hanover Creek and Hiway 90 near Manhattan Bar	W6,600, N4,000
STR-HAN P.O.	Adjacent to Hanover Post Office at spring coming into Hanover Creek from the west	NE1/4 of Sec 21, T17S.R12W
Continential	Downstream of the Continential Mine	SW1/4 of SW1/4 of Sec 10, T17S.R12W

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	PH (Std. Units)	SPEC. COND. (µS)	AL (mg/L)	NH3 (mg/L)	AS (mg/L)	HCO3 (mg/L)	BR (mg/L)	CD (mg/L)	CA (mg/L)	CO3 (mg/L)	CL (mg/L)
WD-1	20-Sep-89	6.30	50000.00				278.0		0.001	57.6	-1.5	5.6
WD-1	09-Nov-89	7.10	490.00	0.17	2.66	-0.005	305.0	-0.30	0.001	72.1	-4.0	5.2
WD-1	13-Mar-90	6.80	488.00				321.6		0.003	67.5	-4.0	4.8
WD-1	04-Jun-90	6.20	481.60				253.0		0.003	66.8	-4.0	5.3
WD-1	10-Oct-90	6.50	555.00	0.00	0.00	0.000	246.0		0.001	57.0	0.0	5.1
WD-1	28-Jan-91	7.50	370.00	0.00	0.00	0.000	219.0		0.002	47.7	4.0	4.5
WD-1	09-Apr-91	0.00	420.00	0.00	0.00	0.000	242.0		0.001	77.0	4.0	5.6
WD-3	04-Jun-90	5.10	4104.00	0.00	0.00	0.000	52.0		0.017	574.0	4.0	44.6
WD-3	02-Oct-90	5.50	4090.00	0.00	0.00	0.000	4.0		0.011	455.0	0.0	44.5
WD-3	25-Jan-91	5.90	3400.00	0.00	0.00	0.000	4.0		0.008	522.0	4.0	29.1
WD-3	09-Apr-91	4.92	3700.00	0.00	0.00	0.000	4.0		0.008	535.0	4.0	30.7
WD-3A	20-Sep-89	5.13	4050.00				28.1		0.007	711.0	-1.5	42.2
WD-3A	06-Nov-89	5.10	4400.00	3.54	1.90	-0.005	21.8	1.60	0.009	599.0	-4.0	42.7
WD-3A	12-Mar-90	5.40	4248.00	-0.06			-4.0		0.016	558.0	-4.0	34.9
WD-3A	04-Jun-90	5.10	4104.00	5.65			52.0		0.017	574.0	-4.0	44.6
WD-4	24-Aug-89	3.55	5400.00				-1.5		0.250	450.0	-1.5	32.1
WD-4	09-Nov-89	3.30	10580.00	476.00	0.52	-0.005	-4.0	-0.30	0.310	523.0	-4.0	24.4
WD-4	13-Mar-90	3.40	9440.00				4.2		-0.001	519.0	-4.0	29.8
WD-4	04-Jun-90	2.40	9900.00	555.00			-4.0		0.654	202.0	-4.0	26.6
WD-4	12-Oct-90	3.10	7500.00	0.00	0.00	0.000	4.0		0.238	413.0	0.0	26.4
WD-4	29-Jan-91	3.40	10000.00	0.00	0.00	0.000	4.0		0.346	651.0	4.0	24.5
WD-4	09-Apr-91	0.00	8000.00	0.00	0.00	0.000	4.0		0.658	449.0	4.0	27.7
WD-5	21-Aug-89	6.71	3220.00				428.0		0.005	606.0	-1.5	104.0
WD-5	06-Nov-89	6.70	2770.00	0.32	0.56	-0.005	403.0	1.40	0.003	549.0	-4.0	75.4
WD-5	09-Mar-90	6.40	3094.00				547.8		0.004	598.0	-4.0	80.1
WD-5	26-May-90	6.40	1287.00				368.0		0.007	598.0	-4.0	77.8
WD-5	10-Oct-90	6.50	2620.00	0.00	0.00	0.000	505.0		0.003	520.0	0.0	73.8
WD-5	22-Jan-91	6.90	2000.00	0.00	0.00	0.000	534.0		0.002	508.0	4.0	74.2
WD-5	09-Apr-91	6.23	2100.00	0.00	0.00	0.000	459.0		0.002	516.0	4.0	78.5
WD-6D	22-Aug-89	7.60	3160.00				323.0		0.008	479.0	-1.5	24.6
WD-6D	09-Nov-89	8.10	3170.00	0.57	0.43	-0.005	305.0	1.00	0.003	622.0	-4.0	24.9
WD-6D	12-Mar-90	6.40	3960.00				458.0		0.060	867.0	-4.0	24.1
WD-6D	30-May-90	7.10	3600.00				106.0		0.004	605.0	-4.0	29.7
WD-6D	12-Oct-90	6.10	3400.00	0.00	0.00	0.000	342.0		0.004	554.0	0.0	28.3
WD-6D	09-Apr-91	0.00	2600.00	0.00	0.00	0.000	328.0		0.003	641.0	4.0	41.4
WD-6S	22-Aug-89	6.01	3310.00				132.0		0.090	439.0	-1.5	23.9
WD-6S	06-Nov-89	5.10	4370.00	4.60	0.68	-0.005	61.8	-0.30	0.600	560.0	-4.0	23.2
WD-6S	09-Mar-90	4.80	7260.00	52.00			-4.0		2.510	664.0	-4.0	26.5
WD-6S	26-May-90	6.40	9260.00	278.00			-4.0		4.860	581.0	-4.0	26.1
WD-6S	02-Oct-90	3.90	8330.00	0.00	0.00	0.000	4.0		1.670	484.0	0.0	29.1
WD-6S	22-Jan-91	4.70	4500.00	0.00	0.00	0.000	4.0		0.916	600.0	4.0	42.3
WD-6S	09-Apr-91	0.00	6000.00	0.00	0.00	0.000	4.0		0.864	485.0	4.0	40.7
WD-7	22-Aug-89	6.33	1220.00				283.0		-0.007	150.0	-1.5	24.3
WD-7	06-Nov-89	6.50	1310.00	0.05	0.30	-0.005	312.0	1.10	0.002	161.0	-4.0	25.9
WD-7	25-Jan-90	7.10	1150.00	0.00	0.00	0.000	310.0		0.002	169.0	4.0	26.5
WD-7	09-Mar-90	6.40	1404.00				324.0		0.001	167.0	-4.0	22.8
WD-7	26-May-90	7.10	1218.00	0.28			289.0		-0.001	180.0	-4.0	28.0
WD-7	02-Oct-90	6.70	1340.00	0.00	0.00	0.000	305.0		0.003	177.0	0.0	27.2
WD-7	09-Apr-91	0.00	1280.00	0.00	0.00	0.000	343.0		0.001	231.0	4.0	28.2
WD-8D	22-Aug-89	6.85	1410.00				142.0		-0.007	173.0	-1.5	11.3
WD-8D	20-Nov-89	7.70	1320.00	0.14	-0.25	-0.005	109.0	-0.30	0.001	196.0	-4.0	10.7
WD-8D	25-Jan-90	7.50	1300.00	0.00	0.00	0.000	107.0		0.002	230.0	4.0	10.0
WD-8D	09-Mar-90	6.80	1399.20	0.20			133.0		-0.001	190.0	-4.0	10.4
WD-8D	26-May-90	6.80	1624.00				106.0		0.008	206.0	-4.0	10.9
WD-8D	02-Oct-90	6.60	1590.00	0.00	0.00	0.000	102.0		0.002	239.0	0.0	10.3
WD-8D	09-Apr-91	0.00	1350.00	0.00	0.00	0.000	55.0		0.001	187.0	4.0	10.2
WD-8S	23-Aug-89	5.98	1440.00				25.0		0.070	283.0	-1.5	11.8
WD-8S	22-Nov-89	4.50	3350.00	15.20	-0.25	-0.005	-4.0	-0.30	0.089	397.0	-4.0	14.2
WD-8S	28-Jan-90	7.30	1350.00	0.00	0.00	0.000	10.2		0.022	136.0	4.0	10.8
WD-8S	13-Mar-90	5.60	1708.00				33.2		-0.001	206.0	-4.0	9.1
WD-8S	30-May-90	5.60	1798.00				15.0		0.008	173.0	-4.0	11.9
WD-8S	12-Oct-90	5.20	1650.00	0.00	0.00	0.000	13.7		0.029	154.0	0.0	8.8
WD-8S	09-Apr-91	0.00	1500.00	0.00	0.00	0.000	20.0		0.021	197.0	4.0	13.5

- indicates constituent was undetected at the specified detection level

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	PH (Std. Units)	SPEC. COND. (µS)	AL (mg/L)	NH3 (mg/L)	AS (mg/L)	HCO3 (mg/L)	BR (mg/L)	CD (mg/L)	CA (mg/L)	CO3 (mg/L)	CL (mg/L)
WD-9D	23-Aug-89	6.81	1800.00				387.0		-0.007	181.0	-1.5	47.4
WD-9D	20-Nov-89	7.10	1470.00	0.19	-0.25	-0.005	363.0	0.30	0.002	180.0	-4.0	44.8
WD-9D	09-Mar-90	6.90	1144.44	-0.06			369.0		-0.001	135.0	-4.0	48.3
WD-9D	26-May-90	7.00	1450.00				337.0		0.011	197.0	-4.0	48.3
WD-9D	02-Oct-90	6.50	1450.00	0.00	0.00	0.000	356.0		0.001	191.0	0.0	47.3
WD-9D	24-Jan-91	7.40	1250.00	0.00	0.00	0.000	361.0		0.003	187.0	4.0	48.0
WD-9D	09-Apr-91	6.37	1400.00	0.00	0.00	0.000	338.0		0.001	182.0	4.0	48.3
WD-9S	23-Aug-89	6.96	1710.00				390.0		-0.007	188.0	-1.5	55.0
WD-9S	09-Nov-89	7.00	1650.00	0.14	-0.25	-0.005	365.0	1.00	0.001	198.0	-4.0	52.4
WD-9S	26-Jan-90	0.00	0.00	0.00	0.00	0.000	377.0		0.001	239.0	4.0	54.1
WD-9S	13-Mar-90	6.80	1534.00				408.0		-0.001	192.0	-4.0	39.6
WD-9S	31-May-90	6.90	1566.00				368.0		0.013	201.0	-4.0	49.5
WD-9S	02-Oct-90	6.80	1800.00	0.00	0.00	0.000	373.0		0.002	239.0	0.0	52.8
WD-9S	09-Apr-91	0.00	2050.00	0.00	0.00	0.000	411.0		0.002	311.0	4.0	55.5
WD-10	24-Aug-89	5.35	4210.00				6.0		0.076	568.0	-1.5	32.1
WD-10	08-Nov-89	5.10	4700.00	9.33	-0.25	-0.005	-4.0	-0.30	0.117	484.0	-4.0	45.3
WD-10	13-Mar-90	4.10	4543.00	54.00			16.6		0.100	404.0	-4.0	47.8
WD-10	26-May-90	4.20	4720.00				-4.0		0.024	505.0	-4.0	47.8
WD-10	02-Oct-90	3.70	5000.00	0.00	0.00	0.000	4.0		0.085	410.0	0.0	50.0
WD-10	24-Jan-91	3.80	3700.00	0.00	0.00	0.000	4.0		0.038	440.0	4.0	49.9
WD-10	09-Apr-91	0.00	3700.00	0.00	0.00	0.000	4.0		0.050	465.0	4.0	49.7
WD-11	21-Aug-89	6.69	1210.00				223.0		0.002	184.0	-1.5	10.9
WD-11	12-Mar-90	6.40	1092.50				236.0		-0.001	166.0	-4.0	10.0
WD-11	26-May-90	6.20	1148.40	0.28			201.0		0.010	176.0	-4.0	10.5
WD-11	02-Oct-90	6.60	1370.00	0.00	0.00	0.000	203.0		0.001	186.0	0.0	9.4
WD-11	24-Jan-91	7.30	1000.00	0.00	0.00	0.000	209.0		0.001	163.0	4.0	9.2
WD-11	09-Apr-91	0.00	780.00	0.00	0.00	0.000	189.0		0.001	183.0	4.0	9.3

- Indicates constituent was undetected at the specified detection level

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	CR (mg/L)	CO (mg/L)	CU (mg/L)	F (mg/L)	I (mg/L)	FE (mg/L)	PB (mg/L)	LI (mg/L)	MG (mg/L)	MN (mg/L)	MO (mg/L)	NI (mg/L)
WD-1	20-Sep-89	0.012		0.016	0.41		0.210	0.041		10.2	0.076	-0.040	-0.030
WD-1	09-Nov-89	0.011	-0.004	-0.002	0.42	-0.1	0.037	-0.020	-0.050	12.6	0.027	-0.040	-0.003
WD-1	13-Mar-90	-0.002		0.117	0.28		13.900	-0.020		13.4	0.890	0.020	0.013
WD-1	04-Jun-90	0.028		0.043	0.30		0.031	-0.020		12.5	0.064	0.031	0.015
WD-1	10-Oct-90	0.023	0.000	0.042	0.40		0.032	0.020		14.1	0.124	0.097	0.004
WD-1	28-Jan-91	0.003	0.000	0.101	0.31		0.064	0.020		10.9	0.542	0.004	0.004
WD-1	09-Apr-91	0.003	0.004	0.031	0.49		1.210	0.020		13.9	0.605	0.000	0.004
WD-3	04-Jun-90	0.212	0.000	1.140	2.20		265.000	0.020		361.0	14.300	0.183	0.229
WD-3	02-Oct-90	0.080	0.000	0.021	0.00		0.000	0.020		240.0	14.100	0.222	0.241
WD-3	25-Jan-91	0.003	0.000	0.004	5.50		373.000	0.020		267.0	24.400	0.126	0.248
WD-3	09-Apr-91	0.003	0.511	0.123	2.60		567.000	0.020		302.0	23.700	0.000	0.243
WD-3A	20-Sep-89	0.016		-0.040	2.90		440.000	-0.080		326.0	14.900	-0.100	0.310
WD-3A	06-Nov-89	0.089	0.670	0.520	2.36	-0.1	259.000	-0.020	0.050	356.0	10.200	0.080	0.190
WD-3A	12-Mar-90	-0.002		0.100	2.24		360.000	-0.020		323.0	16.600	0.150	0.330
WD-3A	04-Jun-90	0.212		1.140	2.20		265.000	-0.020		361.0	14.300	0.183	0.229
WD-4	24-Aug-89	0.110		0.120	0.18		0.700	0.280		555.0	127.000	0.130	0.600
WD-4	09-Nov-89	1.540	9.400	202.000	0.24	-0.1	4.120	-0.020	-0.050	1170.0	460.000	1.920	4.920
WD-4	13-Mar-90	-0.002		220.000	0.42		5.300	-0.020		1333.0	562.000	0.440	2.500
WD-4	04-Jun-90	-0.003		166.000	0.20		6.270	-0.020		1476.0	449.000	-0.003	-0.004
WD-4	12-Oct-90	0.225	0.000	149.000	0.50		1.520	0.020		990.0	365.000	2.370	1.860
WD-4	29-Jan-91	0.026	0.000	196.000	0.27		4.500	0.020		1070.0	363.000	5.370	1.680
WD-4	09-Apr-91	0.019	15.900	199.000	0.30		0.250	0.020		1110.0	503.000	0.000	2.400
WD-5	21-Aug-89	0.072		0.057	0.32		0.438	0.120		90.9	0.670	0.050	-0.030
WD-5	06-Nov-89	0.042	0.029	0.058	0.27	-0.1	0.137	0.087	-0.050	83.7	1.190	-0.040	0.021
WD-5	09-Mar-90	-0.002		0.097	0.18		3.120	-0.020		87.0	5.000	0.030	0.020
WD-5	26-May-90	0.078		0.134	0.30		0.081	-0.020		92.0	1.460	0.048	0.049
WD-5	10-Oct-90	0.039	0.000	0.021	0.30		0.733	0.020		71.4	5.650	0.313	0.017
WD-5	22-Jan-91	0.003	0.000	0.044	0.27		0.259	0.020		69.1	7.030	0.065	0.004
WD-5	09-Apr-91	0.003	0.006	0.006	0.26		0.231	0.020		69.2	5.150	0.000	0.013
WD-6D	22-Aug-89	0.071		0.021	0.34		1.550	0.160		129.0	5.560	0.040	-0.030
WD-6D	09-Nov-89	0.040	0.071	0.140	0.52	-0.1	0.083	-0.020	-0.050	177.0	13.700	0.032	0.024
WD-6D	12-Mar-90	-0.002		0.190	0.87		15.100	0.040		327.0	39.800	0.097	0.100
WD-6D	30-May-90	0.105		0.027	0.40		0.015	-0.020		210.0	2.400	0.104	0.006
WD-6D	12-Oct-90	0.060	0.000	0.024	1.20		2.550	0.020		255.0	34.300	0.877	0.042
WD-6D	09-Apr-91	0.003	0.053	0.019	0.92		0.010	0.020		241.0	19.600	0.000	0.026
WD-6S	22-Aug-89	0.096		0.026	1.39		10.300	0.168		196.0	5.600	-0.040	0.087
WD-6S	06-Nov-89	0.084	1.080	0.017	4.01	-0.1	24.600	0.110	-0.050	388.0	92.300	0.130	0.250
WD-6S	09-Mar-90	-0.020		0.870	0.40		68.600	0.260		922.0	731.000	0.590	0.880
WD-6S	26-May-90	0.011		7.020	0.40		337.000	-0.020		1652.0	744.000	0.016	2.750
WD-6S	02-Oct-90	0.313	0.000	0.603	0.00		0.000	0.180		1770.0	417.000	0.855	1.540
WD-6S	22-Jan-91	0.003	0.000	0.574	0.56		265.000	0.452		734.0	318.000	0.489	0.889
WD-6S	09-Apr-91	0.006	4.470	0.898	0.52		253.000	0.451		714.0	324.000	0.000	1.060
WD-7	22-Aug-89	0.025		0.057	0.32		0.390	0.040		41.0	1.000	-0.040	0.046
WD-7	06-Nov-89	0.024		-0.004	0.39	-0.1	0.160	0.030	-0.050	55.0	0.490	-0.040	0.009
WD-7	25-Jan-90	0.003	0.000	0.033	0.42		0.298	0.020		47.9	1.090	0.012	0.008
WD-7	09-Mar-90	-0.002		0.015	0.30		1.100	-0.020		46.2	0.900	0.024	0.004
WD-7	26-May-90	0.036		-0.004	0.40		0.010	-0.020		28.8	1.010	-0.003	0.006
WD-7	02-Oct-90	0.067	0.000	0.010	0.00		0.000	0.020		37.8	1.030	0.076	0.027
WD-7	09-Apr-91	0.003	0.004	0.010	0.37		0.050	0.020		64.0	0.763	0.000	0.004
WD-8D	22-Aug-89	0.038		0.023	0.36		0.150	0.110		46.0	0.580	-0.040	-0.030
WD-8D	20-Nov-89	0.028	0.006	0.004	0.34	-0.1	0.220	0.034	-0.050	83.4	0.180	-0.040	0.006
WD-8D	25-Jan-90	0.003	0.000	0.050	0.33		1.120	0.020		112.0	0.241	0.015	0.017
WD-8D	09-Mar-90	0.030		-0.004	0.28		0.240	-0.020		84.1	0.160	-0.004	-0.003
WD-8D	26-May-90	0.075		0.054	0.30		0.063	-0.020		96.4	0.187	0.066	0.033
WD-8D	02-Oct-90	0.010	0.000	0.004	0.00		0.000	0.020		128.0	0.001	0.040	0.036
WD-8D	09-Apr-91	0.003	0.004	0.005	0.32		0.683	0.020		101.0	0.252	0.000	0.036
WD-8S	23-Aug-89	0.080		13.100	1.00		0.140	0.180		168.0	9.700	-0.040	0.140
WD-8S	22-Nov-89	0.075	0.940	62.800	1.06	-0.1	0.095	0.240	-0.050	376.0	57.400	0.086	0.340
WD-8S	28-Jan-90	0.003	0.000	7.590	0.90		0.055	0.026		100.0	9.040	0.023	0.079
WD-8S	13-Mar-90	-0.002		5.760	0.38		0.360	-0.020		140.0	8.500	0.070	0.080
WD-8S	30-May-90	0.037		0.053	0.70		0.009	-0.020		120.0	0.003	0.042	0.028
WD-8S	12-Oct-90	0.040	0.000	10.500	1.00		0.039	0.020		99.1	11.900	0.438	0.079
WD-8S	09-Apr-91	0.003	0.072	7.850	0.69		0.009	0.020		132.0	10.200	0.000	0.062

- Indicates constituent was undetected at the specified detection level

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	CR (mg/L)	CO (mg/L)	CU (mg/L)	F (mg/L)	I (mg/L)	FE (mg/L)	PB (mg/L)	LI (mg/L)	MG (mg/L)	MN (mg/L)	MO (mg/L)	NI (mg/L)
WD-9D	23-Aug-89	0.042		0.046	0.76		0.200	0.110		74.0	0.730	-0.040	-0.030
WD-9D	20-Nov-89	0.028	0.006	-0.004	0.82	-0.1	0.045	0.034	-0.050	61.3	0.630	-0.040	0.005
WD-9D	09-Mar-90	-0.002		-0.004	0.68		0.032	-0.020		71.0	0.590	-0.004	-0.003
WD-9D	26-May-90	0.093		0.088	0.70		0.041	-0.020		64.4	0.612	0.082	0.047
WD-9D	02-Oct-90	0.003	0.000	0.004	0.00		0.000	0.020		60.2	0.620	0.040	0.004
WD-9D	24-Jan-91	0.003	0.000	0.074	0.78		0.092	0.020		59.5	0.745	0.015	0.021
WD-9D	09-Apr-91	0.003	0.006	0.004	0.70		0.097	0.020		63.6	0.611	0.000	0.006
WD-9S	23-Aug-89	0.018		-0.040	0.96		0.660	-0.080		68.0	0.130	-0.040	-0.030
WD-9S	09-Nov-89	0.025	0.004	0.041	1.17	-0.1	0.019	-0.020	-0.050	83.1	0.196	-0.040	-0.003
WD-9S	26-Jan-90	0.003	0.000	0.053	1.20		0.048	0.020		110.0	0.083	0.018	0.006
WD-9S	13-Mar-90	-0.002		0.110	1.15		19.200	0.170		90.1	2.780	0.056	0.037
WD-9S	31-May-90	0.096		0.116	1.10		0.025	-0.020		96.7	0.052	0.087	0.052
WD-9S	02-Oct-90	0.036	0.000	0.013	0.00		0.000	0.020		91.1	0.031	0.040	0.004
WD-9S	09-Apr-91	0.003	0.011	0.005	1.10		0.021	0.020		156.0	0.027	0.000	0.016
WD-10	24-Aug-89	0.081		1.650	0.66		136.000	0.075		314.0	37.300	0.072	0.120
WD-10	06-Nov-89	0.085	0.650	4.970	0.52	-0.1	84.600	0.170	-0.050	467.0	69.400	0.105	0.230
WD-10	13-Mar-90	0.230		8.100	0.35		95.000	0.850		453.0	63.000	0.160	0.260
WD-10	26-May-90	0.085		1.060	2.10		0.004	-0.020		552.0	5.930	0.089	0.086
WD-10	02-Oct-90	0.159	0.000	18.500	0.00		0.000	0.020		546.0	39.900	0.343	0.265
WD-10	24-Jan-91	0.027	0.000	10.100	4.30		44.500	0.020		470.0	52.400	0.333	0.226
WD-10	09-Apr-91	0.003	0.287	10.700	4.40		74.600	0.020		479.0	57.600	0.000	0.176
WD-11	21-Aug-89	0.034		0.005	0.74		2.340	0.068		45.5	1.100	-0.040	-0.030
WD-11	12-Mar-90	-0.020		1.600	0.65		65.100	-0.080		62.5	3.900	0.120	0.010
WD-11	26-May-90	0.090		0.063	0.60		0.340	-0.020		41.2	1.900	0.065	0.050
WD-11	02-Oct-90	0.030	0.000	0.004	0.00		0.000	0.020		45.8	1.540	0.040	0.004
WD-11	24-Jan-91	0.003	0.000	0.004	0.83		0.744	0.020		35.9	2.080	0.003	0.004
WD-11	09-Apr-91	0.003	0.013	0.051	0.74		0.961	0.020		45.4	3.350	0.000	0.017

- Indicates constituent was undetected at the specified detection level

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	K (mg/L)	NA (mg/L)	SO4 (mg/L)	SN (mg/L)	TDS (mg/L)	V (mg/L)	ZN (mg/L)	SIO2 (mg/L)	BE (mg/L)	TEMP (Deg C.)
WD-1	20-Sep-89	4.33	36.0	44.6		344		-0.050			
WD-1	09-Nov-89	4.52	35.3	67.5	-0.5	382	-0.05	0.011			
WD-1	13-Mar-90	6.00	35.0	158.0		368		0.098			
WD-1	04-Jun-90	4.33	31.6	65.0		367		0.031			
WD-1	10-Oct-90	3.50	26.2	55.3		350		0.044		0.005	16.0
WD-1	28-Jan-91	4.60	33.7	72.2		350		0.234		0.005	14.0
WD-1	09-Apr-91	5.20	34.6	155.0		452		0.064		0.000	15.0
WD-3	04-Jun-90	25.00	55.0	4230.0		6550		3.600		0.000	0.0
WD-3	02-Oct-90	22.20	49.8	3670.0		5465		3.030		0.005	19.0
WD-3	25-Jan-91	28.70	57.4	3940.0		5640		5.280		0.005	17.0
WD-3	09-Apr-91	28.30	56.5	3860.0		5480		8.230		0.000	17.5
WD-3A	20-Sep-89	30.50	60.0	4010.0		5939		3.500			
WD-3A	08-Nov-89	24.40	53.6	3950.0	-0.5	5490	-0.05	3.300			
WD-3A	12-Mar-90	34.10	56.8	4180.0		5100		3.190			
WD-3A	04-Jun-90	25.00	55.0	4230.0		6550		3.600			
WD-4	24-Aug-89	9.62	120.0	3850.0		6910		33.800	116.00		
WD-4	09-Nov-89	11.10	102.0	9960.0	-0.5	16300	-0.05	140.000			
WD-4	13-Mar-90	13.60	124.0	8160.0		18950		137.000			
WD-4	04-Jun-90	13.30	130.0	10700.0		19600		117.000			
WD-4	12-Oct-90	11.90	85.8	6430.0		11170		72.100		0.005	16.0
WD-4	29-Jan-91	10.20	141.0	9550.0		23845		67.700		0.005	17.0
WD-4	09-Apr-91	13.30	95.3	10200.0		16820		118.000		0.000	19.0
WD-5	21-Aug-89	8.82	44.5	1470.0		3060		1.140			
WD-5	08-Nov-89	6.50	44.6	1550.0	-0.5	2740	-0.05	0.420			
WD-5	09-Mar-90	9.27	37.4	1250.0		2523		0.230			
WD-5	26-May-90	7.60	35.4	1620.0		2870		0.032			
WD-5	10-Oct-90	9.28	81.7	1200.0		2630		0.018		0.005	16.0
WD-5	22-Jan-91	7.30	37.5	1180.0		2420		0.026		0.005	15.0
WD-5	09-Apr-91	7.09	38.1	1230.0		2390		0.319		0.000	17.5
WD-6D	22-Aug-89	5.59	41.2	1400.0		2910		0.510			
WD-6D	09-Nov-89	5.12	47.1	2070.0	1.2	3440	-0.05	1.110			
WD-6D	12-Mar-90	8.02	50.8	3310.0		4567		11.900			
WD-6D	30-May-90	45.90	77.2	2150.0		4220		0.140			
WD-6D	12-Oct-90	17.40	42.7	2170.0		3880		1.930		0.005	15.0
WD-6D	09-Apr-91	8.02	61.1	2170.0		3565		1.150		0.000	15.2
WD-6S	22-Aug-89	4.22	43.6	1870.0		3380		20.700	14.00		
WD-6S	08-Nov-89	5.01	45.4	3530.0	-0.5	5610	-0.05	63.500			
WD-6S	09-Mar-90	8.29	56.2	6690.0		11400		224.000			
WD-6S	26-May-90	9.00	46.1	12100.0		17600		252.000			
WD-6S	02-Oct-90	7.30	44.1	10400.0		16795		224.000		0.005	20.0
WD-6S	22-Jan-91	7.30	54.5	6370.0		9485		138.000		0.005	14.0
WD-6S	09-Apr-91	6.77	56.5	5890.0		8840		162.000		0.000	21.5
WD-7	22-Aug-89	2.73	49.5	437.0		1010		2.040			
WD-7	08-Nov-89	2.34	58.3	440.0	0.6	1030	-0.05	1.700			
WD-7	25-Jan-90	3.90	64.0	514.0		1155		0.433		0.005	20.0
WD-7	09-Mar-90	3.08	56.3	367.0		1000		2.100			
WD-7	26-May-90	3.30	50.4	405.0		1100		1.050			
WD-7	02-Oct-90	2.80	53.7	460.0		1120		1.000		0.005	16.0
WD-7	09-Apr-91	3.70	77.2	672.0		1256		1.020		0.000	17.2
WD-8D	22-Aug-89	5.26	45.4	538.0		1180		0.070			
WD-8D	20-Nov-89	2.90	35.1	738.0	-0.5	1200	-0.05	0.090			
WD-8D	25-Jan-90	4.30	30.6	956.0		1460		0.019		0.005	21.0
WD-8D	09-Mar-90	5.67	33.8	781.0		1220		-0.005			
WD-8D	26-May-90	4.20	29.9	856.0		1660		0.047			
WD-8D	02-Oct-90	3.50	32.3	992.0		1780		0.005		0.005	17.5
WD-8D	09-Apr-91	3.78	31.7	946.0		1525		0.029		0.000	19.0
WD-8S	23-Aug-89	4.42	27.0	1430.0		2450		15.200			
WD-8S	22-Nov-89	5.40	39.8	2860.0	-0.5	4220	-0.05	29.000			
WD-8S	26-Jan-90	3.90	25.6	755.0		1355		7.830		0.005	16.0
WD-8S	13-Mar-90	4.35	27.6	1170.0		1700		7.990			
WD-8S	30-May-90	4.20	27.5	962.0		1970		0.008			
WD-8S	12-Oct-90	3.31	20.1	847.0		1520		8.610		0.005	16.0
WD-8S	09-Apr-91	4.76	33.2	1050.0		1771		11.500		0.000	16.0

- Indicates constituent was undetected at the specified detection level

TABLE 3

SUMMARY OF GROUNDWATER QUALITY

WELL	DATE	K (mg/L)	NA (mg/L)	SO4 (mg/L)	SN (mg/L)	TDS (mg/L)	V (mg/L)	ZN (mg/L)	SIO2 (mg/L)	SE (mg/L)	TEMP (Deg C.)
WD-9D	23-Aug-89	6.65	79.3	546.0		1290		0.230			
WD-9D	20-Nov-89	2.90	89.2	496.0	-0.5	1150	-0.05	0.069			
WD-9D	09-Mar-90	24.60	60.7	514.0		1140		0.010			
WD-9D	26-May-90	3.20	53.0	446.0		1220		0.040			
WD-9D	02-Oct-90	2.90	57.1	450.0		1250		0.017		0.005	18.0
WD-9D	24-Jan-91	5.00	65.4	464.0		1175		0.014		0.005	17.0
WD-9D	09-Apr-91	3.81	70.1	540.0		1214		0.015		0.000	18.0
WD-9S	23-Aug-89	4.43	99.4	538.0		1460		-0.050			
WD-9S	09-Nov-89	3.60	134.0	622.0	-0.5	1340	-0.05	0.042			
WD-9S	26-Jan-90	4.80	90.0	924.0		1660		0.110		0.005	0.0
WD-9S	13-Mar-90	4.23	74.7	583.0		1290		0.600			
WD-9S	31-May-90	5.00	59.5	564.0		1380		0.030			
WD-9S	02-Oct-90	4.00	83.7	787.0		1900		0.022		0.005	18.0
WD-9S	09-Apr-91	5.58	94.4	1230.0		2320		0.037		0.000	16.0
WD-10	24-Aug-89	16.40	69.4	2670.0		4940		12.600			
WD-10	06-Nov-89	19.30	146.0	3690.0	-0.5	5870	-0.05	40.200			
WD-10	13-Mar-90	24.60	116.0	3950.0		6000		34.200			
WD-10	26-May-90	23.60	100.0	3770.0		6880		3.730			
WD-10	02-Oct-90	16.50	122.0	4520.0		7790		365.000		0.005	17.0
WD-10	24-Jan-91	19.90	127.0	4460.0		6480		26.500		0.005	15.0
WD-10	09-Apr-91	19.10	118.0	4080.0		6122		38.600		0.000	19.0
WD-11	21-Aug-89	7.67	14.3	549.0		1140		0.068			
WD-11	12-Mar-90	9.35	15.6	615.0		923		0.620			
WD-11	26-May-90	5.94	11.4	410.0		980		0.024			
WD-11	02-Oct-90	4.70	14.1	482.0		1090		0.005		0.005	11.5
WD-11	24-Jan-91	6.00	14.2	422.0		920		0.005		0.005	17.0
WD-11	09-Apr-91	5.73	12.7	467.0		872		0.192		0.000	18.5

- indicates constituent was undetected at the specified detection level

REFERENCE 30

Record of Communication
S. Wust and R. Vendrely

Record of Communication

S. LUST 1-15-92 10:20

w/ Rock Vandiely NMED Silver City

Re: Chino Site - use of Hanover & Whitewater Cr

There are no intakes or recreational uses on Hanover or Whitewater Creeks

3=N

REFERENCE 31

Record of Communication
S. Wust and G. Lopez

Record of Communication

S. WUST 1-15-92 10:00

w/ GEORGE LOPEZ NM Game + Fish

RE: Chino Site - use of Hanover + Whitewater Creeks

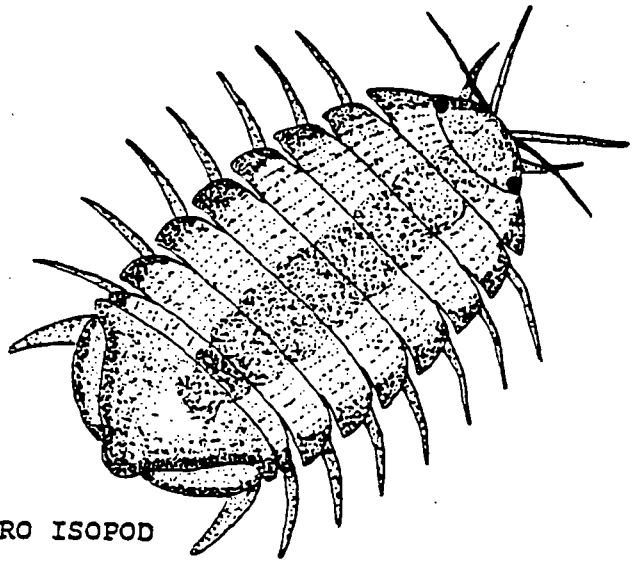
There are no catchments or stocked areas on Hanover or Whitewater Creeks, or on the Mimbres R. outside of the mountains

SW

REFERENCE 32

NM Department of Game & Fish, 1987

NEW MEXICO
DEPARTMENT OF GAME AND FISH



SOCORRO ISOPOD

HANDBOOK OF SPECIES ENDANGERED IN NEW MEXICO

01

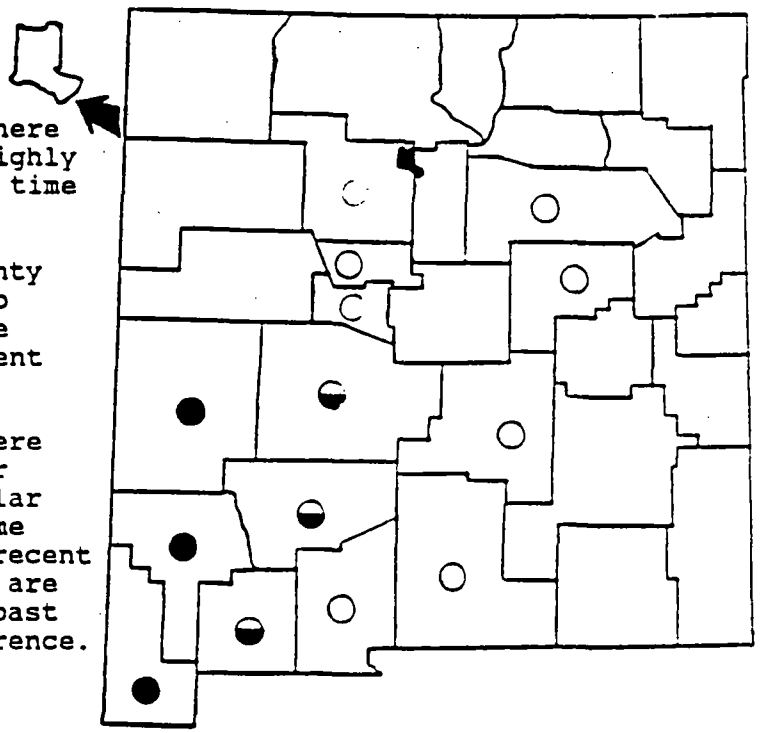
COMMON BLACK-HAWK (Buteogallus anthracinus)
Listing status: New Mexico: Endangered (group 2), first listed Jan. 24, 1975 (NMGF Reg. 563).

Distinguishing features: In keeping with the name, this medium-sized (length 500-600 mm and wing span 1.2 m) raptor (family Accipitridae) is mainly black, and as such it is distinguished from most other birds of prey (Hubbard and Eley 1985). It differs from the zone-tailed hawk (Buteo albonotatus) in its much broader wings, pale bases of the primaries, and tail pattern. The latter is black, with a white tip, base, and single broad white band; the black tail of the zone tail has several narrow bands, which are whitish below and pale gray above. Melanistic buteos of other species usually have tail patterns different from that of the common black-hawk, and their wings are narrower. The all blackish turkey vulture (Cathartes aura) is bare-headed, as well as being relatively narrow-winged. The immature of the common black-hawk resembles those of such species as the Swainson's hawk (B. swainsoni), but the wings are much broader.

Other descriptive details: Adults have the bill black, iris dark brown, and the cere and legs yellow (Hubbard and Eley 1985). Immatures are blackish-brown above, with rusty or yellowish-brown markings; the underwings and underparts are yellowish-brown, with blackish streaking especially on the body and barring on the thighs (Bailey 1928). The tail and wings are light brown, variously barred with blackish. Adult measurements include wing length 380-405 mm (both sexes) and tail 192-228 in males and 203-244 in females (Brown and Amadon 1968).

Distribution: This species occurs from Arizona to southern Texas and southward to Peru and Paraguay (Brown and Amadon 1968). New Mexico: The common black-hawk summers primarily at lower elevations in the Gila, San Francisco, and Mimbres drainages, which are key habitat areas for it (Hubbard and Eley 1985). The species has also occurred sparingly in the Rio Grande Valley, including having bred northward to near Albuquerque (Hundertmark 1974). Single vagrants have been documented near El Pueblo (San Miguel Co.) and near Santa Rosa, but otherwise no verified reports exist outside of the above areas in the state.

Enlargement of Los Alamos Co. (see dark area on the *map.)



solid circle: indicates a county where the listed species is known or is highly likely to occur regularly in recent time (i.e., 1960 or later).

half-solid circle: indicates a county where the listed species is known to occur less than regularly, but where regular occurrence is likely in recent time (i.e., 1960 or later).

open circle: indicates a county where the listed species is known to occur less than regularly, and where regular occurrence is unlikely in recent time (1960 or later). Included here are recent reports that are unsubstantiated or are otherwise questionable, as well as past (pre-1960) records of regular occurrence.

*See Introduction for the names and locations of the other counties.

Biology: In the neotropics this species occupies a wide array of habitats, including in areas where it subsists largely on land crabs (Brown and Amadon 1968). It is characteristically found in the Southwest in cottonwood (Populus spp.) and other woodlands along permanent lowland streams (Hubbard and Eley 1985). There it takes a variety of prey, including fishes, amphibians, reptiles, mammals, and even birds, plus invertebrates such as insects and crayfish. Although generally lethargic and given to periods of quietly sitting, the common black-hawk is graceful on the wing. In the spring the species, which centers its activities on nests that are used year after year, engages in aerial courtship activities. Its insistent, barking screams are characteristic and can be used to ascertain its presence, even when the bird is not seen. The bulky nest is constructed of sticks and typically placed high in a cottonwood. The clutch is generally of two eggs, which are white with irregular brown blotches concentrated at the larger end; the eggs average 57 x 46 mm in size (Reed 1965).

Status: South of the United States, this species is locally common for a raptor, and even north of the border it occurs in moderate numbers in some areas (Hubbard and Eley 1985). In New Mexico it is generally an uncommon summer resident (March to October, rarely November), being most numerous in the Gila Basin where several pairs are known to nest. No serious decline has been definitely documented in the state, but without doubt the bird has decreased as habitat has been lost or altered.

Conservation: In New Mexico, the conservation of riparian habitat and protection from persecution are prime considerations in perpetuating this species (Hubbard and Eley 1985). In particular, the preservation or restoration of cottonwoods in the Gila, Mimbres, and San Francisco basins would benefit this hawk, which in no way appears to conflict with man. Wanton shooting of birds and destruction of nests are also problems, and enforcement of the state's raptor protection law against such activities is essential.

Bibliography: Bailey, F.M. 1928. Birds of New Mexico. New Mex. Dept. Game and Fish, Santa Fe, NM; Brown, L. and D. Amadon. 1968. Eagles, hawks, and falcons of the world. McGraw-Hill Book Co., New York, NY; Hubbard, J.P. and J.W. Eley. 1985. Common black-hawk (Buteogallus anthracinus). New Mex. Dept. Game and Fish, Handbook Spec. End. in New Mexico:BIRD/AC/BG/AN:1-2; Hundertmark, C.A. 1974. Breeding range extensions of certain birds in New Mexico. Wilson Bull. 86:298-300; Reed, C. A. 1965. North American birds eggs. Dover Pub., New York, NY.

Citation: New Mexico Department of Game and Fish (Santa Fe, NM 87503). 1988. Handbook of Species Endangered in New Mexico, F-185:1-2.

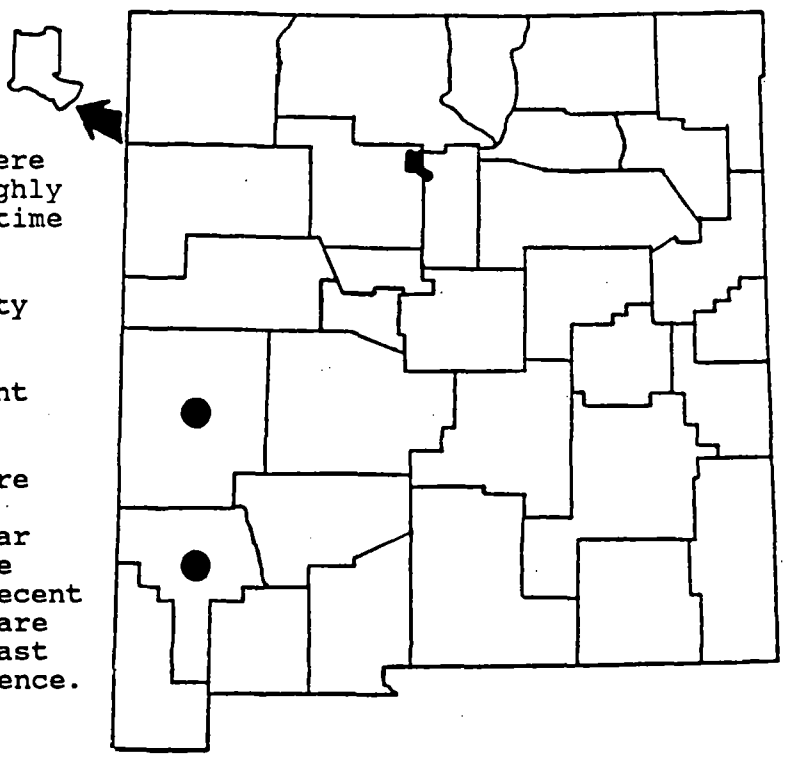
LOACH MINNOW (Tiaroga cobitis)
Listing status: New Mexico: Endangered (group 2); first listing Jan. 24, 1975 (NMGF Reg. 563) and current listing Jul. 22, 1983 (NMGF Reg. 624). Federal: Proposed as threatened.

Distinguishing features: This species belongs to the minnow family (Cyprinidae), which is characterized by having 10 or fewer rays in the soft-rayed dorsal fin and 6 or fewer pharyngeal teeth in a major row. The loach minnow may be identified by its lower lip, which is thick and creased in such a way as to appear lobed in lateral view. In addition, the creamy-white spots anterior and posterior to the dorsal fin and on the upper and lower sides of the posterior portion of the caudal peduncle are distinctive. Superficially, the loach minnow resembles the speckled dace (Rhinichthys osculus); however, the mouth in the latter species is subterminal and overhung by a protruding snout, whereas the loach minnow has a terminal mouth.

Other descriptive details: The body of the loach minnow is slender and slightly dorso-ventrally flattened, with the eyes upwardly directed (Koster 1957; Minckley 1973). The rather small mouth is oblique and does not reach the anterior margin of the eyes. The dorsal coloration is olivaceous, with black mottling; the venter is white. Breeding males have the lips, ventral fins, and belly bright red in color. Breeding females show some yellowing of the ventral fins and the lower body. Scales are largely or totally absent on the back and breast. There are 8 dorsal and 7 anal fin rays, more than 60 scales in the lateral series, and the pharyngeal dentition is 1,4-4,1. Total length in adults is 50-60 mm, rarely larger.

Distribution: This species is endemic to the Gila basin of Arizona and New Mexico (Minckley 1973). New Mexico: The loach minnow occurs in the San Francisco River from the Upper Frisco Box downstream to the Arizona border (Catron Co.), the Tularosa River downstream from Cruzville (Catron Co.), and the Gila River from the vicinity of its forks to the Middle Box. Key habitat areas include all of the above, especially the Tularosa River and the reach of the Gila River between Mogollon Creek and the head of the Middle Box.

Enlargement of Los Alamos Co. (see dark area on the *map.)



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*See Introduction for the names and locations of the other counties.

Biology: The loach minnow inhabits riffle areas with moderate to rapid water velocities and moderate to high gradients. The species is most common in a substrate of elevated cobble and rubble--particularly where sediments have not filled-in crevices. Such areas are usually along the margins and at the heads of riffles. Primary foods are insects, including the larvae of midges and blackflies and the nymphs of mayflies (Schreiber 1978; Britt 1982). Spawning occurs from late March through early June, when water temperatures average 21 C. Fertilized eggs average 1.55 mm in diameter and are laid in a single layer on the undersides of cobble and rubble in riffles. Eggs hatch in about 6 days at a water temperature of 21 C, and hatchlings are about 5 mm in total length. Individual females lay an average of 200 or fewer ova (Britt 1982), although up to 1200 have been reported (Minckley 1973)--perhaps erroneously. Females spawn at age 1 in their second summer, and normal longevity in the species is about 2 yrs (Britt 1982).

Status: This species has become reduced in range and numbers in Arizona (Minckley 1973) and at least to some degree in New Meixco. In the latter state, it appears to be reasonably secure within its major key habitat areas, but elsewhere its numbers are small. The major threat to the species is the loss or alteration of habitat, due to stream-dewatering, sediment-deposition, changes in channel morphology, and altered flow regimes. In addition, competition from or predation by such non-native fishes as the red shiner (*Notropis lutrensis*) and various gamefishes may have contributed to the decline of the species in portions of its range. A proposed reclamation project in the Cliff-Gila Valley reach of the Gila River could greatly alter habitats and make the area uninhabitable by the loach minnow--especially if a dam and reservoir are constructed there.

Conservation: Survival of the loach minnow depends primarily upon the maintenance or enhancement of suitable habitat. Particularily important are riffle areas with a substrate of cobble and rubble that is free from excessive sediment deposition. Flooding is probably the key to the prevention of excessive sedimentation in such areas, given the sediment loads that are present in the Gila Basin. In the long term, sedimentation could be reduced by improved watershed management, which would probably make flooding less essential to habitat maintenance for the loach minnow. In addition, the introduction of non-native fishes, e.g., red shiner, bass (*Micropterus salmoides* and *M. dolomieui*), and catfishes (*Ictalurus* spp and *Pylodictis olivaris*)should be avoided in loach minnow habitat. In any area where such exotics are known or thought to threaten a loach minnow population, they should be reduced or eliminated.

Bibliography: Britt, K.A. 1982. The reproductive biology and aspects of life history of *Tiaroga cobitis* in southwestern New Mexico. New Mex. St. Univ., MS thesis; Koster, W.J. 1957. Guide to the fishes of New Mexico. Univ. New Mex. Press, Albuquerque, NM; Minckley, W.L. 1973. Fishes of Arizona. Ariz. Dept. Game and Fish, Phoenix, AZ; Schreiber, D.C. 1978. Feeding interrelationships of fishes of Aravaipa Creek, Arizona. Ariz. State Univ., MS thesis.

Citation: New Mexico Department of Game and Fish (Santa Fe, NM 87503). 1985. Handbook of Species Endangered in New Mexico, FISH/CY/TI/CO:1-2. Account by David L. Propst, Michael D. Hatch, and John P. Hubbard.

REFERENCE 33

Bureau of the Census, 1991

SUPERFUND

U.S. Department of Commerce
Economics and Statistics Administration
BUREAU OF THE CENSUS

1990 CPH-1-33

CENSUS '90

1990 Census of Population and Housing

Summary Population and Housing Characteristics

New Mexico

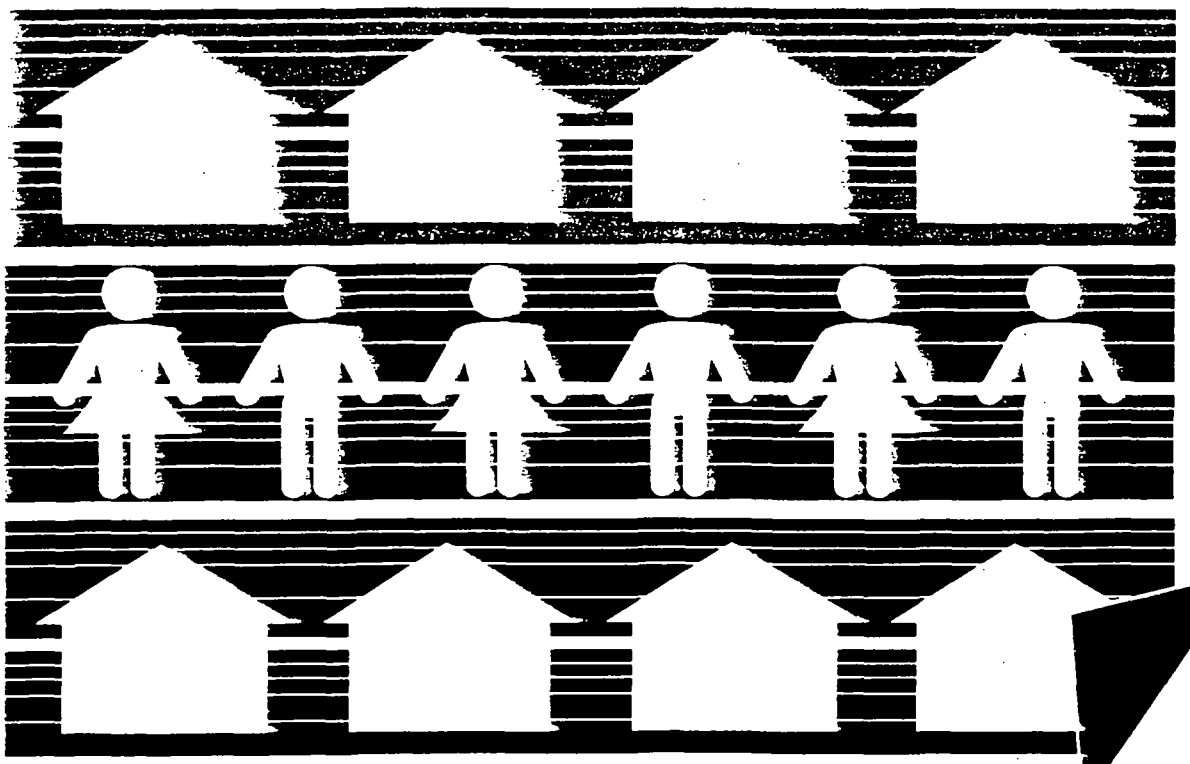

Table 1. **Age: 1990**—Con.

[For definitions of terms and meanings of symbols, see text]

State County County Subdivision Place	All persons	Age												
		Under 5 years	16 years and over	18 years and over	18 to 20 years	21 to 24 years	25 to 44 years	45 to 54 years	55 to 59 years	60 to 64 years	65 years and over	75 years and over	85 years and over	Median age
DeBaca County	2 252	141	1 748	1 684	53	74	536	243	115	156	507	250	80	40 8
East De Baca division	2 028	129	1 579	1 525	48	65	476	213	108	147	468	240	79	41 4
Fort Sumner village	1 269	88	1 010	981	34	47	265	118	71	102	344	186	65	45 0
West De Baca division	224	12	169	159	5	9	60	30	7	9	39	10	1	37 1
Dona Ana County	135 510	11 647	98 595	94 310	9 082	10 516	40 929	11 708	5 262	4 920	11 893	4 504	998	27 9
Anthony division	17 574	1 916	11 300	10 557	910	998	5 053	1 403	621	581	991	311	56	24 4
Anthony CDP	5 160	620	3 226	2 989	318	374	1 330	360	196	156	255	79	11	21 9
Chaparral CDP	2 962	274	1 976	1 841	156	158	840	296	115	104	172	49	4	26 0
Dona Ana-Hill division	15 558	1 430	10 925	10 402	635	746	5 248	1 524	607	516	1 126	407	111	29 6
Dona Ana CDP	1 202	109	826	785	62	82	360	107	51	42	81	32	12	26 7
Las Cruces city (pt.)	3 241	309	2 349	2 238	119	164	1 142	284	128	126	275	91	20	30 6
Fairacres division	3 895	239	3 095	3 012	155	242	1 327	434	232	194	428	136	22	34 8
Mesilla town (pt.)	7	1	5	5	-	1	3	-	-	-	1	-	-	27 5
Hatch division	3 849	383	2 624	2 481	160	217	963	332	193	161	455	173	32	28 1
Hatch village	1 136	109	806	761	40	74	273	97	63	46	168	73	16	29 4
Las Cruces division	76 117	5 912	58 047	56 008	6 104	7 038	22 617	6 592	2 966	2 862	7 829	3 121	707	28 5
Las Cruces city (pt.)	58 885	4 509	44 907	43 275	3 384	5 255	17 859	5 225	2 390	2 410	6 752	2 760	643	29 9
Mesilla town (pt.)	1 968	114	1 541	1 491	98	100	564	241	121	97	270	94	17	36 4
University Park CDP	4 520	308	3 835	3 818	2 050	918	795	42	2	6	5	1	-	20 3
South Dona Ana division	15 901	1 425	10 815	10 118	910	934	4 679	1 325	621	599	1 050	355	70	26 3
Sunland Park city	8 179	811	5 220	4 787	558	541	2 289	567	250	250	332	100	17	22 0
White Sands division	2 616	342	1 789	1 732	208	341	1 042	98	22	7	14	1	-	23 4
White Sands CDP	2 616	342	1 789	1 732	208	341	1 042	98	22	7	14	1	-	23 4
Eddy County	48 605	3 773	35 407	33 949	1 872	1 997	13 757	4 492	2 197	2 250	7 384	3 325	768	33 4
Artesia division	14 566	1 238	10 385	9 973	571	606	4 134	1 319	680	658	2 005	914	192	32 1
Artesia city	10 610	899	7 656	7 362	419	454	2 918	931	502	505	1 633	781	163	32 7
Hope village	101	4	86	77	2	6	26	15	3	5	20	3	-	42 1
Carlsbad division	31 888	2 356	23 492	22 523	1 213	1 286	9 011	2 984	1 413	1 483	5 133	2 299	555	34 1
Carlsbad city	24 952	1 807	18 637	17 896	939	1 015	6 826	2 265	1 082	1 183	4 586	2 104	530	35 1
Carlsbad North CDP	1 167	62	890	855	39	30	347	155	56	67	161	57	8	38 4
Loco Hills division	300	20	221	214	9	12	96	34	17	15	31	7	1	32 7
Loving division	1 851	159	1 309	1 239	79	93	516	155	87	94	215	105	20	30 6
Loving village	1 243	119	862	822	55	70	337	92	51	65	152	79	14	29 5
Grant County	27 676	2 084	20 177	19 270	1 259	1 303	7 382	2 834	1 218	1 394	3 880	1 565	359	33 2
Bayard-Santa Rita division	3 665	297	2 612	2 494	166	148	902	370	176	218	514	198	37	33 1
Bayard city	2 598	215	1 842	1 754	118	109	655	257	116	153	346	134	27	32 4
Hurley town (pt.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Central division	3 164	292	2 249	2 149	147	139	864	245	124	151	479	224	74	31 1
Central village	1 835	179	1 254	1 195	92	82	493	114	75	96	243	88	17	29 0
Hurley division	1 794	108	1 348	1 280	57	75	451	186	73	105	333	129	26	36 9
Hurley town (pt.)	1 534	91	1 145	1 083	48	67	367	165	62	85	289	112	23	36 7
Mimbres division	1 096	84	824	798	27	36	273	105	71	88	198	68	9	39 4
Pinos Altos division	958	65	723	699	25	24	283	135	43	60	129	46	7	38 4
Silver City division	15 177	1 101	11 162	10 666	786	826	4 056	1 567	662	699	2 070	845	196	32 6
Silver City town	10 683	797	7 839	7 495	620	642	2 771	1 000	456	451	1 555	697	174	31 5
Tyrone division	1 822	137	1 259	1 184	51	55	553	226	69	73	157	55	10	31 7
Guadalupe County	4 156	314	3 023	2 882	168	167	1 167	433	202	178	567	286	56	32 3
Dilia division	529	32	400	387	15	16	139	66	37	35	79	45	10	36 4
Santa Rosa division	2 886	245	2 061	1 958	126	123	821	291	127	109	361	183	36	31 0
Santa Rosa city	2 263	191	1 621	1 536	111	101	640	226	93	81	284	141	30	30 4
Vaughn division	741	37	562	537	27	28	207	76	38	34	127	58	10	35 0
Vaughn town	633	32	480	459	25	26	171	68	35	27	107	44	8	35 2
Harding County	987	66	751	709	25	38	240	90	47	63	206	96	17	38 3
North Harding division	805	55	620	584	17	31	188	68	36	52	192	85	16	39 5
Mosquero village (pt.)	164	8	130	121	5	6	36	12	9	10	43	19	-	42 1
Roy village	362	21	285	268	6	15	79	34	17	22	95	40	11	41 4
South Harding division	182	11	131	125	8	7	52	22	11	11	14	11	1	34 6
Hidalgo County	5 958	477	4 219	3 985	235	287	1 680	588	259	249	687	300	69	30 7
North Hidalgo division	4 667	386	3 345	3 168	187	239	1 237	453	214	218	620	274	65	31 1
Lordsburg city	2 951	241	2 149	2 039	133	142	743	272	143	147	459	220	54	31 9
Virden village	108	8	87	80	3	7	24	13	6	5	22	5	-	39 2
South Hidalgo division	1 291	91	874	817	48	48	443	135	45	31	67	26	4	29 6
Lea County	55 765	4 855	39 106	37 234	2 398	2 551	16 494	5 009	2 431	2 429	5 922	2 346	514	30 2
Eunice division	3 014	230	2 100	1 992	124	119	873	262	137	134	343	111	17	30 8
Eunice city	2 676	204	1 838	1 745	107	112	775	223	118	114	296	101	16	30 0
Hobbs division	36 880	3 336	25 867	24 679	1 584	1 741	11 238	3 248	1 560	1 508	3 800	1 535	367	30 1
Hobbs city	29 115	2 693	20 333	19 408	1 303	1 422	8 653	2 508	1 185	1 186	3 151	1 300	308	29 6
Jal division	2 335	197	1 660	1 577	86	87	604	245	135	136	284	99	11	32 6
Jal city	2 156	173	1 532	1 451	83	79	550	228	128	131	252	87	10	32 8
Lovington division	12 107	988	8 441	8 001	535	555	3 423	1 081	517	567	1 323	524	109	30 0
Lovington city	9 322	808	6 417	6 074	419	466	2 654	735	378	431	991	384	56	28 7

Table 5. **Household, Family, and Group Quarters Characteristics: 1990**—Con.

(For definitions of terms and meanings of symbols, see text)

State County County Subdivision Place	Persons in households	All households	Family households: Total	Family households: Married-couple family	Family households: Female householder, no husband present	Nonfamily households: Total	Nonfamily households: Householder living alone: Total	Nonfamily households: Householder living alone: 65 years and over: Total	Nonfamily households: Householder living alone: 65 years and over: Female	Persons per— Household	Persons per— Family	Persons in group quarters: Total	Persons in group quarters: Institutionalized persons	Persons in group quarters: Other persons in group quarters
Eddy County	47 956	17 472	13 272	10 924	1 734	4 200	3 816	1 982	1 538	2.74	3.21	649	608	41
Artesia division	14 496	5 226	3 952	3 283	486	1 274	1 166	637	497	2.77	3.26	70	70	-
Artesia city	10 540	3 916	2 910	2 356	416	1 006	941	529	429	2.69	3.20	70	70	-
Hope village	101	43	29	26	2	14	13	6	3	2.35	2.86	-	-	-
Carlsbad division	31 315	11 537	8 754	7 158	1 189	2 783	2 516	1 283	1 001	2.71	3.16	573	538	35
Carlsbad city	24 395	9 273	6 846	5 507	1 024	2 427	2 214	1 173	927	2.63	3.12	557	522	35
Carlsbad North CDP	1 167	442	355	317	24	87	76	33	22	2.64	2.96	-	-	-
Loco Hills division	300	121	84	74	6	37	35	12	7	2.48	3.06	-	-	-
Loving division	1 845	588	482	409	53	106	99	50	33	3.14	3.55	6	-	6
Loving village	1 237	391	315	261	40	76	72	39	25	3.16	3.63	6	-	6
Grant County	27 113	9 773	7 428	5 987	1 107	2 345	2 075	973	702	2.77	3.24	563	306	257
Bayard-Santa Rita division	3 665	1 265	981	764	169	284	261	142	103	2.90	3.39	-	-	-
Bayard city	2 598	894	696	534	132	198	182	103	74	2.91	3.39	-	-	-
Hurley town (pt.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Central division	2 951	986	769	585	148	217	181	90	61	2.99	3.42	213	211	2
Central village	1 835	593	479	365	93	114	97	61	47	3.09	3.48	-	-	-
Hurley division	1 794	652	515	450	51	137	123	73	53	2.75	3.16	-	-	-
Hurley town (pt.)	1 534	552	440	381	49	112	105	68	51	2.78	3.19	-	-	-
Mimbres division	1 096	418	308	273	18	110	100	48	28	2.62	3.09	-	-	-
Pinos Altos division	958	379	263	236	22	116	102	39	28	2.53	3.08	-	-	-
Silver City division	14 827	5 473	4 101	3 237	672	1 372	1 211	547	417	2.71	3.19	350	95	255
Silver City town	10 341	3 870	2 795	2 071	581	1 075	949	455	361	2.67	3.21	342	95	247
Tyrone division	1 822	600	491	442	27	109	97	34	12	3.04	3.41	-	-	-
Guadalupe County	4 133	1 520	1 136	788	246	384	352	162	102	2.72	3.19	23	15	8
Dilia division	529	186	144	109	17	42	38	17	10	2.84	3.26	-	-	-
Santa Rosa division	2 863	1 032	787	536	183	245	222	105	66	2.77	3.22	23	15	8
Santa Rosa city	2 240	810	614	395	166	196	180	87	53	2.77	3.21	23	15	8
Vaughn division	741	302	205	143	46	97	92	40	26	2.45	3.06	-	-	-
Vaughn town	633	263	175	118	43	88	83	39	25	2.41	3.04	-	-	-
Harding County	987	396	273	231	28	123	117	65	36	2.49	3.12	-	-	-
North Harding division	805	329	220	184	25	109	104	61	34	2.45	3.12	-	-	-
Mosquero village (pt.)	164	67	46	35	8	21	20	11	6	2.45	3.04	-	-	-
Roy village	362	151	100	86	10	51	50	28	19	2.40	3.07	-	-	-
South Harding division	182	67	53	47	3	14	13	4	2	2.72	3.15	-	-	-
Hidalgo County	5 846	2 004	1 545	1 250	211	459	411	152	102	2.92	3.38	112	104	8
North Hidalgo division	4 555	1 594	1 203	939	198	391	348	140	96	2.86	3.35	112	104	8
Lordsburg city	2 839	1 021	757	536	172	264	238	105	70	2.78	3.30	112	104	8
Virden village	108	37	30	30	-	7	6	2	2	2.92	3.30	-	-	-
South Hidalgo division	1 291	410	342	311	13	68	63	12	6	3.15	3.50	-	-	-
Lea County	55 195	19 306	14 933	12 235	2 027	4 373	3 919	1 708	1 304	2.86	3.31	570	511	59
Eunice division	3 014	1 050	840	732	64	210	198	95	76	2.87	3.29	-	-	-
Eunice city	2 676	924	738	634	62	186	174	88	71	2.90	3.33	-	-	-
Hobbs division	36 526	12 900	9 853	7 923	1 474	3 047	2 687	1 090	840	2.83	3.29	354	295	59
Hobbs city	28 815	10 242	7 686	6 037	1 290	2 556	2 273	966	749	2.81	3.31	300	241	59
Jal division	2 335	828	649	576	54	179	169	102	75	2.82	3.28	-	-	-
Jal city	2 156	762	596	525	52	166	157	94	71	2.83	3.30	-	-	-
Lovington division	11 891	4 017	3 193	2 657	403	824	762	377	281	2.96	3.40	216	216	-
Lovington city	9 166	3 094	2 400	1 927	371	694	635	321	245	2.96	3.45	156	156	-
Tatum division	1 429	511	398	347	32	113	103	44	32	2.80	3.19	-	-	-
Tatum town	768	279	213	180	24	66	61	23	16	2.75	3.19	-	-	-
Lincoln County	11 873	4 789	3 441	2 816	458	1 348	1 193	484	345	2.48	2.95	346	335	11
Capitan division	2 007	807	579	492	62	228	201	80	46	2.49	2.96	216	216	-
Capitan village	842	356	245	203	32	111	100	44	29	2.37	2.89	-	-	-
Ruidoso village (pt.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carrizozo division	1 210	513	339	266	53	174	164	104	68	2.36	2.96	50	44	6
Carrizozo town	1 025	437	281	217	46	156	147	93	66	2.35	3.01	50	44	6
Corona division	524	198	149	133	11	49	47	13	7	2.65	3.15	-	-	-
Corona village	215	88	58	46	8	30	28	10	5	2.44	3.10	-	-	-
Hondo division	889	316	233	186	29	83	74	39	23	2.81	3.37	-	-	-
Ruidoso division	7 243	2 955	2 141	1 739	303	814	707	248	201	2.45	2.89	80	75	5
Ruidoso village (pt.)	4 525	1 895	1 344	1 095	202	551	482	170	144	2.39	2.85	75	75	-
Ruidoso Downs village	920	344	254	188	39	90	71	31	27	2.67	3.06	-	-	-
Los Alamos County	18 044	7 213	5 318	4 807	364	1 895	1 653	350	256	2.50	2.96	71	62	9
Los Alamos division	11 782	5 009	3 414	3 010	295	1 595	1 391	287	206	2.35	2.89	71	62	9
Los Alamos CDP	11 384	4 855	3 302	2 922	279	1 553	1 360	279	199	2.34	2.88	71	62	9
White Rock division	6 262	2 204	1 904	1 797	69	300	262	63	50	2.84	3.09	-	-	-
White Rock CDP	6 192	2 180	1 887	1 782	67	293	255	63	50	2.84	3.09	-	-	-
Luna County	17 893	6 797	4 895	3 875	803	1 902	1 729	1 013	718	2.63	3.16	217	100	117
Deming North division	14 088	5 292	3 768	2 870	722	1 524	1 401	860	627	2.66	3.23	207	100	107
Deming city (pt.)	10 832	4 060	2 835	2 085	615	1 225	1 133	713	537	2.67	3.28	136	100	36
Deming South division	3 805	1 505	1 127	1 005	81	378	328	153	91	2.53	2.95	10	-	10
Columbus village	638	236	173	141	23	63	58	37	18	2.70	3.25	3	-	3
Deming city (pt.)	2	1	1	1	-	-	-	-	-	2.00	2.00	-	-	-
McKinley County	59 957	16 588	13 364	9 854	3 336	3 224	2 828	835	585	3.61	4.10	729	371	358
Crownpoint division	5 152	1 339	1 074	683	300	265	249	59	30	3.85	4.42	172	56	116
Crownpoint CDP	1 936	499	404	250	117	95	87	9	4	3.88	4.39	172	56	116
Gallup division	20 714	6 832	5 201	3 695	1 135	1 631	1 404	419	321	3.03	3.51	527	296	231
Gallup city (pt.)	18 601	6 194	4 694	3 305	1 063	1 500	1 295	392	301	3.00	3.49	501	296	205
Red Rock division	17 689	4 628	3 820	2 491	926	808	708	235	153	3.82	4.29	6	-	6
Gallup city (pt.)	52	10	10	4	5	-	-	-	-	5.20	4.80	-	-	-
Reservation division	9 044	2 158	1 821	1 090	508	337	303	104	71	4.19	4.62	-	-	-
Mexican Springs CDP	242	62	50	30	17	12	11	5	2	3.90	4.50	-	-	-
Navajo CDP	1 985	416	366	212	103	50	42	5	4	4.77	5.08	-	-	-
Tohatchi CDP	661	174	141	94	35	33	31	3	3	3.80	4.32	-	-	-
Zuni division	7 358	1 631	1 448	895	467	183	164	18	10	4.51	4.87	24	19	5
Black Rock CDP	834	215	172	101	56	43	31	1	1	3.88	4.36	24	19	5
Zuni Pueblo CDP	5 857	1 249	1 132	700	370	117	112	16	9	4.69	5.01	-	-	-
Mora County	4 243	1 519	1 127	856	188	392	347	160	112	2.79	3.31	21	7	14
Mora division	3 202	1 118	842	641	140	276	243	115	77	2.86	3.37	21	7	14
Wagon Mound division	1 041	401	285	215	48	116	104	45	35	2.60	3.15	-	-	-
Wagon Mound village	319	135	85	56	23	50	48	27	22	2.36	3.09	-	-	-

REFERENCE 34

Record of Communication
S. Wust and L. Shomo

Record of Communication

S. WUST 1-7-92 14:20

w/ LAURIE SHEMO US Fish + Wildlife

Re: Chino Site - Habitat

Local minnow habitat in Whitewater Cr.
(Federal threatened species)
None in Hanover, habitat around it (Forest)
may be used by Peregrine Falcon if high
cliffs are present - would have to confirm
on site.

Can verify findings with letter to them
requesting info on species + habitat

SW

REFERENCE 35

New Mexico Environment Department
Wellhead Protection Program

WELLHEAD PROTECTION PROGRAM

STATE OF NEW MEXICO

August 1990

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APPENDIX J - City of Albuquerque Emergency Response Plan
APPENDIX K - EID Emergency Plan for Safe Drinking Water

WELLHEAD PROTECTION PROGRAM

STATE OF NEW MEXICO

August 1990

Element I. Program Summary and Purpose

The purpose of New Mexico's wellhead protection program is two-fold: to protect the State's public water supply systems, and to fulfill the wellhead protection requirements of the federal Safe Drinking Water Act Amendments of 1986 (SDWA). Section 1428 (a) of SDWA requires each state to submit to the Administrator of the Environmental Protection Agency (EPA) "a State program to protect wellhead areas within their jurisdiction from contaminants which may have any adverse affects on the health of persons". The basic criterion to be used by EPA in evaluating state programs is, according to Section 1428 (c) (1), whether or not the State program is adequate for the purpose of protecting public water systems from contaminants. Such protection of public water supply systems from contamination is the basic wellhead protection goal in the statute.

According to Section 1428 (a) and (b) of the Federal Safe Drinking Water Act, each State Wellhead Protection Program shall include the following components:

(1) Specify the duties of State agencies, local government entities, and public water supply systems with respect to the development and implementation of programs required by this section;

(2) For each wellhead, determine the wellhead protection area as defined in subsection (e) based on all reasonably available hydrogeologic information on ground water flow, recharge and discharge and other information the State deems necessary to adequately determine the wellhead protection area;

(3) Identify within each wellhead protection area all potential anthropogenic sources of contaminants which may have any adverse effect on the health of persons;

For your info.

New Mexico Health and Environment Department

Kindly

GARREY CARRUTHERS
Governor

DENNIS BOYD
Secretary

MICHAEL J. BURKHART
Deputy Secretary

RICHARD MITZELFELT
Director

WELLHEAD PROTECTION PROGRAM
STATE OF NEW MEXICO

August, 1990

Environmental Improvement Division
New Mexico Health and Environment Department
1190 St. Francis Drive
Santa Fe, New Mexico 87503

The Environmental Improvement Division of the New Mexico Health and Environment Department has been designated by the Governor of the State of New Mexico as the lead State agency for purposes of the Wellhead Protection Program required under Section 1428 of the Federal Safe Drinking Water Act Amendments of 1986. This Wellhead Protection Program for the State of New Mexico is being submitted to the Regional Administrator of the Environmental Protection Agency in conformance with the requirements of that Act.

Richard Mitzelfelt
Director
Environmental Improvement Division

– ENVIRONMENTAL IMPROVEMENT DIVISION –
Harold Runnels Building
1190 St. Francis Dr.
Santa Fe, New Mexico 87503

REFERENCE 36

Record of Communication, 1992
S. Wust and J. Humphrey

STATE OF NEW MEXICO
HEALTH & ENVIRONMENT

RECORD OF TELEPHONE CONVERSATION

Time: 8:40 AM	Date: 12-2-92
Originating Party: S. WUST NMED	Other Parties: J.E. HUMPHREY CHINO MINES

Subject: Availability of wells for sampling

Discussion: We will be out Dec. 9-10 at Chino for LSI sampling. Info on wells -
WD6: Better to use CB6D (same area, has pump whereas WD6 has no pump) 4" hole, 80' deep, can pump dry
WD10: Pump, 4", 80', can pump dry
WD4: No pump, 4", 30', has 20' water, may pump dry (don't know) - This well is in the local system boundary; may consider B57 or B54 [SLW: no to B wells, we will sample WD4]
DM16S: No pump, 4", 80', ~30' water, can probably pump dry
2GS: Pump, 4", 220', will not pump dry

All wells are available for sampling, can probably pump 3 volumes if not pump dry or by waiting (several hours) after pump dry

Signed

REFERENCE 37

Record of Communication, 1993
D. Doremus and J. Humphrey

RECORD OF TELEPHONE CONVERSATION

Time: 4:30 pm	Date: 5-3-93
Originating Party: S.E. HUMPHREY	Other Parties: DALE DOREMUS, NMED
CHINO MINES CO.	

Subject: Vol/area of dumps at Chino

Discussion:

Chino engineers worked up numbers for the dumps:
West Dump: 520 acres; 298,693,945 tons
South Dump: 800 acres; 418,177,798 tons

They are still working on numbers for Hurley tailings

Signed

REFERENCE 38

Communication--letter
T. Shelley to S. Wust

phelps dodge Mining Company Chino Mines Company, Hurley, New Mexico 88043 • (505) 537-3381

May 14, 1993

Mr. Stephen Wust
NM Environment Department
1190 St. Francis Drive
Santa Fe, NM 87503

Dear Mr. Wust:

Please find enclosed a copy of our estimates on the volumes and areas of the Hurley tailings. I have also enclosed a copy of an old sketch which illustrates the layout of the older ponds. The volumes of the older impoundments are quite approximate. Please note that the first draft of the volume table contained an error in the acre-feet total of older ponds. The volume of material calculated for Pond 7 should be fairly accurate.

I have compiled information, as you requested, on the number of Chino Mines Co. (CMC) personnel who work directly on the tailings and leach dumps on a daily basis.

There are 12 CMC workers who regularly work directly on the leach dumps. During a normal day shift there are about 8 to 9 people working on the dumps.

There are 21 CMC workers who regularly work directly on the tailing dams. During a normal day shift there are about 11 people working on the tailings. Two of the 11 personnel have about half the exposure to working directly on tailing as the others because their duties require them to be off of the tailings attending to other areas.

Please call if I can be of further assistance.

Sincerely,

Thomas L. Shelley

Thomas L. Shelley
Environmental Engineer

TLS

Enclosures

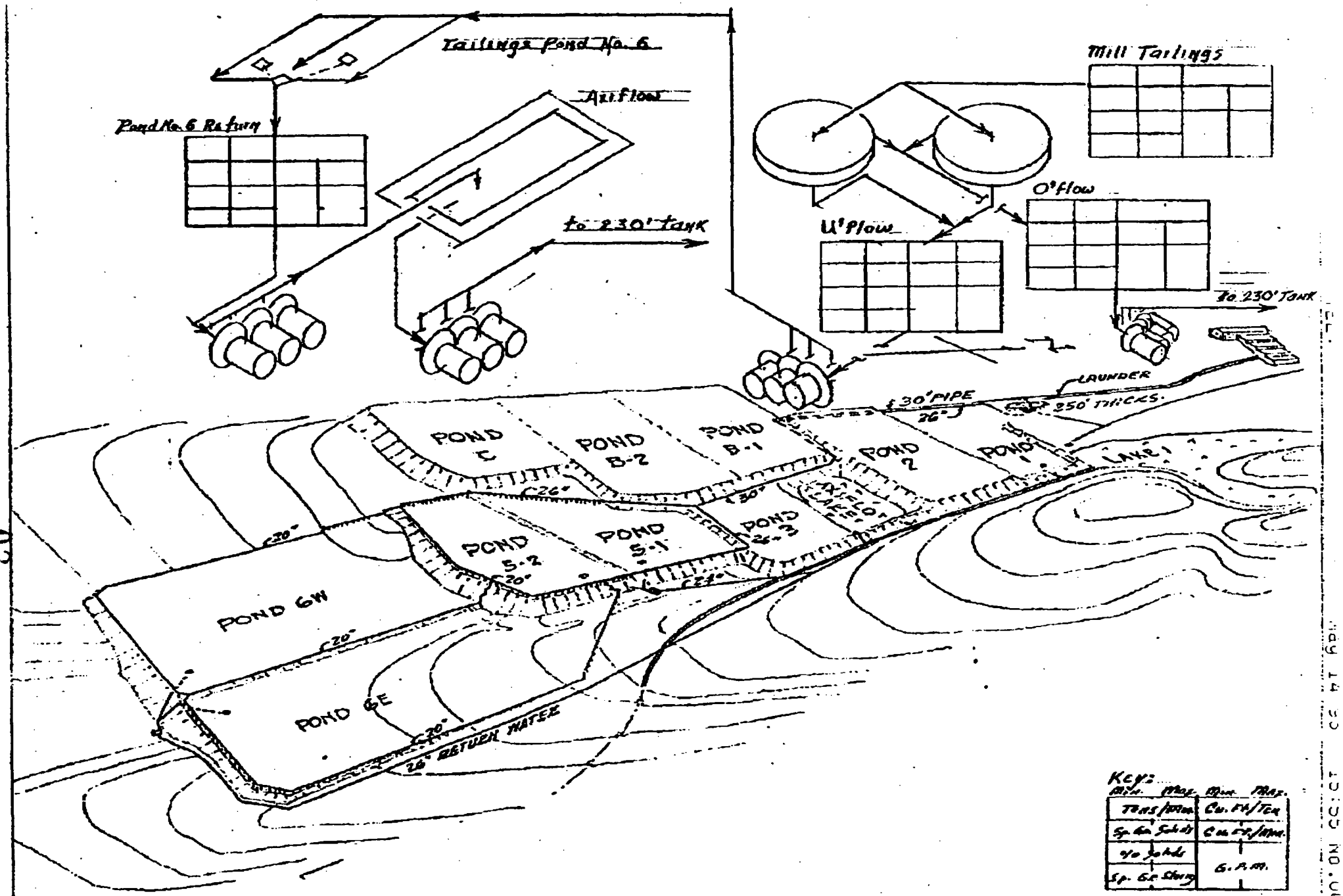
Chino Mines Co. Tailings Ponds

Volume and Area Data

Pond No.	Status (1)	Approx. Footprint Surface Area (Acres)	Approx. Volume (ac-ft)	Approx. Volume (cu.yds)
6E	active	360	29700	47916000
6W	active	378	54700	88249000
1	inactive	104	7700	12423000
2	inactive	113	12800	20651000
3	inactive	90	4300	6937000
4 (5-1)	inactive	158	11100	17908000
4 (5-2)	inactive	111	7200	11616000
B-1	active	116	10200	16456000
B-2	active	113	9300	15004000
C	active	144	12500	20167000
Total (Older Ponds):		1687	159500	257327000
7	active	615	39000	62948000

Notes:

1. Older ponds are currently used for short durations primarily in upset situations.



Tailings Disposal System
General Arrangement

K-10616B

REFERENCE 39

Shacklette and Boerngen, 1984

Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States

By HANSFORD T. SHACKLETTE *and* JOSEPHINE G. BOERNGEN

U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1270

An account of the concentrations of 50 chemical elements in samples of soils and other regoliths

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1984

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2. Aluminum	14
3. Antimony	16
4. Arsenic	18
5. Barium	20
6. Beryllium	22
7. Boron	24
8. Bromine	26
9. Calcium	28
10. Carbon (total)	30
11. Cerium	32
12. Chromium	34
13. Cobalt	36
14. Copper	38
15. Fluorine	40
16. Gallium	42
17. Germanium	44
18. Iodine	46
19. Iron	48
20. Lanthanum	50
21. Lead	52
22. Lithium	54
23. Magnesium	56
24. Manganese	58
25. Mercury	60
26. Molybdenum	62
27. Neodymium	64
28. Nickel	66
29. Niobium	68
30. Phosphorus	70
31. Potassium	72
32. Rubidium	74
33. Scandium	76
34. Selenium	78
35. Silicon	80
36. Sodium	82

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FIGURES 37–47. Maps showing element content of surficial materials in the conterminous United States:
37. Strontium 84
38. Sulfur 86
39. Thorium 88
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TABLE 1. Average or median contents, and range in contents, reported for elements in soils and other surficial materials . . 4
2. Mean concentrations, deviations, and ranges of elements in samples of soils and other surficial materials in the conterminous United States 6

1, unlike the geometric means shown in table 2, are estimates of geochemical abundance (Miesch, 1967). Arithmetic means are always larger than corresponding geometric means (Miesch, 1967, p. B1) and are estimates of the fractional part of a single specimen that consists of the element of concern rather than of the typical concentration of the element in a suite of samples.

Concentrations of 46 elements in samples of this study are presented in table 2, which gives the determination ratios, geometric-mean concentrations and deviations, and observed ranges in concentrations. The analytical data for most elements as received from the laboratories were transformed into logarithms because of the tendency for elements in natural materials, particularly the trace elements, to have positively skewed

TABLE 2.—*Mean concentrations, deviations, and ranges of elements in samples of soils and other surficial materials in the conterminous United States*

[Means and ranges are reported in parts per million (μg/g), and means and deviations are geometric except as indicated. Ratio, number of samples in which the element was found in measurable concentrations to number of samples analyzed. <, less than; >, greater than]

Element	Conterminous United States			Western United States (west of 96th meridian)					Eastern United States (east of 96th meridian)				
	Mean	Deviation	Estimated arithmetic mean	Ratio	Mean	Deviation	Observed range	Estimated arithmetic mean	Ratio	Mean	Deviation	Observed range	Estimated arithmetic mean
Al, percent	4.7	2.48	7.2	661:770	5.8	2.00	0.5 - >10	7.4	450:477	3.3	2.87	0.7 - >10	5.7
As---------	5.2	2.23	7.2	728:730	5.5	1.98	<0.10 - 97	7.0	521:527	4.8	2.56	<0.1 - 73	7.4
B---------	26	1.97	33	506:778	23	1.99	<20 - 300	29	425:541	31	1.88	<20 - 150	38
Ba---------	440	2.14	580	778:778	580	1.72	70 - 5,000	670	541:541	290	2.35	10 - 1,500	420
Be---------	.63	2.38	.92	310:778	.68	2.30	<1 - 15	.97	169:525	.55	2.53	<1 - 7	.85
Br---------	.56	2.50	.85	113:220	.52	2.74	<0.5 - 11	.86	78:128	.62	2.18	<0.5 - 5.3	.85
C, percent-	1.6	2.57	2.5	250:250	1.7	2.37	0.16 - 10	2.5	162:162	1.5	2.88	0.06 - 37	2.6
Ca, percent	.92	4.00	2.4	777:777	1.8	3.05	0.06 - 32	3.3	514:514	.34	3.08	0.01 - 28	.63
Ce---------	63	1.78	75	81:683	65	1.71	<150 - 300	75	70:489	63	1.85	<150 - 300	76
Co---------	6.7	2.19	9.1	698:778	7.1	1.97	<3 - 50	9.0	403:533	5.9	2.57	<0.3 - 70	9.2
Cr---------	37	2.37	54	778:778	41	2.19	3 - 2,000	56	541:541	33	2.60	1 - 1,000	52
Cu---------	17	2.44	25	778:778	21	2.07	2 - 300	27	523:533	13	2.80	<1 - 700	22
F----------	210	3.34	430	598:610	280	2.52	<10 - 1,900	440	390:435	130	4.19	<10 - 3,700	360
Fe, percent	1.8	2.38	2.6	776:777	2.1	1.95	0.1 - >10	2.6	539:540	1.4	2.87	0.01 - >10	2.5
Ga---------	13	2.03	17	767:776	16	1.68	<5 - 70	19	431:540	9.3	2.38	<5 - 70	14
Ge---------	1.2	1.37	1.2	224:224	1.2	1.32	0.58 - 2.5	1.2	130:131	1.1	1.45	<0.1 - 2.0	1.2
Hg---------	.058	2.52	.089	729:733	.046	2.33	<0.01 - 4.6	.065	534:534	.081	2.52	0.01 - 3.4	.12
I----------	.75	2.63	1.2	169:246	.79	2.55	<0.5 - 9.6	1.2	90:153	.68	2.81	<0.5 - 7.0	1.2
K, percent[1]	1.5	.79	None	777:777	1.8	.71	0.19 - 6.3	None	537:537	1.2	.75	0.005 - 3.7	--
La---------	30	1.92	37	462:777	30	1.89	<30 - 200	37	294:516	29	1.98	<30 - 200	37
Li---------	20	1.85	24	731:731	22	1.58	5 - 130	25	479:527	17	2.16	<5 - 140	22
Mg, percent	.44	3.28	.90	777:778	.74	2.21	0.03 - >10	1.0	528:528	.21	3.55	0.005 - 5	.46
Mn---------	330	2.77	550	777:777	380	1.98	30 - 5,000	480	537:540	260	3.82	<2 - 7,000	640
Mo---------	.59	2.72	.97	57:774	.85	2.17	<3 - 7	1.1	32:524	.32	3.93	<3 - 15	.79
Na, percent	.59	3.27	1.2	744:744	.97	1.95	0.05 - 10	1.2	363:449	.25	4.55	<0.05 - 5	.78
Nb---------	9.3	1.75	11	418:771	8.7	1.82	<10 - 100	10	322:498	10	1.65	<10 - 50	12
Nd---------	40	1.68	46	120:538	36	1.76	<70 - 300	43	109:332	46	1.58	<70 - 300	51
Ni---------	13	2.31	19	747:778	15	2.10	<5 - 700	19	443:540	11	2.64	<5 - 700	18
P----------	260	2.67	430	524:524	320	2.33	40 - 4,500	460	380:382	200	2.95	<20 - 6,800	360
Pb---------	16	1.86	19	712:778	17	1.80	<10 - 700	20	422:541	14	1.95	<10 - 300	17
Rb---------	58	1.72	67	221:224	69	1.50	<20 - 210	74	107:131	43	1.94	<20 - 160	53
S, percent-	.12	2.04	.16	34:224	.13	2.37	<0.08 - 4.8	.19	20:131	.10	1.34	<0.08 - 0.31	.11
Sb---------	.48	2.27	.67	35:223	.47	2.15	<1 - 2.6	.62	31:131	.52	2.38	<1 - 8.8	.76
Sc---------	7.5	1.82	8.9	685:778	8.2	1.74	<5 - 50	9.6	389:526	6.5	1.90	<5 - 30	8.0
Se---------	.26	2.46	.39	590:733	.23	2.43	<0.1 - 4.3	.34	449:534	.30	2.44	<0.1 - 3.9	.45
Si, percent[1]	31	6.48	None	250:250	30	5.70	15 - 44	None	156:156	34	6.64	1.7 - 45	--
Sn---------	.89	2.36	1.3	218:224	.90	2.11	<0.1 - 7.4	1.2	123:131	.86	2.81	<0.1 - 10	1.5
Sr---------	120	3.30	240	778:778	200	2.16	10 - 3,000	270	501:540	53	3.61	<5 - 700	120
Ti, percent	.24	1.89	.29	777:777	.22	1.78	0.05 - 2.0	.26	540:540	.28	2.00	0.007 - 1.5	.35
Th---------	8.6	1.53	9.4	195:195	9.1	1.49	2.4 - 31	9.8	102:102	7.7	1.58	2.2 - 23	8.6
U----------	2.3	1.73	2.7	224:224	2.5	1.45	0.68 - 7.9	2.7	130:130	2.1	2.12	0.29 - 11	2.7
V----------	58	2.25	80	778:778	70	1.95	7 - 500	88	516:541	43	2.51	<7 - 300	66
Y----------	21	1.78	25	759:778	22	1.66	<10 - 150	25	477:541	20	1.97	<10 - 200	25
Yb---------	2.6	1.79	3.1	754:764	2.6	1.63	<1 - 20	3.0	452:486	2.6	2.06	<1 - 50	3.3
Zn---------	48	1.95	60	766:766	55	1.79	10 - 2,100	65	473:482	40	2.11	<5 - 2,900	52
Zr---------	180	1.91	230	777:778	160	1.77	<20 - 1,500	190	539:541	220	2.01	<20 - 2,000	290

[1]Means are arithmetic, deviations are standard.