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*Prepared for*

**United States Environmental Protection Agency**
Remedial Project Manager
Superfund Division
77 West Jackson Boulevard
Chicago, Illinois 60604

# TECHNICAL LETTER REPORT

## MATTHIESSEN AND HEGELER ZINC COMPANY SITE, OPERABLE UNIT #1 LASALLE, ILLINOIS

*On behalf of*

**Carus Chemical Company**
1500 Eighth Street
LaSalle, Illinois 61301

*Prepared by*

Geosyntec consultants
engineers | scientists | innovators

2258 Riverside Avenue
Jacksonville, Florida 32204

Project Number FR0756

December 2006

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Ms. Demaree Collier
Remedial Project Manager
U.S. EPA, Superfund Division
77 West Jackson Boulevard, SR-6J
Chicago, Illinois 60604

**Via Federal Express**

**DATE:** 11 December 2006

**SUBJECT:** Transmittal of Technical Letter Report
Matthiessen & Hegeler Zinc Company Site
LaSalle, Illinois

In fulfillment of the requirements of Task 1.1 of the Statement of Work (Appendix A) of the Administrative Settlement Agreement and Order on Consent for Remedial Investigation and Feasibility Study ("Settlement Agreement"), U.S. EPA Region V CERCLA Docket No.V-W-'06-C-856, between the U.S. EPA and Carus Corporation and Carus Chemical Company, Geosyntec Consultants is submitting a copy of the Technical Letter Report for Operable Unit #1 by overnight courier. The purpose of this report is to: (i) compile and present existing OU1 data, including information about site activities, waste disposal practices, and results of previous investigations; (ii) discuss the presence of contamination at OU1; and (iii) identify potential data gaps to be addressed by the RI/FS Work Plan.

If you have any questions or need clarification with regard to the information presented in the technical letter report, please contact Ms. Nandra Weeks, or in her absence, Ms. Jill Johnson at (904) 388-8821.

Sincerely,

Nandra D. Weeks, P.E.
Project Manager

Copies to: Illinois EPA, Bureau of Land, Federal Site Remediation Section (Clarence Smith)
Carus Corporation (Chithambarathanu Pillai Ph.D.)
Mayer, Brown, Rowe & Maw, LLP (Michelle Gale)
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FR1093/Deliverables/Technical Letter Report/Cover Letter

LETTER
REPORT

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11 December 2006

Ms. Demaree Collier
Remedial Project Manager
United States Environmental Protection Agency, Superfund Division
77 West Jackson Boulevard
Chicago, Illinois 60604

**Subject: Technical Letter Report Summarizing Previous Site Investigations Matthiessen and Hegeler Zinc Company Site, Operable Unit #1 LaSalle, Illinois**

Dear Ms. Collier:

In accordance with Task 1 of the Statement of Work for Matthiessen and Hegeler (M&H) Zinc Company Site Operable Unit #1 (OU1), GeoSyntec Consultants (GeoSyntec) has prepared this Technical Letter Report on behalf of Carus Corporation and the Carus Chemical Company (hereafter collectively referred to as Carus), prior to planning the Remedial Investigation (RI)/Feasibility Study (FS). The Statement of Work (SOW) is a component of the Administrative Settlement Agreement and Order on Consent (ASAOC) between USEPA Region V, Carus Corporation, and Carus Chemical Company. The purpose of this report is to: (i) compile and present existing OU1 data, including information about site activities, waste disposal practices, and results of previous investigations; (ii) discuss the presence of contamination at OU1; and (iii) identify potential data gaps to be addressed by the RI/FS Work Plan.

The remainder of this technical letter report consists of the following: (i) OU1 setting and background, which includes location and history in the context of all operations at the site, an overview of surrounding properties, the physiographic and climatic setting, and an aerial photograph review; (ii) regional and OU1 hydrology, geology, and hydrogeology; (iii) analytical results from previous investigations; (iv) a summary of pertinent findings from previous investigations; and (v) a discussion of data gaps to be addressed as part of the RI/FS Work Plan. Tables and figures are provided as attachments to this letter.

## SITE SETTING AND BACKGROUND

### *Site Overview*

OU1 is a portion of the broader M&H Zinc Company Superfund Site, located on the east side of LaSalle, Illinois. Figure 1 presents an overview of the Site, which encompasses approximately 183 acres of defined property plus any off-property areas, such as the Little Vermilion River, which may have been affected by the Site's manufacturing history. The Site is divided into two operable units: OU1, comprising the Carus facility in the south, the slag pile created from M&H operations, and the Little Vermilion River, and OU2, comprising the former M&H Zinc Company in the north. The ASAOC requires Carus' participation in a sitewide RI/FS, which, for Carus, specifically entails: (i) performance of OU1-related activities, and (ii) combination of investigative findings from OU1 with those from OU2 provided by USEPA's contractor into sitewide reports as needed.

OU2 encompasses approximately 132 acres of upland soils. It is bounded to the south by OU1, to the east and north by the Little Vermillion River, and to the west by the town of La Salle. Its industrial history principally entailed zinc smelting, plating, and stamping operations. OU1, which is the subject of this technical letter report, is described in more detail in the next section.

### *OU1 Description*

OU1 is comprised of three areas: (i) Carus' manufacturing facility; (ii) a slag pile related to the former M&H smelter operations; and (iii) the Little Vermilion River. The Carus manufacturing facility is located at 1500 8th Street, in the northwest quarter of Section 14 and in the northeast quarter of Section 15 in Township 33 North, Range 1 East of the Third Principal Meridian in LaSalle County, Illinois. The slag pile is located in the northwest quarter of Section 14 in the township referenced above and is bordered to the east by the Little Vermilion River. The river generally runs from north to south toward its confluence with the Illinois River approximately one mile south of the Site; it also serves as the eastern boundary of OU1 and OU2. A location map is provided as Figure 1. Note that the northern boundary of the slag pile serves as part of the boundary between OU1 and OU2; this boundary is dashed on associated figures because the boundary is estimated at present. Likewise, the spatial extent of site-related impacts in the Little Vermillion River will be better understood during and after RI characterization; hence, dashed boundary lines immediately to the north and south of the site indicate possible study boundaries. The main plant area of Carus contains numerous buildings associated with manufacture of potassium permanganate and other specialty chemicals. Property to the east of the main plant area includes, from west to east: (i) the eastern embankment of the manufacturing facility; (ii) a

segment of the former Illinois Central Rail Road (ICRR) embankment; (iii) the slag pile associated with the M&H Zinc Company Site; and (iv) a holding pond (also known as the south lagoon). OU1 is bounded by OU2 of the M&H Site to the north; a limestone quarry, a cemetery, and farmland to the east; and private residences to the south and west.

OU1 is currently used for industrial purposes (manufacturing). The Carus manufacturing facility began operations at the present location in the early 1900's. A figure showing the overview of process areas is provided as Figure 2. Based on historical records, the slag pile likely began to be formed in the early 1860's and was completed in the early 1960's.

***Industrial History***

OU2 property, located north of the Carus manufacturing facility at 900 Sterling Street, began primarily as a zinc processing facility in the mid 1800's. It is presumed that most of OU2 was farmed prior to industrial activity; however, two abandoned deep coal mines exist on OU2. Coal extracted from these mines was likely used in the furnaces for zinc smelting processes.

A historical overview of the Carus and M&H operations has been developed based on the following sources: (i) review of available plat surveys of the surrounding area from 1876 to 1925 (obtained from the LaSalle County Historical Society); (ii) historical photographs from 1939 to 1988 (obtained from the University of Illinois at Urbana-Champaign); (iii) site topographic maps; and (iv) interviews with individuals familiar with historical site operations. The historical aerial photographs depict the Carus and the M&H properties from 1939 to 1988 and provide an indication of past disposal practices. These historical aerials are presented as Figures 3 through 7. A historical overview is provided below:

- In the mid-1800's, M&H began operations primarily as a zinc processing facility under the name of Matthiessen and Hegeler. Zinc ore was imported to the M&H property where it was refined, recovered, and rolled for industrial use. By-products, including sinter, slag, and other off-specification materials, were placed south and east of the M&H plant in the area that is now between the M&H and Carus plants and the Little Vermilion River. Portions of the slag and sinter were placed on property now owned by Carus.

- Based on the plat survey, in 1876, a large portion of the property now owned by Carus was likely used for agricultural purposes. Property owners included: (i) Zinc Rolling Mills, northwest of the ICRR; (ii) F. Gray, in the Little Vermilion River valley area; (iii) ICRR for the railroad and a round house located southwest of the site; and (iv) small lots west of the ICRR owned by various individuals. The largest portion of property was

owned by F. Gray. This property included the Grist Mill and several other buildings. The Grist Mill was constructed on an island between a large river arm (likely to be the Little Vermilion River bed enlarged by a dam regulating the river flow) and a narrow river arm (likely to be artificially excavated). The Little Vermilion River flowed from its present location north of the slag pile, toward the south-southwest where the holding pond is presently located, and then toward the southeast.

- Based on the plat survey, in 1876, a mine shaft (Kentucky Shaft) was located on the Northern Illinois Coal & Iron Company property. Another coal mine shaft was present on the upland area of the M&H property. Coal extracted from these mines was likely used in the furnaces for zinc smelting processes.

- Based on the 1895 plat survey, a portion of the property owned by the Northern Illinois Coal & Iron Company was purchased by M&H.

- On the 1905 and 1906 plat surveys, no significant changes occurred. On the 1925 plat survey, Carus is shown as a property owner of the northwest quadrant of the present manufacturing facility property. No other significant changes were noted on the plat survey.

- Based on an aerial photograph, by 1939, most of the slag had been placed in its current location.

- Based on an aerial photograph, in 1953, a new river channel was noted downstream of the slag pile, east of the former river channel.

- Based on an aerial photograph, in 1958, the Little Vermilion River was more prominent to the east of the slag pile, and joined the former river channel downstream of the site.

- Based on an aerial photograph and site interviews, by 1961, the holding pond had been constructed at the southeast corner of OU1 and received wastewater discharge (process water) from the Carus manufacturing facility. The holding pond improved effluent handling methods and curtailed direct discharge of the effluent to the Little Vermilion River.

- Based on the aerial photographs, site interviews, and topographic maps, it appears that between 1961 and 1988, the holding pond berm was raised twice and the pond dredged at

least once. In the 1988 aerial photograph, approximately 1,300 ft of the slag pile's eastern edge was in contact with the Little Vermilion River.

- In the late 1970's, M&H reportedly filed for bankruptcy, and operation of the rolling mill was taken over by Zinco. In 1991, Zinco merged with LaSalle Rolling Mills, which was the surviving corporation. LaSalle Rolling Mills continued operations until the late 1990's and performed smelting, rolling, casting, stamping, and plating of zinc and aluminum sheet and wire products.

***Current Operations***

The manufacturing and business operations of Carus and M&H have always been separate. Carus began operations in 1915 manufacturing potassium permanganate products used for water purification and wastewater treatment. Today, approximately 15,000 tons of potassium permanganate are produced annually at the Carus facility. Additionally, Carus produces sodium permanganate and a specialty line of products. Sodium permanganate is used by the electronics industry for descumming and descaling. Other products are used for denim highlighting, chemical synthesis and purification, wire descaling, and acid mine leachate treatment. Air filter media are produced for air purification use in residential, commercial, and industrial buildings.

Beyond some warehousing, there are no known current operations on the former M&H property comprising OU2.

***Materials Management and Waste Disposal Practices***

According to the Screening Site Inspection (SSI), originally Carus manufactured potassium permanganate at the facility in LaSalle and over time other products were added, including:

- manganese dioxide
- sodium permanganate
- PPC 2,3, pyridine dicarboxylic acid
- chlorides
- nitrates
- cesium carbonates

Currently, the following products are manufactured at the Carus facility:

- Potassium permanganate
- Sodium permanganate
- Manganese dioxide catalysts
- Blended phosphates

- Blended zinc phosphates

Raw materials stored in bulk include:

- Manganese dioxide ore
- Potassium hydroxide solution
- Liquefied oxygen
- Sodium silicofluoride
- Phosphoric acid
- Sodium hexameta phosphate

Carus also stores the following chemicals in smaller volumes than the chemicals listed above:

- Manganese sulfate
- Copper sulfate
- Aluminum oxide
- Silicon dioxide
- Sodium acid pyrophosphate
- Tetra potassium pyrophosphate
- Disodium phosphate
- Dipotassium phosphate
- Calcium oxide
- Calcium chloride
- Calcium nitrate
- Sodium chloride
- Sulfuric acid
- Nitric acid
- Hydrochloric acid
- Sodium hydroxide
- Sodium carbonate
- Sodium bisulfite
- Sodium silicate
- Zinc chloride
- Zinc oxide
- Zinc sulfate

Non-contact cooling water from potassium permanganate operations is discharged into the holding pond. Water is discharged to the Little Vermilion River via a National Pollution Discharge Elimination System (NPDES) regulated discharge point. Process water from the pilot plant is treated on-site and discharged to the publicly owned treatment works (POTW) of the City of LaSalle. Solid wastes are disposed of off-site in a Carus-owned landfill.

### *Physiographic and Climatic Setting*

The Carus manufacturing facility is located within LaSalle County, which consists of a flat upland area with an average elevation of 650 to 750 ft (1927 North American Datum). The facility lies at an elevation of approximately 580 ft, except near the eastern boundary of the site, where the elevation decreases to approximately 460 ft at the boundary of the Little Vermilion River. The Little Vermilion River flows north to south for approximately one mile from the facility where it discharges into the Illinois River. The Illinois River Valley divides LaSalle County into approximately two equal sections. The Illinois River Valley is approximately one mile wide at the County of LaSalle, with relatively steep bluffs approaching 150 ft high.

The temperature in the City of LaSalle varies between approximately 18°F in January to 86°F in July. Mean annual rainfall is approximately 34 inches. The prevailing wind is from the south with an average velocity of 11 mph.

## GEOLOGY AND HYDROGEOLOGY

### *Overview*

The information presented in this section is based on boring logs and field notes from previous field investigations, as well as published literature. A detailed description of the regional and OU1 hydrology, geology, and hydrogeology is presented below, as well as a discussion of groundwater flow characteristics. Cross-sections were developed based on the results of prior investigations. The cross-sections illustrate GeoSyntec's understanding of the geologic profile of areas within OU1. A cross-section location map is presented as Figure 8 and cross-sections A through G are presented in Figures 9 through 12.

### *Surface Hydrology*

#### Regional Surface Hydrology

LaSalle County lies within the Illinois River Drainage Basin. The Illinois River flows across the central portion of LaSalle County in a westerly direction. Overall, LaSalle County is moderately well-drained, although marshes occur near the headwaters of some upland creeks. Important tributaries of the Illinois River include the Fox River, the Vermilion River, and the Little Vermilion River, the latter of which flows from north to south along the eastern property boundary of the site.

## OU1 Surface Hydrology

The most important feature influencing surface-water flow at and near the site is the Little Vermilion River. The majority of the surface-water runoff across OU1 has been directed toward the holding pond. The holding pond discharges to the Little Vermilion River through a NPDES permitted discharge pipe. The easternmost edge of the slag deposits occur within the 100-year flood plain of the Little Vermilion River as designated by the United States Geological Survey (USGS). In general, surface-water runoff across OU2 is directed toward the Little Vermilion River.

### *Geology*

## Regional Geology

The regional geology of north-central Illinois consists of unconsolidated Pleistocene glacial deposits overlying Paleozoic sedimentary deposits. For the purposes of this investigation, the Paleozoic strata can be divided into lower Paleozoic deposits and upper Paleozoic deposits. The lower Paleozoic deposits consist primarily of sandstone, dolomite, and shale, and are on the order of 4,800 ft thick. The upper Paleozoic deposits, which are entirely of Pennsylvanian age, consist primarily of shale, limestone, sandstone, and coal, and are on the order of 400 ft thick. The distinction between lower and upper Paleozoic deposits is significant with respect to the LaSalle Anticline, which is the most important geological structure in the region.

The LaSalle Anticline is a sharp, southwestward-dipping flexure in the lower Paleozoic sedimentary strata. The flexure was formed after deposition of the lower Paleozoic strata but before deposition of the upper Paleozoic strata. The axis of flexure on the northwest to southeast trending anticline is located approximately one mile to the northeast of the site. The effect of this flexure is that lower Paleozoic strata that exist at depths of 1,500 ft at an approximate distance of 1.5 mile to the southwest of the site are exposed at or near the ground-surface about one mile to the northeast of the site. However, this sharp flexure does not occur within the upper Paleozoic (Pennsylvanian) strata. The upper Paleozoic deposits merely overlap and thin against the flexure.

During the Mesozoic and early Cenozoic periods in Illinois, emergence of the Paleozoic formations resulted in widespread erosion and production of a low-relief topography. During the Pleistocene Epoch, glaciers advanced over the region, scouring out softer rocks and soils. As the ice melted, large volumes of rock and soil debris were left behind in the form of glacial drift. Glacial drift deposits range up to 600 ft in thickness in the region.

Glacial-drift thicknesses near the site were estimated from formation descriptions provided in well construction reports, submitted by well drillers to the Illinois Department of Public Health (IDPH). Within a 5-mile radius of the site, drift thicknesses range from less than 10 ft to approximately 100 ft. The average thickness of glacial deposits is approximately 40 ft within an area bounded to the south by the Illinois River and the east by the Little Vermilion River. South of the Illinois River and west of the Vermilion River, glacial deposits average approximately 60-ft thick. Northeast of the site, across the Little Vermilion River, glacial deposits appear to be 10-ft thick or less. Pennsylvanian age and older formations outcrop to the east of the Little Vermilion River, as the crest of the LaSalle Anticline is approached.

**Geologic History**

The bedrock of OU1 consists of shale and limestone with small amounts of coal and sandstone. These rocks were deposited about 300 million years ago during the Pennsylvanian Period in shallow marine and swamp environments. Following deposition, these deposits were buried, compacted, and cemented into moderately to well-consolidated sedimentary rock.

Glaciers scoured valleys into the Pennsylvanian deposits during the Pleistocene Epoch, about 20,000 years ago. This scouring created an irregular surface of fresh bedrock beneath the ice. When the ice melted, large volumes of sediment ranging in size from boulders to silt were left behind as deposits of till. In some places, silty clay was deposited by wind or standing water.

Following and also possibly during the Pleistocene Epoch, erosion scoured out the Little Vermilion Gorge and appears to have removed nearly all of the glacial deposits from OU1, except for a small erosional remnant in the northeastern corner of the Carus main plant area. Where Pennsylvanian shales were exposed, up to 8 ft of residual soils have developed. In the central part of the Carus main plant area, an erosional gully formed. The geometry of this gully is represented in the cross-sections, shown on Figures 9 through 12, and the base of the gully is shown in Figure 13 as the base of the fill. Also during this time, stream and floodplain sediments were deposited in the Little Vermilion Valley.

In the late 1800's, zinc smelting began just to the north of OU1 and large amounts of slag and some waste sinter were produced. Waste slag was taken from the retorts and transported to OU1 by the narrow gauge railroad. In the early 1900's, a long ridge of slag was deposited along the eastern side of the current Carus main plant area. This ridge of slag has the appearance of a berm constructed across the mouth of the gully.

General infilling of the gully likely began following construction of the slag ridge. In the northeastern part of the impounded gully, which was close to the narrow gauge railroad, much of the fill material consisted of waste sinter from smelting operations. In most of the gully, however, fill material consisted of fresh to weathered Pennsylvanian green shale. This shale appears to have been scraped from a small knoll that probably existed near the location of the gully. In the early stages of infilling, a shallow pond appears to have formed in the gully, causing deposition of the soft, alluvial soils observed in Boring C-3 and G-05.

According to a historic site map, by 1928, infilling of the gully had been completed and the area was traversed by the tracks of the LaSalle and Bureau County Railroad. The 1928 map also shows the earliest Carus buildings. The railroad tracks were removed in the 1970's. Around 1980, the emergency storage area was constructed utilizing an engineered, compacted clay liner, designed to contain liquids in an emergency situation.

## Site Geology and Stratigraphy

**Overview:** The rocks and soils beneath OU1 were formed as either natural or man-made deposits of sediment and fill material. Each type of deposit has chemical and hydrogeologic properties which are unique and individually significant to the flow and chemical composition of the shallow groundwater beneath OU1. For this report, these deposits can be divided into four general groups on the basis of age and origin:

- the Pennsylvanian System, which includes the bedrock and residual soils formed upon it;
- the Pleistocene Series, which includes the glacial deposits in the northeastern corner of the main plant area;
- Holocene alluvium, which is confined to the bottom of the Little Vermilion Valley; and
- modern fill, which includes all materials which have been deposited or reworked by human action since the onset of industrial operations.

The remainder of this section consists of a systematic description of each of these four groups of materials, including: (i) overall makeup and distribution; (ii) internal composition; and (iii) a general description of hydrogeologic properties, if applicable.

**Pennsylvanian System:** The Pennsylvanian System constitutes the bedrock and underlies the entire area around OU1. Within the area of investigation, the Pennsylvanian System consists of

horizontal or nearly horizontal layers of shale and limestone with a few thin beds of coal and sandstone. In many areas, a mantle of residual soil has developed within the upper few feet of the Pennsylvanian deposits. The full Pennsylvanian section at OU1, down to the level of the Little Vermilion River, is shown on Cross-Section A (Figure 9). On the cross-sections (Figures 9 through 11), the Pennsylvanian System was divided, from the top down, into the following four units: (i) green shale, which includes some coal and gray claystone; (ii) red shale; (iii) limestone; and (iv) gray shale with thin beds of limestone.

The green shale unit actually consists of several layers of green, calcareous shale, a layer of green calcareous siltstone, a thin bed of coal, a layer of gray claystone, a layer of bituminous clay and shale, and at least one thin bed of marlstone. Additionally, within several feet of the natural ground surface, a mantle of residual soil has developed in the top of the green shale unit.

In the layers of green calcareous shale and siltstone, groundwater appears to flow slowly through small, widely spaced fractures. Where weathering has reduced the amount of calcareous cement, some intergranular flow may also take place. The intergranular hydraulic conductivity of the weathered green shale at Monitoring Well G-02 was measured to be $9.9 \times 10^{-7}$ cm/s on the basis of laboratory hydraulic conductivity testing.

Although it is very thin, the coal bed is highly fractured and therefore has high hydraulic conductivity, probably giving it a transmissivity comparable to the entire calcareous green shale section. During the drilling of Monitoring Well G-03, free water was not encountered in the split-spoon samples, except when the coal bed was penetrated. Additional water was encountered in the bituminous claystone and shale at points where the organic content was sufficiently high to make the clay of very low plasticity. Based on a slug test performed in Monitoring Well G-02, the gross hydraulic conductivity of the green shale was measured to be about $4 \times 10^{-6}$ cm/s.

The red shale unit is much more uniform than the green shale unit and is distinguished by its color, its medium plasticity, and the absence of calcite either as fossils or as cements. Due to the absence of calcite and the medium plasticity, groundwater flow most likely occurs by means of molecular diffusion and limited fracture flow. In clays of medium plasticity, fracture flow is limited somewhat by the tendency of the clays to swell slightly in the presence of fresh water.

The limestone unit is about 50 ft thick and is believed to underlie the main plant area of OU1. This limestone was encountered only in Boring G-01 but was observed in an outcrop along the bluffs of the Little Vermilion River (see Cross-Section A, Figure 9). Except for fractures, the limestone unit is impermeable. Although significant fractures were observed within the

limestone, they were present at a relatively low density (approximately one fracture every 30 to 100 ft along the face of the outcrop). This low density of fractures indicates a low transmissivity for the limestone unit. No karst development was observed.

**Pleistocene Deposits:** The Pleistocene Series is confined to the northeast corner of the main plant area, where it forms a layer up to approximately 20 ft thick. The Pleistocene Series consists of the following lithologies: (i) coarse till; (ii) fine till; and (iii) silty clay.

In all three types of Pleistocene deposits, groundwater flows through intergranular pore spaces, with the hydraulic conductivity determined by the size and abundance of the pores. The coarse till, which has a matrix of sand and little or no silt and clay, is characterized by a moderately high hydraulic conductivity. In Monitoring Well G-04, the hydraulic conductivity of the coarse till was measured to be approximately $2.7 \times 10^{-3}$ cm/s.

The silty clay and fine till are estimated to have low to very low hydraulic conductivities on the basis of their fine grain size. Because the matrix of the fine till and the silty clay deposits are of low plasticity, low-rate intergranular flow should dominate. Because of the extremely poorly sorted (very well-graded) nature of the fine till, the amount of intergranular space available for flow should be very low, further reducing the hydraulic conductivity of the fine till deposits.

**Holocene Alluvium:** Alluvial deposits appear to be confined to the valley of the Little Vermilion River, and are believed to consist mainly of loose silty sand and soft sandy silt. The depth of the alluvial deposits is unknown. The alluvial deposits are believed to be of Holocene age (within the past 10,000 years), but a Pleistocene component may also be present. In the section of the river that flows by OU1, the alluvial deposits appear to have been buried by deposits of slag.

**Fill Deposits:** Fill deposits were observed to cover large areas of OU1. Significant deposits were found mainly in the central part of the main plant area where they constitute the infill material for the former gully. The fill deposits are both complex and very significant to the flow and potentially to the quality of groundwater. In general, the following types of fill were observed during this site investigation: (i) soil fill; (ii) sinter; and (iii) slag.

- Soil Fill - Soil fill consists primarily of reworked Pennsylvanian shale. In general, the reworked shale appears to have been derived from residual soil developed in the top of the calcareous green shale, as well as from unweathered shale and siltstone. The reworked shale is characterized by a loosely compacted jumble of shale and siltstone clods with a small amount of miscellaneous fill material. In addition to the reworked

shale, the following other types of fill soils were identified: (i) sediment from the OU1 pond that lies beneath the reworked shale in Borings G-05, C-3, and possibly C-10; (ii) structural fill associated with the Illinois Central Railroad grade; (iii) miscellaneous shallow fill and road gravel; and (iv) the compacted clay liner constructed for the emergency storage area. In the reworked shale deposits, groundwater most likely flows primarily between large clods of reworked shale and secondarily within the weathered clods of shale. The poorly compacted nature of the deposit gives the reworked shale a coarsely granular texture, similar to the coarse till. Based on a slug test conducted in Monitoring Well G-05, the hydraulic conductivity of the reworked shale deposit was found to be about 2.0 x 10-3 cm/s.

- Sinter Fill - Sinter, in the context of zinc production, is an intermediate product consisting of agglomerated zinc oxide. Sinter is produced when zinc sulfide ore is roasted, which causes the sulfur to be driven off and the zinc to oxidize. The sinter identified in the fill deposits is presumed to have been off-specification material. Where encountered in the borings, the sinter consisted of black, loose granular material, the size of medium sand. The hydraulic conductivity of the sinter is most likely slightly greater than the reworked shale or the coarse till.

- Slag Fill - Slag is the recrystallized or vitrified silicate and oxide residue from the production of metal from ore. Typically, and as observed at OU1, slag ranges in color from moderate red to blackish red and has a highly porous, cindery, vesicular texture similar to scoriaceous lava rock. Much of the slag appears to have become welded into large blocks by its own heat prior to and during deposition. Slag deposits observed in outcrops of OU1 were extremely porous with large, interconnected voids on the order of 0.3 to 1.0 ft across. The hydraulic conductivity of the slag deposits is believed to be very high, at least locally within the deposit.

### *Hydrogeology*

#### Regional Hydrogeology

Aquifers within north-central Illinois are represented by sands and gravels occurring within the glacial drift, as well as permeable bedrock formations, principally sandstones and dolomites. The City of LaSalle has a wellfield approximately 0.6 mile south of OU1, within the Illinois River Valley. The water supply wells are screened in glacial sands and gravels at depths ranging from 60 to 70 ft below land surface (BLS). The City of Peru operates a municipal wellfield

approximately two miles northwest of the Carus Chemical Company manufacturing facility. Water is obtained from lower Paleozoic formations at depths greater than 2,000 ft BLS.

**OU1 Hydrogeology and Hydrostratigraphy**

The main plant area is dominated by an old erosional gully that is filled with loosely compacted soils and slag. The erosional gullies were formed by glacial scouring during the Pleistocene Epoch, about 20,000 years ago. Around this time, the Little Vermilion Gorge was scoured nearly removing all glacial deposits from OU1. Stream and floodplain sediments were deposited in the Little Vermilion Valley. The fill deposits form the upland fill aquifer system which overlies a bedrock confining layer. The slag berm along the eastern side of the main plant area seems to have been constructed across the mouth of the gully. Infilling of the gully most likely began following construction of the slag ridge. A shallow pond appeared in the gully, causing deposition of soft alluvial soils. Based on historic maps of the site, infilling of the gully was completed by 1928.

The deposits beneath the main plant area can be divided into five hydrostratigraphic units based on the magnitudes of their permeabilities and the nature of their pore structures. The hydrostratigraphic units are outlined below. Hydraulic conductivity values are provided in the Phase I Site Investigation report [GeoSyntec, 1994].

- Unit I consists of slag deposits, with very high permeability and very large pore spaces. The hydraulic conductivity of Unit I is estimated to be on the order of $1 \times 10^{-1}$ cm/s.

- Unit II consists of fill deposits and coarse till, with the moderately high permeability and coarse, intergranular texture (considering clods of reworked shale as large grains). The hydraulic conductivity of Unit II is estimated to be on the order of $1 \times 10^{-3}$ to $3 \times 10^{-3}$ cm/s.

- Unit III consists of the upper two-thirds of the green shale unit and includes residual soil and weathered shale, the coal, and the bituminous gray claystone and shale. Flow in Unit III appears to occur primarily through fractures in the shale and coal. The hydraulic conductivity of Unit III is estimated to be on the order of $3 \times 10^{-6}$ to $1 \times 10^{-5}$ cm/s.

- Unit IV consists of the fine till deposit, with its very low hydraulic conductivity and intergranular flow. According to Freeze and Cherry [1979], fine tills may have hydraulic conductivities as low as $1 \times 10^{-8}$ to $1 \times 10^{-10}$ cm/s.

- Unit V consists of the lower part of the green shale and the red shale, which together form the lower confining layer for the shallow upland fill aquifer system. Unit V may have a hydraulic conductivity somewhat higher than Unit IV due to the potential for molecular diffusion and fractures within the shales.

Hydraulic testing was conducted during previous investigations. These results were discussed relative to specific stratigraphic units earlier in the Stratigraphy section, as applicable and are summarized in Table 2.

***Groundwater Flow***

**Overview**

The purpose of this section is to describe the nature of the groundwater flow systems beneath OU1 in order that information on groundwater quality can be evaluated properly with respect to potential environmental risk. The flow and chemical composition of groundwater beneath the main plant area are strongly influenced by the geometry and composition of fill deposits and bedrock. A separate flow system exists for the slag pile in OU1. In order to understand the complex relationships between the various layers of bedrock and fill deposits, a description of the OU1 geology and a narrative on the geologic history of OU1 was provided earlier in this document.

**Description of the Main Plant Area Flow System**

The shallow groundwater flow system in the main plant area is comprised of two main units. The most prominent water-bearing unit is associated with the old erosion gully that was filled with loosely compacted soils and slag, corresponding to hydrostratigraphic Units I and II. A secondary unit is associated with the coarse till (Pleistocene) deposits confined to the northeast portion of the main plant area. The water-bearing unit associated with old erosion gully (referred to as the fill aquifer) is bounded below by the red shale and limestone, which are assigned to hydrostratigraphic Unit V and which form the lower confining layer. The fill aquifer is bounded laterally on the north, west, and south by the green shale unit, which forms hydrostratigraphic Unit III. On the northeast, the fill aquifer is bounded by the fine till, which forms Unit IV. The lower and lateral boundaries of the fill aquifer are considered to correspond to the base of fill.

The secondary water-bearing element of the shallow flow system is present in the coarse till deposits in the northeastern corner of the main plant area. The coarse till is assigned to hydrostratigraphic Unit II and hereinafter is considered the coarse till aquifer.

The principal sources of water for the fill aquifer are fugitive loss of non-contact cooling water from the plant sewer system and direct infiltration of precipitation. Direct infiltration appears to be responsible for the water present in the coarse till aquifer and in the green shale unit in the northeastern portion of the main plant area.

**Description of the Slag Pile Flow System**

The slag pile area is believed to be underlain by a single shallow flow system consisting of two components. Hereafter, this will be referred to as the Little Vermilion Flow System. Due to the presence of the Pennsylvanian shales and limestones, GeoSyntec believes that there is no significant interconnection between the Little Vermilion Flow System and deeper water supply aquifers.

The main component of the Little Vermilion Flow System consists of the river channel, the alluvium, and the slag in the lower portions of the valley. Observations made during previous investigations suggest a common southward-flowing gradient in these deposits with gradual convergence of flow into the river. The other component of the Little Vermilion Flow System is believed to consist of flow from the upland areas directly toward the river under relatively steep hydraulic gradients.

The evidence presented above suggests that water within slag pile area will generally be discharged at the southern end of OU1 through either the channel or alluvium of the Little Vermilion River.

**Direction and Rate of Flow**

Water level elevations measured in monitoring wells at OU1 suggest that shallow groundwater flows to the east-southeast towards the Little Vermilion River. Groundwater in the main plant area generally flows eastward toward the Little Vermilion River. The groundwater flow from the Phase I area appears to be channelized into a narrow area in the vicinity of Soil Boring G-01 likely as a result of the configuration of the bedrock surface and the nature of the fill and glacial deposits.

The direction of flow in the upland fill is shown on the potentiometric surface map (Figure 14). This map also shows the four hydrostratigraphic units which are present above the lower confining layer (Unit V). The direction of flow is to the east, toward the Little Vermilion River.

Generally, the potentiometric surface flattens away from the groundwater mound and steepens toward the steep hillside leading down to the Little Vermilion River. The potentiometric gradient in the slag (Unit I) is very flat. This flatness is reflective of the high hydraulic conductivity of the unit as opposed to the absence of flow. The potentiometric gradient in the green shale (Unit III) away from the plant is fairly flat. This is reflective of the low rate of recharge and discharge and of the flat topography. In the spring, when infiltration is high due to rain and snowmelt and evapotranspiration is low, the potentiometric gradient in Unit III is expected to be significantly higher.

Darcy's Law expresses an ideal relationship between the potentiometric gradient, the hydraulic conductivity, and the rate of groundwater flow under non-turbulent conditions:

$$Q = KAi$$

where Q is the rate of flow, K is the hydraulic conductivity, A is the unit cross-sectional area perpendicular to flow, and i is the hydraulic gradient. By dividing A into Q, the Darcy Flow Velocity (V) is obtained. The Darcy Flow Velocity indicates the general rate of water flow through a large volume of rock, as opposed to specific rates of flow through individual pores. Groundwater flow rates were estimated for Units II and III using this relationship as follows:

- At Monitoring Well G-02, the potentiometric gradient in Unit III is mapped as 8 percent (see Figure 14) and the hydraulic conductivity was estimated by slug testing to be about $4.1 \times 10^{-6}$ cm/s. From these values, the overall rate of groundwater flow at Monitoring Well G-02 should be approximately 0.3 ft/yr.

- At Monitoring Well G-04, the potentiometric gradient in the coarse till aquifer (Unit II) is mapped at 3 percent (see Figure 14) and the hydraulic conductivity was estimated by slug testing to be about $2.7 \times 10^{-3}$ cm/s. From these values, the overall rate of flow at Monitoring Well G-04 should be approximately 78 ft/yr. At Monitoring Well G-05, the potentiometric gradient in the shallow fill aquifer (Unit II) is mapped at 4 percent (see Figure 14) and the hydraulic conductivity was determined by slug testing to be about $2.1 \times 10^{-3}$ cm/s. From these values, the overall rate of flow at Monitoring Well G-05 should be approximately 90 ft/yr. Based on this information, the average groundwater flow rate for Unit II is 84 ft/yr.

## SUMMARY OF PREVIOUS INVESTIGATIONS

### *Overview*

This section of the technical letter report was prepared to summarize findings and present the analytical results from previous investigations conducted in the OU1 area. GeoSyntec's understanding of the geology, hydrogeology, and flow of groundwater were presented in previous sections of this report and hence are not repeated herein. Soil, groundwater, surface water, and sediment samples have been collected at the OU1 as part of prior investigations conducted by GeoSyntec and Illinois Environmental Protection Agency (IEPA). The specific parameters analyzed during the events varied between investigations. The investigations included analyses for the Target Analyte List (TAL) metals and the Target Compound List (TCL), including: (i) volatile organic compounds (VOCs); (ii) base/neutral and acid extractable organic compounds (BNAs, commonly referred to as Semivolatile Organic Compounds (SVOCs)); (iii) pesticides and polychlorinated biphenyls (PCBs); and (iv) inorganic compounds, including metals and inorganic anions (i.e., cyanide, sulfate, and sulfide).

Previous environmental investigations which have been performed by the IEPA and GeoSyntec at the M&H Zinc Company Site are summarized in the following documents:

- "CERCLA Preliminary Assessment Report", Carus Chemical Company, September 1991, prepared by the IEPA;
- "CERCLA Screening Site Inspection Report", Carus Chemical Company, December 1992, prepared by the IEPA;
- "Preliminary Site Investigation Report", Carus Chemical Company, June 1993, prepared by GeoSyntec;
- "Phase I Site Investigation Completion Report", Carus Chemical Company Manufacturing Facility, LaSalle, Illinois, January 1994, prepared by GeoSyntec;
- "CERCLA Preliminary Assessment Report", M&H Zinc Company Site, October 1994, prepared by the IEPA;
- "CERCLA Integrated Site Assessment Report", M&H Zinc Company Site, January 1995, prepared by the IEPA; and

- "Phase II Site Investigation Completion Report", Carus Chemical Company Manufacturing Facility, LaSalle, Illinois, January 1996, prepared by GeoSyntec.

The discussion provided below has been limited to the investigations conducted at OU1, including the Carus main plant area, the slag pile, and the Little Vermilion River. Note that while two IEPA studies (1994 and 1995) were targeted towards the former M&H Zinc Company Site proper, which is now essentially associated with OU2, a portion of the samples from the latter study were collected from areas that are within OU1. Specifically, Integrated Site Assessment (ISA) sediment samples collected from the Little Vermillion River and samples collected from the slag pile are relevant to OU1 and hence are included in the OU1 database and are discussed in this document.

The general areas of investigation are illustrated on Figure 2. A summary of the samples collected during previous investigations at the site is presented in Table 3. A summary of completion and location information for borings, piezometers, and monitoring wells is presented in Tables 4 and 5. The sampling locations are displayed on Figures 15a and 15b. Note that the two IEPA studies that involved sample collection (the Carus SSI and the M&H ISA) used the same sample location nomenclature, e.g. X101, X102, X201, X202, etc., in different locations. In order to differentiate between the two programs and avoid misattribution of chemistry data, we have appended the prefix "SSI-" and "ISA-" to the location identification codes, as shown in Figures 15a-b and the data tables. This clarified nomenclature will be used hereafter.

In this report, the historical analytical data are screened against updated risk screening values for multiple media to support preliminary considerations of the OU1 setting with respect to likely risk assessment approaches for this site. The soil and groundwater analytical results were screened against the USEPA Region IX Preliminary Remediation Goals (PRGs) for industrial soil and tap water, respectively. These screening values are broadly accepted across most USEPA regions, including Region V, because they account for multiple routes of exposure, including dermal, ingestion, and inhalation pathways. It should be noted that groundwater analytical data for lead were compared to the federal Maximum Contaminant Level (MCL) of 0.015 mg/L as no tap water PRG is available for this constituent. The analytical results for sediment samples collected from the onsite holding pond and the Little Vermillion River were screened against the USEPA Region V Ecological Screening Levels (ESLs) for Sediment[1]. The analytical results for surface water samples collected from the Little Vermillion River were screened against USEPA Region V ESLs for Surface Water[1].

[1] USEPA Region 5 RCRA Corrective Action Ecological Screening Levels, updated August, 2003 Available online at http //www.epa gov/reg5rcra/ca/edql.htm

A summary of the previous site investigations is provided below.

***Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Preliminary Assessment Report (Carus)***

The CERCLA Preliminary Assessment Report was prepared by the IEPA following placement of the Carus main plant area in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) in May 1991. The purpose of the Preliminary Assessment Report was to conduct an initial evaluation of the site and recommend to the U.S. EPA a priority for conducting additional investigations as part of the CERCLA process. No environmental samples were collected during this effort.

Based on the lack of any documented evidence of prior environmental damage, the previous safety record for Carus, and the previous efforts taken by Carus to prevent releases and contain releases should they occur, the IEPA assigned a low priority to the site and recommended to the U.S. EPA that a CERCLA Screening Site Inspection be conducted "as time allows".

***CERCLA Screening Site Inspection (Carus)***

**Overview**

A CERCLA Screening Site Inspection (SSI) was conducted on 20 and 21 November 1991 by the IEPA for the Carus main plant area, which is now included in OU1. The purpose of the SSI was to: (i) collect additional data in order to perform a preliminary Hazard Ranking System (HRS) site score; (ii) establish priorities among sites most likely to qualify for the National Priorities List (NPL); and (iii) identify the most critical data requirements for any further investigation, if necessary.

The SSI report provided a summary of activities at the site, including manufacturing processes, disposal practices, and current activities. As part of the SSI, IEPA conducted limited sampling of soil, sediment, and groundwater to evaluate the chemical constituents at the site. The report also presented and discussed results of soil, sediment, and groundwater sample analyses at the Carus main plant area and at several off-site locations.

**Investigation Activities**

The scope of work conducted as part of the SSI included collection of the following samples:

- four surface soil samples (designated SSI-X102 through SSI-X105), including: (i) two samples located east of the railroad embankment, where slag and other materials had been disposed; (ii) one sample located near the southeast corner of the manufacturing area; and (iii) one sample located in the manufacturing area adjacent to a former drum and filter bag storage area;

- one background surface soil sample from Hegeler Park (designated SSI-X101), located approximately 0.5 mi northwest of the main plant area;

- five surface sediment samples (designated SSI-X203 through SSI-X207), including: (i) two samples (SSI-X205 and -206) from the south settling pond (hereinafter referred to as the holding pond); (ii) one sample (SSI-X207) from the emergency storage area; and (iii) two samples from the western bank of the Little Vermilion River (SSI-X203 and -204);

- three additional surface sediment samples from the west bank of the Little Vermilion River at locations upstream at distances ranging between approximately 0.1 mi and 0.2 mi from the northern Carus property boundary (designated SSI-X201, -202, and -208).

- groundwater samples from three on-site monitoring wells (G101, G103, and G106); and

- one groundwater sample (G112), which was selected to represent background conditions, from the LaSalle Electrical Utilities NPL Site, located approximately 1.2 mi north-northwest of the site.

Samples collected during the IEPA SSI were submitted for laboratory analysis for the suite of organic and inorganic chemical constituents contained on the U.S. EPA TCL and TAL. A discussion of the field activities and the results from the IEPA SSI are presented below.

**Investigation Results**

The SSI results are presented in Tables 6 through 10. The analytical results are summarized below.

- Soil results (Table 6) indicate that there were 21 metals detected in the soil samples collected as part of the IEPA SSI, and the concentrations of arsenic, lead, and manganese were greater than the industrial soil PRG in one or more soil samples. Note that the arsenic concentration in the background soil sample exceeded the EPA PRG for industrial soil.

- Groundwater results (Tables 7 and 8) indicate that several inorganic constituents were detected in OU1 at concentrations in excess of EPA PRGs for tap water, including aluminum, arsenic, cadmium, chromium, iron, lead (screened against MCL), manganese, vanadium, and zinc. There was also one exceedance of the SVOC bis(2-Ethylhexyl) phthalate, a plasticizer commonly introduced through sampling or analytical cross-contamination. The concentration of arsenic exceeded the EPA PRG for tap water in the background sample, as well. It was noted in previous site documents that the groundwater samples collected during the IEPA SSI were not filtered prior to laboratory analysis. Consequently, the elevated concentrations detected in excess of water quality standards may reflect influence from particulates contained within the analyzed samples.

- Sediment results for samples collected in the river (Table 9) indicate that 19 metals, cyanide, sulfate, and sulfide were detected in one or more sediment samples collected during the IEPA SSI. Cadmium, copper, cyanide, lead, mercury, nickel, and zinc were detected at concentrations exceeding one of the ecological screening criteria in one or more of the river sediment samples; cadmium was also detected at concentrations exceeding the ecological screening criterion in the background river sediment sample. Sediment results for samples collected in the holding pond and emergency storage area (Table 10) indicate that acetone, carbon disulfide, and toluene; ten SVOCs (mostly polynuclear aromatic hydrocarbons (PAHs)), one PCB, 20 metals, sulfate, and sulfide were detected in one or more sediment samples collected during the IEPA SSI. Acetone, Aroclor 1254, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenanthrene, pyrene, arsenic, cadmium, chromium, copper, lead, mercury, nickel, and zinc were detected at concentrations exceeding one of the ecological screening criteria in one or more of the holding pond/emergency storage area sediment samples.

***Preliminary Site Investigation (Carus)***

**Overview**

At the request of Carus, a Preliminary Site Investigation (PSI) was conducted by GeoSyntec at the Carus main plant area in October 1992. The objectives of the PSI were to: (i) assess chemical constituents contained within the soil, sludges, and groundwater; (ii) examine visually the subsurface materials; (iii) collect soil samples for laboratory analysis; and (iv) install additional groundwater monitoring wells. A discussion of the field activities and the results from the PSI are presented below.

**Investigation Activities**

The scope of work conducted as part of the PSI included: (i) advancement of 16 soil borings for examination of the subsurface materials and collection of soil samples for laboratory analysis; (ii) installation of two groundwater monitoring wells; (iii) collection and laboratory analysis of soil and sediment samples from the Little Vermilion River and the holding pond; (iv) collection of five unfiltered groundwater samples from the two newly installed monitoring wells and three existing wells (those sampled during the IEPA SSI in November 1991); (v) measurement of water levels in monitoring wells to evaluate groundwater flow; and (vi) performance of a single well aquifer test (slug test) in a monitoring well located within the slag-deposit area east of the railroad embankment.

Soil samples collected during the GeoSyntec PSI were extracted using EPA Method 1311, the Toxicity Characteristic Leaching Procedure (TCLP) and were analyzed for the eight RCRA metals which included: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. This method is typically used to evaluate metals mobility in a landfill environment and was commonly used in 1992 to evaluate the leaching potential of metals in a non-landfill environment as well. EPA Method 1312, the Synthetic Precipitation Leaching Procedure (SPLP), was developed in 1994 and is more commonly used today to evaluate the leaching potential of metals into groundwater and surface-water bodies.

**Investigation Results**

The PSI results are presented in Tables 8, 9, and 11. The analytical results are summarized below.

- The groundwater quality results for the two monitoring well samples (Table 8) indicated that arsenic and lead were detected at concentrations in excess of the EPA PRG and MCL, respectively, for tap water in five groundwater samples (G101, G103, G106, MW-1, and MW-2). Additionally, chromium was detected at a concentration in excess of the EPA PRG for tap water in G103 and cadmium in G106.

- The analytical results for sediment samples collected in the river during the PSI (Table 9) indicate that seven metals were detected. No inorganic constituents were detected at concentrations exceeding the ecological screening criteria in river sediment samples.

- The TCLP data (Table 11) indicate that most of these metals were either not detected or were detected at concentrations well below the EPA TCLP criteria. Two samples,

however, did indicate TCLP concentrations in excess of the regulatory limits. These include: sample B3/S1, collected from an area where sinter had been deposited, which indicated a cadmium concentration of 1.15 mg/L, which slightly exceeds the EPA TCLP limit of 1 mg/L for cadmium; and sample GW2/S1, collected from the slag deposit area, which indicated a concentration of lead of 5.21 mg/L, which slightly exceeds the TCLP limit of 5 mg/L for lead. As previously discussed, SPLP extraction would be a more appropriate method to evaluate the leaching potential of metals from the slag into the groundwater or surface-water bodies.

***November 1993 Investigation (Carus)***

**Overview**

The investigation in November of 1993 was conducted by GeoSyntec at the Carus main plant area (now a part of OU1), and the findings were presented in a report which was submitted to the IEPA in January 1994. The purposes of the investigation were to: (i) characterize the nature and extent of "hazardous substances" as defined in Section 101(14) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) in the main plant area that is now a part of OU1; (ii) provide the necessary data in order to develop cleanup objectives; and (iii) develop the data such that a phased approach can be utilized to manage particular areas of concern. The objectives of the investigation as reported in the *Proposed Work Plan for a Phase I Site Investigation - Carus Chemical Company Manufacturing Facility* were to: (i) evaluate the constituents at three locations of the site, including concentration and extent; (ii) assess the data to more accurately depict the hydrogeology; (iii) investigate and identify potential migration pathways; (iv) obtain the data necessary to develop an action plan; and (v) satisfy requirements of the Illinois Pre-Notice Site Cleanup Program.

The field activities conducted as part of the November 1993 investigation and the results are discussed below.

**Investigation Activities**

The scope of work conducted as part of the November 1993 investigation included: (i) advancement of 18 soil borings; (ii) completion of three of the soil borings as groundwater monitoring wells; (iii) performance of a water supply well exposure survey; (iv) an evaluation of existing groundwater monitoring wells; (v) slug testing; (vi) water level measurements; (vii) soil sampling and analysis; (viii) surface-water sampling and analysis; and (ix) groundwater sampling and analysis.

Based on the results of the site investigation, cross-sections illustrating the geologic profile were developed. These are presented herein as Figures 10 through 12 and were discussed in the Geology and Hydrogeology section earlier in this document. The significant results are summarized below.

**Investigation Results**

The analytical results are presented in Tables 6 through 8 and 11 and are summarized below.

- The water supply well exposure survey included the following activities: (i) interviews were conducted with various individuals who were familiar with water use in the area (including the Mayor of LaSalle, the City Engineer, and the Director of Public Works); (ii) utility system maps were reviewed; and (iii) well construction reports were evaluated. Based on the results of the water supply well exposure survey, there is little potential for human exposure to groundwater through private wells. This inference is based on the distance of the private wells from the Carus Main Plant Area (within two miles of the site, there were no known wells located within the sands and gravels of the Pleistocene drift) and the differentiation between the hydrostratigraphic units that supply the private wells from those of the OU1 flow system. Specifically, private wells are supplied by water withdrawn from sands and gravels within the Pleistocene drift. While generally regionally extensive, it is largely absent from OU1 due to post-Pleistocene erosion, with the exception of an isolated remnant present in the northeastern corner of the Carus main plant area. The only areally extensive unconsolidated medium at the Carus plant is residuum developed from the weathering of exposed Pennsylvanian bedrock; aquifer hydraulic testing demonstrated that the hydraulic conductivity of the residuum is two orders of magnitude less than that of the Pleistocene deposits. Hence, it is unlikely to serve as a significant transport mechanism toward private wells.

- The laboratory results for soil samples collected during the investigation (Table 6) reveal elevated concentrations of inorganic constituents at some sample locations, primarily for samples collected from areas containing slag, sinter, and other industrial by-products associated with past M&H operations. Aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, thallium, vanadium, zinc, sulfate, and sulfide were detected in these samples. The However, only two metals exceeded their corresponding PRGs: arsenic, which was similar in magnitude to the SSI background value (SSI-X101), but which exceeded the PRG in all but one sample, and lead, which exceeded its PRG in one

sample, the surface sample from boring C-11, Samples collected from fill materials containing slag, such as the sample from 10 ft at C-11 and 7 ft at C-9, indicated elevated concentrations of cadmium, lead, zinc, and sulfate compared to concentrations detected in native geologic materials. It is evident from the data presented in Table 6 that the elevated concentrations detected are comparable to those detected in surface soil and sediment samples collected during the IEPA SSI.

- TCLP results of soil and slag samples (Table 11) indicate that none of the samples analyzed contained detectable quantities of metals at concentrations in excess of U.S. EPA regulatory limits. However, relatively high concentrations of cadmium were detected in the extract from the surface samples collected from C-11 and G-04, which had cadmium concentrations of 445 μg/L and 883 μg/L, respectively. Both of the samples were collected from modern fill materials. Sinter materials were observed near the surface at C-11 and reworked shale was observed in surface soil at G-04. Elevated concentrations of lead and zinc were also detected for samples collected from slag deposits at C-9 and C-11, but did not exceed the screening criteria. As noted before, SPLP extraction is a more appropriate method to evaluate leaching potential for metals from the slag.

- Groundwater results (Tables 7 and 8) indicate that eight inorganic constituents (arsenic, cadmium, copper, iron, lead, manganese, vanadium, and zinc), naphthalene, and BTEX constituents were detected at concentrations exceeding screening criteria. Petroleum and/or petroleum constituents were observed in the soil and groundwater samples from Monitoring Well G-04 (located along the northern property boundary between Carus and M&H within the main plant area). At the time of the investigation, the petroleum appeared to be fresh diesel fuel or light fuel oil and were limited to the extreme northeast corner of the main plant area (in monitoring well G-04). These elevated concentrations were suspected to result from surface-water runoff of spillage from a former nearby tank located on the M&H property adjacent to the property line. The tank was removed by others and is no longer a suspected source.

- The water quality data suggest that groundwater impacts from sulfate occur throughout the main plant. Sulfate concentrations range from 610 to 1,520 mg/L. The most likely source of this sulfate is the mineral gypsum (hydrous calcium sulfate, CaS04*2H20) in the calcareous green shales. Euhedral crystals of gypsum were observed in Soil Boring C-11 at a depth of about 26 ft. Microcrystalline gypsum may also be the form of much of the calcium in the calcareous green shales. It should be noted that the surface-water

sample collected near the NPDES outfall pipe indicated sulfate concentrations of 226 mg/L, which is less than the groundwater sulfate concentrations.

- GeoSyntec collected a surface-water sample from the holding pond near the top of the pipe which discharged water to the Little Vermillion River (Table 8). The discharge represented the point of compliance for the Carus NPDES permit. The drainage at the site is designed to discharge surface water and cooling water into the holding pond located at the southeastern edge of the site. NPDES sample results indicate relatively low concentrations of the chemical constituents analyzed. Overall, concentrations for metals and sulfate are much less than those detected in groundwater samples collected from Monitoring Well MW2, located adjacent to the outfall pipe.

***1994 Investigation (Carus)***

**Overview**

GeoSyntec continued its investigation in 1994, and the findings were presented in a report which was submitted to the IEPA in January 1996. The purposes of this investigation were to: (i) characterize the nature and extent of chemical constituents in the portion of the slag pile in OU1 on Carus property; (ii) evaluate the impacts on groundwater and the Little Vermilion River; (iii) identify the potential sources of any such impacts; and (iv) satisfy the requirements of the Pre-Notice Program. The results of this investigation were intended for use in establishing risk-based cleanup levels and to evaluate possible remedial alternatives consistent with applicable standards under CERCLA. To accomplish these purposes, the investigation had the following objectives: (i) to characterize the nature and extent of suspected "hazardous substances", as defined in Section 101(14) of CERCLA, and as previously identified by the IEPA; (ii) to determine the relationship between various industrial deposits (e.g., slag) and suspected "hazardous substances"; (iii) to determine the relationship between the industrial deposits and water resources for the area; and (iv) to perform all work in accordance with applicable U.S. EPA and IEPA standards.

The field activities conducted as part of the 1994 investigation and the results are discussed below.

**Investigation Activities**

The scope of work included: (i) a site inspection; (ii) evaluation of the holding pond; (iii) meteorological assessments; (iv) surface-water sampling in the Little Vermilion River and

analysis; (v) sediment sampling in the Little Vermilion River and analysis; (vi) advancement of 18 soil borings, and soil sampling and analysis, principally in the slag pile; (vii) installation of 10 piezometers; (viii) water-level measurements; (ix) slug and pump tests; and (x) groundwater sampling and analysis.

**Investigation Results**

The investigation results are presented in Tables 6 through 8 and 11 through 16. The analytical results are summarized below.

- The cross-sections developed based on subsurface investigations show that the aquifer in the slag pile area is isolated from the shallow perched groundwater in the main plant area by several tens of feet of low-permeability shale. The aquifer in the slag pile area is wholly within the alluvium of the Little Vermilion River and the overlying fill materials, as shown in Figure 10. Both the shallow perched groundwater in the main plant area and the aquifer in the river alluvium in the slag pile area are isolated from the first significant aquifer in the St. Peter Sandstone, which occurs at a depth of more than 1,000 ft below the Little Vermilion River.

- The aquifer in the slag pile area is confined to the alluvium of the Little Vermilion River and the overlying fill material, and is isolated from the deep aquifer by more than 1,000 ft of alternating layers of low-permeability shales and limestones. The aquifer in the slag pile area is also separate and distinct from the shallow perched groundwater in the main plant area, and from groundwater in the main plant (upland) area of the former M&H properties.

- Slag from the former M&H smelter covers approximately six acres in OU1. TCLP analyses of samples from the slag pile in the investigation area exceeded TCLP limits for cadmium and lead at a few boring locations (P-15A, P-17, and P-19). In addition, while zinc does not have a regulatory TCLP limit, it was detected in elevated concentrations (1-660 mg/L.) However, as noted earlier, the TCLP method, selected because the work predated the development of the SPLP method, may be unrepresentative of typical geochemical conditions. Hence, the results are considered in the context a general evaluation of leachability potential.

- The impact to soil of the most concern is elevated concentrations of lead in five samples, as shown in Table 6. The analytical results for total lead were in excess of the Industrial PRG screening value. Additionally, chromium, iron, and manganese were detected at

concentrations greater than corresponding screening criteria in one soil sampling location each.

- Groundwater results (Tables 7 and 8) indicate that cadmium, iron, lead, manganese, nickel, and zinc were present at concentrations in excess of screening criteria. Overall, the results for MW-1 and MW-2 were lower than previous results. Generally, the investigation results for G-04 revealed higher BTEX concentrations than those detected in the November 1993 investigation. The concentration of benzene and xylenes remained in excess of screening criteria.

- Piezometers P-1 and P-18 had the most constituents in excess of screening, including cadmium, iron, manganese, nickel, and zinc. The highest concentrations of cadmium (2.22 mg/L) and zinc (831 mg/L) were detected in Piezometer P-1, which had a pH of 4.3.

- Sediment results are presented for river sediment samples (Table 12) and holding pond sediment samples (Tables 13 through 15). The river sediment results indicate concentrations of cadmium, lead, mercury, nickel, and zinc at concentrations in excess of at least one of the ecological screening criteria; however, no TCLP criteria are exceeded. Pond line samples consistently exceeded ecological screening criteria for cadmium, chromium, lead, mercury, nickel, and zinc, but did not exhibit TCLP exceedances for metals or TCLP detections for PAHs.

- Surface-water samples were obtained at several locations in the Little Vermilion River (Table 16). Several constituents were detected at concentrations in excess of ecological screening criteria, including iron, lead, mercury, zinc, and cyanide.

***CERCLA Preliminary Assessment Report (M&H Zinc Company Site, November, 1993)***

The CERCLA Preliminary Assessment Report was prepared by the IEPA in 1994 following the CERCLA Site Screening Inspection of the Carus Site conducted in November 1991, at which IEPA noted large piles of slag material. A CERCLA site reconnaissance visit was conducted by the IEPA on 29 and 30 July and 18 August 1993. The report provided an operational and regulatory history of the M&H Zinc Company and summarized the findings of the site visit. Groundwater, surface water, air, and soil migration pathways were discussed. No environmental samples were collected during this effort.

***CERCLA Integrated Site Assessment (M&H Zinc Company, Undated)***

**Overview**

The CERCLA Integrated Site Assessment was conducted on 14 and 15 December 1993 by IEPA to "help characterize the nature of sources, and to determine if these sources had impacted nearby human populations or the environment".

**Investigation Activities**

The IEPA sampling team collected four sediment samples from the Little Vermilion River and eight soil samples. The samples were analyzed for organic and inorganic constituents included on the Target Compound List and Target Analyte List (TCL/TAL). Of the eight soil samples, three were collected from the slag pile (ISA-X105, ISA-X105, and ISA-X106) located within OU1. In addition, thirteen soil samples were collected off-site at residences near the site. These soil samples were analyzed for the TAL. While additional soil samples were collected in the M&H upland area as well as the La Salle community, these samples are not deemed relevant to OU1. Hence, this report only addresses in detail the river sediment samples and the three soil samples collected from the slag pile.

**Investigation Results**

One of the evaluation steps performed by IEPA during its ISA entailed screening data against removal action levels (RALs) to determine the need for an expedited removal action. The source or derivation of the RALs is not provided in the report. The analytical results indicated that some constituents were present at concentrations in excess of RALs, including pentachlorophenol (only detected above the RAL in one sample located on OU2), arsenic, cadmium, and lead. Overall, however, the report concludes that the M&H Zinc Company Site does not pose enough of a threat to human health or the environment to warrant a time-critical CERCLA removal action.

For the purposes of this Technical Letter Report, the soil and sediment data were screened against updated screening values used elsewhere in this report, i.e., Region IX PRGs and ecological screening values provided by Region V. It was determined that soil concentrations in the three slag pile samples exceeded industrial PRGs for arsenic and lead. In addition, the sediment samples exhibited exceedances of sediment screening values for arsenic, cadmium, copper, lead, mercury, nickel, zinc, and cyanide.

**DATA USABILITY**

The IEPA did not provide data validation reports for the CERCLA Preliminary Assessment and SSI. As such, GeoSyntec cannot opine as to the usability of the data provided by IEPA. Both of these efforts were performed as screening-level assessments.

Data analyses for the 1992 PSI were performed by National Environmental Testing (NET) Midwest, Inc. out of Rockford, Illinois (NET's Quality Assurance Plan is provided electronically on enclosed disk). This investigation was performed as a screening-level assessment; therefore, no data validation was conducted.

Data analyses for the 1993 investigation were performed by the Applied Research & Development Laboratory (ARDL) out of Mt. Vernon, Illinois (analytical reports are provided electronically on enclosed disk). Contract Laboratory Program (CLP) deliverables were provided by the laboratory (included electronically on the enclosed disk). Available data validation reports are provided on the enclosed disk. These data validation reports indicate that the laboratory data package is acceptable.

Data analyses for the 1994 investigation were performed by ARDL (analytical reports are provided electronically on enclosed disk). CLP deliverables were provided by the laboratory. Independent data validation was performed by the Analytics Division of Roy F. Weston of West Chester, Pennsylvania. Overall, the quality of the data generated by ARDL was good and the data is useable; however, some of the results were qualified due to exceeding QC limits, artifacts of laboratory contamination, etc. These qualifications were limited and are explained in detail in the data validation report (provided electronically on enclosed disk). Validation of organic data was performed according to the guidelines set forth in U.S. EPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

- data completeness;
- technical holding time;
- GC/MS instrument performance check;
- calibration (initial and continuing);
- blanks;
- system monitoring compound and surrogate recoveries;
- matrix spike/matrix spike duplicate;
- field duplicate precision;
- internal standard performance;
- pesticide instrument performance;
- compound identification; and

- compound quantitations.

Validation of inorganic data was performed using the quality assurance guidelines set forth in Inorganic Functional Guidelines. The validation included a rigorous review of the following criteria:

- technical holding time;
- calibration;
- contract required detection limit samples;
- blank samples;
- interference check samples;
- matrix spike/matrix spike duplicate
- duplicate digestion sample analyses;
- laboratory control sample;
- serial dilution sample;
- graphite furnace;
- quarterly verification of instrument parameters;
- preparation logs;
- run logs; and
- data completeness.

**SUMMARY**

The following conclusions are based on all the results of all the investigations conducted to date on OU1:

- Slag material associated with past smelting operations (M&H Zinc Company) was placed within the Little Vermilion River Valley and encroaches upon and has changed the course of the Little Vermilion River. The M&H Zinc Company generated and placed these materials prior to acquisition of the property by Carus.
- Slag material (and groundwater within the slag) is likely to be at least partially in direct contact with the surface water in the Little Vermilion River. The groundwater within the slag discharges to the Little Vermilion River.
- Groundwater within the slag and the alluvium of the Little Vermilion River is isolated from the deeper aquifer by more than 1,000 ft of alternating layers of low permeability shales and limestones. This groundwater is distinct from the shallow perched groundwater in the Carus manufacturing area.

- The sinter and slag areas are the primary sources of chemical constituents in the environment at OU1.
- Impacts to soils located within OU1 may include arsenic, chromium, iron, lead, and manganese (based on totals data), as well as zinc and cadmium (based on TCLP data).
- The sinter and slag source areas appear to have had only a very minor impact on groundwater at the site due to the low leaching potential and immobility of the constituents bound in the sinter/slag matrix. The sand and gravel aquifer below the site has only been minimally affected.
- Relatively minor impacts to groundwater quality with respect to screening criteria have been detected in monitoring wells screened within the slag pile. These impacts primarily include aluminum, arsenic, cadmium, chromium, iron, lead, manganese, nickel, and zinc. These elevated concentrations may be associated with turbidity of groundwater samples, and may not reflect the mobility of the constituents in groundwater.
- An isolated area of elevated levels of BTEX constituents in groundwater was identified (November 1993) in the extreme northeast corner of the Carus main plant area. These impacts were apparently due to surface water runoff from tank spillage on the M&H Zinc Company Site.
- Elevated levels of metals are present within the slag. The site is located in a low-traffic area and site access is controlled by fencing and weekend patrols by off-duty police officers.
- Elevated levels of organics and metals were measured within at least one of the two sediment samples collected from the holding pond. Results for these samples were evaluated with respect to ecological screening criteria. Impacts to sediment include elevated levels of arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, acetone, anthracene, arochlor 1254, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenanthrene, and pyrene.
- Elevated levels of metals were measured within some of the surface-water and sediment samples collected from the Little Vermilion River. Results for samples collected in the river were evaluated with respect to ecological screening criteria. Impacts to sediment include elevated levels of arsenic, cadmium, copper, cyanide, lead, mercury, nickel, and zinc. Impacts to surface water include elevated levels of cyanide, iron, lead, mercury,

and zinc. The types of metals observed and the concentrations may indicate potential impacts from the presence of slag.

## IDENTIFICATION OF DATA GAPS

A significant amount of data has been generated in the environmental investigations conducted at the site to date. These investigations include the Preliminary Site Investigation, the November 1993 investigation, and the 1994 investigation. Based on GeoSyntec's review of data from these investigations, as well as other site documents, additional multi-media sampling is recommended to more fully characterize impacts to site media due to historical operations. We have identified a number of data gaps that will be developed and presented in the RI/FS Work Plan. The following general tasks are being contemplated to address potential data gaps.

- Further characterization of slag materials, including: (i) SPLP or Sequential Extraction Procedure (SEP) analyses to evaluate leaching potential; (ii) geochemical data (analysis of samples for cation and/or anion exchange capacity; and field measurement of pH and redox conditions); (iii) analytical chemistry; and (iv) configuration of the slag pile (vertical and lateral delineation).
- Geotechnical characterization of the slag pile to evaluate present slope stability, as well as the potential for future site management options.
- Collection of co-located soil/slag and groundwater samples within and in the vicinity of the slag piles.
- Collection of groundwater information necessary for geochemical modeling allowing GeoSyntec to conduct portions of the RI and FS phases of the project concurrently by including analytical procedures in the investigation that can be used to evaluate feasibility of treatment options. The groundwater/geochemical model can be used for sensitivity analysis necessary to develop conceptual groundwater treatment ideas.
- Collection of strategically located samples to support representative exposure point concentration (EPC) estimates for human and ecological receptors, and to support the development of engineering and/or institutional controls, if necessary.
- Detailed characterization of ecological habitat in the vicinity of the site, including terrestrial, riparian, and aquatic systems. A key component of this ecological characterization will address the Little Vermilion River. This characterization

component will address such aspects as sediment deposition patterns, sediment and surface water quality, and community assessments.

**CLOSURE**

We look forward to meeting with you to discuss the information summarized herein and the applicability of existing site data to the RI/FS process at the site. Please contact representatives of Carus or either of the undersigned if you have any questions about the information provided in this document or would like to discuss any other site issues.

Sincerely,

Peter J. de Haven, P.E.
Senior Hydrogeologist

Nandra D. Weeks, P.E.
Principal/Project Manager

Attachments

TABLES

Table 1. Summary of Soil Characteristics in Soil Borings
Carus Chemical Company

| Boring Identification | Depth (ft) | Investigation Phase | Soil Nature | Grain Size | Dry/Moist/Wet |
|---|---|---|---|---|---|
| G-03 | 5 | 1993 Investigation | weathered green shale | clay | NA |
| G-03 | 15 | 1993 Investigation | red shale | clay | NA |
| C-9 | 0 | 1993 Investigation | limestone, road pavement | sandy gravel | NA |
| C-9 | 7 | 1993 Investigation | slag | silty sandy gravel | NA |
| C-11 | 0 | 1993 Investigation | limestone, road pavement | sandy gravel | NA |
| C-11 | 10 | 1993 Investigation | slag | silty sandy gravel | NA |
| C-11 | 15 | 1993 Investigation | shale | clay | NA |
| C-8 | 0 | 1993 Investigation | lagoon liner | gravelly clay | NA |
| C-5 | 3 | 1993 Investigation | pleistocene clay | clay | NA |
| C-10 | 0 | 1993 Investigation | limestone, road pavement | sandy gravel | NA |
| C-10 | 7 | 1993 Investigation | reworked shale | clay | NA |
| P-1 | 21 | 1994 Investigation | red shale and slag | clayey sand, some gravel | dry |
| P-1 | 80 | 1994 Investigation | slag | sandy gravel | dry |
| P-2 | 19 | 1994 Investigation | organic soil in slag | sandy silty clay | moist |
| P-2 / P-2 DP | 42 | 1994 Investigation | shaley sand in slag | silty sand | dry |
| P-15A | 20 | 1994 Investigation | slag | silty sandy gravel | dry |
| P-17 | 10 | 1994 Investigation | slag | silty sandy gravel | dry |
| P-17 | 42 | 1994 Investigation | recent alluvium | gravelly sand | wet |
| P-18 | 39 | 1994 Investigation | slag | gravelly silty sand | dry |
| P-19 | 20 | 1994 Investigation | clay and slag | gravel to sand | dry |
| P-19 | 42 | 1994 Investigation | slag | grayish red sand | dry |
| P-21 | 2 5 | 1994 Investigation | slag | sandy clayey silt | dry |
| P-21 | 21 | 1994 Investigation | slag | gravelly sand | dry |
| P-21 | 41 | 1994 Investigation | slag | gravelly sand | dry |
| P-21 | 60 | 1994 Investigation | slag | gravelly sand | dry |
| P-22 | 41 | 1994 Investigation | slag | gravelly sand | dry |
| P-22 | 106 | 1994 Investigation | alluvium | clayey gravel | wet |

Notes.
1 DP indicates duplicate sample

Table 2. Summary of Hydraulic Conductivity Data
Carus Chemical Company

| Well/ Piezometer | Hydraulic Conductivity | | Remarks |
|---|---|---|---|
| | (cm/sec) | (ft/min) | |
| P-6 | $1.6 \times 10^{-4}$ | $3.2 \times 10^{-4}$ | Slug Test |
| P-7 | $9.5 \times 10^{-5}$ | $1.9 \times 10^{-4}$ | Slug Test |
| P-9 | $5.0 \times 10^{-4}$ | $1.0 \times 10^{-3}$ | Slug Test |
| P-15 | $4.6 \times 10^{-6}$ | $9.1 \times 10^{-5}$ | Slug Test |
| P-17 | $\sim 5 \times 10^{-3}$ | $\sim 1 \times 10^{-2}$ | Pump Test |
| P-18 | $2.2 \times 10^{-2}$ | $4.3 \times 10^{-2}$ | Slug test |
| P-18 | $\sim 4 \times 10^{-2}$ | $8 \times 10^{-2}$ | Pump Test |
| MW-1 | $\sim 2 \times 10^{-1}$ | $\sim 4 \times 10^{-1}$ | Pump Test |
| MW-1 | $*5.7 \times 10^{-2}$ | $*1.1 \times 10^{-1}$ | Slug Test |
| MW-2 | $\sim 7 \times 10^{-3}$ | $1 \times 10^{-2}$ | Pump Test |
| G-02 | $4.0 \times 10^{-6}$ | $7.9 \times 10^{-5}$ | Slug Test |
| G-04 | $2.7 \times 10^{-3}$ | $5.4 \times 10^{-3}$ | Slug Test |
| G-05 | $2.0 \times 10^{-3}$ | $4.0 \times 10^{-3}$ | Slug Test |

Notes:

1. Slug tests and pump tests were performed during the 1994 Investigation Investigation following groundwater sampling. Slug test data were analyzed using the Bouwer and Rice model. Pump test data were analyzed using the Theis equation.
2. "*" indicates a second set of data for the same well.

Table 3. Summary of Fieldwork Completed to Date at the Site
Carus Chemical Company

| Work Element | Screening Site Inspection (IEPA) | Preliminary Site Investigation (Geosyntec) | Integrated Site Assessment (IEPA)[2] | 1993 Investigation (Geosyntec) | 1994 Investigation (Geosyntec) | Total |
|---|---|---|---|---|---|---|
| Soil/Slag Sampling Locations | 5 | 5 | 3 | 9 | 9 | 31 |
| Surface Soil/Slag/Ash Samples[1] | 5 | 6 | 3 | 17 | 17 | 48 |
| Groundwater Samples | 4 | 5 | | 8 | 11 | 28 |
| River Sediment Samples | 5 | 3 | 5 | | 3 | 16 |
| River/Discharge/Cooling Water Samples | | | | 2 | 3 | 5 |
| Holding Pond/Emergency Storage Area Sediment Samples | 3 | | | | 3 | 6 |

Notes
1 Includes samples obtained for chemical analysis A larger number of samples may have been obtained for visual description and classification
2 Only ISA samples deemed relevant to OU1 included.
3 Numbers do not include samples obtained for quality control purposes

Table 4 Summary Information for Borings and Piezometers
Carus Chemical Company

| Boring/Piezometer | | Total Depth (ft, BLS) | Screened Interval (ft, BLS) | | Depth to Water (ft, BLS) |
|---|---|---|---|---|---|
| | | | Top | Bottom | |
| P-1 | Piezometer | 90 0 | 78.0 | 88 0 | 81 9 |
| P-2 | Boring | 72.0 | - | - | dry |
| P-3 | Boring | 15.5 | - | - | dry |
| P-4 | Boring | 12 1 | - | - | dry |
| P-6 | Piezometer | 25.5 | 9.0 | 24 0 | 18 0 |
| P-7 | Piezometer | 22.7 | 10 0 | 20 0 | 13 2 |
| P-9 | Piezometer | 12 0 | 5 0 | 10 0 | 6 2 |
| P-10 | Boring | 7 5 | - | - | dry |
| P-11 | Boring | 13 0 | - | - | dry |
| P-12 | Boring | 5 0 | - | - | dry |
| P-15 | Piezometer | 45.5 | 35 0 | 40 0 | 23.9 |
| P-15A | Piezometer | 25 0 | 20.0 | 25.0 | 20 9 |
| P-17 | Piezometer | 55 0 | 38.0 | 48.0 | 29 5 |
| P-18 | Piezometer | 62 0 | 50.0 | 60 0 | 45.4 |
| P-19 | Piezometer | 61 0 | 43 0 | 53 0 | 50.1 |
| P-20 | Piezometer | 21 5 | 11 0 | 21 0 | dry |
| P-21 | Boring | 77.0 | - | - | dry |
| P-22 | Boring | 121 0 | - | - | 90 0 |

Notes

1 All borings from the 1994 Investigation have the prefix "P". Piezometers have the same designation as the borings in which they were installed "Piezometer" in the column to the right of the Piezometer name indicates that a piezometer was installed. "Boring" indicates that the borehole was plugged and abandoned.

2 ft, BLS indicates feet below land surface

3 "-" indicates not applicable

Table 5. Completion Elevations of 1993 and 1994 Investigation
Piezometers and Monitoring Wells
Carus Chemical Company

| Well | TOC Elevation (ft, MSL) | TOC Height Above Ground (ft) | Ground Elevation (ft, MSL) |
|---|---|---|---|
| G-101 | 575 95 | 2 27 | 573 71 |
| G-103 | 574 57 | 1 87 | 572.70 |
| G-106 | 573.23 | 1 71 | 571 52 |
| G-02 | 568 39 | 2.70 | 565 69 |
| G-04 | 575.30 | 2 67 | 572 63 |
| G-05 | 577 47 | 2.58 | 574 89 |
| MW-1 | 572 27 | 2.48 | 569 78 |
| MW-2 | 489 08 | 0.00 | 489 08 |
| P-1 | 548.81 | 1.86 | 546.95 |
| P-6 | 573.95 | 2.64 | 571 31 |
| P-7 | 545 21 | 2 66 | 542 55 |
| P-9 | 534 53 | 2 67 | 531 86 |
| P-15 | 491 78 | 2 57 | 489 21 |
| P-15A | 492 02 | 2 80 | 489 22 |
| P-17 | 490 40 | 2 69 | 487 71 |
| P-18 | 508.49 | 2.64 | 505.85 |
| P-19 | 514 54 | 2.64 | 511.90 |
| P-20 | 545 97 | 2 78 | 543 19 |

Notes:
1 TOC = top of well casing
2 ft, MSL = feet above mean sea level

Table 6 Inorganic Analytical Results for Detected Parameters - Soil Samples
Carus Chemical Company

| Boring Identification | Depth (ft) / Description | Matrix | Investigation Phase | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Region 9 PRGs, Residential Soil (mg/kg)** | **76,000** | **31** | **0.39** | **5,400** | **150** | **37** | **NC** | **30** | **900** | **3,100** | **23,000** |
| | | | **Region 9 PRGs, Industrial Soil (mg/kg)** | **100,000** | **410** | **1.60** | **67,000** | **1,900** | **450** | **NC** | **64** | **1,900** | **41,000** | **100,000** |
| SSI-X101 | 0 33 / Background | Soil (Assumed) | IEPA SSI | 17,600 | 5 5 U | **5.2** | 148 | 1 1 | 13 | 4,600 J | 30 | 14 | 29 | 18,700 J |
| SSI-X102 | 0 / Drum/Filter Bag Storage Area | Soil (Assumed) | IEPA SSI | ND | NA | ND | ND | NA | ND | 64,400 | NA | NA | 409 | NA |
| SSI-X103 | 0 5 / N Fence/E of Property | Slag | IEPA SSI | 9,360 | 30 | **245** | 820 | 1 6 | 41 | 32,200 | 47 | 3 6 | 278 | 40,000 |
| SSI-X104 | 0 5 / West Bank of LVR | Slag | IEPA SSI | 13,600 | 4 8 U | **21 J** | 259 | 1 5 | 71 | 12,400 | 35 | 14 | 417 | 29,400 |
| SSI-X105 | 0 67 / SE Corner of Carus Facility | Soil (Assumed) | IEPA SSI | 10,900 | 5 5 U | **27 J** | 159 | 0 88 J | 11 | 48,900 J | 25 | 21 | 42 | 18,800 J |
| ISA-X104 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 35,300 | NA | **22** | 169 | 1 6 | 36 | ND | 43 | ND | 906 | ND |
| ISA-X105 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 22,700 | NA | **65** | 410 | 13 | 60 | 33,400 | 32 | 46 | 429 | ND |
| ISA-X106 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 14,100 | NA | **110** | 191 | 1 7 | 181 | 50,700 | 28 | ND | 4,340 | ND |
| C-10 | 0 | Road Gravel | 1993 Investigation | 12,400 | 6 1 U | **12 J** | 190 | 0 97 J | 9 8 | 36,400 | 44 | 15 | 59 | 20,000 |
| C-10 | 7 | Sinter | 1993 Investigation | 12,900 | 6 1 U | **3.0 J** | 107 | 0 88 J | 8 4 | 38,600 | 21 | 15 | 39 | 18,700 |
| C-11 | 0 | Road Gravel | 1993 Investigation | 4,580 | 5 6 U | **21** | 217 | 0 76 J | 38 | 16,300 | 22 | 16 | 232 | 59,100 |
| C-11 | 10 | Slag | 1993 Investigation | 23,100 | 5 5 U | **6.7 J** | 80 | 2 9 | 2 4 | 25,500 | 6 1 | 3 5 J | 27 | 9,980 |
| C-11 | 15 | Shale | 1993 Investigation | 14,600 | 6 1 U | **2.8 J** | 59 | 1 1 J | 21 | 103,000 | 40 | 16 | 30 | 18,600 |
| C-5 | 3 | Fill | 1993 Investigation | 9,560 | 5 9 U | **2.3 J** | 53 | 0 66 J | 2 7 | 56,700 J | 14 | 9 5 J | 20 | 16,400 |
| C-8 | 0 | Fill | 1993 Investigation | 5,330 | 5 6 U | **5.4 J** | 26 | 0 34 J | 0 90 U | 66,200 J | 9 8 | 8 5 J | 17 | 16,700 |
| C-9 | 0 | Road Gravel | 1993 Investigation | 9,260 | 5 6 U | **3.3 J** | 29 | 0 54 J | 0 90 U | 62,300 | 17 | 12 | 13 | 14,300 |
| C-9 | 7 | Slag | 1993 Investigation | 11,600 | 5 7 U | **8.2 J** | 82 | 2 4 | 8 3 | 20,200 | 23 | 6 9 J | 54 | 41,000 |
| G-03 | 5 | Shale | 1993 Investigation | 15,000 | 5 8 U | **4.0 J** | 179 | 1 1 J | 0 93 U | 38,100 | 27 | 11 J | 47 | 25,700 |
| G-03 | 15 | Shale | 1993 Investigation | 10,900 | 5 3 U | 1 1 U | 20 | 0 57 | 0 97 | 78,800 | 23 | 8 2 J | 12 | 8 2 |
| SSI-X101 | 0 / Background | Soil (Assumed) | 1994 Investigation | NA | NA | NA | 127 | NA | 22 | NA | 22 | NA | NA | 39,500 |
| P-1 | 21 | Slag | 1994 Investigation | NA | NA | NA | 161 | NA | 1.9 | NA | 6 3 | NA | NA | 14,100 J |
| P-1 | 80 | Slag | 1994 Investigation | NA | NA | NA | 55 | NA | 9 5 | NA | 13 | NA | NA | 24,500 J |
| P-15A | 20 | Slag | 1994 Investigation | NA | NA | NA | 258 | NA | 50 | NA | 37 | NA | NA | 33,000 |
| P-17 | 10 | Slag | 1994 Investigation | NA | NA | NA | 236 | NA | 52 | NA | **98** | NA | NA | 55,800 |
| P-17 | 42 | Alluvium | 1994 Investigation | NA | NA | NA | 189 | NA | 45 | NA | 12 | NA | NA | 60,300 |
| P-18 | 39 | Slag | 1994 Investigation | NA | NA | NA | 608 | NA | 23 | NA | 22 | NA | NA | 54,900 |
| P-19 | 20 | Slag | 1994 Investigation | NA | NA | NA | 50 | NA | 6 1 | NA | 6 7 | NA | NA | 10,600 |
| P-19 | 42 | Slag | 1994 Investigation | NA | NA | NA | 17 J | NA | 15 | NA | 22 | NA | NA | 55,700 |
| P-2 | 19 | Slag | 1994 Investigation | NA | NA | NA | 152 | NA | 228 | NA | 19 | NA | NA | 35,100 J |
| P-2 | 42 | Slag | 1994 Investigation | NA | NA | NA | 85 | NA | 8 4 | NA | 27 | NA | NA | 97,800 J |
| P-21 | 2 5 | Slag | 1994 Investigation | NA | NA | NA | 471 | NA | 6 3 | NA | 4 0 | NA | NA | 60,800 J |
| P-21 | 21 | Slag | 1994 Investigation | NA | NA | NA | 124 | NA | 2 1 | NA | 41 | NA | NA | **209,000** |
| P-21 | 41 | Slag | 1994 Investigation | NA | NA | NA | 117 | NA | 4 6 | NA | 2 8 | NA | NA | 7,920 |
| P-21 | 60 | Slag | 1994 Investigation | NA | NA | NA | 65 | NA | 18 | NA | 4 1 | NA | NA | 5,240 |
| P-22 | 41 | Slag | 1994 Investigation | NA | NA | NA | 136 | NA | 2 6 | NA | 8 6 | NA | NA | 26,900 J |
| P-22 | 106 | Alluvium | 1994 Investigation | NA | NA | NA | 32 J | NA | 7 2 | NA | 8 7 | NA | NA | 39,700 J |

Notes
1 Results are presented in mg/kg
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7 Shaded cells with bold text indicate concentrations in exceedance of industrial screening criteria

Table 6 Inorganic Analytical Results for Detected Parameters - Soil Samples
Carus Chemical Company

| Boring Identification | Depth (ft) / Description | Matrix | Investigation Phase | Lead | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Region 9 PRGs, Residential Soil (mg/kg)** | **400** | **NC** | **1,800** | **23** | **1,600** | **NC** | **390** | **390** | **NC** | **NC** | **78** |
| | | | **Region 9 PRGs, Industrial Soil (mg/kg)** | **800** | **NC** | **19,000** | **310** | **20,000** | **NC** | **5100** | **5,100** | **NC** | **NC** | **1,000** |
| SSI-X101 | 0 33 / Background | Soil (Assumed) | IEPA SSI | 138 | 2,580 | 934 J | 0 095 U | 14 | 6,060 | 4 4 UJ | 2 0 U | 7,600 | 0 66 U | 40 |
| SSI-X102 | 0 / Drum/Filter Bag Storage Area | Soil (Assumed) | IEPA SSI | ND | 35,600 | **118,000** | ND | 45 | ND | NA | 21 | NA | NA | NA |
| SSI-X103 | 0.5 / N Fence/E of Property | Slag | IEPA SSI | **38,700** | 1,220 | 287 J | 0 074 U | 4 0 J | 5,090 | 4 4 UJ | 2 0 U | 916 J | 0 66 U | 34 |
| SSI-X104 | 0 5 / West Bank of LVR | Slag | IEPA SSI | 730 | 1,520 | 2,510 J | 1 3 | 39 | 1,380 | 4 1 U | 1 7 U | 815 J | 0 62 U | 28 |
| SSI-X105 | 0 67 / SE Corner of Carus Facility | Soil (Assumed) | IEPA SSI | 324 | 19,700 | 10,500 J | 0.19 | 38 | 13,500 | 4 5 UJ | 2 0 U | 5,670 | 0 67 U | 16 |
| ISA-X104 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | **905** | NA | ND | ND | ND | 8,100 | 18 | ND | 1,440 | 0 72 J | ND |
| ISA-X105 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 342 | NA | 5,450 | 1 4 | 105 | ND | ND | ND | 1,190 | ND | 110 |
| ISA-X106 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | **1,370** | NA | 1,290 | 2 1 | 119 | ND | 28 | 18 | 790 J | 0 98 J | ND |
| C-10 | 0 | Road Gravel | 1993 Investigation | 190 | 10,100 | 3,980 | 0 76 | 37 | 4,670 | 3 5 J | 1 2 U | 572 J | 0 24 U | 20 |
| C-10 | 7 | Sinter | 1993 Investigation | 225 | 6,580 | 1,350 | 0.12 U | 37 | 3,010 | 0 25 U | 1 2 U | 356 J | 0 25 U | 16 |
| C-11 | 0 | Road Gravel | 1993 Investigation | **3,660** | 5,190 | 1,480 | 1 8 | 22 | 1,470 | 2 4 J | 1 1 U | 334 J | 0 25 J | 28 |
| C-11 | 10 | Slag | 1993 Investigation | 77 | 2,390 | 122 | 0.11 U | 7.2 | 572 J | 1 1 U | 1 1 U | 1,130 | 0 22 U | 27 |
| C-11 | 15 | Shale | 1993 Investigation | 510 | 1,080 | 1,440 | 0.12 U | 49 | 2,570 | 1 2 U | 1 2 U | 591 J | 0 24 U | 28 |
| C-5 | 3 | Fill | 1993 Investigation | 19 | 12,400 | 600 | 0 11 UJ | 29 | 2,210 | 0 24 U | 1.2 U | 213 U | 0 24 U | 12 |
| C-8 | 0 | Fill | 1993 Investigation | 15 J | 36,300 | 395 J | 0 11 U | 22 | 1,250 | 0 23 U | 1 1 U | 203 U | 0 24 J | 11 J |
| C-9 | 0 | Road Gravel | 1993 Investigation | 6 2 | 12,000 | 1,530 | 0 11 U | 30 J | 3,010 | 1 1 U | 1 1 U | 203 U | 0 23 U | 0 55 |
| C-9 | 7 | Slag | 1993 Investigation | 49 | 693 J | 81 | 0 11 U | 17 | 5,330 | 1.1 U | 1.1 U | 1,050 J | 0 23 U | 54 |
| G-03 | 5 | Shale | 1993 Investigation | 21 | 10,600 | 417 | 0 12 U | 29 | 2,740 | 1.2 U | 1 2 U | 210 U | 0 23 U | 30 |
| G-03 | 15 | Shale | 1993 Investigation | 2 9 | 11,700 | 1,560 | 0 10 U | 27 | 2,320 | 0 21 U | 1 1 U | 336 J | 0 21 U | 14 |
| SSI-X101 | 0 / Background | Soil (Assumed) | 1994 Investigation | 78 | NA | 1,220 | 0 15 | 48 | NA | NA | NA | NA | NA | NA |
| P-1 | 21 | Slag | 1994 Investigation | **1,470** | NA | 38 | 0 12 U | 11 | NA | NA | NA | NA | NA | NA |
| P-1 | 80 | Slag | 1994 Investigation | 2 1 J | NA | 185 | 0.11 U | 75 | NA | NA | NA | NA | NA | NA |
| P-15A | 20 | Slag | 1994 Investigation | **2,340** | NA | **40,600** | 2 3 | 53 | NA | NA | NA | NA | NA | NA |
| P-17 | 10 | Slag | 1994 Investigation | **1,400** | NA | 1,500 | 0 42 | 89 | NA | NA | NA | NA | NA | NA |
| P-17 | 42 | Alluvium | 1994 Investigation | 48 | NA | 2,030 | 0 12 U | 38 | NA | NA | NA | NA | NA | NA |
| P-18 | 39 | Slag | 1994 Investigation | 290 | NA | 2,280 | 0 11 U | 66 | NA | NA | NA | NA | NA | NA |
| P-19 | 20 | Slag | 1994 Investigation | 23 | NA | 57 | 0 10 U | 19 | NA | NA | NA | NA | NA | NA |
| P-19 | 42 | Slag | 1994 Investigation | 34 | NA | 217 | 0 12 U | 41 | NA | NA | NA | NA | NA | NA |
| P-2 | 19 | Slag | 1994 Investigation | **2,300** | NA | 1,170 | 0 11 U | 9 1 J | NA | NA | NA | NA | NA | NA |
| P-2 | 42 | Slag | 1994 Investigation | 267 | NA | 28 | 0 12 U | 15 | NA | NA | NA | NA | NA | NA |
| P-21 | 2 5 | Slag | 1994 Investigation | **3,850** | NA | 96 | 0 11 U | 41 | NA | NA | NA | NA | NA | NA |
| P-21 | 21 | Slag | 1994 Investigation | 221 | NA | 203 | 0 11 U | 24 | NA | NA | NA | NA | NA | NA |
| P-21 | 41 | Slag | 1994 Investigation | 99 | NA | 50 | 0 15 | 4 4 U | NA | NA | NA | NA | NA | NA |
| P-21 | 60 | Slag | 1994 Investigation | 76 | NA | 67 | 0.16 | 4 9 J | NA | NA | NA | NA | NA | NA |
| P-22 | 41 | Slag | 1994 Investigation | 48 | NA | 82 | 0 10 U | 16 | NA | NA | NA | NA | NA | NA |
| P-22 | 106 | Alluvium | 1994 Investigation | 5 5 | NA | 859 | 0 12 U | 20 | NA | NA | NA | NA | NA | NA |

Notes
1 Results are presented in mg/kg
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7. Shaded cells with bold text indicate concentrations in exceedance of industrial screening criteria

Table 6 Inorganic Analytical Results for Detected Parameters - Soil Samples
Carus Chemical Company

| Boring Identification | Depth (ft) / Description | Matrix | Investigation Phase | Zinc | Cyanide | Bicarbonate | Carbonate | Sulfate | Sulfide |
|---|---|---|---|---|---|---|---|---|---|
| | | | **Region 9 PRGs, Residential Soil (mg/kg)** | **23,000** | **1,200** | **NC** | **NC** | **NC** | **NC** |
| | | | **Region 9 PRGs, Industrial Soil (mg/kg)** | **100,000** | **12,000** | **NC** | **NC** | **NC** | **NC** |
| SSI-X101 | 0 33 / Background | Soil (Assumed) | IEPA SSI | 1,200 J | 0 32 U | NA | NA | 10 | 1 0 U |
| SSI-X102 | 0 / Drum/Filter Bag Storage Area | Soil (Assumed) | IEPA SSI | ND | NA | NA | NA | 254 | NA |
| SSI-X103 | 0 5 / N Fence/E of Property | Slag | IEPA SSI | 3,490 | 0 29 U | NA | NA | 274 | 1 0 U |
| SSI-X104 | 0 5 / West Bank of LVR | Slag | IEPA SSI | 43,700 | 0 27 | NA | NA | 90 | 1 0 U |
| SSI-X105 | 0 67 / SE Corner of Carus Facility | Soil (Assumed) | IEPA SSI | 1,700 J | 0 26 U | NA | NA | 296 | 1 0 U |
| ISA-X104 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 10,200 | ND | NA | NA | NA | NA |
| ISA-X105 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 42,000 | ND | NA | NA | NA | NA |
| ISA-X106 | 0 67 / Carus Slag Pile | Slag | IEPA ISA | 37,500 | ND | NA | NA | NA | NA |
| C-10 | 0 | Road Gravel | 1993 Investigation | 2,390 | 0 60 U | NA | NA | 637 | 5 6 U |
| C-10 | 7 | Sinter | 1993 Investigation | 4,130 | 0 61 U | NA | NA | 503 | 5 7 U |
| C-11 | 0 | Road Gravel | 1993 Investigation | 8,550 | 0 56 U | NA | NA | 10,800 | 5 7 |
| C-11 | 10 | Slag | 1993 Investigation | 2,160 | 0 52 U | NA | NA | 4,160 | 5 8 |
| C-11 | 15 | Shale | 1993 Investigation | 390 | 0 60 U | NA | NA | 1,830 | 5 6 U |
| C-5 | 3 | Fill | 1993 Investigation | 443 | 0 57 U | NA | NA | 479 | 8 4 U |
| C-8 | 0 | Fill | 1993 Investigation | 72 | 0 53 U | NA | NA | 1,070 | 20 |
| C-9 | 0 | Road Gravel | 1993 Investigation | 49 | 0 55 U | NA | NA | 767 | 5 7 U |
| C-9 | 7 | Slag | 1993 Investigation | 506 | 0 54 U | NA | NA | 8,640 | 17 |
| G-03 | 5 | Shale | 1993 Investigation | 46 | 0 53 U | NA | NA | 498 | 8 4 U |
| G-03 | 15 | Shale | 1993 Investigation | 39 | 0 52 U | NA | NA | 527 | 5 7 |
| SSI-X101 | 0 / Background | Soil (Assumed) | 1994 Investigation | 3,030 | NA | NA | NA | NA | NA |
| P-1 | 21 | Slag | 1994 Investigation | 1,090 | 0 55 U | 90 | 0 0090 | 23,200 | 24 U |
| P-1 | 80 | Slag | 1994 Investigation | 8,860 | 0 53 U | 470 | 0 0030 | 19,800 | 21 U |
| P-15A | 20 | Slag | 1994 Investigation | 21,600 | 0 59 U | 773 | 7 3 | 176 | 547 |
| P-17 | 10 | Slag | 1994 Investigation | 15,100 | 0 56 U | 376 | 11 | 289 | 21 U |
| P-17 | 42 | Alluvium | 1994 Investigation | 21,800 | 0 60 U | 909 | 18 | 774 | 380 |
| P-18 | 39 | Slag | 1994 Investigation | 9,700 | 0 45 U | 191 | 0 52 | 3,080 | 22 U |
| P-19 | 20 | Slag | 1994 Investigation | 9,120 | 0 52 U | 193 | 0 052 | 3,580 | 24 |
| P-19 | 42 | Slag | 1994 Investigation | 3,000 | 0 61 U | 957 | 0 73 | 3,990 | 129 |
| P-2 | 19 | Slag | 1994 Investigation | 5,400 | 0 50 U | 374 | 1 5 | 5,990 | 23 U |
| P-2 | 42 | Slag | 1994 Investigation | 489 | 0 74 | 96 | 0 0010 | 12,500 | 23 U |
| P-21 | 2 5 | Slag | 1994 Investigation | 26,100 | 0 53 U | 191 | 0 021 | 3,100 | 23 U |
| P-21 | 21 | Slag | 1994 Investigation | 2,960 | 0 55 U | 479 | 0.057 | 11,500 | 78 |
| P-21 | 41 | Slag | 1994 Investigation | 852 | 0 53 U | 183 | 0 014 | 12,900 | 13 |
| P-21 | 60 | Slag | 1994 Investigation | 1,270 | 0 54 U | 185 | 0 025 | 9,300 | 24 |
| P-22 | 41 | Slag | 1994 Investigation | 3,770 | 0 48 U | 1,050 | 0 12 | 6,120 | 21 |
| P-22 | 106 | Alluvium | 1994 Investigation | 687 | 0 45 U | 2,610 | 302 | 472 | 22 U |

Notes
1 Results are presented in mg/kg
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7 Shaded cells with bold text indicate concentrations in exceedance of industrial screening criteria

Table 7 Organic Analytical Results - Groundwater
Carus Chemical Company

| Sampling Point | Monitoring Well | Background G-112 | G-101 | G-103 | G-106 | Cooling Water | G-02 | G-04 | MW-1 | NPDES Outfall | G-04 | P-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Unknown | Shale | Till | Slag | None | Shale | Till | Slag | None | Till | Till |
| | EPA Region 9 PRG, Tap Water (mg/l) | IEPA SSI | IEPA SSI | IEPA SSI | IEPA SSI | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1994 Investigation | 1994 Investigation |
| Volatile Organic Compounds | | | | | | | | | | | | |
| 1,1,1-Trichloroethane | 3 2 | 0 019 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,1,2,2-Tetrachloroethane | 0 000055 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,1,2-Trichloroethane | 0 00020 | ND | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,1-Dichloroethane | 0 81 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,1-Dichloroethene | 0 34 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,2-Dichloroethane | 0 00012 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,2-Dichloroethene (total) | NC | NA | NA | NA | NA | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,2-Dichloropropane | 0 00016 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Butanone (MEK) | 7 0 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Hexanone | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Methyl-2-Pentanone | 2 0 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Acetone | 5 5 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 0050 JB | NA | NA |
| Benzene | 0 00035 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | **0.55** | 0 010 U | 0 010 U | **0.87** | 0 0050 U |
| Bromoform | 0 0085 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Bromomethane | 0 0087 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Carbon Disulfide | 1 0 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Carbon Tetrachloride | 0 00017 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Chlorobenzene | 0 11 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Chloroethane | 0 0046 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Chloroform | 0 00017 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Chloromethane | 0 16 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| cis/trans-1,2-Dichloroethene | NC | 0 019 | 0 010 U | 0 010 U | 0 010 U | NA | NA | NA | NA | NA | NA | NA |
| cis-1,3-Dichloropropene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Dibromochloromethane | 0 00013 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Dichlorobromomethane | 0 00018 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Dichloromethane (Methylene chloride) | 0 0043 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 0030 IB | NA | NA |
| Ethyl benzene | 1 3 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 39 | 0 010 U | 0 010 U | 0 95 | 0 0050 U |
| Styrene | 1 6 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Tetrachloroethene | 0 00010 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Toluene | 0 72 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 36 | 0 010 U | 0 010 U | 0 25 | 0 0050 U |
| trans-1,3-Dichloropropene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Trichloroethene | 0 000028 | **0.031** | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Vinyl Chloride | 0 000020 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Xylenes (unspecified) | 0 21 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | NA | **1.2** | NA | NA | **1.4** | 0 0050 U |

Notes

1 Results presented in mg/l

2 B indicates analyte was also detected in the blank

3 I indicates estimated concentration

4 NA indicates not analyzed

5 NC indicates no applicable screening criterion

6 ND indicates below detection limit, drawn from data sources where detection limits not available

7 U indicates that constituent concentration was below the indicated detection limit

8 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals for Tap Water

9 Shaded cells with bold text indicate concentrations in exceedance of screening criteria

Table 7 Organic Analytical Results - Groundwater
Carus Chemical Company

| Sampling Point | Monitoring Well | Background G-112 | G-101 | G-103 | G-106 | Cooling Water | G-02 | G-04 | MW-1 | NPDES Outfall | G-04 | P-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Unknown | Shale | Till | Slag | None | Shale | Till | Slag | None | Till | Till |
| | EPA Region 9 PRG, Tap Water (mg/l) | IEPA SSI | IEPA SSI | IEPA SSI | IEPA SSI | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1994 Investigation | 1994 Investigation |
| Semi-Volatile Organic Compounds | | | | | | | | | | | | |
| 1,2,4-Trichlorobenzene | 0 0072 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,2-Dichlorobenzene | 0 37 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,3-Dichlorobenzene | 0 18 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 1,4-Dichlorobenzene | 0 00050 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,2'-oxybis(1-Chloropropane) | 0 00027 | NA | NA | NA | NA | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,4,5-Trichlorophenol | 3 6 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 2,4,6-Trichlorophenol | 0 0036 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,4-Dichlorophenol | 0 11 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,4-Dimethylphenol | 0 73 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,4-Dinitrophenol | 0 073 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 2,4-Dinitrotoluene | 0 073 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2,6-Dinitrotoluene | 0 036 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Chloronaphthalene | 0 49 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Chlorophenol | 0 030 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Methylnaphthalene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Methylphenol | 1 8 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 2-Nitroaniline | 0 11 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 2-Nitrophenol | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 3,3'-Dichlorobenzidine | 0 00015 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 3-Nitroaniline | 0 0032 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 4,6-Dinitro-2-methylphenol | 0 0036 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 4-Bromophenyl-phenylether | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Chloro-3-methylphenol | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Chloroaniline | 0 15 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Chlorophenyl-phenylether | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Methylphenol | 0 18 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| 4-Nitroaniline | 0 0032 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| 4-Nitrophenol | NC | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| Acenaphthene | 0 37 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 018 U | 0 010 U | 0 010 U | 0 018 U | 0 018 U |
| Acenaphthylene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U |
| Anthracene | 1 8 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0066 U | 0 010 U | 0 010 U | 0 0066 U | 0 0066 U |
| Benzo(a)anthracene | 0 000092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0015 U | 0 010 U | 0 010 U | 0 00013 U | 0 00013 U |
| Benzo(a)pyrene | 0 0000092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00023 U | 0 010 U | 0 010 U | 0 00023 U | 0 00023 U |

Notes
1 Results presented in mg/l
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable screening criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals for Tap Water
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria

Table 7 Organic Analytical Results - Groundwater
Carus Chemical Company

| Sampling Point | Monitoring Well | Background G-112 | G-101 | G-103 | G-106 | Cooling Water | G-02 | G-04 | MW-1 | NPDES Outfall | G-04 | P-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Unknown | Shale | Till | Slag | None | Shale | Till | Slag | None | Till | Till |
| | EPA Region 9 PRG, Tap Water (mg/l) | IEPA SSI | IEPA SSI | IEPA SSI | IEPA SSI | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1994 Investigation | 1994 Investigation |
| Benzo(b)fluoranthene | 0 000092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00018 U | 0 041 U | 0 010 U | 0 00018 U | 0 00018 U |
| Benzo(g,h,i)perylene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00076 U | 0 010 U | 0 010 U | 0 00076 U | 0 00076 U |
| Benzo(k)fluoranthene | 0 00092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00017 U | 0 035 U | 0 010 U | 0 00017 U | 0 00017 U |
| Bis(2-Chloro-1-methylethyl)Ether | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | NA | NA | NA | NA | NA | NA |
| bis(2-Chloroethoxy) methane | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| bis(2-Chloroethyl) ether | 0 000010 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| bis(2-Ethylhexyl) phthalate | 0 0048 | 0 010 U | 0 010 U | 0 010 U | **0.0070 J** | 0 010 U | 0 010 U | NA | 0 23 U | 0 010 U | NA | NA |
| Butylbenzylphthalate | 7 3 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Carbazole | 0 0034 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Chrysene | 0 0092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0024 | 0 010 U | 0 010 U | 0 0015 U | 0 0015 U |
| Dibenzo(a,h)anthracene | 0 0000092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00030 U | 0 010 U | 0 010 U | 0 00030 U | 0 00030 U |
| Dibenzofuran | 0 012 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Diethylphthalate | 29 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Dimethylphthalate | 360 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Di-n-butylphthalate | 3 6 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0030 JB | 0 010 U | NA | 0 0020 JB | 0 0020 JB | NA | NA |
| Di-n-octylphthalate | 1 5 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Fluoranthene | 1 5 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0010 J | 0 010 U | 0 010 U | 0 0021 U | 0 0021 U |
| Fluorene | 0 24 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0021 U | 0 010 U | 0 010 U | 0 0021 U | 0 0021 U |
| Hexachlorobenzene | 0 000042 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Hexachlorobutadiene | 0 00086 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Hexachlorocyclopentadiene | 0 22 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Hexachloroethane | 0 0048 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Hexanoic Acid | NC | ND | ND | ND | ND | NA | NA | NA | NA | NA | NA | NA |
| Indeno(1,2,3-cd)pyrene | 0 000092 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 00043 U | 0 010 U | 0 010 U | 0 00043 U | 0 00043 U |
| Isophorone | 0 071 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Naphthalene | 0 0062 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | **0.045** | 0 010 U | 0 010 U | 0 0013 J | 0 010 U |
| Nitrobenzene | 0 0034 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| N-Nitroso-di-n-propylamine | 0 0000096 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| N-Nitrosodiphenylamine/Diphenylamine | 0 014 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Pentachlorophenol | 0 00056 | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | NA |
| Phenanthrene | NC | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0064 U | 0 010 U | 0 010 U | 0 0064 U | 0 0064 U |
| Phenol | 11 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | NA | 0 010 U | 0 010 U | NA | NA |
| Pyrene | 0 18 | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 010 U | 0 0027 U | 0 010 U | 0 010 U | 0 0027 U | 0 0027 U |

Notes

1 Results presented in mg/l
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable screening criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals for Tap Water
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria

Table 7 Organic Analytical Results - Groundwater
Carus Chemical Company

| Sampling Point | Monitoring Well | Background G-112 | G-101 | G-103 | G-106 | Cooling Water | G-02 | G-04 | MW-1 | NPDES Outfall | G-04 | P-6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Unknown | Shale | Till | Slag | None | Shale | Till | Slag | None | Till | Till |
| | EPA Region 9 PRG, Tap Water (mg/l) | IEPA SSI | IEPA SSI | IEPA SSI | IEPA SSI | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1994 Investigation | 1994 Investigation |
| Pesticides | | | | | | | | | | | | |
| 4,4'-DDD | 0 00028 | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| 4,4'-DDE | 0 00020 | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| 4,4'-DDT | 0 00020 | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Aldrin | 0 0000040 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| alpha-BHC | 0 000011 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| alpha-Chlordane | NC | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| beta-BHC | 0 000037 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| delta-BHC | NC | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| Dieldrin | 0 0000042 | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Endosulfan I | NC | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| Endosulfan II | NC | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Endosulfan sulfate | NC | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Endrin | 0 011 | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Endrin Aldehyde | NC | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| Endrin ketone | NC | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | 0 00010 U | NA | 0 00010 U | 0 00010 U | NA | NA |
| gamma-BHC (Lindane) | 0 000052 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| gamma-Chlordane | NC | 0 000059 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| Heptachlor | 0 000015 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| Heptachlor epoxide | 0 0000074 | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | 0 000050 U | NA | 0 000050 U | 0 000050 U | NA | NA |
| Methoxychlor | 0 18 | 0 00050 U | 0 00050 U | 0 00050 U | 0 00050 U | 0 00050 U | 0 00050 U | NA | 0 00050 U | 0 00050 U | NA | NA |
| Toxaphene | 0 000061 | 0 0050 U | 0 0050 U | 0 0050 U | 0 0050 U | 0 0050 U | 0 0050 U | NA | 0 0050 U | 0 0050 U | NA | NA |
| PCBs | | | | | | | | | | | | |
| Aroclor 1016 | 0 00096 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| Aroclor 1221 | 0 000034 | 0 0020 U | 0 0020 U | 0 0020 U | 0 0020 U | 0 0020 U | 0 0020 U | NA | 0 0020 U | 0 0020 U | NA | NA |
| Aroclor 1232 | 0 000034 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| Aroclor 1242 | 0 000034 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| Aroclor 1248 | 0 000034 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| Aroclor 1254 | 0 000034 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| Aroclor 1260 | 0 000034 | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | 0 0010 U | NA | 0 0010 U | 0 0010 U | NA | NA |
| TICs | | | | | | | | | | | | |
| 1,2,3-Trimethylbenzene | NC | NA | NA | NA | NA | NA | NA | NA | NA | 0 020 | NA | NA |
| Ethylmethylbenzene (unspecified) | NC | NA | NA | NA | NA | NA | NA | NA | 0 20 J | NA | NA | NA |
| Unknown Aromatic | NC | NA | NA | NA | NA | NA | 0 030 U | NA | NA | NA | NA | NA |

Notes

1 Results presented in mg/l

2 J indicates estimated concentration

3 NA indicates not analyzed

4 NC indicates no applicable screening criterion

5 ND indicates below detection limit, drawn from data sources where detection limits not available

6 U indicates that constituent concentration was below the indicated detection limit

7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals for Tap Water

8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria

Table 8. Inorganic Analyses - Groundwater
Carus Chemical Company

| Parameter | Monitoring Well | Blank | Blank | Cooling Water | G-02 | G-04 | G-04 | G-05 | G-101 | G-101 |
|---|---|---|---|---|---|---|---|---|---|---|
| | Matrix | None | None | None | Shale | Till | Till | Fill | Shale | Till |
| | EPA Region 9 PRG, Tap Water (mg/l) | 1993 Investigation | 1994 Investigation | 1993 Investigation | 1993 Investigation | 1993 Investigation | 1994 Investigation | 1993 Investigation | IEPA SSI | PSI |
| Aluminum | 36 | 0 10 U | NA | 0 10 U | 1.00 | NA | NA | 6 3 | **48** | NA |
| Antimony | 0 015 | 0 025 U | NA | 0 025 U | 0.025 U | NA | NA | 0.025 U | 0 025 U | NA |
| Arsenic | 0 000045 | 0 0010 U | NA | **0.0023** | 0 0010 U | **0.0068** | NA | **0.0055 J** | **0.021 J** | **0.0030** |
| Barium | 2 6 | 0 0050 U | 0 0050 U | 0 21 | 0.055 | 0 14 | 0.016 J | 0.13 | 0 36 J | 0 10 U |
| Beryllium | 0.073 | 0 0010 U | NA | 0 0010 U | 0.0010 U | NA | NA | 0 0010 U | 0 0020 J | NA |
| Cadmium | 0 018 | 0 0040 U | 0 0030 U | 0 0040 U | 0.0040 U | 0 0040 U | 0.0030 U | **0.026** | **0.037** | 0.0050 U |
| Calcium | NC | 0.10 U | NA | 116 | 437 | NA | NA | 260 | 0 30 J | NA |
| Chromium | 0 11 | 0 0050 U | 0 0050 U | 0 0050 U | 0.0057 | 0 0050 U | 0.0050 U | 0.0077 J | 0 057 | 0 013 |
| Cobalt | 0.73 | 0 0050 U | NA | 0 0053 | 0.019 | NA | NA | 0 022 J | 0 047 J | NA |
| Copper | 1 5 | 0 0050 U | NA | 0 0082 | 0 031 | NA | NA | 0.094 | 0 10 | NA |
| Cyanide | 0 73 | 0 0062 U | 0 0062 U | 0 0062 U | 0 0062 U | NA | 0 0050 U | 0 0050 U | 0.0083 U | NA |
| Iron | 11 | 0.075 U | 0 14 | 0 69 | 0.84 | NA | **13** | 11 | **34 J** | NA |
| Lead | 0 015 | 0.0010 U | 0.0010 U | 0 0010 U | 0 0058 | **0.020 J** | 0 0050 U | **2.2** | **0.61** | **0.038** |
| Magnesium | NC | 0 10 U | NA | 38 | 103 | NA | NA | 132 | 119 | NA |
| Manganese | 0 88 | 0 0050 U | 0.16 J | 0 62 | **3.8** | NA | **4.7 J** | **3.2** | **3.7** | NA |
| Mercury | NC | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0.013 | 0 0016 | 0 00020 U |
| Nickel | 0 73 | 0 010 U | 0 020 U | 0 010 U | 0 041 | NA | 0 020 U | 0 038 | 0.075 | NA |
| Potassium | NC | 0.0020 U | NA | 2.5 | 13 | NA | NA | 77 J | 34 | NA |
| Selenium | 0 18 | 0 0010 U | NA | 0 0010 U | 0.0050 UJ | 0 0050 UJ | NA | 0 0050 UJ | 0 020 U | 0 0020 U |
| Silver | NC | 0 0050 U | NA | 0 0050 U | 0.0050 U | NA | NA | 0.0050 U | 0.0090 U | 0.010 U |
| Sodium | NC | 0 90 U | NA | 35 | 115 | NA | NA | 151 | 278 | NA |
| Thallium | NC | 0.0010 U | NA | 0.0010 U | 0 0010 U | NA | NA | 0.0010 U | 0.0030 U | NA |
| Vanadium | 0.036 | 0 0050 U | NA | 0.0050 U | 0.0050 U | NA | NA | 0.015 J | **0.062** | NA |
| Zinc | 11 | 0 0050 U | 0 0050 UJ | 0 083 | 0.31 | NA | 0.042 J | 0 0064 | 3.3 | NA |
| Bicarbonate | NC | NA | 5.0 U | NA | NA | NA | 279 | NA | NA | NA |
| Carbonate | NC | NA | 0 00010 U | NA | NA | NA | 0.20 | NA | NA | NA |
| Sulfate | NC | 1 0 U | 2.0 U | 114 | 1,300 | NA | 2,990 | 885 | 1,060 | NA |
| Sulfide | NC | 1 0 U | 1.0 U | 1 0 U | 1.0 U | NA | 1 0 U | 1 0 U | 1.0 U | NA |
| Total Suspended Solids | NC | NA | 6.7 U | NA | NA | NA | NA | NA | NA | NA |

Notes
1 Results presented in mg/l
2 J indicates estimated result
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates concentration below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals (PRGs) for Tap Water, USEPA MCL used for lead
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria
9 Blank = equipment blank
10 Cooling Water = Sample of cooling water derived from the City of LaSalle municipal water supply
11 NDPES = Surface water sample collected near NPDES discharge pipe

Table 8. Inorganic Analyses - Groundwater
Carus Chemical Company

| Parameter | Monitoring Well | G-101 | G-103 | G-103 | G-103 | G-106 | G-106 | G-106 | G-112 |
|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Till | Till | Till | Till | Slag | Slag | Slag | Unknown |
| | EPA Region 9 PRG, Tap Water (mg/l) | 1993 Investigation | IEPA SSI | PSI | 1993 Investigation | IEPA SSI | PSI | 1993 Investigation | IEPA SSI |
| Aluminum | 36 | 0 10 U | **123** | NA | 0 10 U | **55** | NA | 0 10 U | 3.4 |
| Antimony | 0.015 | 0 025 U | 0 025 U | NA | 0 025 U | 0 025 U | NA | 0 025 U | **0.081** |
| Arsenic | 0.000045 | **0.0012 J** | **0.0071 J** | **0.0030** | **0.0010** | **0.0084 J** | **0.0060** | **0.0025** | **0.0028 J** |
| Barium | 2 6 | 0 018 J | 2.5 J | 2 2 | 0 024 | 0 38 J | 0 32 | 0 017 | 0.17 J |
| Beryllium | 0.073 | 0 0010 U | 0 013 | NA | 0 0010 U | 0 0050 J | NA | 0 0010 U | 0.0010 J |
| Cadmium | 0.018 | 0 0040 U | **0.019** | 0 012 | 0 0040 U | **0.035** | **0.046** | 0 0056 | 0.0020 J |
| Calcium | NC | 204 | 655 J | NA | 292 | 654 J | NA | 0 58 | 0 20 UJ |
| Chromium | 0 11 | 0 0050 U | **0.25** | **0.16** | 0 0050 U | **0.12** | 0 065 | 0 0050 U | 0 0070 J |
| Cobalt | 0 73 | 0 0050 U | 0 071 | NA | 0 0050 U | 0.074 | NA | 0 012 | 0 010 J |
| Copper | 1 5 | 0 013 | 0.25 | NA | 0 0050 U | 0.39 | NA | 0 0050 U | 0 027 |
| Cyanide | 0 73 | 0 0062 U | 0 0050 U | NA | 0 0050 U | 0.0050 U | NA | 0 0050 U | 0 0050 U |
| Iron | 11 | 0.075 U | **208 J** | NA | 0 075 U | **85 J** | NA | 3.1 | 6 1 J |
| Lead | 0.015 | 0 011 J | 0 020 U | **0.045** | 0.0050 U | **0.61** | **0.13** | 0 0096 | 0 020 U |
| Magnesium | NC | 111 | 195 | NA | 136 | 120 | NA | 64 | 61 |
| Manganese | 0 88 | 0 026 | **14** | NA | 0 43 | **9.1** | NA | **6.2** | 0 14 |
| Mercury | NC | 0 00020 U | 0.00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0 00020 U |
| Nickel | 0 73 | 0.014 J | 0.21 | NA | 0 012 | 0 12 | NA | 0.022 | 0 024 J |
| Potassium | NC | 8.2 | 46 | NA | 2.4 | 133 | NA | 80 | 8 4 |
| Selenium | 0 18 | 0 0050 UJ | 0 020 UJ | 0 0020 U | 0 0050 UJ | 0 020 UJ | 0 0020 U | 0 0050 UJ | 0 020 UJ |
| Silver | NC | 0 0050 U | 0.0090 U | 0.033 | 0 0050 U | 0 0090 U | 0 055 | 0 0050 U | 0 0090 U |
| Sodium | NC | 215 | 2,000 | NA | 125 | 215 | NA | 13 | 17 |
| Thallium | NC | 0 0010 U | 0 0030 U | NA | 0.0010 U | 0 030 U | NA | 0 0010 U | 0 0030 U |
| Vanadium | 0.036 | 0.0050 U | **0.25** | NA | 0 0050 U | 0 019 J | NA | 0 0050 U | 0.015 U |
| Zinc | 11 | 0 23 | 3 6 | NA | 0.18 | **17** | NA | 10 | 0 022 J |
| Bicarbonate | NC | NA | NA | NA | NA | NA | NA | NA | NA |
| Carbonate | NC | NA | NA | NA | NA | NA | NA | NA | NA |
| Sulfate | NC | 610 | 1,680 | NA | 908 | 2,080 | NA | 1,520 | 174 |
| Sulfide | NC | 1 0 U | 1 0 U | NA | 1 0 U | 1 0 U | NA | 1 0 U | 1.0 U |
| Total Suspended Solids | NC | NA | NA | NA | NA | NA | NA | NA | NA |

Notes
1 Results presented in mg/l
2 J indicates estimated result
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates concentration below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals (PRGs) for Tap Water, USEPA MCL used for lead
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria
9 Blank = equipment blank
10 Cooling Water = Sample of cooling water derived from the City of LaSalle municipal water supply
11 NDPES = Surface water sample collected near NPDES discharge pipe

Table 8. Inorganic Analyses - Groundwater
Carus Chemical Company

| Parameter | Monitoring Well | MW-1 | MW-1 | MW-1 | MW-2 | MW-2 | MW-2 | NPDES Outfall | P-1 |
|---|---|---|---|---|---|---|---|---|---|
| | Matrix | Slag | Slag | Slag | Unknown | Unknown | Unknown | None | Slag |
| | EPA Region 9 PRG, Tap Water (mg/l) | PSI | 1993 Investigation | 1994 Investigation | PSI | 1993 Investigation | 1994 Investigation | 1993 Investigation | 1994 Investigation |
| Aluminum | 36 | NA | 3.7 | NA | NA | 26 | NA | 0.11 | NA |
| Antimony | 0.015 | NA | 0 025 U | NA | NA | 0 025 U | NA | 0.025 U | NA |
| Arsenic | 0 000045 | **0.0030** | **0.0090** | NA | **0.019** | **0.022** | NA | **0.0096** | NA |
| Barium | 2 6 | 0.35 | 0 085 | 0 024 J | 0.48 | 1.1 | 0.034 J | 0.17 | 0.0068 J |
| Beryllium | 0 073 | NA | 0 0010 U | NA | NA | 0.0037 | NA | 0.0010 U | NA |
| Cadmium | 0 018 | 0.015 | **0.029** | 0.014 | 0.011 | **0.051** | 0.0030 U | 0.0040 U | **2.2** |
| Calcium | NC | NA | 603 | NA | NA | 706 | NA | 108 | NA |
| Chromium | 0 11 | 0.022 | 0 0050 U | 0 0050 U | 0.079 | 0.077 | 0 0050 U | 0.011 | 0.0066 J |
| Cobalt | 0 73 | NA | 0 0082 | NA | NA | 0 10 | NA | 0.0050 U | NA |
| Copper | 1 5 | NA | 0 022 | NA | NA | **3.1** | NA | 0 0066 | NA |
| Cyanide | 0 73 | NA | 0 0062 U | 0 0085 | NA | 0 0050 U | 0 0067 | 0 043 | 0 0050 U |
| Iron | 11 | NA | 7 3 | 4.5 | NA | **137** | 5 9 | 0 30 | 1 5 |
| Lead | 0.015 | **0.022** | **0.031** | 0.0050 U | **0.11** | **0.30** | 0 0050 U | **0.016 J** | 0.0050 U |
| Magnesium | NC | NA | 48 | NA | NA | 140 | NA | 39 | NA |
| Manganese | 0 88 | NA | **6.6** | **9.8 J** | NA | **17** | **2.7** | 0.45 | **12 J** |
| Mercury | NC | 0.00020 U | 0 00020 U | 0 00020 U | 0 00020 U | 0.0021 | 0 00020 U | 0.00020 U | 0 00025 |
| Nickel | 0 73 | NA | 0 030 | 0 047 | NA | 0 21 | 0.038 J | 0.010 U | **1.1** |
| Potassium | NC | NA | 97 | NA | NA | 108 | NA | 10 | NA |
| Selenium | 0 18 | 0.0020 | 0 0050 UJ | NA | 0.0020 | 0.0050 UJ | NA | 0 0050 U | NA |
| Silver | NC | 0.018 | 0 0050 U | NA | 0 038 | 0.0050 U | NA | 0 0050 U | NA |
| Sodium | NC | NA | 114 | NA | NA | 227 | NA | 95 | NA |
| Thallium | NC | NA | 0 0010 U | NA | NA | 0.0013 | NA | 0 0010 U | NA |
| Vanadium | 0 036 | NA | 0 016 | NA | NA | **0.16** | NA | 0.0009 J | NA |
| Zinc | 11 | NA | 7 2 | 8 4 J | NA | **26** | 1.1 | 0.042 | **831 J** |
| Bicarbonate | NC | NA | NA | 229 U | NA | NA | 203 | NA | 5 0 |
| Carbonate | NC | NA | NA | 0 21 | NA | NA | 0 17 | NA | ND |
| Sulfate | NC | NA | 1,480 | 1,640 | NA | 1,460 | 1,170 | 226 | 4,440 |
| Sulfide | NC | NA | 1 0 U | 1 0 U | NA | 2 3 | 1.0 U | 21 | 1.0 U |
| Total Suspended Solids | NC | NA | NA | NA | NA | NA | 30 | NA | 16 |

Notes
1 Results presented in mg/l
2 J indicates estimated result
3 NA indicates not analyzed.
4. NC indicates no applicable regulatory criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates concentration below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals (PRGs) for Tap Water, USEPA MCL used for lead
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria
9 Blank = equipment blank
10 Cooling Water = Sample of cooling water derived from the City of LaSalle municipal water supply
11 NDPES = Surface water sample collected near NPDES discharge pipe

Table 8. Inorganic Analyses - Groundwater
Carus Chemical Company

| Parameter | Monitoring Well | P-6 | P-7 | P-9 | P-15 | P-17 | P-18 | P-19 |
|---|---|---|---|---|---|---|---|---|
| | Matrix | Till | Shale | Shale | Shale | Alluvium | Alluvium | Slag |
| | EPA Region 9 PRG, Tap Water (mg/l) | 1994 Investigation | 1994 Investigation | 1994 Investigation | 1994 Investigation | 1994 Investigation | 1994 Investigation | 1994 Investigation |
| Aluminum | 36 | NA | NA | NA | NA | NA | NA | NA |
| Antimony | 0 015 | NA | NA | NA | NA | NA | NA | NA |
| Arsenic | 0 000045 | 0.0010 U | NA | NA | NA | NA | NA | NA |
| Barium | 2 6 | 0.092 J | 0 047 J | 0.024 J | 0 042 J | 0 025 J | 0 015 J | 0 023 J |
| Beryllium | 0 073 | NA | NA | NA | NA | NA | NA | NA |
| Cadmium | 0 018 | 0 0030 J | 0.0030 U | 0.0052 | 0 0030 U | 0 0030 U | **0.56** | **0.072** |
| Calcium | NC | NA | NA | NA | NA | NA | NA | NA |
| Chromium | 0 11 | 0.0050 U | 0 0050 U | 0.0050 U | 0 0050 U | 0 0050 U | 0 0050 U | 0.0050 U |
| Cobalt | 0 73 | NA | NA | NA | NA | NA | NA | NA |
| Copper | 1 5 | NA | NA | NA | NA | NA | NA | NA |
| Cyanide | 0 73 | 0 0062 U | 0 0050 U | 0 0050 U | 0 0050 U | 0 0050 U | 0 0054 | 0 0061 |
| Iron | 11 | 1 3 | **15** | 0 050 U | 0.19 | 5 4 | **17** | 0 13 |
| Lead | 0 015 | **0.067 J** | 0 011 J | 0.0050 U | 0 010 J | 0 011 J | 0 0050 U | 0.0050 U |
| Magnesium | NC | NA | NA | NA | NA | NA | NA | NA |
| Manganese | 0.88 | **25** | **21 J** | 0 63 J | **3.3 J** | **2.0** | **12 J** | **1.2 J** |
| Mercury | NC | 0 00020 U | 0 00020 U | 0 00048 | 0.00020 U | 0.00020 U | 0 00024 | 0 00020 U |
| Nickel | 0.73 | 0 046 | 0 031 J | 0 020 U | 0.020 U | 0.091 | 0 49 | 0 046 |
| Potassium | NC | NA | NA | NA | NA | NA | NA | NA |
| Selenium | 0.18 | 0 0050 UJ | NA | NA | NA | NA | NA | NA |
| Silver | NC | NA | NA | NA | NA | NA | NA | NA |
| Sodium | NC | NA | NA | NA | NA | NA | NA | NA |
| Thallium | NC | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | 0.036 | NA | NA | NA | NA | NA | NA | NA |
| Zinc | 11 | 5 3 | 2 7 J | 0 94 J | 0 52 J | 8 8 | **382 J** | 6 5 J |
| Bicarbonate | NC | 453 | 384 | 413 | 466 | 223 | 124 | 332 |
| Carbonate | NC | 0 53 | 0 25 | 0 22 | 0 39 | 0.28 | 0.036 | 0.29 |
| Sulfate | NC | 157 | 1,890 | 1,510 | 502 | 1,350 | 2,450 | 1,300 |
| Sulfide | NC | 1 0 U | 1 0 U | 1.0 U | 1 0 U | 1 0 U | 1.0 U | 1 0 U |
| Total Suspended Solids | NC | 8 5 | NA | NA | 6 7 U | 28 | 28 | 7 9 |

Notes
1 Results presented in mg/l
2 J indicates estimated result
3 NA indicates not analyzed
4 NC indicates no applicable regulatory criterion
5. ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates concentration below the indicated detection limit
7 Regulatory criteria are EPA Region 9 Preliminary Remediation Goals (PRGs) for Tap Water, USEPA MCL used for lead
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria
9 Blank = equipment blank
10 Cooling Water = Sample of cooling water derived from the City of LaSalle municipal water supply
11 NDPES = Surface water sample collected near NPDES discharge pipe

Table 9. Inorganic Chemical Analyses - River Sediments
Carus Chemical Company

| Sampling Point | Ecological Screening Criteria | Background SSI-X208 | Background S/S3 | ISA-X201 | ISA-X202 | ISA-X203 | ISA-X204 | ISA-X205 | SSI-X201 | SSI-X202 | SSI-X203 | SSI-X204 | S/S1 | S/S2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | USEPA Region 5 | IEPA SSI | Geosyntec PSI | IEPA ISA | IEPA ISA | IEPA ISA | IEPA ISA | IEPA ISA | IEPA SSI | IEPA SSI | IEPA SSI | IEPA SSI | Geosyntec PSI | Geosyntec PSI |
| Aluminum | NC | 3,430 | NA | 4,170 | ND | ND | ND | ND | 7,980 | 20,000 | 6,200 | 6,810 | NA | NA |
| Antimony | NC | 58 | NA | NA | NA | NA | NA | NA | 5 8 U | 7.6 U | 5 3 U | 7.1 U | NA | NA |
| Arsenic | 9.79 | 4.5 | 0 043 | 9.2 | ND | ND | ND | **16** | 3 3 J | 8.6 J | 0.44 U | 7 7 | 0 038 | 0 036 |
| Barium | NC | 34 U | 0.65 | ND | ND | ND | ND | ND | 72 | 157 | 111 | 226 | 0 45 | 1 5 |
| Beryllium | NC | 0.50 J | NA | ND | 0.48 J | 0 92 J | 0.61 J | 0 55 J | 0.69 J | 1 5 | 2.3 | 1 1 J | NA | NA |
| Cadmium | 0 99 | **1.3** | 0 021 | ND | **29** | **47** | **2.7** | **2.8** | **37** | **23** | **15** | **5.1** | 0 085 | 0 0050 U |
| Calcium | NC | 87,500 | NA | ND | ND | ND | ND | ND | 24,500 | 25,100 | 27,100 | 75,800 | NA | NA |
| Chromium | 43.4 | 6.0 | 0 024 | 5 3 | ND | ND | 19 | 20 | 20 | 39 | 38 | 21 | 0 029 | 0 022 |
| Cobalt | 50 | 5.5 J | NA | ND | ND | ND | ND | ND | 9 7 J | 19 | 11 | 12 J | NA | NA |
| Copper | 31.6 | 7.7 | NA | 5 5 J | **109** | **259** | ND | ND | **102** | **46** | **186** | **49** | NA | NA |
| Iron | NC | 8,600 | NA | ND | ND | ND | ND | ND | 15,000 | 23,100 | 46,000 | 15,400 | NA | NA |
| Lead | 35 8 | 7 6 | 0 10 U | 6.9 | **164** | **325** | 29 | ND | **594** | **1,050** | **733** | **262** | 0 67 | 0.13 |
| Magnesium | NC | 34,600 | NA | NA | NA | NA | NA | NA | 8,190 | 8,290 | 9,160 | 9,360 | NA | NA |
| Manganese | NC | 520 J | NA | ND | ND | ND | ND | ND | 500 J | 758 J | 1,580 J | 1,210 J | NA | NA |
| Mercury | 0.174 | 0.074 U | 0 0020 U | ND | **0.40** | **0.51** | 0 060 J | ND | **0.53** | 0 15 U | **0.35** | **0.18** | 0 0020 | 0 0020 |
| Nickel | 22.7 | 7.4 | NA | 5 6 J | ND | 22 | 18 | **25** | 20 | **29** | **85** | 17 | NA | NA |
| Potassium | NC | 733 J | NA | 409 J | ND | 1,650 | 1,490 | ND | 1,490 | 3,350 | 812 J | 1,280 J | NA | NA |
| Selenium | NC | 3.5 UJ | 0 0020 U | ND | ND | 0 41 J | 0 69 J | ND | 4 7 U | 6.2 U | 0 44 U | 5 5 U | 0.0020 U | 0.0020 U |
| Silver | 0.5 | 1 5 U | 0.044 | ND | ND | ND | ND | ND | 2 1 U | 2.7 U | 1.9 U | 2 6 U | 0.010 U | 0 068 |
| Sodium | NC | 171 J | NA | ND | ND | ND | ND | ND | 175 J | 302 J | 358 J | 304 J | NA | NA |
| Thallium | NC | 0 52 U | NA | ND | ND | 0 29 J | 0 38 J | ND | 0 71 U | 0.94 U | 0.67 U | 0 82 U | NA | NA |
| Vanadium | NC | 8 7 | NA | 11 J | ND | ND | ND | 66 | 26 | 44 | 69 | 20 | NA | NA |
| Zinc | 121 | 60 | NA | 46 | **4,670** | **12,100** | **292** | **150** | **6,500** | **4,630** | **6,290** | **1,570** | NA | NA |
| Sulfate | NC | 265 | NA | NA | NA | NA | NA | NA | 125 | 250 | 267 | 238 | NA | NA |
| Sulfide | NC | 1.0 U | NA | NA | NA | NA | NA | NA | 1.0 U | 16 | 1 0 U | 1 0 U | NA | NA |
| Cyanide | 0.0001 | 0 26 U | 0.25 U | ND | ND | ND | ND | ND | 0 32 U | **1.3** | **0.48** | 0 32 U | 0 25 U | 0.25 U |

Notes
1 Analytical results are presented in mg/kg
2 S/S1, S/S2, and S/S3 listed as mg/L in TCLP extract
3 J indicates estimated concentration.
4 NA indicates not analyzed.
5 NC indicates no applicable screening criterion
6 ND indicates below detection limit, drawn from data sources where detection limits not available
7 U indicates that constituent concentration was below the indicated detection limit.
8 USEPA Region 5 Ecological Screening Levels for Sediment (August 2003)
9 Shaded cells with bold text indicates concentrations in exceedance of Ecological Screening Criteria

Table 10. Chemical Analyses - Holding Pond/Emergency Storage Area Sediment Samples from SSI Carus Chemical Company

| Category | Parameter | Ecological Screening Criteria | IEPA SSI | | |
|---|---|---|---|---|---|
| | | USEPA Region 5 | SSI-X205 | SSI-X206 | SSI-X207 |
| Gen Chem | Sulfate | NC | 161 | 191 | 88 |
| Gen Chem | Sulfide | NC | 140 | 1.0 U | 1.0 U |
| Metal | Aluminum | NC | 4,160 | 5,810 | 5,580 |
| Metal | Antimony | NC | 52 | 31 | 20 |
| Metal | Arsenic | 9 79 | **32** | **38** | 6 8 |
| Metal | Barium | NC | 361 | 867 | 100 |
| Metal | Beryllium | NC | 0 48 U | 0 43 U | 1 0 J |
| Metal | Cadmium | 0 99 | **2.9** | **10** | **5.4** |
| Metal | Calcium | NC | 243,000 | 194,000 | 67,400 J |
| Metal | Chromium | 43 40 | **57** | 42 | 20 |
| Metal | Cobalt | 50 00 | 12 J | 18 J | 8 5 J |
| Metal | Copper | 31 60 | **185** | **383** | **73** |
| Metal | Iron | NC | 3,890 | 10,200 | 14,100 J |
| Metal | Lead | 35.80 | **70** | **326** | **363** |
| Metal | Magnesium | NC | 15,600 | 17,400 | 34,400 |
| Metal | Manganese | NC | 17,000 | 28,900 | 2,030 J |
| Metal | Mercury | 0.17 | **0.27** | **0.29** | 0 10 |
| Metal | Nickel | 22.70 | **50** | **91** | 21 |
| Metal | Potassium | NC | 942 J | 1,280 J | 6,570 |
| Metal | Sodium | NC | 808 J | 842 J | 3,960 |
| Metal | Vanadium | NC | 58 | 50 | 17 |
| Metal | Zinc | 121 00 | **609** | **2,790** | 1,810 J |
| PCB | Aroclor 1254 | 0.06 | 1.0 U | **2.9** | NA |
| SVOC | Anthracene | 0 06 | 1.0 U | **0.25 J** | 0 41 U |
| SVOC | Benzo(a)anthracene | 0 11 | 1.0 U | **1.1** | 0 41 U |
| SVOC | Benzo(a)pyrene | 0 15 | 1 0 U | **1.0** | 0 41 U |
| SVOC | Benzo(b)fluoranthene | 10 40 | 1 0 U | 1.6 | 0 41 U |
| SVOC | Benzo(k)fluoranthene | 0.24 | 1 0 U | **0.42 J** | 0.41 U |
| SVOC | bis(2-Ethylhexyl) phthalate | 0.18 | **0.46 JB** | **0.58 JB** | 0.12 J |
| SVOC | Chrysene | 0.17 | 1 0 U | **1.1** | 0.41 U |
| SVOC | Fluoranthene | 0.42 | 1 0 U | **2.3** | 0.41 U |
| SVOC | Phenanthrene | 0.20 | 1 0 U | **1.4** | 0.41 U |
| SVOC | Pyrene | 0.20 | 1.0 U | **2.0** | 0.41 U |
| VOC | Acetone | 0 01 | **0.41 B** | **0.22 B** | 0 012 U |
| VOC | Carbon disulfide | 0 02 | 0 030 U | 0 010 J | 0.012 U |
| VOC | Toluene | 1 22 | 0 030 U | 0.010 J | 0 0070 J |

Notes
1. Analytical results are presented in mg/kg
2 B indicates analyte was also detected in the blank
3 J indicates estimated concenctration
4 NA indicates not analyzed
5. NC indicates no applicable screening criterion
6 ND indicates below detection limit, drawn from data sources where detection limits not available
7 U indicates that constituent concentration was below the indicated detection limit
8 USEPA Region 5 Ecological Screening Levels for Sediment (August 2003)
9 Shaded cells with bold text indicates concentrations in exceedance of Ecological Screening Criteria
10 Only parameters detected in either sample are shown

Table 11 TCLP Metals Analyses - Soil
Carus Chemical Company

| Boring Identification | Depth (ft) | Matrix | Investigation Phase | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium | Silver | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Regulatory Limit** | **NC** | **NC** | **5 0** | **100** | **NC** | **1 0** | **NC** | **5 0** | **NC** | **NC** | **NC** | **5 0** | **NC** | **NC** | **0 2** | **NC** | **NC** | **1.0** | **5.0** | **NC** | **NC** | **NC** |
| B12/S1 | Unkown | Slag | Geosyntec PSI | NA | NA | 0 0010 U | 0 10 U | NA | 0 048 | NA | 0 010 U | NA | NA | NA | 1 1 | NA | NA | 0 0020 U | NA | NA | 0 0020 U | 0 032 | NA | NA | NA |
| B12/S2 | Unkown | Slag | Geosyntec PSI | NA | NA | 0 0010 U | 0 24 | NA | 0 050 | NA | 0 013 | NA | NA | NA | 0 10 U | NA | NA | 0 0020 U | NA | NA | 0 0020 U | 0 015 | NA | NA | NA |
| BH-3 | Unkown | Sinter | Geosyntec PSI | NA | NA | 0 0010 U | 0 26 | NA | **1 2** | NA | 0 010 U | NA | NA | NA | 0 38 | NA | NA | 0 0020 U | NA | NA | 0 0020 U | 0 016 | NA | NA | NA |
| BH-6 | Unkown | Sinter | Geosyntec PSI | NA | NA | 0 0010 U | 1 1 | NA | 0 62 | NA | 0 010 U | NA | NA | NA | 0 43 | NA | NA | 0 0020 U | NA | NA | 0 0020 U | 0 023 | NA | NA | NA |
| GW1 | Unkown | Slag | Geosyntec PSI | NA | NA | 0 0010 U | 0 26 | NA | 0 21 | NA | 0 014 | NA | NA | NA | 0 10 U | NA | NA | 0 0020 U | NA | NA | 0 0020 U | 0 013 | NA | NA | NA |
| GW2 | Unkown | Slag | Geosyntec PSI | NA | NA | 0 10 | 0 64 | NA | 0 43 | NA | 0 041 | NA | NA | NA | **5 2** | NA | NA | 0 0020 | NA | NA | 0 0020 U | 0 027 | NA | NA | NA |
| C-10-0 | 0 | Road Gravel | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 55 | 0 0010 U | 0 016 | 0 55 | 0 0050 U | 0 0050 U | 0 0050 U | 0 075 U | 0 030 U | 15 | 0 035 | 0 00020 U | 0 012 | 66 | 0 050 U | 0 0050 U | 0 10 U | 0 050 U | 1 6 |
| C-10-7 | 7 | Sinter | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 1 6 | 0 0010 U | 0 083 | 576 | 0 0050 U | 0 0050 U | 0 0075 J | 0 075 U | 0 12 | 18 | 4 0 | 0 00020 U | 0 013 | 33 | 0 050 U | 0 0050 U | 0 10 U | 0 0050 U | 7 4 |
| C-11-0 | 0 | Road Gravel | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 18 J | 0 0010 U | 0 45 | 790 I | 0 0050 U | 0 0050 U | 0 012 J | 0 075 | 1 8 | 31 | 5 9 J | 0 00020 U | 0 011 | 15 | 0 050 U | 0 0050 U | 0 0052 J | 0 0050 U | 69 I |
| C-11-10 | 10 | Slag | 1993 Investigation | 1 0 | 0 025 U | 0 050 U | 0 13 | 0 0017 J | 0 13 | 287 I | 0 0050 U | 0 022 J | 0 12 | 0 19 | 0 57 | 26 | 1 4 J | 0 00020 U | 0 030 | 2 6 J | 0 050 U | 0 0050 U | 0 0024 J | 0 0050 U | 100 J |
| C-11-15 | 15 | Shale | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 09 | 0 0010 U | 0 0075 | 190 I | 0 0050 U | 0 0050 U | 0 0050 U | 0 075 U | 0 030 U | 6 8 J | 0 82 | 0 00020 U | 0 010 | 13 | 0 050 U | 0 0050 U | 0 0015 J | 0 0050 U | 0 084 J |
| C-5-3 | 3 | Fill | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 81 | 0 0010 U | 0 0040 U | 691 | 0 0050 U | 0 0050 U | 0 011 J | 0 075 U | 0 030 U | 38 | 5 2 | 0 00020 U | 0 023 | 16 | 0 050 U | 0 0050 U | 0 10 U | 0 0050 U | 0 16 |
| C-5-12 | 12 | Shale | 1993 Investigation | NA | NA | 0 050 U | 1 7 U | NA | 0 0040 U | NA | 0 0050 U | NA | NA | NA | 0 030 U | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| C-6-5 | 5 | Till | 1993 Investigation | NA | NA | 0 050 U | 0 66 | NA | 0 0040 U | NA | 0 0050 U | NA | NA | NA | 0 030 U | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| C-7-6 | 6 | Till | 1993 Investigation | NA | NA | 0 050 U | 1 4 | NA | 0 0040 U | NA | 0 0050 U | NA | NA | NA | 0 030 U | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| C-8-0 | 0 | Fill | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 52 | 0 0010 U | 0 0053 | 557 | 0 0050 U | 0 014 J | 0 0050 U | 0 075 U | 0 030 U | 84 | 2 6 | 0 00020 U | 0 033 | 7 5 | 0 050 U | 0 050 U | 0 10 U | 0 0060 I | 0 12 |
| C-9-0 | 0 | Road Gravel | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 1 3 | 0 0010 U | 0 0040 U | 684 J | 0 0050 U | 0 0072 J | 0 0050 U | 0 075 U | 0 030 U | 31 | 6 6 J | 0 00020 U | 0 010 U | 44 | 0 050 U | 0 0050 U | 0 0061 J | 0 0050 U | 0 088 J |
| C-9-7 | 7 | Slag | 1993 Investigation | 4 7 | 0 025 U | 0 050 U | 0 083 | 0 0043 J | 0 11 | 637 J | 0 0055 | 0 029 J | 0 097 | 3 2 | 0 030 U | 45 | 3 0 J | 0 00020 U | 0 027 | 7 7 | 0 050 U | 0 0050 U | 0 0020 J | 0 0050 U | 2 8 J |
| G-03-5 | 5 | Shale | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 2 4 | 0 0010 U | 0 0040 U | 677 J | 0 0050 U | 0 0050 U | 0 0091 J | 0 075 U | 0 030 U | 29 | 1 8 J | 0 00020 U | 0 010 U | 2 0 U | 0 050 U | 0 0050 U | 0 0032 J | 0 0050 U | 0 28 J |
| G-03-15 | 15 | Shale | 1993 Investigation | 0 10 U | 0 025 U | 0 050 U | 0 42 | 0 0010 U | 0 0040 U | 684 J | 0 0050 U | 0 0050 U | 0 0050 U | 0 075 U | 0 030 U | 39 | 6 4 J | 0 00020 U | 0 010 U | 8 3 | 0 050 U | 0 0050 U | 0 0026 J | 0 0050 U | 0 066 J |
| G-04-Surface | 0 | Fill | 1993 Investigation | NA | NA | 0 050 U | 1 8 | NA | 0 88 | NA | 0 0050 U | NA | NA | NA | 0 094 | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| G-04-5 | 5 | Fill | 1993 Investigation | NA | NA | 0 050 U | 1 9 | NA | 0 095 | NA | 0 0050 U | NA | NA | NA | 0 030 U | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| G-04-15 | 15 | Till | 1993 Investigation | NA | NA | 0 050 U | 2 0 | NA | 0 0061 | NA | 0 0050 U | NA | NA | NA | 0 030 U | NA | NA | 0 00020 U | NA | NA | 0 050 U | NA | NA | NA | NA |
| SSI-X101 | Unkown | Unknown | 1994 Investigation | NA | NA | NA | 0 57 | NA | 0 059 | NA | 0 0050 U | NA | NA | 0 050 U | 0 020 U | NA | 0 32 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 1 3 |
| P-1-21 | 21 | Slag | 1994 Investigation | NA | NA | NA | 0 055 J | NA | 0 028 | NA | 0 0050 U | NA | NA | 0 050 U | 3 4 | NA | 0 13 | 0 00020 U | 0 081 | NA | NA | NA | NA | NA | 1 7 |
| P-1-80 | 80 | Slag | 1994 Investigation | NA | NA | NA | 0 078 J | NA | 0 21 | NA | 0 013 | NA | NA | 5 1 | 0 023 | NA | 5 4 | 0 00020 U | 0 78 | NA | NA | NA | NA | NA | 662 |
| P-15A-20 | 20 | Slag | 1994 Investigation | NA | NA | NA | 2 0 | NA | 0 17 | NA | 0 025 | NA | NA | 0 23 | **5 8** | NA | 9 5 J | 0 00020 U | 0 22 | NA | NA | NA | NA | NA | 6 2 J |
| P-17-10 | 10 | Slag | 1994 Investigation | NA | NA | NA | 1 5 | NA | 0 79 | NA | 0 020 | NA | NA | 0 15 | **7.2** | NA | 2 8 J | 0 00020 U | 0 035 I | NA | NA | NA | NA | NA | 7 8 J |
| P-17-42 | 42 | Alluvium | 1994 Investigation | NA | NA | NA | 0 92 | NA | 0 096 | NA | 0 0050 U | NA | NA | 0 19 | 0 020 U | NA | 7 4 J | 0 00020 U | 0 23 | NA | NA | NA | NA | NA | 4 5 J |
| P-18-39 | 39 | Slag | 1994 Investigation | NA | NA | NA | 0 25 | NA | 0 33 | NA | 0 0068 J | NA | NA | 0 19 | 0 12 | NA | 1 8 J | 0 00020 U | 0 25 | NA | NA | NA | NA | NA | 4 9 J |
| P-19-20 | 20 | Slag | 1994 Investigation | NA | NA | NA | 0 16 J | NA | 0 062 | NA | 0 0097 J | NA | NA | 0 42 | 0 020 U | NA | 0 17 J | 0 00020 U | 0 029 J | NA | NA | NA | NA | NA | 107 J |
| P-19-42 | 42 | Slag | 1994 Investigation | NA | NA | NA | 0 13 J | NA | **1 1** | NA | 0 0050 U | NA | NA | 0 21 | 0 020 U | NA | 0 32 J | 0 00020 U | 1 1 | NA | NA | NA | NA | NA | 9 1 J |
| P-2-19 | 19 | Slag | 1994 Investigation | NA | NA | NA | 0 13 J | NA | 0 25 | NA | 0 0050 U | NA | NA | 0 050 U | 0 63 | NA | 7 2 | 0 00020 U | 0 049 | NA | NA | NA | NA | NA | 7 6 |
| P-2 DP-42 | 42 | Slag | 1994 Investigation | NA | NA | NA | 0 078 J | NA | 0 14 | NA | 0 0050 U | NA | NA | 0 34 | 0 020 U | NA | 0 054 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 2 2 |
| P-2-42 | 42 | Slag | 1994 Investigation | NA | NA | NA | 0 078 J | NA | 0 14 | NA | 0 0050 U | NA | NA | 0 22 | 0 020 U | NA | 0 052 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 2 1 |
| P-21-2 5 | 2 5 | Slag | 1994 Investigation | NA | NA | NA | 0 054 I | NA | 0 040 | NA | 0 0050 U | NA | NA | 0 050 U | 2 4 | NA | 0 062 | 0 00020 U | 0 025 J | NA | NA | NA | NA | NA | 184 |
| P-21-21 | 21 | Slag | 1994 Investigation | NA | NA | NA | 0 069 J | NA | 0 027 | NA | 0 0054 J | NA | NA | 0 050 U | 0 048 J | NA | 0 65 | 0 00020 U | 0 094 | NA | NA | NA | NA | NA | 4 6 J |
| P-21-41 | 41 | Slag | 1994 Investigation | NA | NA | NA | 0 10 J | NA | 0 067 | NA | 0 0050 U | NA | NA | 0 050 U | 0 51 | NA | 0 67 J | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 1 1 J |
| P-21-60 | 60 | Slag | 1994 Investigation | NA | NA | NA | 0 11 J | NA | 0 29 | NA | 0 0089 J | NA | NA | 1 0 | 0 39 | NA | 0 78 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 6 4 J |
| P-22-41 | 41 | Slag | 1994 Investigation | NA | NA | NA | 0 075 J | NA | 0 021 | NA | 0 0094 J | NA | NA | 1 5 | 0 21 | NA | 0 069 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 6 2 |
| P-22-106 | 106 | Alluvium | 1994 Investigation | NA | NA | NA | 0 62 | NA | 0 0080 | NA | 0 0050 U | NA | NA | 0 050 U | 0 020 U | NA | 4 9 | 0 00020 U | 0 020 U | NA | NA | NA | NA | NA | 1 7 |

Notes

1 Results presented in mg/l
2 J indicates estimated concentration
3 NA indicates not analyzed
4 NC indicates no applicable screening criterion
5 ND indicates below detection limit, drawn from data sources where detection limits not available
6 U indicates that constituent concentration was below the indicated detection limit
7 Regulatory limits per EPA Toxicity Characteristic Leaching Procedure (TCLP) Screening Criteria
8 Shaded cells with bold text indicate concentrations in exceedance of screening criteria

Table 12. Comparison of Total and TCLP Metals Concentrations in River Sediment, 1994 Investigation
Carus Chemical Company

| Parameter | Ecological Screening Criteria | TCLP Screening Criteria | Quarry Bridge-07B | | Section Line | | 5th St. Bridge-05B | |
|---|---|---|---|---|---|---|---|---|
| | USEPA Region 5 (6) | USEPA(7) | Total | TCLP | Total | TCLP | Total | TCLP |
| Barium | NC | 100 | 101 | 0.83 | 35 J | 0.68 | 42 J | 0.82 |
| Cadmium | 0.99 | 1.0 | **2.4** | 0.0058 | **21** | 0.0050 | **4.3** | 0 033 |
| Chromium | 43.4 | 5.0 | 13 | 0.0050 U | 7.1 | 0 0050 U | 4 6 | 0.0050 U |
| Iron | NC | NC | 16,100 | 0 050 U | 41,500 | 0.050 U | 9,990 | 0.050 U |
| Lead | 35 8 | 5.0 | **101** | 0 020 U | **56** | 0.026 | 31 | 0 032 |
| Manganese | NC | NC | 584 | 1 6 | 662 | 4 3 | 310 | 5 0 |
| Mercury | 0.174 | 0 2 | **0.35** | 0 00020 U | 0 12 U | 0.00020 U | 0.13 U | 0 00020 U |
| Nickel | 22 7 | NC | **24** | 0 020 U | **25** | 0 028 J | 13 | 0 040 |
| Zinc | 121 | NC | **180** | 0 35 | **1,400** | 1 4 | **598** | 6 8 |

Notes
1 Concentration units in mg/kg for total soil and mg/l for TCLP.
2. Samples collected November 1994.
3 J indicates that constituent concentration was between the detection limit and the contract required detection limit.
4. NC indicates no applicable regulatory criterion.
5. U indicates that constituent concentration was below the indicated detection limit.
6 USEPA Region 5 Ecological Screening Levels for Sediment (August 2003)
7. TCLP limits per EPA Toxicity Characteristic Leaching Procedure (TCLP) Screening Criteria.
8 Shaded cells with bold text indicate concentrations in exceedance of ecological screening criteria.

Table 13. Total Metals Analysis - Holding Pond Sediment
Carus Chemical Company

| Category | Parameter | USEPA Region 5 Ecological Screening Criteria | Pond Line 1 | Pond Line 1 DP | Pond Line 2 | Pond Line 4 |
|---|---|---|---|---|---|---|
| Gen Chem. | Cyanide | 0 0001 | 1 1 U | 1 2 U | 1 3 U | 1 5 U |
| Gen Chem. | Bicarbonate | NC | 638 | 538 | 539 | 289 |
| Gen Chem. | Carbonate | NC | 51 | 47 | 50 | 4 9 |
| Gen Chem | Sulfate | NC | 719 | 967 | 1,240 | 25,800 |
| Gen. Chem | Sulfide | NC | 142 U | 137 U | 155 U | 177 U |
| Metal | Barium | NC | 2,020 | 6,770 | 7,310 | 3,620 |
| Metal | Cadmium | 0 99 | **8.3** | **4.9** | **4.5** | **5.2** |
| Metal | Chromium | 43.4 | **130** | **277** | **255** | **280** |
| Metal | Iron | NC | 33,800 J | 127,000 J | 109,000 J | 193,000 J |
| Metal | Lead | 35 8 | **133** | **141** | **148** | **130** |
| Metal | Manganese | NC | 46,700 | 103,000 | 76,200 | 155,000 |
| Metal | Mercury | 0.17 | **0.81** | **1.4** | **1.9** | **0.97** |
| Metal | Nickel | 22.7 | **174** | **448** | **495** | **737** |
| Metal | Zinc | 121 | **1,620 J** | **513 J** | **595 J** | **551 J** |

Notes
1 Concentration units are given in mg/kg
2 Samples collected in 1994 Investigation
3 NC indicates no applicable regulatory criterion
4 USEPA Region 5 Ecological Screening Levels for Sediment (August 2003).
5 Shaded cells with bold text indicates concentrations in exceedance of ecological screening criteria
6 DP indicates a duplicate sample
7 Samples were composite samples collected from several depth and location in the soft sediment on a same section

Table 14 TCLP Metals Analyses - Holding Pond Sediment
Carus Chemical Company

| Category | Parameter | TCLP Standard | Pond Line 1 | Pond Line 1 DP | Pond Line 2 | Pond Line 4 |
|---|---|---|---|---|---|---|
| Metal | Barium | 100 | 1 6 | 0.65 | 0 76 | 0.13 J |
| Metal | Cadmium | 1 0 | 0.0054 | 0 0030 U | 0.0030 U | 0 0030 U |
| Metal | Chromium | 5 0 | 0.0050 U | 0.0092 J | 0 0080 J | 0 023 |
| Metal | Iron | NC | 0.050 U | 0 050 U | 0 056 J | 0 050 U |
| Metal | Lead | 5.0 | 0.021 | 0 020 U | 0.020 U | 0 020 U |
| Metal | Manganese | NC | 1.8 | 147 | 125 | 454 |
| Metal | Mercury | 0.20 | 0 00020 U | 0.00020 U | 0.00020 U | 0 00020 U |
| Metal | Nickel | NC | 0.24 | 0 19 | 0 16 | 0.33 |
| Metal | Zinc | NC | 0.49 | 0.12 | 0.090 | 0.087 |

Notes
1 Concentration units are given in mg/kg
2. Samples collected in 1994 Investigation.
3 J indicates estimated concentration
4 NC indicates no applicable regulatory criterion.
5 U indicates that constituent concentration was below the indicated detection limit.
6. USEPA Region 5 Ecological Screening Levels for Sediment (August 2003).
7. Shaded cells with bold text indicates concentrations in exceedance of ecological screening criteria
8. DP indicates a duplicate sample.
9. Samples were composite samples collected from several depth and location in the soft sediment on a same section.

Table 15. TCLP PAH Analysis - Holding Pond Sediment
Carus Chemical Company

| Parameter | Pond Line 1 | Pond Line 2 | Pond Line 4 |
|---|---|---|---|
| Acenaphthene | 0 018 U | 0 018 U | 0 018 U |
| Acenaphthylene | 0 010 U | 0 010 U | 0.010 U |
| Anthracene | 0 0066 U | 0.0066 U | 0 0066 U |
| Benzo(a)anthracene | 0 00013 U | 0.00013 U | 0 00013 U |
| Benzo(a)pyrene | 0.00023 U | 0 00023 U | 0.00023 U |
| Benzo(b)fluoranthene | 0 00018 U | 0 00018 U | 0 00018 U |
| Benzo(g,h,i)perylene | 0 00076 U | 0 00088 U | 0.00076 U |
| Benzo(k)fluoranthene | 0.00017 U | 0 00017 U | 0.00017 U |
| Chrysene | 0 0015 U | 0 0015 U | 0 0015 U |
| Dibenzo(a,h)anthracene | 0.00030 U | 0 00030 U | 0 00030 U |
| Fluoranthene | 0.0021 U | 0 0021 U | 0 0021 U |
| Fluorene | 0 0021 U | 0.0021 U | 0 0021 U |
| Indeno(1,2,3-cd)pyrene | 0.00043 U | 0.00043 U | 0 00043 U |
| Naphthalene | 0 010 U | 0.010 U | 0 010 U |
| Phenanthrene | 0 0064 U | 0.0064 U | 0 0064 U |
| Pyrene | 0.0027 U | 0 0027 U | 0.0027 U |

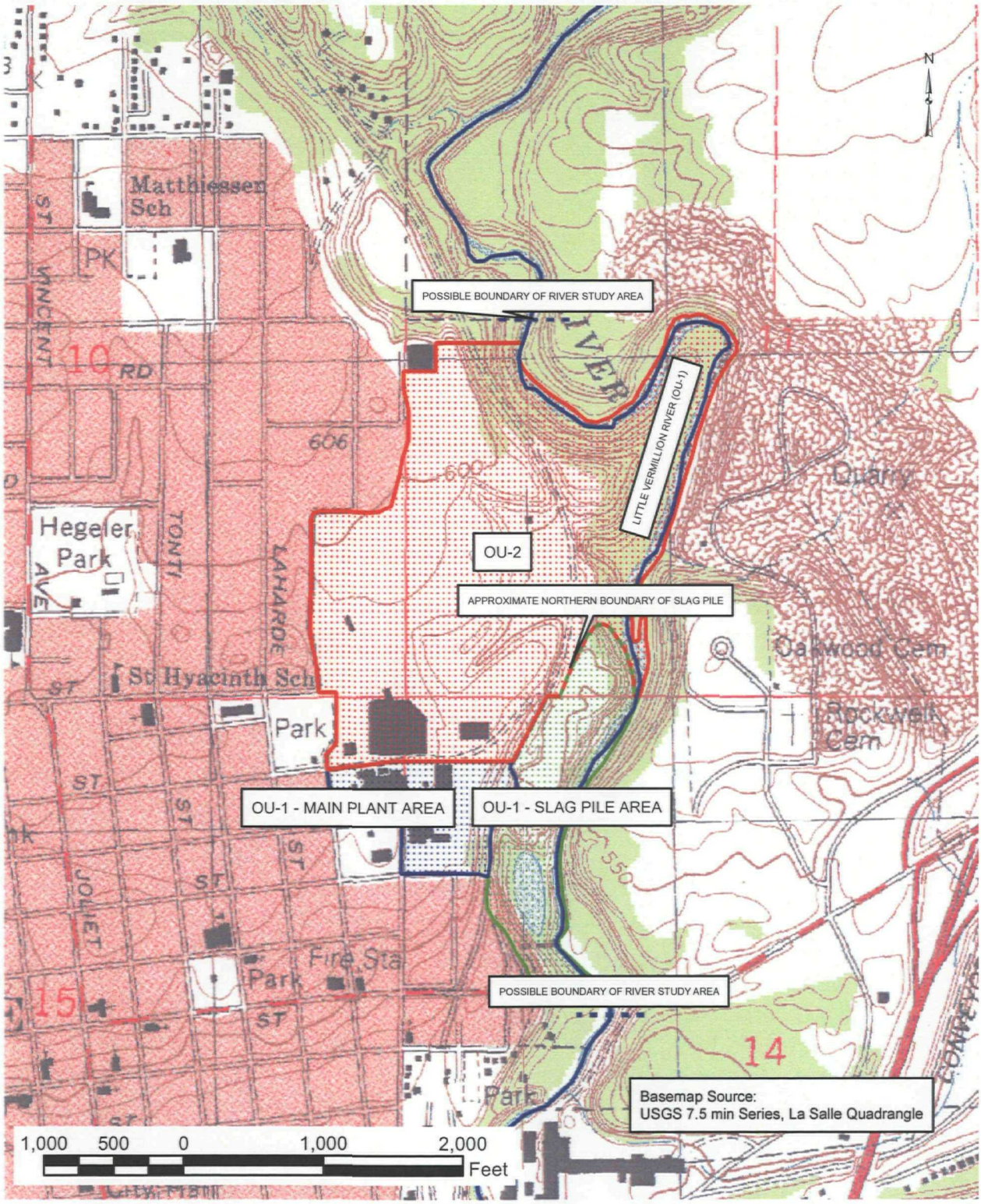
Notes:
1 Concentration units are given in mg/L
2 Samples were collected in November 1994
3 U indicates that constituent concentration was below the indicated detection limit.

Table 16. River-Water Analyses
Carus Chemical Company

| Parameter | Ecological Screening Criteria USEPA Region 5 [6] | Quarry Bridge | 5th St. Bridge | Section Line |
|---|---|---|---|---|
| Barium | 0 22 | 0 098 J | 0 12 J | 0 11 J |
| Cadmium | 0.00015 | 0 0030 U | 0 0030 U | 0.0030 U |
| Chromium | 0 042 | 0.0050 U | 0 0050 U | 0.0050 U |
| Iron | 1[7] | **1.4** | **1.9** | **3.5** |
| Lead | 0 0012 | **0.0028 J** | **0.0020 J** | **0.0076 J** |
| Manganese | NC | 0 19 | 0.11 | 1 8 |
| Mercury | 1.3E-06 | **0.00020** | **0.00022** | 0 00020 U |
| Nickel | 0 029 | 0.020 U | 0.020 U | 0 028 J |
| Zinc | 0 066 | 0 028 | **0.096** | **0.12** |
| Cyanide | 0.0052 | **0.010** | 0 0062 U | **0.010** |
| Bicarbonate | NC | 251 | 246 | 251 |
| Carbonate | NC | 3.0 | 3.1 | 3.3 |
| Sulfate | NC | 37 | 40 | 39 |
| Sulfide | 2[7] | 1.0 U | 1 0 U | 1 0 U |
| Total Suspended Solids | NC | 30 | 102 | 72 |

Notes
1. Concentration units given in mg/l.
2. Samples were collected in November 1994.
3. J indicates estimated concentration
4. NC denotes that no applicable standard exists.
5. U indicates that constituent concentration was below the indicated detection limit.
6. USEPA Region 5 Ecological Screening Levels for Water (August 2003)
7. Screening criteria for iron and sulfide represent USEPA Region 4 Freshwater Chronic Criteria for Organisms, per USEPA 822-Z-99-001, April 1999.
8. Shaded cells with bold text indicates concentrations in exceedance of Ecological Screening Criteria.
9. The "Quarry Bridge" sample is the upgradient sample.

FIGURES




| | | |
|---|---|---|
| APPROXIMATE BOUNDARY OF MATTHIESEN AND HEGELER ZINC COMPANY SUPERFUND SITE | PROJECT: M & H ZINC CO. SITE | |
| | PROJECT NO: FR0756 | |
| FIGURE 1 | GEOSYNTEC CONSULTANTS JACKSONVILLE, FLORIDA | DATE: 09/17/06 |
| | | DOCUMENT NO: FL060000 |

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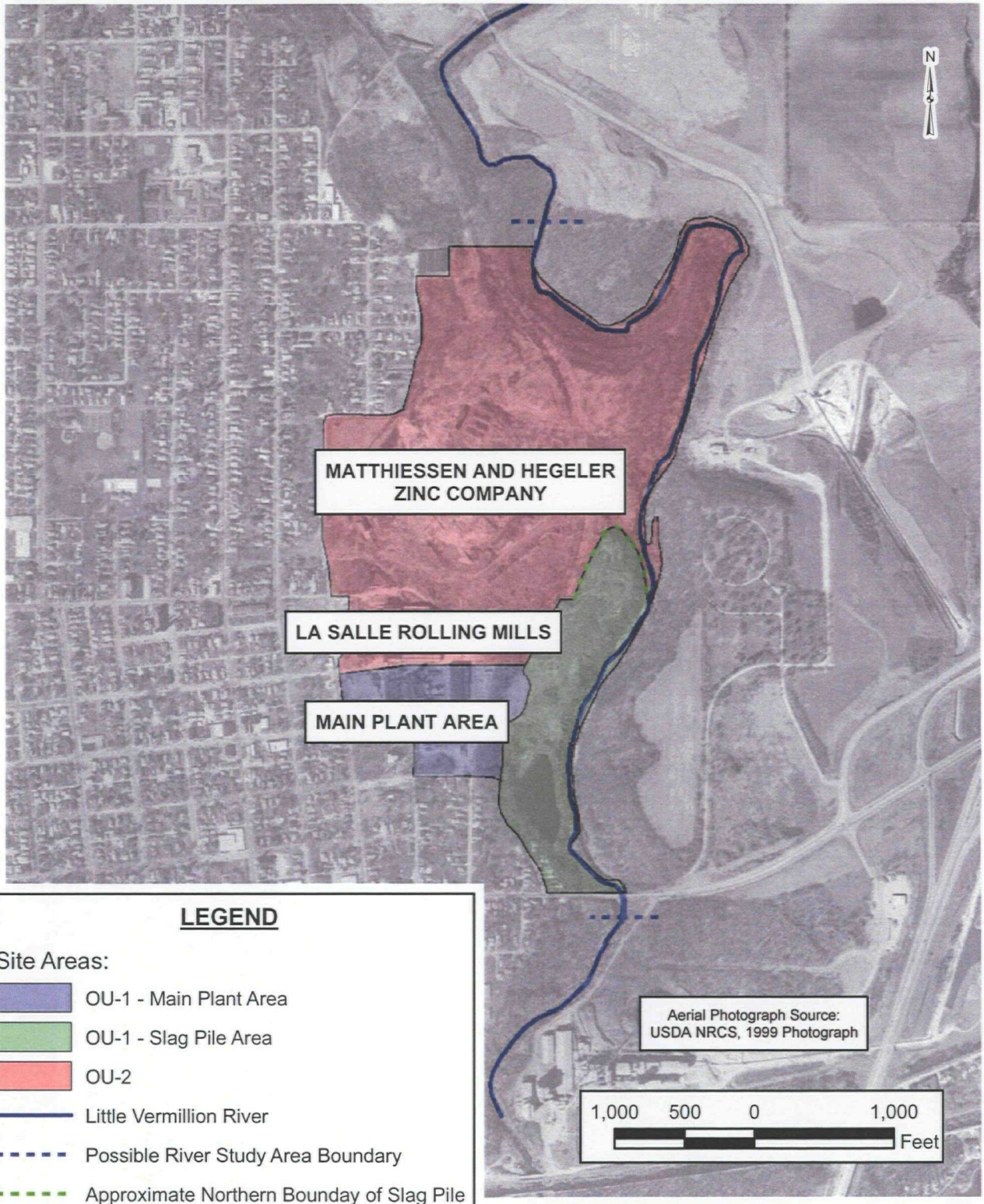


**LEGEND**

Site Areas:

- OU-1 - Main Plant Area
- OU-1 - Slag Pile Area
- OU-2
- Little Vermillion River
- Possible River Study Area Boundary
- Approximate Northern Bounday of Slag Pile

| | | |
|---|---|---|
| OVERVIEW OF HISTORICAL PROCESS AREAS | PROJECT: | M & H ZINC CO. SITE |
| | PROJECT NO: | FR0756 |
| FIGURE 2 | DATE: | 09/17/06 |
| GEOSYNTEC CONSULTANTS JACKSONVILLE, FLORIDA | DOCUMENT NO: | FL060000 |

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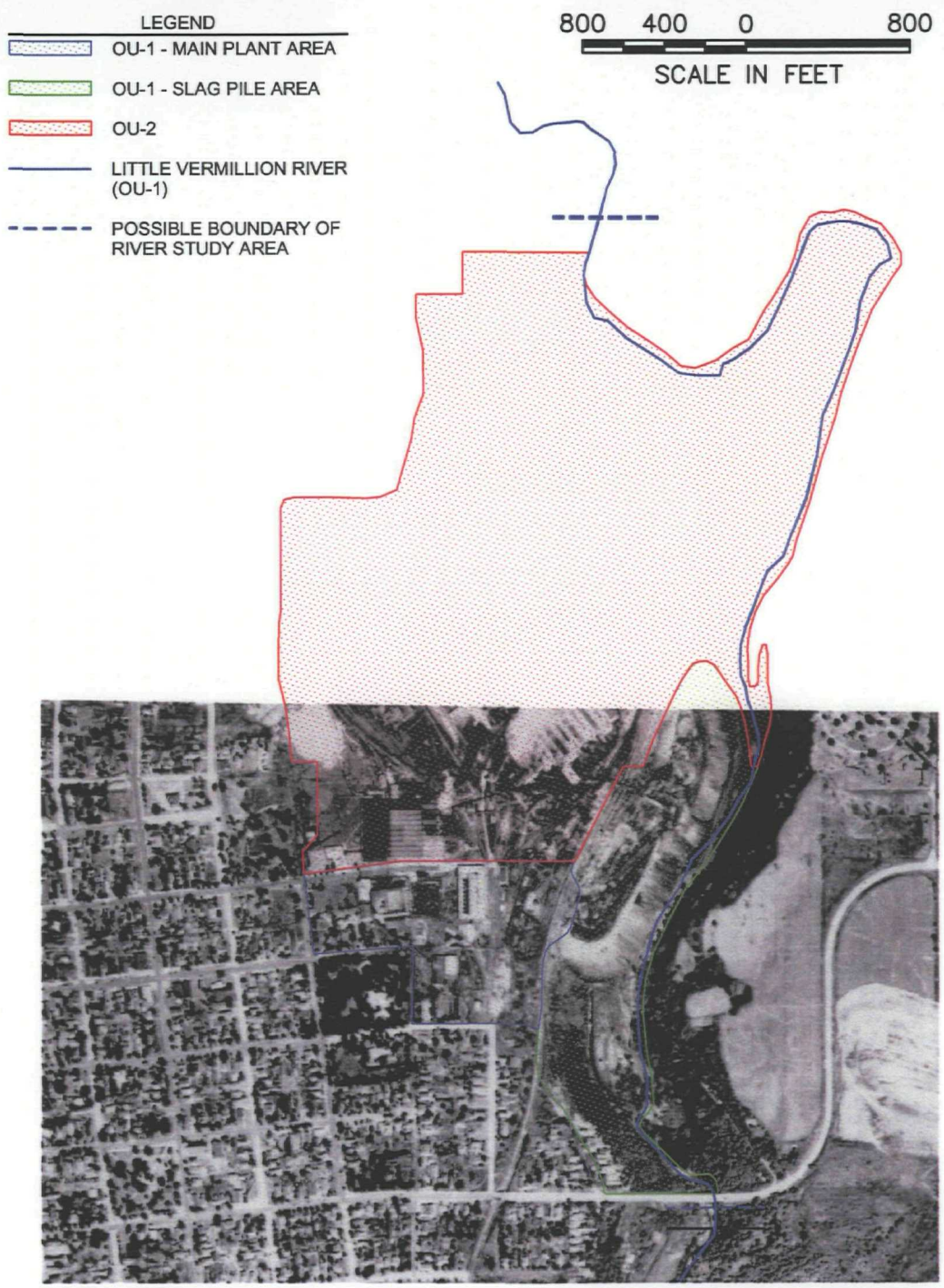
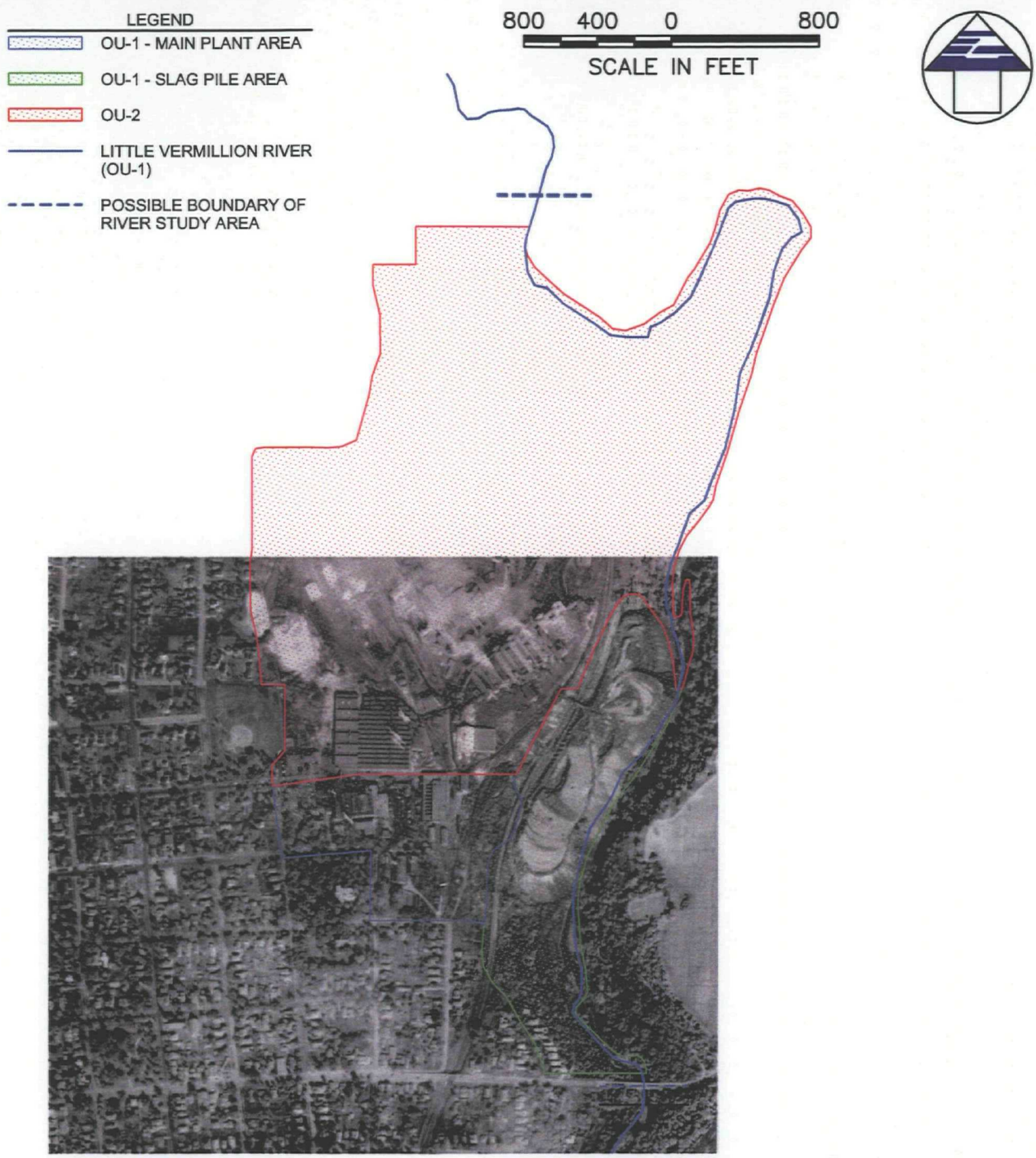



1939 HISTORICAL AERIAL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
| PROJECT NO. | FR0756.01 | FIGURE NO. | 3 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F09 |




1953 HISTORICAL AERIAL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

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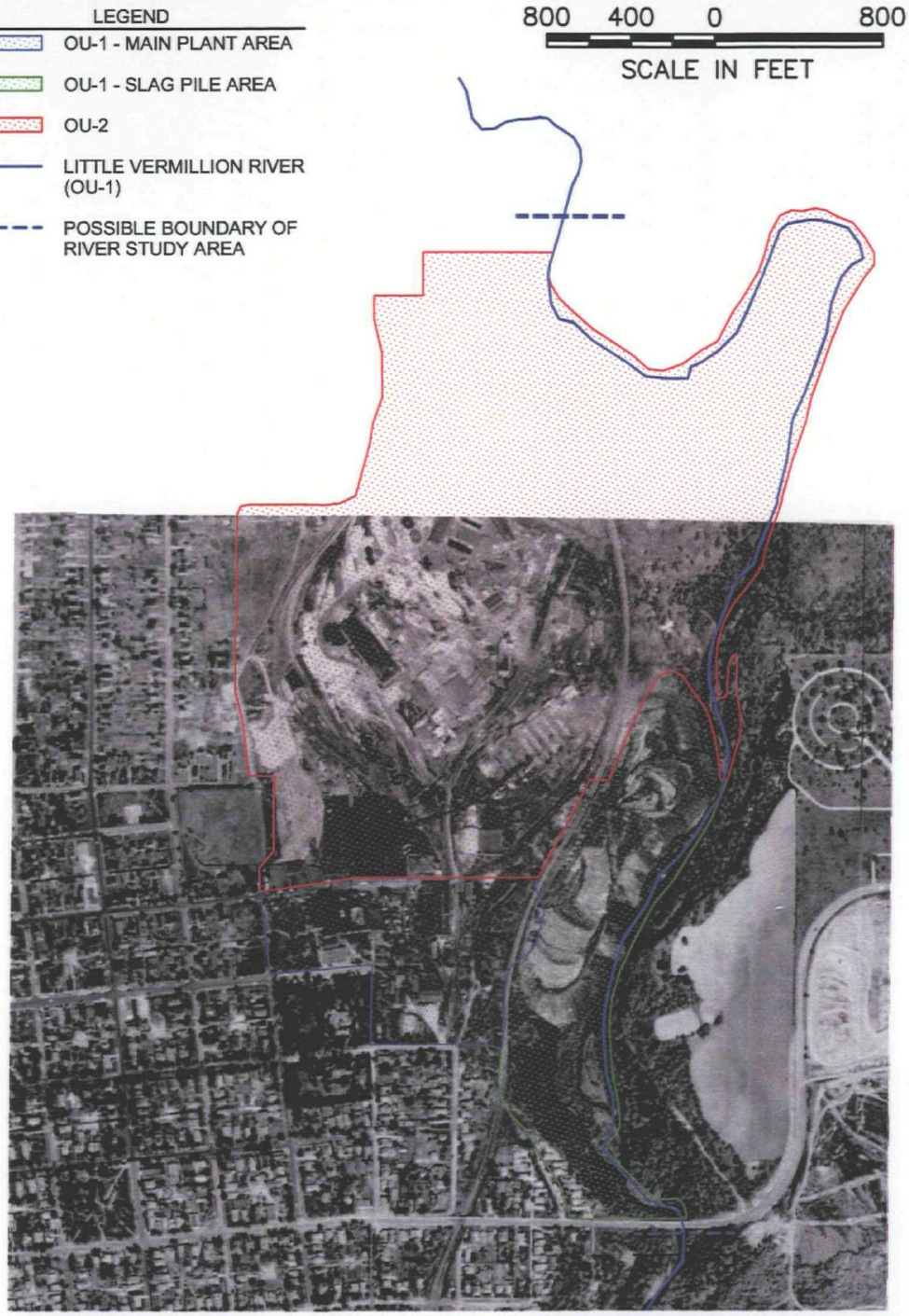
| DOCUMENT NO. | | FILE NO. | FR0756.01F09 |




1958 HISTORICAL AERIAL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

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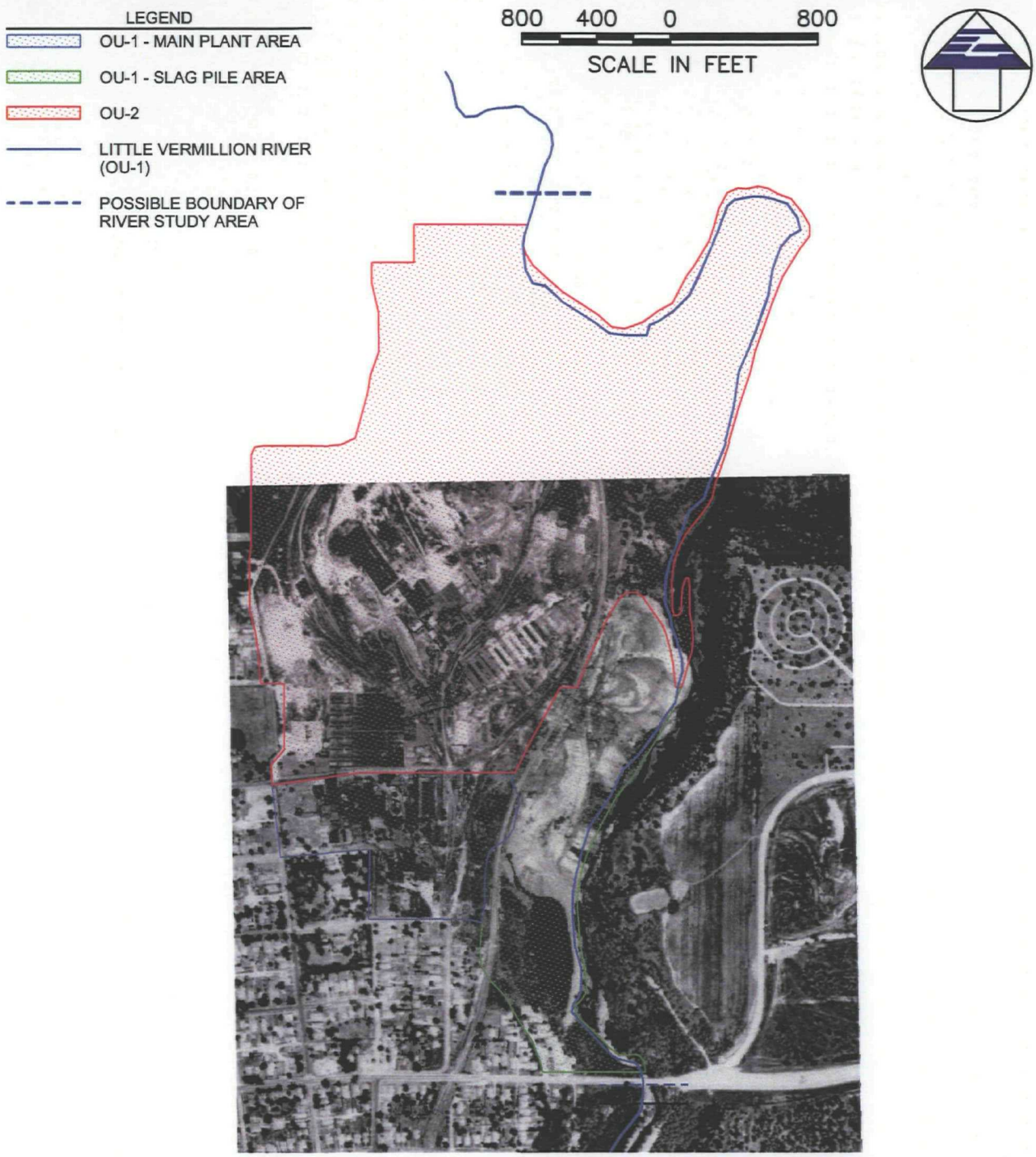


1964 HISTORICAL AERIAL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

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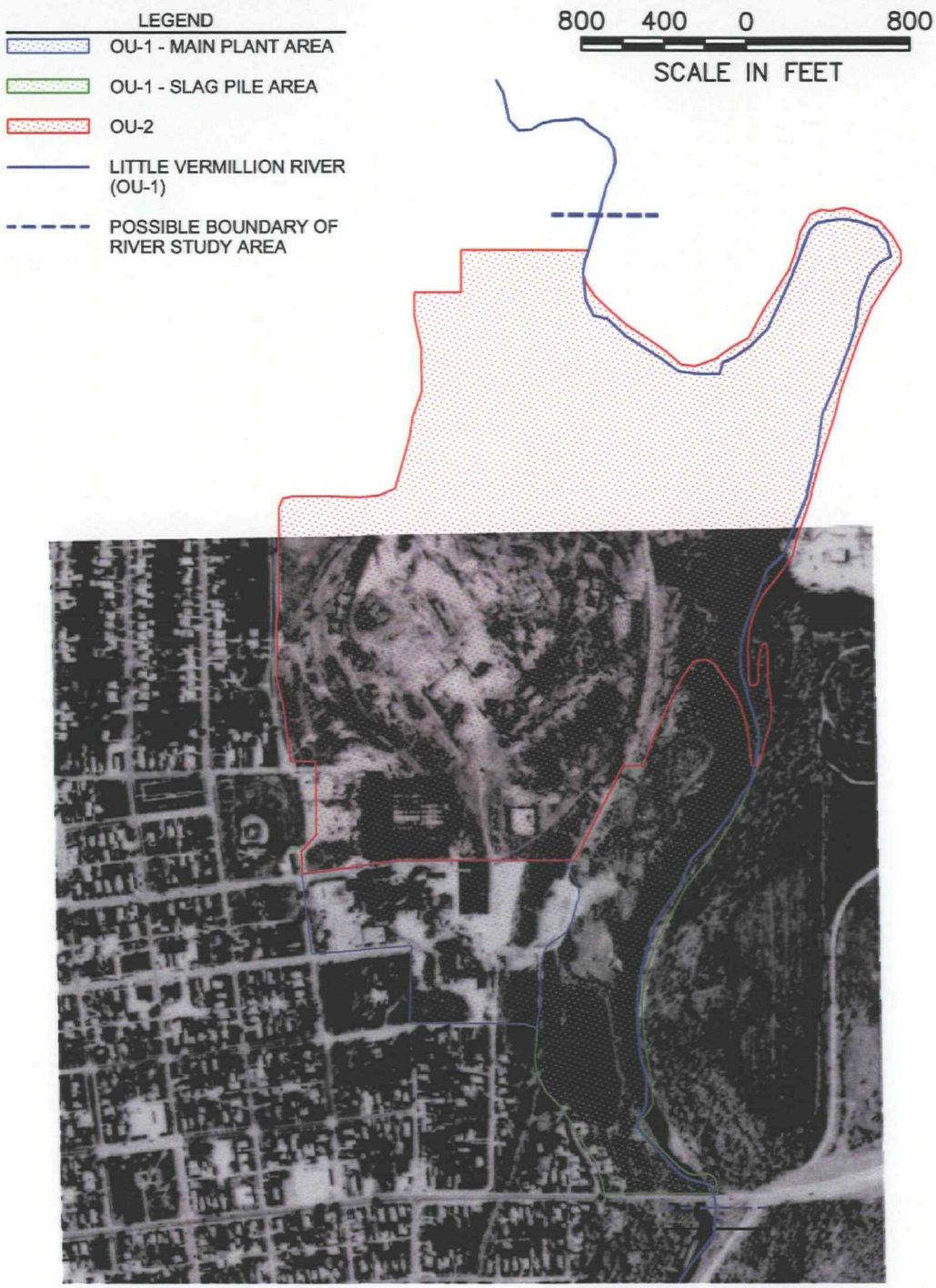
| PROJECT NO. | FR0756.01 | FIGURE NO. | 6 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F09 |




1988 HISTORICAL AERIAL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

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| PROJECT NO. | FR0756.01 | FIGURE NO. | 7 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F09 |

LASALLE ROLLING MILLS

9TH STREET

8TH STREET

7TH STREET

STERLING STREET

UNION STREET

MAIN PLANT AREA

M&H LAB

OIL STORAGE & DIKE

EMERGENCY STORAGE AREA

EMERGENCY CONTAINMENT POND

ILLINOIS CENTRAL RAILROAD GRADE

HOLDING POND

LITTLE VERMILION RIVER

120 60 0 120

SCALE IN FEET

## LEGEND

| | | | |
|---|---|---|---|
| X X X | FENCE | G-101 ⊕ | MONITORING WELLS INSTALLED BEFORE NOVEMBER 1993 |
| C-7 ◉ | BORINGS INSTALLED DURING NOVEMBER 1993 | C-8 ▲ | SHALLOW SOIL SAMPLE |
| G-02 ⊕ | MONITORING WELLS INSTALLED DURING NOVEMBER 1993 | 029 | BUILDING NUMBER |

# CROSS-SECTION LOCATIONS

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
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| PROJECT NO. | FR0756.01 | FIGURE NO. | 8 |
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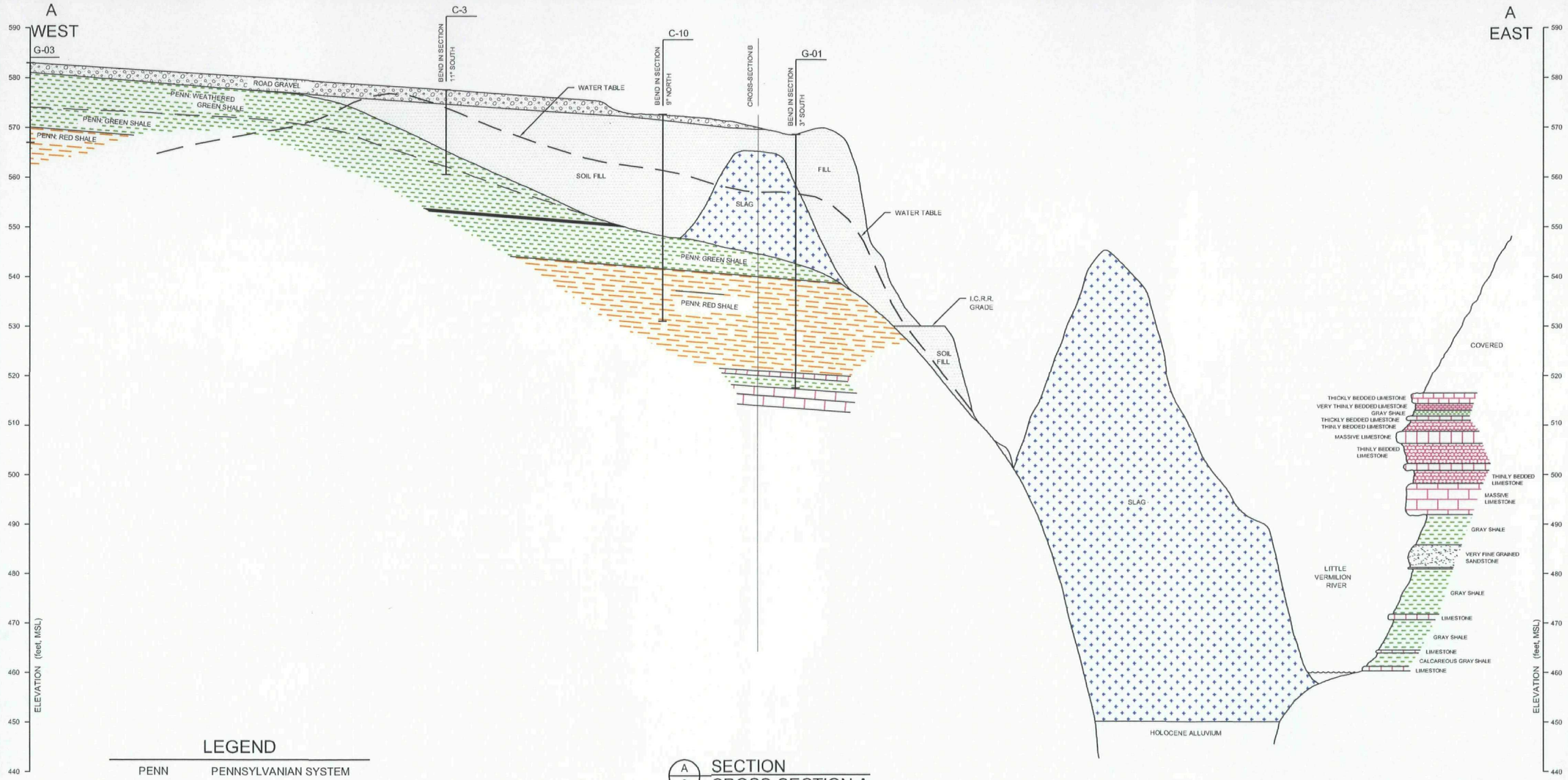


## LEGEND

| | |
|---|---|
| PENN | PENNSYLVANIAN SYSTEM |
| PLEIST | PLEISTOCENE SERIES |
| I.C.R.R. | ILLINOIS CENTRAL RAILROAD |
| | ROAD GRAVEL |
| | FILL |
| | SLAG |
| | GREEN SHALE |
| | RED SHALE |
| | LIMESTONE |
| | SANDSTONE |

(A/3) SECTION
CROSS-SECTION A

120 60 0 120
HORIZONTAL SCALE IN FEET

20 10 0 20
VERTICAL SCALE IN FEET

CROSS-SECTION A

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
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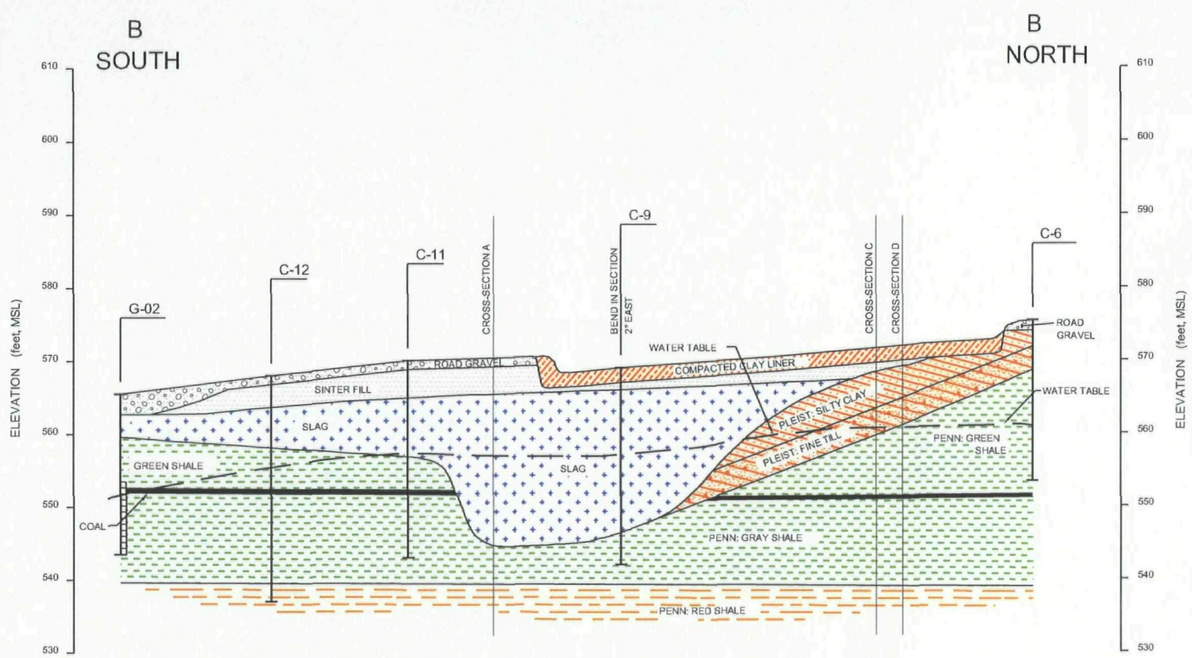
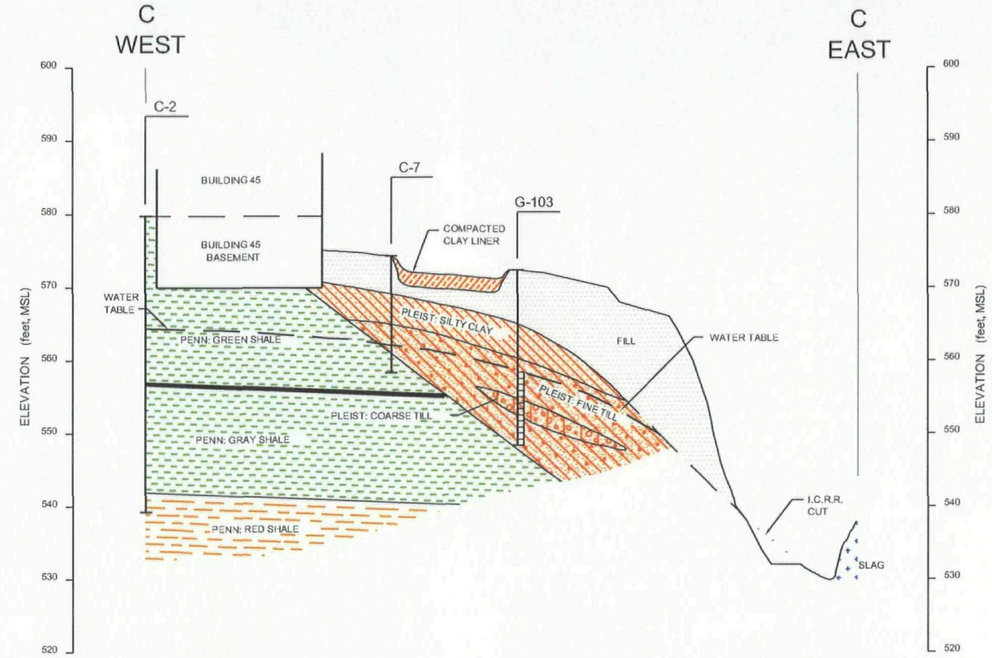
| DOCUMENT NO. | | FILE NO. | FR0756.01F02 |




B/3 SECTION
CROSS-SECTION B

C/3 SECTION
CROSS-SECTION C

## LEGEND

| | |
|---|---|
| PENN | PENNSYLVANIAN SYSTEM |
| PLEIST | PLEISTOCENE SERIES |
| I.C.R.R. | ILLINOIS CENTRAL RAILROAD |
| | ROAD GRAVEL |
| | FILL |
| | SLAG |
| | GREEN SHALE |
| | RED SHALE |
| | LIMESTONE |
| | COMPACTED CLAY LINER |
| | SILTY CLAY |
| | FINE TILL |
| | COARSE TILL |

120 60 0 120
HORIZONTAL SCALE IN FEET

20 10 0 20
VERTICAL SCALE IN FEET

CROSS-SECTION B & C

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

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|---|---|---|---|
| PROJECT NO. | FR0756.01 | FIGURE NO. | 10 |
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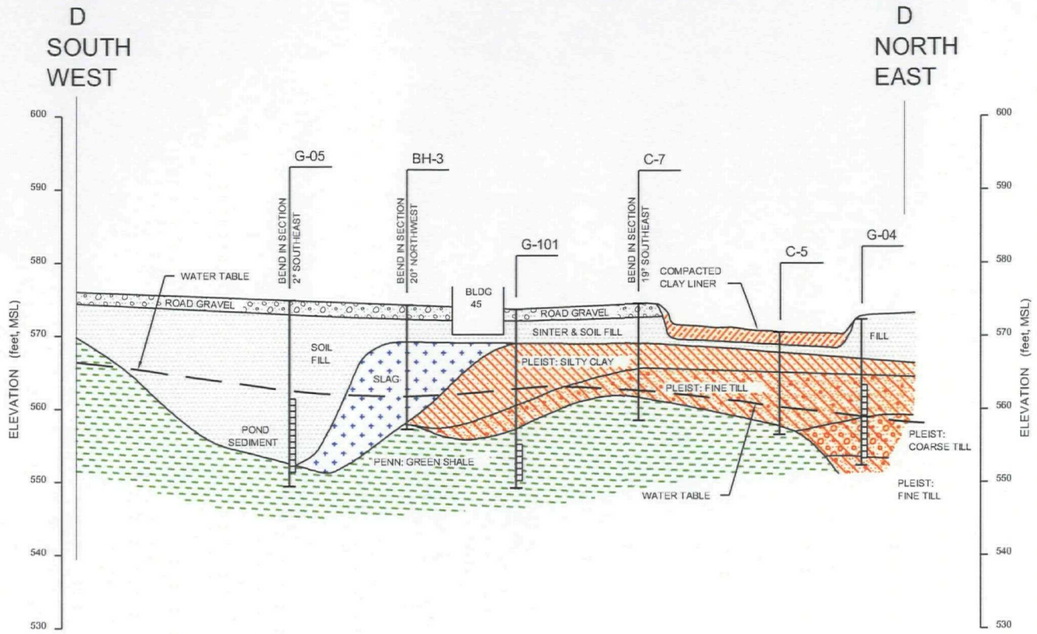
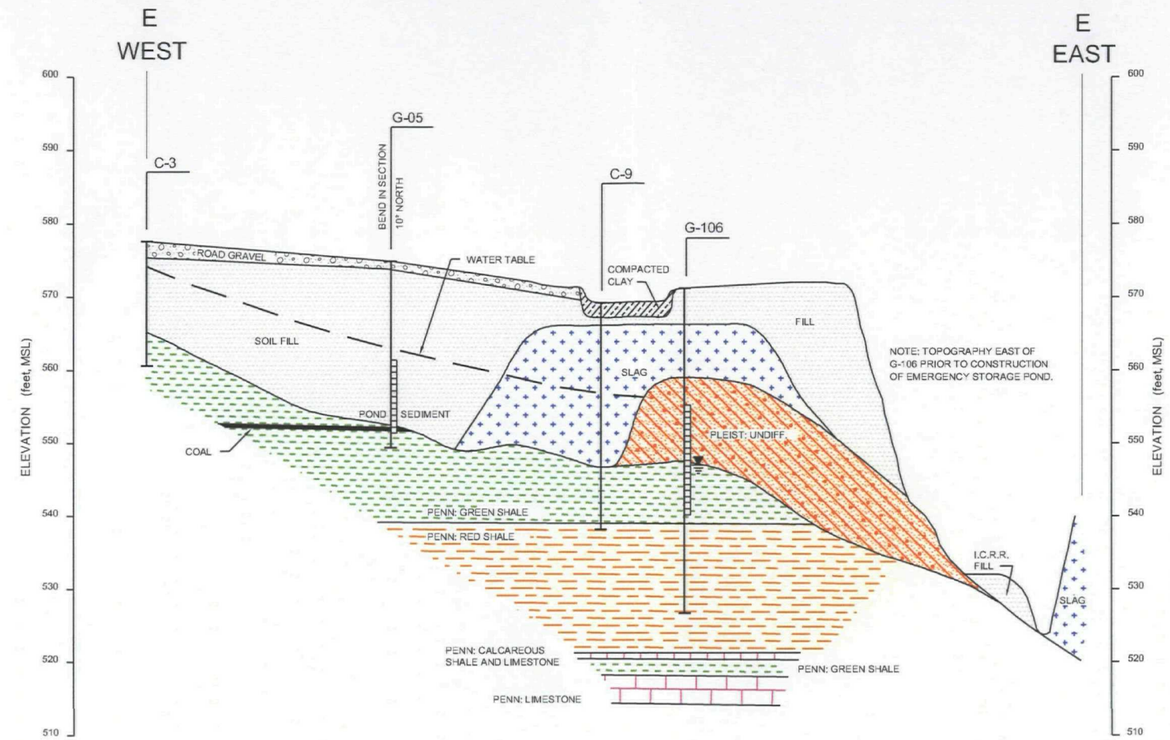



D/3 SECTION
CROSS-SECTION D




E/3 SECTION
CROSS-SECTION E

## LEGEND

| | |
|---|---|
| PENN | PENNSYLVANIAN SYSTEM |
| PLEIST | PLEISTOCENE SERIES |
| I.C.R.R. | ILLINOIS CENTRAL RAILROAD |
| | ROAD GRAVEL |
| | FILL |
| | SLAG |
| | GREEN SHALE |
| | RED SHALE |
| | LIMESTONE |
| | COMPACTED CLAY LINER |
| | SILTY CLAY |
| | FINE TILL |
| | COARSE TILL |

120 60 0 120
HORIZONTAL SCALE IN FEET

20 10 0 20
VERTICAL SCALE IN FEET

CROSS-SECTIONS D & E

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
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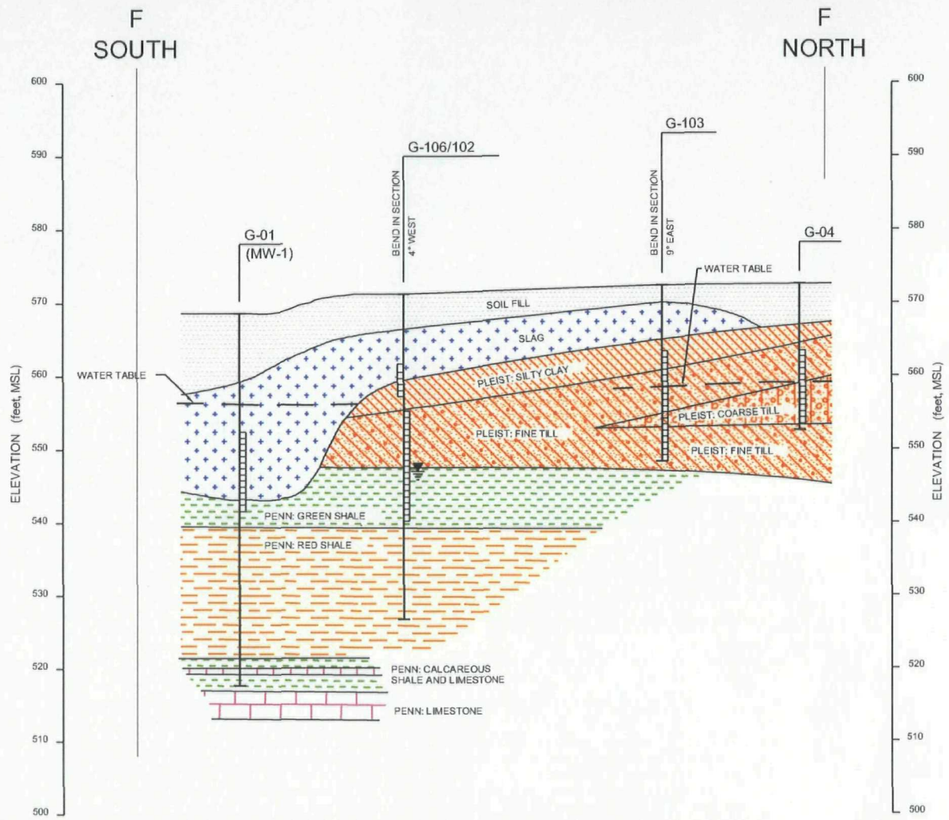
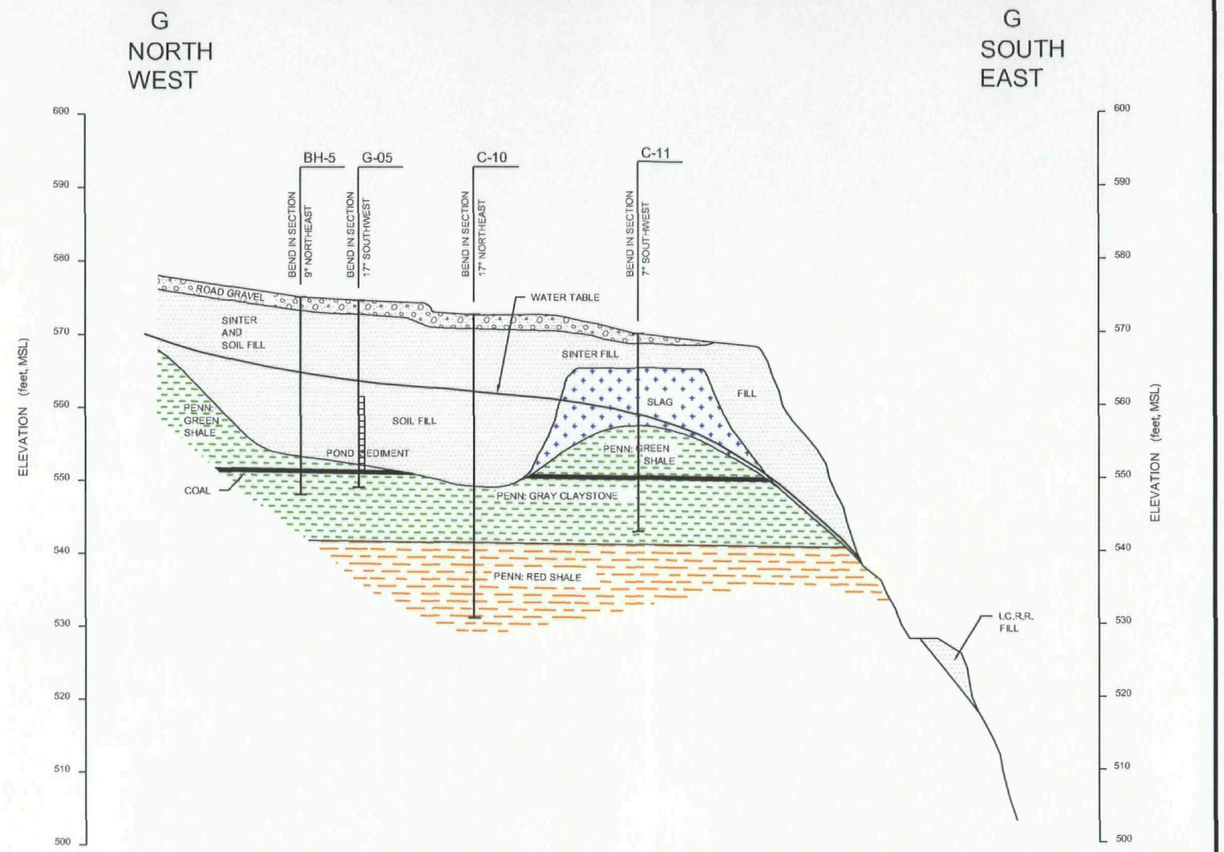



F/3 SECTION
CROSS-SECTION F




G/3 SECTION
CROSS-SECTION G

## LEGEND

| | |
|---|---|
| PENN | PENNSYLVANIAN SYSTEM |
| PLEIST | PLEISTOCENE SERIES |
| I.C.R.R. | ILLINOIS CENTRAL RAILROAD |
| | ROAD GRAVEL |
| | FILL |
| | SLAG |
| | GREEN SHALE |
| | RED SHALE |
| | LIMESTONE |
| | SILTY CLAY |
| | FINE TILL |
| | COARSE TILL |

120 60 0 120
HORIZONTAL SCALE IN FEET

20 10 0 20
VERTICAL SCALE IN FEET

CROSS-SECTION F & G

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
| PROJECT NO. | FR0756.01 | FIGURE NO. | 12 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F04 |

LASALLE ROLLING MILLS

9TH STREET

8TH STREET

7TH STREET

STERLING STREET

UNION STREET

M&H LAB

MAIN PLANT AREA

EMERGENCY STORAGE AREA

EMERGENCY CONTAINMENT POND

ILLINOIS CENTRAL RAILROAD GRADE

HOLDING POND

VERMILION RIVER

LITTLE

570 565 560 555 550 545 540 575 580

120 60 0 120

SCALE IN FEET

## LEGEND

| | |
|---|---|
| FENCE | |
| C-7 | BORINGS INSTALLED DURING NOVEMBER 1993 |
| G-02 | MONITORING WELLS INSTALLED DURING NOVEMBER 1993 |
| G-101 | MONITORING WELLS BEFORE NOVEMBER 1993 |
| C-8 | SHALLOW SOIL SAMPLE |
| 029 | BUILDING NUMBER |
| 570 | BASE CONTOUR OF FILL DEPOSIT |
| | AREA WHERE FILL IS ESTIMATED TO BE MORE THAN 4 FEET THICK |

# CONTOUR MAP OF THE BASE OF THE FILL

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
| PROJECT NO. | FR0756.01 | FIGURE NO. | 13 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F05 |

## LEGEND

| | |
|---|---|
| FENCE | |
| C-7 | BORINGS INSTALLED DURING NOVEMBER 1993 |
| G-02 | MONITORING WELLS INSTALLED DURING NOVEMBER 1993 |
| G-101 | MONITORING WELLS INSTALLED BEFORE NOVEMBER 1993 |
| C-8 | SHALLOW SOIL SAMPLE |
| 029 | BUILDING NUMBER |
| 552 | POTENTIOMETRIC CONTOUR |

## HYDROSTRATIGRAPHIC UNITS

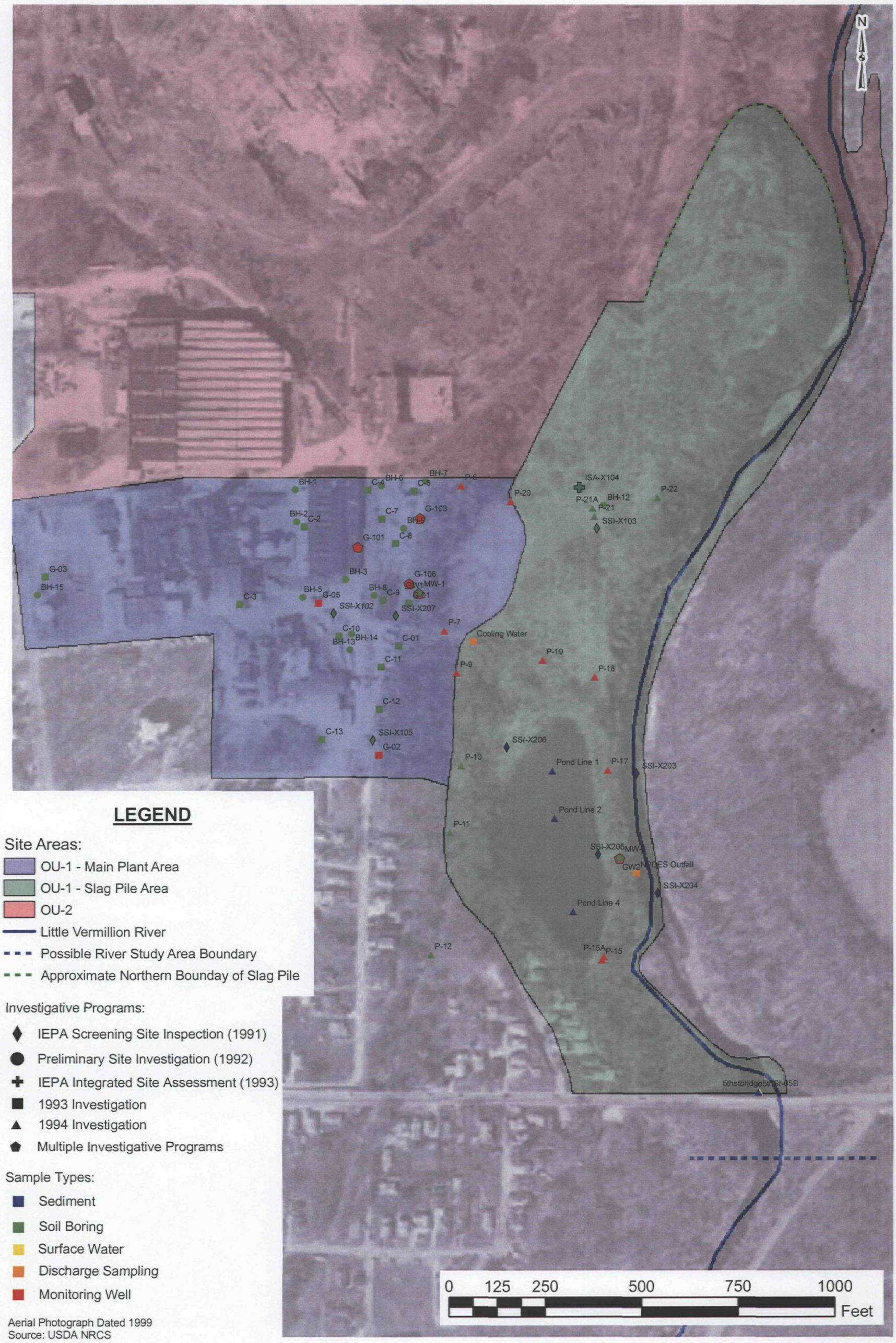
- UNIT I (SLAG)
- UNIT II (FILL)
- UNIT III (WEATHERED GREEN SHALE, COAL, ETC.)
- UNIT IV (FINE TILL)

POTENTIOMETRIC MAP
SHALLOW AQUIFER SYSTEM
ON 17 NOVEMBER 1993

MATTHIESEN AND HEGELER ZINC COMPANY
SUPERFUND SITE
LASALLE, ILLINOIS

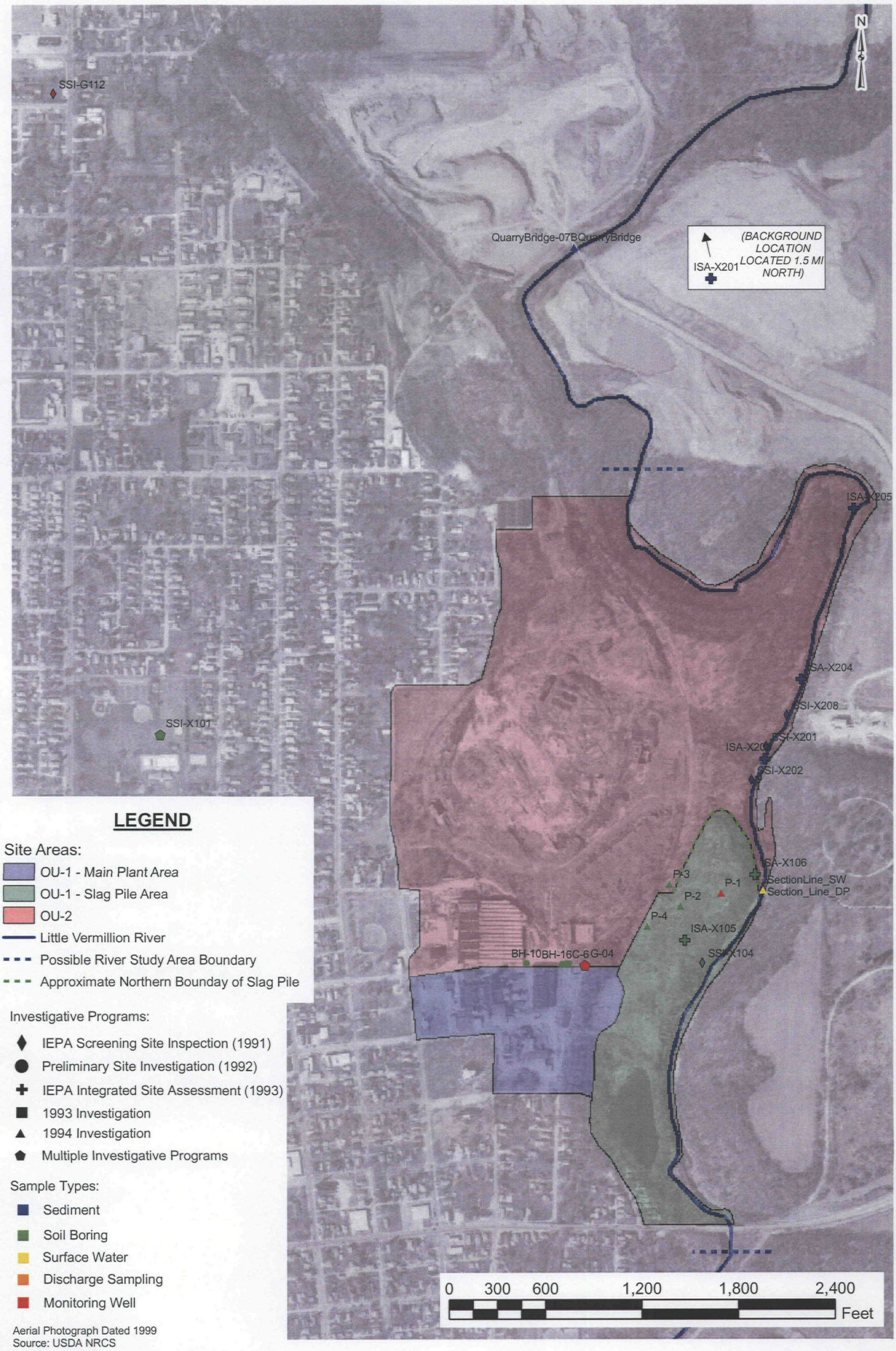
GEOSYNTEC CONSULTANTS
JACKSONVILLE, FLORIDA

| | | | |
|---|---|---|---|
| PROJECT NO. | FR0756.01 | FIGURE NO. | 14 |
| DOCUMENT NO. | | FILE NO. | FR0756.01F06 |




| HISTORICAL SAMPLING LOCATIONS (SOUTHERN) | | PROJECT: M & H ZINC CO. SITE |
|---|---|---|
| | | PROJECT NO: FR0756 |
| FIGURE 15A | GeoSyntec Consultants, Jacksonville, Florida | DATE: 09/25/06 |
| | | DOCUMENT NO: FL050000 |

CARUS®




| HISTORICAL SAMPLING LOCATIONS (NORTHERN) | | PROJECT: M & H ZINC CO. SITE |
|---|---|---|
| | | PROJECT NO: FR0756 |
| FIGURE 15B | GEOSYNTEC CONSULTANTS JACKSONVILLE, FLORIDA | DATE: 09/25/06 |
| | | DOCUMENT NO: FL050000 |

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ENCLOSED
DISK

ARDL inc. applied research & development laboratory

CHEMISTRY • BIOLOGY • PHYSIOLOGY
ENGINEERING • ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115059

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/10/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

    a. Volume 1A - Inorganic Analysis (Total) Data Package
    b. Volume 1B - Inorganic Analysis (TCLP) Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 • Mt. Vernon Airport, Route 15 East • Mt. Vernon, Illinois 62864 • (618) 244-3235 • FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

115059

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS

SAMPLERS: (Signature) John A Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Total Inorganic | TCLP Inorganic | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| G03 - 5 ft | 9Nov93 | | | | 2 | 1 | 1 | | | |
| G03 - 15 ft | ↓ | | | | 2 | 1 | 1 | | | |
| C-9 Surface | ↓ | | | | 2 | 1 | 1 | | | |
| C-9 - 7ft | ↓ | | | | 2 | 1 | 1 | | | |
| C-11 - Surface | ↓ | | | | 2 | 1 | 1 | | | |
| C-11 - 10ft | ↓ | | | | 2 | 1 | 1 | lid cracked - TCLP contained ok | | |
| C-11 - 15ft | ✓ | | | | 2 | 1 | 1 | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John A Raymer | 9Nov93 | 6:00pm | Fedex |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) | Date | Time | Shipping Ticket No. |
| [illegible] | 11/10/93 | 0950 | |

REMARKS/SPECIAL INSTRUCTIONS:

Total Inorganics = TAL metals (23) + CN

TCLP Inorg = TAL metals (23) less Na

Full CLP Report

Per Nandra Weeks std TA

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-5FT

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-1

Level (low/med): LOW Date Received: 11/10/93

% 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 | 15000 | | | P |
| 7440-36-0 | Antimony | 5.8 | U | N | P |
| 7440-38-2 | Arsenic | 4.0 | B | N W | F |
| 7440-39-3 | Barium | 179 | | * | P |
| 7440-41-7 | Beryllium | 1.1 | B | | P |
| 7440-43-9 | Cadmium | 0.93 | U | | P |
| 7440-70-2 | Calcium | 38100 | | * | P |
| 7440-47-3 | Chromium | 26.8 | | N | P |
| 7440-48-4 | Cobalt | 10.9 | B | | P |
| 7440-50-8 | Copper | 46.8 | | N | P |
| 7439-89-6 | Iron | 25700 | | | P |
| 7439-92-1 | Lead | 20.9 | | * | F |
| 7439-95-4 | Magnesium | 10600 | | | P |
| 7439-96-5 | Manganese | 417 | | N * | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 29.4 | | | P |
| 7440-09-7 | Potassium | 2740 | | | P |
| 7782-49-2 | Selenium | 1.2 | U | N W | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 210 | U | | P |
| 7440-28-0 | Thallium | 0.23 | U | | F |
| 7440-62-2 | Vanadium | 30.0 | | N | P |
| 7440-66-6 | Zinc | 45.5 | | * | P |
| | Cyanide | 0.53 | U | | C |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-5FT

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-1

Level (low/med): LOW Date Received: 11/10/93

% Solids: 85.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 498 | | | |
| Sulfide | | 8.4 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-15FT

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-2

Level (low/med): LOW Date Received: 11/10/93

% Solids: 94.6

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 10900 | | | P |
| 7440-36-0 | Antimony | 5.3 | U | N | P |
| 7440-38-2 | Arsenic | 1.1 | U | N W | F |
| 7440-39-3 | Barium | 19.9 | B | * | P |
| 7440-41-7 | Beryllium | 0.57 | B | | P |
| 7440-43-9 | Cadmium | 0.97 | B | | P |
| 7440-70-2 | Calcium | 78800 | | * | P |
| 7440-47-3 | Chromium | 23.1 | | N | P |
| 7440-48-4 | Cobalt | 8.2 | B | | P |
| 7440-50-8 | Copper | 11.9 | | N | P |
| 7439-89-6 | Iron | 24000 | | | P |
| 7439-92-1 | Lead | 2.9 | | * S | F |
| 7439-95-4 | Magnesium | 11700 | | | P |
| 7439-96-5 | Manganese | 1560 | | N * | P |
| 7439-97-6 | Mercury | 0.10 | U | | CV |
| 7440-02-0 | Nickel | 27.2 | | | P |
| 7440-09-7 | Potassium | 2320 | | | P |
| 7782-49-2 | Selenium | 0.21 | U | N W | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 336 | B | | P |
| 7440-28-0 | Thallium | 0.21 | U | | F |
| 7440-62-2 | Vanadium | 13.5 | | N | P |
| 7440-66-6 | Zinc | 39.4 | | * | P |
| | Cyanide | 0.52 | U | | C |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-15FT

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-2

Level (low/med): LOW Date Received: 11/10/93

% Solids: 94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 527 | | | |
| Sulfide | | 5.7 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-SURFACE

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-3

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.5

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 9260 | | | P |
| 7440-36-0 | Antimony | 5.6 | U | N | P |
| 7440-38-2 | Arsenic | 3.3 | B | N W | F |
| 7440-39-3 | Barium | 29.3 | B | * | P |
| 7440-41-7 | Beryllium | 0.54 | B | | P |
| 7440-43-9 | Cadmium | 0.90 | U | | P |
| 7440-70-2 | Calcium | 62300 | | * | P |
| 7440-47-3 | Chromium | 16.6 | | N | P |
| 7440-48-4 | Cobalt | 12.1 | | | P |
| 7440-50-8 | Copper | 12.8 | | N | P |
| 7439-89-6 | Iron | 14300 | | | P |
| 7439-92-1 | Lead | 6.2 | | * | F |
| 7439-95-4 | Magnesium | 12000 | | | P |
| 7439-96-5 | Manganese | 1530 | | N * | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 30.4 | | | P |
| 7440-09-7 | Potassium | 3010 | | | P |
| 7782-49-2 | Selenium | 1.1 | U | N W | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 203 | U | | P |
| 7440-28-0 | Thallium | 0.23 | U | | F |
| 7440-62-2 | Vanadium | 13.5 | | N | P |
| 7440-66-6 | Zinc | 49.1 | | * | P |
| | Cyanide | 0.55 | U | | C |

Color Before: GREY Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-SURFACE

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-3

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 767 | | | |
| Sulfide | | 5.7 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-7FT

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-4

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.2

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 11600 | | | P |
| 7440-36-0 | Antimony | 5.7 | U | N | P |
| 7440-38-2 | Arsenic | 8.2 | B | N | F |
| 7440-39-3 | Barium | 81.9 | | * | P |
| 7440-41-7 | Beryllium | 2.4 | | | P |
| 7440-43-9 | Cadmium | 8.3 | | | P |
| 7440-70-2 | Calcium | 20200 | | * | P |
| 7440-47-3 | Chromium | 22.6 | | N | P |
| 7440-48-4 | Cobalt | 6.9 | B | | P |
| 7440-50-8 | Copper | 54.1 | | N | P |
| 7439-89-6 | Iron | 41000 | | | P |
| 7439-92-1 | Lead | 79.1 | | | P |
| 7439-95-4 | Magnesium | 693 | B | | P |
| 7439-96-5 | Manganese | 81.0 | | N * | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 16.8 | | | P |
| 7440-09-7 | Potassium | 5330 | | | P |
| 7782-49-2 | Selenium | 1.1 | U | N W | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 1050 | B | | P |
| 7440-28-0 | Thallium | 0.23 | U | | F |
| 7440-62-2 | Vanadium | 53.7 | | N | P |
| 7440-66-6 | Zinc | 506 | | * | P |
| | Cyanide | 0.54 | U | | C |

Color Before: RED Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-7FT

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-4

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 8640 | | | |
| Sulfide | | 16.7 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-SURFACE

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-5

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 4580 | | | P |
| 7440-36-0 | Antimony | 5.6 | U | N | P |
| 7440-38-2 | Arsenic | 21.1 | | N | F |
| 7440-39-3 | Barium | 217 | | * | P |
| 7440-41-7 | Beryllium | 0.76 | B | | P |
| 7440-43-9 | Cadmium | 38.3 | | | P |
| 7440-70-2 | Calcium | 16300 | | * | P |
| 7440-47-3 | Chromium | 22.1 | | N | P |
| 7440-48-4 | Cobalt | 16.0 | | | P |
| 7440-50-8 | Copper | 232 | | N | P |
| 7439-89-6 | Iron | 59100 | | | P |
| 7439-92-1 | Lead | 3660 | | | P |
| 7439-95-4 | Magnesium | 5190 | | | P |
| 7439-96-5 | Manganese | 1480 | | N * | P |
| 7439-97-6 | Mercury | 1.8 | | | CV |
| 7440-02-0 | Nickel | 21.8 | | | P |
| 7440-09-7 | Potassium | 1470 | | | P |
| 7782-49-2 | Selenium | 2.4 | B | N E | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 334 | B | | P |
| 7440-28-0 | Thallium | 0.25 | B | | F |
| 7440-62-2 | Vanadium | 28.1 | | N | P |
| 7440-66-6 | Zinc | 8550 | | * | P |
| | Cyanide | 0.56 | U | | C |

Color Before: BLACK Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-SURFACE

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-5

Level (low/med): LOW Date Received: 11/10/93

% Solids: 88.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 10800 | | | |
| Sulfide | | 5.7 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-10FT

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-6

Level (low/med): LOW Date Received: 11/10/93

% Solids: 91.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 23100 | | | P |
| 7440-36-0 | Antimony | 5.5 | U | N | P |
| 7440-38-2 | Arsenic | 6.7 | B | N | F |
| 7440-39-3 | Barium | 79.9 | | * | P |
| 7440-41-7 | Beryllium | 2.9 | | | P |
| 7440-43-9 | Cadmium | 2.4 | | | P |
| 7440-70-2 | Calcium | 25500 | | * | P |
| 7440-47-3 | Chromium | 6.1 | | N | P |
| 7440-48-4 | Cobalt | 3.5 | B | | P |
| 7440-50-8 | Copper | 27.1 | | N | P |
| 7439-89-6 | Iron | 9980 | | | P |
| 7439-92-1 | Lead | 77.4 | | | P |
| 7439-95-4 | Magnesium | 2390 | | | P |
| 7439-96-5 | Manganese | 122 | | N * | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 7.2 | B | | P |
| 7440-09-7 | Potassium | 572 | B | | P |
| 7782-49-2 | Selenium | 1.1 | U | N W | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 1130 | | | P |
| 7440-28-0 | Thallium | 0.22 | U | | F |
| 7440-62-2 | Vanadium | 26.8 | | N | P |
| 7440-66-6 | Zinc | 2160 | | * | P |
| | Cyanide | 0.52 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-10FT

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-6

Level (low/med): LOW Date Received: 11/10/93

% Solids: 91.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 4140 | | | |
| Sulfide | | 5.8 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-15FT

Lab Name: ARDL, INC. Contract No.: 115059A

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) SOIL Lab Sample ID: 115059A-7

Level (low/med): LOW Date Received: 11/10/93

% 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 | 14600 | | | P |
| 7440-36-0 | Antimony | 6.1 | U | N | P |
| 7440-38-2 | Arsenic | 2.8 | B | N S | F |
| 7440-39-3 | Barium | 59.2 | | * | P |
| 7440-41-7 | Beryllium | 1.1 | B | | P |
| 7440-43-9 | Cadmium | 20.9 | | | P |
| 7440-70-2 | Calcium | 103000 | | * | P |
| 7440-47-3 | Chromium | 40.0 | | N | P |
| 7440-48-4 | Cobalt | 16.4 | | | P |
| 7440-50-8 | Copper | 29.5 | | N | P |
| 7439-89-6 | Iron | 18600 | | | P |
| 7439-92-1 | Lead | 510 | | | P |
| 7439-95-4 | Magnesium | 5080 | | | P |
| 7439-96-5 | Manganese | 1440 | | N * | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 48.6 | | | P |
| 7440-09-7 | Potassium | 2570 | | | P |
| 7782-49-2 | Selenium | 1.2 | U | N W | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 591 | B | | P |
| 7440-28-0 | Thallium | 0.24 | U | | F |
| 7440-62-2 | Vanadium | 28.4 | | N | P |
| 7440-66-6 | Zinc | 3490 | | * | P |
| | Cyanide | 0.60 | U | | C |

Color Before: GREY Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-15FT

Lab Name: ARDL, INC. Contract: 115059A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water): SOIL Lab Sample ID: 115059A-7

Level (low/med): LOW Date Received: 11/10/93

% Solids: 82.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1830 | | | |
| Sulfide | | 5.6 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-5FT

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-1

Level (low/med): LOW Date Received: 11/10/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 2410 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 677000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 9.1 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 29000 | | | P |
| 7439-96-5 | Manganese | 1810 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 2000 | U | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 3.2 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 277 | | E | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: SMALL ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G03-15FT

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-2

Level (low/med): LOW Date Received: 11/10/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 422 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 684000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 39000 | | | P |
| 7439-96-5 | Manganese | 6350 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 8270 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.6 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 66.2 | | E | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-SURFACE

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-3

Level (low/med): LOW Date Received: 11/10/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1270.0 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 684000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 7.2 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 30900 | | | P |
| 7439-96-5 | Manganese | 6570 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 43500 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 6.1 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 87.9 | | E | P |
| | Cyanide | | | | NR |

Color Before: GREY Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-9-7FT

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-4

Level (low/med): LOW Date Received: 11/10/93

% 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 | 4710 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 82.5 | B | | P |
| 7440-41-7 | Beryllium | 4.3 | B | | P |
| 7440-43-9 | Cadmium | 108 | | | P |
| 7440-70-2 | Calcium | 637000 | | E | P |
| 7440-47-3 | Chromium | 5.5 | B | | P |
| 7440-48-4 | Cobalt | 28.7 | B | | P |
| 7440-50-8 | Copper | 96.7 | | | P |
| 7439-89-6 | Iron | 3170 | | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 45200 | | | P |
| 7439-96-5 | Manganese | 3000 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 26.8 | B | | P |
| 7440-09-7 | Potassium | 7680 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.0 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 2780 | | E | P |
| | Cyanide | | | | NR |

Color Before: RED Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-15FT

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-7

Level (low/med): LOW Date Received: 11/10/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 86.3 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 7.5 | | | P |
| 7440-70-2 | Calcium | 190000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 6810 | | | P |
| 7439-96-5 | Manganese | 819 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 13100 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 1.5 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 84.4 | | E | P |
| | Cyanide | | | | NR |

Color Before: GREY Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-10FT

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-6

Level (low/med): LOW Date Received: 11/10/93

% 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 | 1040 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 126 | B | | P |
| 7440-41-7 | Beryllium | 1.7 | B | | P |
| 7440-43-9 | Cadmium | 125 | | | P |
| 7440-70-2 | Calcium | 287000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 21.6 | B | | P |
| 7440-50-8 | Copper | 123 | | | P |
| 7439-89-6 | Iron | 190 | | | P |
| 7439-92-1 | Lead | 567 | | | P |
| 7439-95-4 | Magnesium | 25700 | | | P |
| 7439-96-5 | Manganese | 1390 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.1 | B | | P |
| 7440-09-7 | Potassium | 2630 | B | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 2.4 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 100000 | | E | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-11-SURFACE

Lab Name: ARDL, INC. Contract No.: 115059B

Lab Code: _____ SAS No.: _____ SDG No.: 03-5FT

Matrix (soil/water) WATER Lab Sample ID: 115059B-5

Level (low/med): LOW Date Received: 11/10/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 177 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 445 | | | P |
| 7440-70-2 | Calcium | 790000 | | E | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 11.9 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 178 | | | P |
| 7439-95-4 | Magnesium | 31100 | | | P |
| 7439-96-5 | Manganese | 5910 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 11.4 | B | | P |
| 7440-09-7 | Potassium | 14600 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 5.2 | B | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 69100 | | E | P |
| | Cyanide | | | | NR |

Color Before: BLACK Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

ARDL inc.
applied research & development laboratory

CHEMISTRY • BIOLOGY • PHYSIOLOGY
ENGINEERING • ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115063

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/11/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis (Total) Data Package
   b. Volume 1B - Inorganic Analysis (TCLP) Data Package
   c. Volume 2 - Organic Analysis Data Package
   d. Volume 3 - VOA Analysis Data Package
   e. Volume 4 - BNA Analysis Data Package
   f. Volume 5 - Pesticide/PCB Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

P.O. Box 1566 • Mt. Vernon Airport, Route 15 East • Mt. Vernon, Illinois 62864 • (618) 244-3235 • FAX (618) 244-1149

# Chain of Custody Record

DATE RECEIVED

VOA
BNA
Pest/PCB

| Project Name / Project No. | |
|---|---|
| Carus | * Analyze both samples for TCL, ~~metals~~ (everything) |
| Samplers Signature | * Analyze also for TCLP metals as per telephone discussion |
| John H Rayner | |

| FIELD LAB NO. | LAB I.D. NO. | COLLECTION DATE | TIME | LOCATION | SAMPLE TYPE/DESCRIPTION | ANALYSIS REQUIRED |
|---|---|---|---|---|---|---|
| C-10-7 | | 10 Nov 93 | 9:00 | | TCLP & Total Metals | |
| C-10-Surface | | ↓ | 8:30 | | TCL | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |

Please send about 20 chain of custody forms

Was Shipping Container Intact When Received By Lab? Yes ____ No ____ Initials ____ Total No. of Containers _____

| RELINQUISHED BY (Signature) | DATE / TIME | RECEIVED BY (Signature) |
|---|---|---|
| John H Rayner | 10 Nov 93 | Fedex |
| | 11/11/93 - 0930 | [illegible] |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

WERE ALL INDIVIDUAL SAMPLE SEALS INTACT?
YES ~~X~~ NO X none
IF NO, INDICATE SAMPLE NUMBERS ON WHICH SEALS WERE BROKEN AT TIME OF RECEIPT.

ANALYST _____ DATE _____
Signature

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: >J6045

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 Date Analyzed: 11/16/93

GC column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12. | U |
| 74-83-9 | Bromomethane | 12. | U |
| 75-01-4 | Vinyl Chloride | 12. | U |
| 75-00-3 | Chloroethane | 12. | U |
| 75-09-2 | Methylene Chloride | 12. | U |
| 67-64-1 | Acetone | 12. | U |
| 75-15-0 | Carbon Disulfide | 12. | U |
| 75-35-4 | 1,1-Dichloroethene | 12. | U |
| 75-34-3 | 1,1-Dichloroethane | 12. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12. | U |
| 67-66-3 | Chloroform | 12. | U |
| 107-06-2 | 1,2-Dichloroethane | 12. | U |
| 78-93-3 | 2-Butanone | 12. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 12. | U |
| 56-23-5 | Carbon Tetrachloride | 12. | U |
| 75-27-4 | Bromodichloromethane | 12. | U |
| 78-87-5 | 1,2-Dichloropropane | 12. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12. | U |
| 79-01-6 | Trichloroethene | 12. | U |
| 124-48-1 | Dibromochloromethane | 12. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12. | U |
| 71-43-2 | Benzene | 12. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12. | U |
| 75-25-2 | Bromoform | 12. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12. | U |
| 591-78-6 | 2-Hexanone | 12. | U |
| 127-18-4 | Tetrachloroethene | 12. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12. | U |
| 108-88-3 | Toluene | 12. | U |
| 108-90-7 | Chlorobenzene | 12. | U |
| 100-41-4 | Ethylbenzene | 12. | U |
| 100-42-5 | Styrene | 12. | U |
| 1330-20-7 | Xylene (total) | 12. | U |

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: >J6045

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 4.92 | 10. | J B |
| 2. | UNKNOWN | 6.43 | 8. | J |
| 3. | | | | |
| 4. | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: >J6046

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 Date Analyzed: 11/16/93

GC column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 12. | U |
| 74-83-9 | Bromomethane | 12. | U |
| 75-01-4 | Vinyl Chloride | 12. | U |
| 75-00-3 | Chloroethane | 12. | U |
| 75-09-2 | Methylene Chloride | 12. | U |
| 67-64-1 | Acetone | 9. | JB |
| 75-15-0 | Carbon Disulfide | 12. | U |
| 75-35-4 | 1,1-Dichloroethene | 12. | U |
| 75-34-3 | 1,1-Dichloroethane | 12. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 12. | U |
| 67-66-3 | Chloroform | 12. | U |
| 107-06-2 | 1,2-Dichloroethane | 12. | U |
| 78-93-3 | 2-Butanone | 12. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 12. | U |
| 56-23-5 | Carbon Tetrachloride | 12. | U |
| 75-27-4 | Bromodichloromethane | 12. | U |
| 78-87-5 | 1,2-Dichloropropane | 12. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 12. | U |
| 79-01-6 | Trichloroethene | 12. | U |
| 124-48-1 | Dibromochloromethane | 12. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 12. | U |
| 71-43-2 | Benzene | 12. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 12. | U |
| 75-25-2 | Bromoform | 12. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 12. | U |
| 591-78-6 | 2-Hexanone | 12. | U |
| 127-18-4 | Tetrachloroethene | 12. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 12. | U |
| 108-88-3 | Toluene | 12. | U |
| 108-90-7 | Chlorobenzene | 12. | U |
| 100-41-4 | Ethylbenzene | 12. | U |
| 100-42-5 | Styrene | 12. | U |
| 1330-20-7 | Xylene (total) | 12. | U |

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0842

Level: (low/med) LOW Date Received: 11/22/93

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.2 Conversion Factor: 1.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 400. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 400. | U |
| 95-57-8 | 2-Chlorophenol | 400. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 400. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 400. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 400. | U |
| 95-48-7 | 2-Methylphenol | 400. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 400. | U |
| 106-44-5 | 4-Methylphenol | 400. | U |
| 621-64-7 | N-Nitroso-Di-n-propylamine | 400. | U |
| 67-72-1 | Hexachloroethane | 400. | U |
| 98-95-3 | Nitrobenzene | 400. | U |
| 78-59-1 | Isophorone | 400. | U |
| 88-75-5 | 2-Nitrophenol | 400. | U |
| 105-67-9 | 2,4-Dimethylphenol | 400. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 400. | U |
| 120-83-2 | 2,4-Dichlorophenol | 400. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 400. | U |
| 91-20-3 | Naphthalene | 400. | U |
| 106-47-8 | 4-Chloroaniline | 400. | U |
| 87-68-3 | Hexachlorobutadiene | 400. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 400. | U |
| 91-57-6 | 2-Methylnaphthalene | 400. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 400. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 400. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 980. | U |
| 91-58-7 | 2-Chloronaphthalene | 400. | U |
| 88-74-4 | 2-Nitroaniline | 980. | U |
| 131-11-3 | Dimethylphthalate | 400. | U |
| 208-96-8 | Acenaphthylene | 400. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 400. | U |
| 99-09-2 | 3-Nitroaniline | 980. | U |
| 83-32-9 | Acenaphthene | 400. | U |

1E

# VOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-2

Sample wt/vol: 5.0 (g/mL) G Lab File ID: >J6046

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 4.83 | 20. | J B |
| 2. | UNKNOWN | 6.52 | 8. | J |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |
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| 30. | | | | |

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0842

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.2 Conversion Factor: 1.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 980. | U |
| 100-02-7 | 4-Nitrophenol | 980. | U |
| 132-64-9 | Dibenzofuran | 400. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 400. | U |
| 84-66-2 | Diethylphthalate | 400. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 400. | U |
| 86-73-7 | Fluorene | 400. | U |
| 100-01-6 | 4-Nitroaniline | 980. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 980. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 400. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 400. | U |
| 118-74-1 | Hexachlorobenzene | 400. | U |
| 87-86-5 | Pentachlorophenol | 980. | U |
| 85-01-8 | Phenanthrene | 400. | U |
| 120-12-7 | Anthracene | 400. | U |
| 86-74-8 | Carbazole | 400. | U |
| 84-74-2 | Di-n-butylphthalate | 71. | J |
| 206-44-0 | Fluoranthene | 39. | J |
| 129-00-0 | Pyrene | 46. | J |
| 85-68-7 | Butylbenzylphthalate | 400. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 400. | U |
| 56-55-3 | Benzo(a)anthracene | 400. | U |
| 218-01-9 | Chrysene | 400. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 230. | J |
| 117-84-0 | Di-n-octylphthalate | 400. | U |
| 205-99-2 | Benzo(b)fluoranthene | 41. | J |
| 207-08-9 | Benzo(k)fluoranthene | 35. | J |
| 50-32-8 | Benzo(a)pyrene | 400. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 400. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 400. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 400. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-1

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0842

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 decanted:(Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.2

Number TICs found: 14

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 5.31 | 1000. | J |
| 2. | UNKNOWN | 5.68 | 200. | J |
| 3. | UNKNOWN | 5.86 | 500. | J B |
| 4. | UNKNOWN | 6.55 | 10000. | J B |
| 5. | UNKNOWN | 9.12 | 2000. | J |
| 6. | UNKNOWN | 14.68 | 90. | J |
| 7. | UNKNOWN | 17.43 | 100. | J |
| 8. | UNKNOWN | 17.48 | 200. | J |
| 9. | UNKNOWN | 18.65 | 3000. | J |
| 10. | UNKNOWN ALKANE | 19.02 | 100. | J |
| 11. | UNKNOWN | 22.09 | 500. | J |
| 12. | UNKNOWN | 24.46 | 90. | J |
| 13. | UNKNOWN | 27.25 | 9000. | J |
| 14. | UNKNOWN | 33.91 | 600. | J |
| 15. | | | | |
| 16. | | | | |
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| 29. | | | | |
| 30. | | | | |

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-2

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0845

Level: (low/med) LOW Date Received: 11/22/93

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.1 Conversion Factor: 1.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 400. | U |
| 111-44-4 | bis(2-Chloroethyl)ether | 400. | U |
| 95-57-8 | 2-Chlorophenol | 400. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 400. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 400. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 400. | U |
| 95-48-7 | 2-Methylphenol | 400. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 400. | U |
| 106-44-5 | 4-Methylphenol | 400. | U |
| 621-64-7 | N-Nitroso-Di-n-propylamine | 400. | U |
| 67-72-1 | Hexachloroethane | 400. | U |
| 98-95-3 | Nitrobenzene | 400. | U |
| 78-59-1 | Isophorone | 400. | U |
| 88-75-5 | 2-Nitrophenol | 400. | U |
| 105-67-9 | 2,4-Dimethylphenol | 400. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 400. | U |
| 120-83-2 | 2,4-Dichlorophenol | 400. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 400. | U |
| 91-20-3 | Naphthalene | 400. | U |
| 106-47-8 | 4-Chloroaniline | 400. | U |
| 87-68-3 | Hexachlorobutadiene | 400. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 400. | U |
| 91-57-6 | 2-Methylnaphthalene | 400. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 400. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 400. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 980. | U |
| 91-58-7 | 2-Chloronaphthalene | 400. | U |
| 88-74-4 | 2-Nitroaniline | 980. | U |
| 131-11-3 | Dimethylphthalate | 400. | U |
| 208-96-8 | Acenaphthylene | 400. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 400. | U |
| 99-09-2 | 3-Nitroaniline | 980. | U |
| 83-32-9 | Acenaphthene | 400. | U |

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-2

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0845

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: 18 decanted: (Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.1 Conversion Factor: 1.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 980. | U |
| 100-02-7 | 4-Nitrophenol | 980. | U |
| 132-64-9 | Dibenzofuran | 400. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 400. | U |
| 84-66-2 | Diethylphthalate | 400. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 400. | U |
| 86-73-7 | Fluorene | 400. | U |
| 100-01-6 | 4-Nitroaniline | 980. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 980. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 400. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 400. | U |
| 118-74-1 | Hexachlorobenzene | 400. | U |
| 87-86-5 | Pentachlorophenol | 980. | U |
| 85-01-8 | Phenanthrene | 400. | U |
| 120-12-7 | Anthracene | 400. | U |
| 86-74-8 | Carbazole | 400. | U |
| 84-74-2 | Di-n-butylphthalate | 97. | J |
| 206-44-0 | Fluoranthene | 400. | U |
| 129-00-0 | Pyrene | 400. | U |
| 85-68-7 | Butylbenzylphthalate | 400. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 400. | U |
| 56-55-3 | Benzo(a)anthracene | 400. | U |
| 218-01-9 | Chrysene | 400. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 58. | J |
| 117-84-0 | Di-n-octylphthalate | 400. | U |
| 205-99-2 | Benzo(b)fluoranthene | 400. | U |
| 207-08-9 | Benzo(k)fluoranthene | 400. | U |
| 50-32-8 | Benzo(a)pyrene | 400. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 400. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 400. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 400. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-10-7

Matrix: (soil/water) SOIL Lab Sample ID: 115063-2

Sample wt/vol: 30.0 (g/mL) G Lab File ID: >W0845

Level: (low/med) LOW Date Received: 11/11/93

% Moisture: not dec. 18 decanted:(Y/N) N Date Extracted: 11/15/93

Concentrated Extract Volume: 500.0 (uL) Date Analyzed: 11/22/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.1

Number TICs found: 20

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 5.43 | 200. | J |
| 2. | UNKNOWN | 5.95 | 100. | J |
| 3. | UNKNOWN | 6.53 | 5000. | J |
| 4. | UNKNOWN | 6.81 | 200. | J |
| 5. | UNKNOWN | 6.99 | 100. | J |
| 6. | UNKNOWN | 8.95 | 1000. | J |
| 7. 100527 | BENZALDEHYDE | 9.12 | 600. | JN |
| 8. | UNKNOWN | 9.17 | 100. | J |
| 9. | UNKNOWN | 18.62 | 1000. | J |
| 10. | UNKNOWN | 22.10 | 200. | J |
| 11. | UNKNOWN PHTHALATE | 22.18 | 100. | J |
| 12. | UNKNOWN | 23.08 | 200. | J |
| 13. | UNKNOWN | 25.06 | 100. | J |
| 14. | UNKNOWN | 27.26 | 9000. | J |
| 15. | UNKNOWN ALKANE | 28.83 | 100. | J |
| 16. | UNKNOWN ALKANE | 29.60 | 100. | J |
| 17. | UNKNOWN ALKANE | 30.35 | 100. | J |
| 18. | UNKNOWN | 30.44 | 100. | J B |
| 19. | UNKNOWN ALKANE | 31.09 | 100. | J |
| 20. | UNKNOWN ALKANE | 31.90 | 200. | J |
| 21. | | | | |
| 22. | | | | |
| 23. | | | | |
| 24. | | | | |
| 25. | | | | |
| 26. | | | | |
| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115063 SAS No.: SDG No.: C-10-7

Matrix(soil/water) : SOIL Lab Sample ID : 115063-1

Sample(wt/vol) : 30.0 (g/mL) G Lab File ID :

% Moisture: 18 decanted:(Y/N) N Date Received : 11/11/93

Extraction(SepF/Cont/Sonc) SONC Date Extracted : 11/15/93

Concentrated Extract Volume:5000(uL) Date Analyzed : 12/13/93

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup:(Y/N) Y pH: --- Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 2.1 | U |
| 319-85-7 | beta-BHC | 2.1 | U |
| 319-86-8 | delta-BHC | 2.1 | U |
| 58-89-9 | gamma-BHC(Lindane) | 2.1 | U |
| 76-44-8 | Heptachlor | 2.1 | U |
| 309-00-2 | Aldrin | 2.1 | U |
| 1024-57-3 | Heptachlor Epoxide | 2.1 | U |
| 959-98-8 | Endosulfan I | 2.1 | U |
| 60-57-1 | Dieldrin | 4.0 | U |
| 72-55-9 | 4,4'-DDE | 4.0 | U |
| 72-20-8 | Endrin | 4.0 | U |
| 33213-65-9 | Endosulfan II | 4.0 | U |
| 72-54-8 | 4,4'-DDD | 4.0 | U |
| 1013-07-8 | Endosulfan sulfate | 4.0 | U |
| 50-29-3 | 4,4'-DDT | 4.0 | U |
| 72-43-5 | Methoxychlor | 21 | U |
| 53494-70-5 | Endrin ketone | 4.0 | U |
| 7421-36-3 | Endrin aldehyde | 4.0 | U |
| 5103-71-9 | alpha-Chlordane | 2.1 | U |
| 5103-74-2 | gamma-Chlordane | 2.1 | U |
| 8001-35-2 | Toxaphene | 210 | U |
| 12674-11-2 | Aroclor 1016 | 40 | U |
| 11104-28-2 | Aroclor 1221 | 82 | U |
| 11141-16-5 | Aroclor 1232 | 40 | U |
| 53469-21-9 | Aroclor 1242 | 40 | U |
| 12672-29-6 | Aroclor 1248 | 40 | U |
| 11097-69-1 | Aroclor 1254 | 120 | JP |
| 11096-82-5 | Aroclor 1260 | 40 | U |

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115063 SAS No.: SDG No.: C-10-7
Matrix(soil/water) : SOIL Lab Sample ID : 115063-2
Sample(wt/vol) : 30.0 (g/mL) G Lab File ID :
% Moisture: 18 decanted:(Y/N) N Date Received : 11/11/93
Extraction(SepF/Cont/Sonc) SONC Date Extracted : 11/15/93
Concentrated Extract Volume:5000(uL) Date Analyzed : 12/08/93
Injection Volume: 1.0 (uL) Dilution Factor: 1.0
GPC Cleanup:(Y/N) Y pH: --- Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 2.1 | U |
| 319-85-7 | beta-BHC | 2.1 | U |
| 319-86-8 | delta-BHC | 2.1 | U |
| 58-89-9 | gamma-BHC(Lindane) | 2.1 | U |
| 76-44-8 | Heptachlor | 2.1 | U |
| 309-00-2 | Aldrin | 2.1 | U |
| 1024-57-3 | Heptachlor Epoxide | 2.1 | U |
| 959-98-8 | Endosulfan I | 2.1 | U |
| 60-57-1 | Dieldrin | 4.0 | U |
| 72-55-9 | 4,4'-DDE | 4.0 | U |
| 72-20-8 | Endrin | 4.0 | U |
| 33213-65-9 | Endosulfan II | 4.0 | U |
| 72-54-8 | 4,4'-DDD | 4.0 | U |
| 1013-07-8 | Endosulfan sulfate | 4.0 | U |
| 50-29-3 | 4,4'-DDT | 4.0 | U |
| 72-43-5 | Methoxychlor | 21 | U |
| 53494-70-5 | Endrin ketone | 4.0 | U |
| 7421-36-3 | Endrin aldehyde | 4.0 | U |
| 5103-71-9 | alpha-Chlordane | 2.1 | U |
| 5103-74-2 | gamma-Chlordane | 2.1 | U |
| 8001-35-2 | Toxaphene | 210 | U |
| 12674-11-2 | Aroclor 1016 | 40 | U |
| 11104-28-2 | Aroclor 1221 | 82 | U |
| 11141-16-5 | Aroclor 1232 | 40 | U |
| 53469-21-9 | Aroclor 1242 | 40 | U |
| 12672-29-6 | Aroclor 1248 | 40 | U |
| 11097-69-1 | Aroclor 1254 | 11 | JP |
| 11096-82-5 | Aroclor 1260 | 40 | U |

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-S

Lab Name: ARDL, INC. Contract No.: 115063A

Lab Code: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water) SOIL Lab Sample ID: 115063A-1

Level (low/med): LOW Date Received: 11/11/93

% Solids: 82.6

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 12400 | | | P |
| 7440-36-0 | Antimony | 6.1 | U | N | P |
| 7440-38-2 | Arsenic | 11.9 | B | | F |
| 7440-39-3 | Barium | 190 | | | P |
| 7440-41-7 | Beryllium | 0.97 | B | | P |
| 7440-43-9 | Cadmium | 9.8 | | N * | P |
| 7440-70-2 | Calcium | 36400 | | | P |
| 7440-47-3 | Chromium | 44.2 | | N * | P |
| 7440-48-4 | Cobalt | 14.7 | | | P |
| 7440-50-8 | Copper | 59.1 | | * | P |
| 7439-89-6 | Iron | 20000 | | | P |
| 7439-92-1 | Lead | 190 | | N * | P |
| 7439-95-4 | Magnesium | 10100 | | * | P |
| 7439-96-5 | Manganese | 3980 | | * | P |
| 7439-97-6 | Mercury | 0.76 | | N | CV |
| 7440-02-0 | Nickel | 37.1 | | | P |
| 7440-09-7 | Potassium | 4670 | | | P |
| 7782-49-2 | Selenium | 3.5 | | S | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 572 | B | | P |
| 7440-28-0 | Thallium | 0.24 | U | | F |
| 7440-62-2 | Vanadium | 20.1 | | | P |
| 7440-66-6 | Zinc | 2390 | | * | P |
| | Cyanide | 0.60 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-S

Lab Name: ARDL, INC. Contract: 115063A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water): SOIL Lab Sample ID: 115063A-1

Level (low/med): LOW Date Received: 11/11/93

% Solids: 82.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 637 | | | |
| Sulfide | | 5.6 | U | N | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract No.: 115063A

Lab Code: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water) SOIL Lab Sample ID: 115063A-2

Level (low/med): LOW Date Received: 11/11/93

% Solids: 81.6

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 12900 | | | P |
| 7440-36-0 | Antimony | 6.1 | U | N | P |
| 7440-38-2 | Arsenic | 3.0 | B | W | F |
| 7440-39-3 | Barium | 107 | | | P |
| 7440-41-7 | Beryllium | 0.88 | B | | P |
| 7440-43-9 | Cadmium | 8.4 | | N * | P |
| 7440-70-2 | Calcium | 38600 | | | P |
| 7440-47-3 | Chromium | 20.7 | | N * | P |
| 7440-48-4 | Cobalt | 15.0 | | | P |
| 7440-50-8 | Copper | 38.9 | | * | P |
| 7439-89-6 | Iron | 18700 | | | P |
| 7439-92-1 | Lead | 225 | | N * | P |
| 7439-95-4 | Magnesium | 6580 | | * | P |
| 7439-96-5 | Manganese | 1350 | | * | P |
| 7439-97-6 | Mercury | 0.12 | U | N | CV |
| 7440-02-0 | Nickel | 36.7 | | | P |
| 7440-09-7 | Potassium | 3010 | | | P |
| 7782-49-2 | Selenium | 0.25 | U | W | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 356 | B | | P |
| 7440-28-0 | Thallium | 0.25 | U | | F |
| 7440-62-2 | Vanadium | 16.3 | | | P |
| 7440-66-6 | Zinc | 4130 | | * | P |
| | Cyanide | 0.61 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: 115063A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water): SOIL Lab Sample ID: 115063A-2

Level (low/med): LOW Date Received: 11/11/93

% Solids: 81.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 503 | | | |
| Sulfide | | 5.7 | U | N | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-S

Lab Name: ARDL, INC. Contract: 115063B

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water): TCLP Lab Sample ID: 115063B-1

Level (low/med): LOW Date Received: 11/11/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 545 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 16.4 | | | P |
| 7440-70-2 | Calcium | 552 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 14600 | | | P |
| 7439-96-5 | Manganese | 34.9 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 12.2 | B | | P |
| 7440-09-7 | Potassium | 66000 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 100 | U | | P |
| 7440-62-2 | Vanadium | 50.0 | U | | P |
| 7440-66-6 | Zinc | 1640 | | | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments:
ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-10-7

Lab Name: ARDL, INC. Contract: 115063B

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-10-7

Matrix (soil/water): TCLP Lab Sample ID: 115063B-2

Level (low/med): LOW Date Received: 11/11/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1640 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 83.3 | U | | P |
| 7440-70-2 | Calcium | 576000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 7.8 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 120 | | | P |
| 7439-95-4 | Magnesium | 17900 | | | P |
| 7439-96-5 | Manganese | 4020 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 13.0 | B | | P |
| 7440-09-7 | Potassium | 32600 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 100 | U | | P |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 7390 | | | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: _____ Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments:
ROCKS

ARDL inc. applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115070

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/12/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis (Total) Data Package
   b. Volume 1B - Inorganic Analysis (TCLP) Data Package
   c. Volume 2 - Organic Sample Data Summary Package
   d. Volume 3 - BETX Analysis Data Package
   e. Volume 4 - PNA Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS Chemical Co.

SAMPLERS: (Signature) [signature]

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Total (see below) | TCLP (see below) | ~~BTEX~~ | Illinois LUST Parms | REMARKS OR SAMPLE LOCATION (Order of Priority: Priorities Corder) | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-8 Surface | 11 Nov | | | | 1 | ✓ | ✓ | | | N/A | | |
| C-5-12ft | 11 Nov | | | | 2 | | | | ✓ | ~~N/A~~ | | |
| G04 surface | 11 Nov | | | | 1 | | | | ✓ | ① BTEX, ② PNAs, ③ Metals | | |
| G04-5ft | 11 Nov | | | | 2 | | | | ✓ | ↓ | | |
| C5-3ft | 11 Nov | | | | 1 | ✓ | ✓ | | | ~~N/A~~ | | |
| G04-15ft | 11 Nov | | | | 1 | | | | ✓ | ① BTEX, ② PNA, ③ Metals | | |
| C6-5ft | 11 Nov | | | | 1 | | | | ✓ | ↓ | | |
| C7-6ft | 11 Nov | | | | 2 | | | | ✓ | ↓ | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | Note priority on all LUST tests | | | | | ① BTEX | | |
| | | | | | | | | | | ② PNA | | |
| | | | | | | | | | | ③ Metals | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| [signature] | | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lachum | Date 11/12/93 | Time 0925 | Shipping Ticket No. 0937113343 |

REMARKS/SPECIAL INSTRUCTIONS:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, Zinc, Cyanide, Sulfate, Sulfide

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-8SUR

Lab Name: ARDL, INC. Contract No.: 115070A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-8SUR

Matrix (soil/water) SOIL Lab Sample ID: 115070A-1

Level (low/med): LOW Date Received: 11/12/93

% Solids: 88.5

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 5330 | | | P |
| 7440-36-0 | Antimony | 5.6 | U | N | P |
| 7440-38-2 | Arsenic | 5.4 | B | S | F |
| 7440-39-3 | Barium | 25.6 | B | | P |
| 7440-41-7 | Beryllium | 0.34 | B | | P |
| 7440-43-9 | Cadmium | 0.90 | U | | P |
| 7440-70-2 | Calcium | 66200 | | E | P |
| 7440-47-3 | Chromium | 9.8 | | | P |
| 7440-48-4 | Cobalt | 8.5 | B | | P |
| 7440-50-8 | Copper | 17.2 | | | P |
| 7439-89-6 | Iron | 16700 | | | P |
| 7439-92-1 | Lead | 14.6 | | N * + | F |
| 7439-95-4 | Magnesium | 36300 | | | P |
| 7439-96-5 | Manganese | 395 | | E | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 22.2 | | | P |
| 7440-09-7 | Potassium | 1250 | | | P |
| 7782-49-2 | Selenium | 0.23 | U | N W | F |
| 7440-22-4 | Silver | 1.1 | U | | P |
| 7440-23-5 | Sodium | 203 | U | | P |
| 7440-28-0 | Thallium | 0.24 | B | | F |
| 7440-62-2 | Vanadium | 10.6 | B | | P |
| 7440-66-6 | Zinc | 71.7 | | | P |
| | Cyanide | 0.53 | U | | C |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-8SUR

Lab Name: ARDL, INC. Contract: 115070A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-8SUR

Matrix (soil/water): SOIL Lab Sample ID: 115070A-1

Level (low/med): LOW Date Received: 11/12/93

% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1070 | | | |
| Sulfide | | 19.7 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C5-3

Lab Name: ARDL, INC. Contract No.: 115070A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-8SUR

Matrix (soil/water) SOIL Lab Sample ID: 115070A-5

Level (low/med): LOW Date Received: 11/12/93

% Solids: 84.7

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 9560 | | | P |
| 7440-36-0 | Antimony | 5.9 | U | N | P |
| 7440-38-2 | Arsenic | 2.3 | B | W | F |
| 7440-39-3 | Barium | 53.0 | | | P |
| 7440-41-7 | Beryllium | 0.66 | B | | P |
| 7440-43-9 | Cadmium | 2.7 | | | P |
| 7440-70-2 | Calcium | 56700 | | E | P |
| 7440-47-3 | Chromium | 14.4 | | | P |
| 7440-48-4 | Cobalt | 9.5 | B | | P |
| 7440-50-8 | Copper | 20.3 | | | P |
| 7439-89-6 | Iron | 16400 | | | P |
| 7439-92-1 | Lead | 18.6 | | N * | F |
| 7439-95-4 | Magnesium | 12400 | | | P |
| 7439-96-5 | Manganese | 600 | | E | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 29.4 | | | P |
| 7440-09-7 | Potassium | 2210 | | | P |
| 7782-49-2 | Selenium | 0.24 | U | N W | F |
| 7440-22-4 | Silver | 1.2 | U | | P |
| 7440-23-5 | Sodium | 213 | U | | P |
| 7440-28-0 | Thallium | 0.24 | U | | F |
| 7440-62-2 | Vanadium | 12.3 | | | P |
| 7440-66-6 | Zinc | 443 | | | P |
| | Cyanide | 0.57 | U | | C |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C5-3

Lab Name: ARDL, INC. Contract: 115070A

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: C-8SUR

Matrix (soil/water): SOIL Lab Sample ID: 115070A-5

Level (low/med): LOW Date Received: 11/12/93

% Solids: 84.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 479 | | | |
| Sulfide | | 8.4 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-8SUR

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-1

Level (low/med): LOW Date Received: 11/12/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 516 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 5.3 | | | P |
| 7440-70-2 | Calcium | 557000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 14.4 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 84000 | | | P |
| 7439-96-5 | Manganese | 2640 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 33.0 | B | | P |
| 7440-09-7 | Potassium | 7530 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 100 | U | | P |
| 7440-62-2 | Vanadium | 6.0 | B | | P |
| 7440-66-6 | Zinc | 118 | | | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-5-12

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-2

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1670 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G04-SU

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-3

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1830 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 883 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 94.1 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BLACK Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G04-5

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-4

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1900 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 95.2 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C5-3

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-5

Level (low/med): LOW Date Received: 11/12/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 809 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 691000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 11.0 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | 38100 | | | P |
| 7439-96-5 | Manganese | 5200 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 23.3 | B | | P |
| 7440-09-7 | Potassium | 15600 | | | P |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | 100 | U | | P |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 161 | | | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

G04-15

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-6

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 2030 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 6.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: FINE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C6-5

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-7

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 659 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

C7-6

Lab Name: ARDL, INC. Contract No.: 115070B

Lab Code: _____ SAS No.: _____ SDG No.: C-5-12

Matrix (soil/water) WATER Lab Sample ID: 115070B-8

Level (low/med): LOW Date Received: 11/12/93

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 50.0 | U | | P |
| 7440-39-3 | Barium | 1430 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | | | | NR |
| 7439-92-1 | Lead | 30.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | | | | NR |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | NR |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 50.0 | U | | P |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | | | | NR |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: COLORLESS Clarity After: CLEAR Artifacts: NO

Comments:

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-5-12

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-2

Sample wt/vol: 5.0 (g/ml) g Lab File ID: >C8037

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 13 Date Analyzed: 11/22/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 100-41-4 | Ethylbenzene | 16 | |
| 1330-20-7 | Xylene (total) | 41 | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C-5-12RE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-2RE

Sample wt/vol: 5.0 (g/ml) g Lab File ID: >C8045

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 13 Date Analyzed: 11/23/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 100-41-4 | Ethylbenzene | 6 | J |
| 1330-20-7 | Xylene (total) | 14 | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GO4-SURFACE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-3

Sample wt/vol: 5.0 (g/ml) G Lab File ID: >J6048

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 20 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 100-41-4 | Ethylbenzene | 6 | J |
| 1330-20-7 | Xylene (total) | 4 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GO4-5

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-4

Sample wt/vol: 5.0 (g/ml) G Lab File ID: >J6049

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 17 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GO4-15

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-6

Sample wt/vol: 5.0 (g/ml) G Lab File ID: >J6050

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 13 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 100-41-4 | Ethylbenzene | 140 | |
| 1330-20-7 | Xylene (total) | 300 | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GO4-15RE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-6RE

Sample wt/vol: 5.0 (g/ml) g Lab File ID: >C8049

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 13 Date Analyzed: 11/23/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 11 | U |
| 108-88-3 | Toluene | 11 | U |
| 100-41-4 | Ethylbenzene | 5 | J |
| 1330-20-7 | Xylene (total) | 11 | J |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C6-5

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-7

Sample wt/vol: 5.0 (g/ml) G Lab File ID: >J6051

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 16 Date Analyzed: 11/16/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C7-6

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-8

Sample wt/vol: 5.0 (g/ml) g Lab File ID: >C8034

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 18 Date Analyzed: 11/22/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

C7-6RE

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: C-5-12

Matrix: (soil/water) SOIL Lab Sample ID: 115070-8RE

Sample wt/vol: 5.0 (g/ml) g Lab File ID: >C8051

Level: (low/med) LOW Date Received: 11/12/93

% Moisture: not dec. 18 Date Analyzed: 11/23/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 12 | U |
| 108-88-3 | Toluene | 12 | U |
| 100-41-4 | Ethylbenzene | 12 | U |
| 1330-20-7 | Xylene (total) | 12 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

C-5-12

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 13
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-2
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/24/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 29 | U |
| 208-96-8 | Acenaphthylene | 29 | U |
| 83-32-9 | Acenaphthene | 29 | U |
| 86-73-7 | Fluorene | 29 | U |
| 85-04-8 | Phenanthrene | 29 | U |
| 120-12-7 | Anthracene | 29 | U |
| 206-44-0 | Fluoranthene | 29 | U |
| 129-00-0 | Pyrene | 29 | U |
| 56-55-3 | Benzo(a)anthracene | 5.7 | U |
| 218-01-9 | Chrysene | 29 | U |
| 205-99-2 | Benzo(b)fluoranthene | 9.2 | U |
| 207-08-9 | Benzo(k)fluoranthene | 9.2 | U |
| 50-32-8 | Benzo(a)pyrene | 11 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 17 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 40 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 23 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

G04-SURFACE

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 20
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-3
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/24/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 31 | U |
| 208-96-8 | Acenaphthylene | 31 | U |
| 83-32-9 | Acenaphthene | 31 | U |
| 86-73-7 | Fluorene | 31 | U |
| 85-04-8 | Phenanthrene | 160 | |
| 120-12-7 | Anthracene | 39 | |
| 206-44-0 | Fluoranthene | 200 | |
| 129-00-0 | Pyrene | 130 | |
| 56-55-3 | Benzo(a)anthracene | 79 | |
| 218-01-9 | Chrysene | 210 | |
| 205-99-2 | Benzo(b)fluoranthene | 100 | |
| 207-08-9 | Benzo(k)fluoranthene | 55 | |
| 50-32-8 | Benzo(a)pyrene | 110 | |
| 53-70-3 | Dibenzo(a,h)anthracene | 120 | |
| 191-24-2 | Benzo(g,h,i)perylene | 44 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 25 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

G04-5

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 17
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-4
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/24/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 30 | U |
| 208-96-8 | Acenaphthylene | 30 | U |
| 83-32-9 | Acenaphthene | 30 | U |
| 86-73-7 | Fluorene | 30 | U |
| 85-04-8 | Phenanthrene | 30 | U |
| 120-12-7 | Anthracene | 30 | U |
| 206-44-0 | Fluoranthene | 30 | U |
| 129-00-0 | Pyrene | 30 | U |
| 56-55-3 | Benzo(a)anthracene | 6.0 | U |
| 218-01-9 | Chrysene | 30 | U |
| 205-99-2 | Benzo(b)fluoranthene | 9.6 | U |
| 207-08-9 | Benzo(k)fluoranthene | 9.6 | U |
| 50-32-8 | Benzo(a)pyrene | 12 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 18 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 42 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 24 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

GO4-15

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 13
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-6
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/24/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 29 | U |
| 208-96-8 | Acenaphthylene | 40 | |
| 83-32-9 | Acenaphthene | 29 | U |
| 86-73-7 | Fluorene | 29 | U |
| 85-04-8 | Phenanthrene | 29 | U |
| 120-12-7 | Anthracene | 29 | U |
| 206-44-0 | Fluoranthene | 49 | |
| 129-00-0 | Pyrene | 42 | |
| 56-55-3 | Benzo(a)anthracene | 5.7 | U |
| 218-01-9 | Chrysene | 29 | U |
| 205-99-2 | Benzo(b)fluoranthene | 9.2 | U |
| 207-08-9 | Benzo(k)fluoranthene | 9.2 | U |
| 50-32-8 | Benzo(a)pyrene | 11 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 17 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 40 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 23 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

C6-5

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 15
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-7
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/25/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 29 | U |
| 208-96-8 | Acenaphthylene | 29 | U |
| 83-32-9 | Acenaphthene | 29 | U |
| 86-73-7 | Fluorene | 29 | U |
| 85-04-8 | Phenanthrene | 29 | U |
| 120-12-7 | Anthracene | 29 | U |
| 206-44-0 | Fluoranthene | 29 | U |
| 129-00-0 | Pyrene | 29 | U |
| 56-55-3 | Benzo(a)anthracene | 5.9 | U |
| 218-01-9 | Chrysene | 29 | U |
| 205-99-2 | Benzo(b)fluoranthene | 9.4 | U |
| 207-08-9 | Benzo(k)fluoranthene | 9.4 | U |
| 50-32-8 | Benzo(a)pyrene | 12 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 18 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 41 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 24 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

C7-6

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115070 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : SOIL
Sample(wt/vol) : 30.0(g/mL) g
Level(low/med) : LOW
% Moisture(not dec): 18
Extraction(Sepf/Conc/Sonc) SONC
GPC Cleanup (Y/N): N pH: ---

Lab Sample ID : 115070-8
Lab File ID :
Date Received : 11/12/93
Date Extracted : 11/15/93
Date Analyzed : 11/25/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/Kg | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 30 | U |
| 208-96-8 | Acenaphthylene | 30 | U |
| 83-32-9 | Acenaphthene | 30 | U |
| 86-73-7 | Fluorene | 30 | U |
| 85-04-8 | Phenanthrene | 30 | U |
| 120-12-7 | Anthracene | 30 | U |
| 206-44-0 | Fluoranthene | 30 | U |
| 129-00-0 | Pyrene | 30 | U |
| 56-55-3 | Benzo(a)anthracene | 6.1 | U |
| 218-01-9 | Chrysene | 30 | U |
| 205-99-2 | Benzo(b)fluoranthene | 9.8 | U |
| 207-08-9 | Benzo(k)fluoranthene | 9.8 | U |
| 50-32-8 | Benzo(a)pyrene | 12 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 18 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 43 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 24 | U |

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115081

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/16/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

    a. Volume 1 - Inorganic Analysis Data Package
    b. Volume 2 - Organic Sample Data Summary Package
    c. Volume 3 - VOA Analysis Data Package
    d. Volume 4 - BNA Analysis Data Package
    e. Volume 5 - PNA Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc. P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS CHEM / GEOSYNTEC

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | METALS FILTERED | TABLES TOT. MET. | TABLES Sulfate | Cyanide | Sulfide | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319-06 | 15Nov93 | | | | 5 | 1 | 1 | 1 | 1 | 1 | | | |
| 3319-07 | ↓ | | | | 5 | 1 | 1 | 1 | 1 | 1 | | | |
| 3319-03 | ↓ | | | | 5 | 1 | 1 | 1 | 1 | 1 | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 15Nov93 | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lachman | Date 11/16/93 | Time 0915 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
Filtered Metals were field filtered.

Table 5 was sent previously

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

# ARDL, Inc. P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS Chem. / GeoSyntec

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | BETX | TCL VOLATILES | TOTAL TAL METALS | FILTERED TAL MET. | TCL BNA | UST PNA | UST METALS | FILTERED UST METALS | CYANIDE | SULFIDE | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319-01 | 15Nov | | | | 7 | | 2 | 1 | 1 | 1 | | | | 1 | 1 | | | | PEST/PCB & SULFATE COMING TOMORROW | | |
| 3319-02 | 15Nov | | | | 5 | 2 | | | | | 1 | 1 | 1 | | | | | | | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 15Nov | 1805 | FEDEX |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lockrum | Date 11/16/93 | Time 0915 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
3319-01 is not finished
talked to Paul Stout at Geo Syntec on 11/16/93 RE: UST metal (Total + Filtered) He said use 8 RCRA metals less Silver.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6127

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 10. | U |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 10. | U |
| 75-35-4 | 1,1-Dichloroethene | 10. | U |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10. | U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 75-27-4 | Bromodichloromethane | 10. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 10. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 10. | U |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6127

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 22.24 | 6. | J |
| 2. | UNKNOWN AROMATIC | 23.80 | 30. | J |
| 3. | UNKNOWN AROMATIC | 29.34 | 20. | J |
| 4. | | | | |
| 5. | | | | |
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| 27. | | | | |
| 28. | | | | |
| 29. | | | | |
| 30. | | | | |

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0853

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/23/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.5

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)_ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 25. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 25. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |
| 99-09-2 | 3-Nitroaniline | 25. | U |
| 83-32-9 | Acenaphthene | 10. | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0853

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/23/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.5

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 25. | U |
| 100-02-7 | 4-Nitrophenol | 25. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 25. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 25. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 25. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 86-74-8 | Carbazole | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 10. | U |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0853

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: not dec. --- decanted:(Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/23/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.5

Number TICs found: 12

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 14.82 | 500. | J |
| 2. | UNKNOWN | 19.51 | 6. | J |
| 3. | UNKNOWN | 20.40 | 3. | J |
| 4. | UNKNOWN | 20.50 | 3. | J |
| 5. | UNKNOWN | 23.10 | 5. | J B |
| 6. | UNKNOWN | 23.35 | 3. | J B |
| 7. | UNKNOWN | 24.87 | 3. | J B |
| 8. | UNKNOWN | 25.07 | 4. | J |
| 9. | UNKNOWN | 26.30 | 6. | J B |
| 10. | UNKNOWN | 27.22 | 3. | J B |
| 11. | UNKNOWN | 27.96 | 3. | J B |
| 12. | UNKNOWN | 35.28 | 10. | J |
| 13. | | | | |
| 14. | | | | |
| 15. | | | | |
| 16. | | | | |
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| 30. | | | | |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-02

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115081-2

Sample wt/vol: 0.5 (g/ml) ML Lab File ID: >R5894

Level: (low/med) LOW Date Received: 11/16/93

% Moisture: not dec. --- Date Analyzed: 11/26/93

GC Column: VOCOL 60M ID: 0.53 (mm) Dilution Factor: 10.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 550 | |
| 108-88-3 | Toluene | 360 | |
| 100-41-4 | Ethylbenzene | 390 | |
| 1330-20-7 | Xylene (total) | 1200 | |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

3319-02

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115081 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : WATER
Sample(wt/vol) : 1000(g/mL) mL
Level(low/med) : LOW
% Moisture(not dec): ---
Extraction(Sepf/Conc/Sonc) SEPF
GPC Cleanup (Y/N): N pH: 6.7

Lab Sample ID : 115081-2
Lab File ID :
Date Received : 11/16/93
Date Extracted : 11/19/93
Date Analyzed : 11/25/93
Dilution Factor: 1.0

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Napthalene | 46 | E |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 1.0 | J |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | 1.5 | U |
| 218-01-9 | Chrysene | 2.4 | |
| 205-99-2 | Benzo(b)fluoranthene | 0.18 | U |
| 207-08-9 | Benzo(k)fluoranthene | 0.17 | U |
| 50-32-8 | Benzo(a)pyrene | 0.23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 0.30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 0.76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 0.43 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

3319-02DL

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 115081 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : WATER
Sample(wt/vol) : 1000(g/mL) mL
Level(low/med) : LOW
% Moisture(not dec): ---
Extraction(Sepf/Conc/Sonc) SEPF
GPC Cleanup (Y/N): N pH: 6.7

Lab Sample ID : 115081-2DL
Lab File ID :
Date Received : 11/16/93
Date Extracted : 11/19/93
Date Analyzed : 11/29/93
Dilution Factor: 10

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 45 | |
| 208-96-8 | Acenaphthylene | 100 | U |
| 83-32-9 | Acenaphthene | 180 | U |
| 86-73-7 | Fluorene | 21 | U |
| 85-04-8 | Phenanthrene | 64 | U |
| 120-12-7 | Anthracene | 66 | U |
| 206-44-0 | Fluoranthene | 21 | U |
| 129-00-0 | Pyrene | 27 | U |
| 56-55-3 | Benzo(a)anthracene | 15 | U |
| 218-01-9 | Chrysene | 1.3 | U |
| 205-99-2 | Benzo(b)fluoranthene | 1.8 | U |
| 207-08-9 | Benzo(k)fluoranthene | 1.7 | U |
| 50-32-8 | Benzo(a)pyrene | 2.3 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | 3.0 | U |
| 191-24-2 | Benzo(g,h,i)perylene | 7.6 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 4.3 | U |

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-1T

Level (low/med): LOW Date Received: 11-16-93

% 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 | 996 | | * | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.0 | U | WN | F |
| 7440-39-3 | Barium | 55.2 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 437000 | | | P |
| 7440-47-3 | Chromium | 5.7 | B | | P |
| 7440-48-4 | Cobalt | 19.0 | B | | P |
| 7440-50-8 | Copper | 31.1 | | | P |
| 7439-89-6 | Iron | 838 | | N* | P |
| 7439-92-1 | Lead | 5.8 | B | W | F |
| 7439-95-4 | Magnesium | 103000 | | | P |
| 7439-96-5 | Manganese | 3830 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 41.3 | | | P |
| 7440-09-7 | Potassium | 12800 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 115000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 305 | | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01D

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-1D

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.3 | B | WN | F |
| 7440-39-3 | Barium | 39.8 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 461000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 20.3 | B | | P |
| 7440-50-8 | Copper | 77.0 | | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 2.0 | B | WN | F |
| 7439-95-4 | Magnesium | 95900 | | | P |
| 7439-96-5 | Manganese | 4370 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 38.7 | B | | P |
| 7440-09-7 | Potassium | 10600 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 104000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | WN | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 538 | | | P |
| | Cyanide | | | | |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-1

Level (low/med): LOW Date Received: 11/16/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-02T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-2T

Level (low/med): LOW Date Received: 11-16-93

% 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 | | | | |
| 7440-36-0 | Antimony | | | | |
| 7440-38-2 | Arsenic | 6.8 | B | WN | F |
| 7440-39-3 | Barium | 139 | B | | P |
| 7440-41-7 | Beryllium | | | | |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | | | | |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | |
| 7440-50-8 | Copper | | | | |
| 7439-89-6 | Iron | | | | |
| 7439-92-1 | Lead | 20.4 | | S | F |
| 7439-95-4 | Magnesium | | | | |
| 7439-96-5 | Manganese | | | | |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | |
| 7440-09-7 | Potassium | | | | |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | | | | |
| 7440-23-5 | Sodium | | | | |
| 7440-28-0 | Thallium | | | | |
| 7440-62-2 | Vanadium | | | | |
| 7440-66-6 | Zinc | | | | |
| | Cyanide | | | | |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-02D

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-2D

Level (low/med): LOW Date Received: 11-16-93

% 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 | | | | |
| 7440-36-0 | Antimony | | | | |
| 7440-38-2 | Arsenic | 2.9 | B | WN | F |
| 7440-39-3 | Barium | 72.3 | B | N | P |
| 7440-41-7 | Beryllium | | | | |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | | | | |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | |
| 7440-50-8 | Copper | | | | |
| 7439-89-6 | Iron | | | | |
| 7439-92-1 | Lead | 3.9 | | WN | F |
| 7439-95-4 | Magnesium | | | | |
| 7439-96-5 | Manganese | | | | |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | | | | |
| 7440-09-7 | Potassium | | | | |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | | | | |
| 7440-23-5 | Sodium | | | | |
| 7440-28-0 | Thallium | | | | |
| 7440-62-2 | Vanadium | | | | |
| 7440-66-6 | Zinc | | | | |
| | Cyanide | | | | |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-03T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-3T

Level (low/med): LOW Date Received: 11-16-93

% 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 | 6310 | | * | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 5.5 | B | WN | F |
| 7440-39-3 | Barium | 134 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 25.5 | | | P |
| 7440-70-2 | Calcium | 260000 | | | P |
| 7440-47-3 | Chromium | 7.7 | B | | P |
| 7440-48-4 | Cobalt | 22.4 | B | | P |
| 7440-50-8 | Copper | 94.0 | | | P |
| 7439-89-6 | Iron | 11200 | | N* | P |
| 7439-92-1 | Lead | 2180 | | | P |
| 7439-95-4 | Magnesium | 132000 | | | P |
| 7439-96-5 | Manganese | 3240 | | | P |
| 7439-97-6 | Mercury | 12.9 | | | CV |
| 7440-02-0 | Nickel | 38.0 | B | | P |
| 7440-09-7 | Potassium | 77300 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 151000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | | F |
| 7440-62-2 | Vanadium | 15.0 | B | | P |
| 7440-66-6 | Zinc | 6.4 | | | P |
| | Cyanide | 5.0 | U | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:
TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-03D

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-3D

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 2.6 | B | WN | F |
| 7440-39-3 | Barium | 47.8 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 5.3 | | | P |
| 7440-70-2 | Calcium | 274000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 13.9 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 597 | | | P |
| 7439-92-1 | Lead | 291 | | N | P |
| 7439-95-4 | Magnesium | 138000 | | | P |
| 7439-96-5 | Manganese | 3150 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 13.6 | B | | P |
| 7440-09-7 | Potassium | 77300 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 153000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | WN | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 3280 | | | P |
| | Cyanide | | | | |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-03

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-3

Level (low/med): LOW Date Received: 11/16/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 885000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-06T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-4T

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | * | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.2 | B | WN | F |
| 7440-39-3 | Barium | 18.2 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 204000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 13.4 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | N* | P |
| 7439-92-1 | Lead | 11.0 | | S | F |
| 7439-95-4 | Magnesium | 111000 | | | P |
| 7439-96-5 | Manganese | 26.3 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 13.6 | B | | P |
| 7440-09-7 | Potassium | 8160 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 215000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 229 | | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-06D

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-4D

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 2.0 | B | WN | F |
| 7440-39-3 | Barium | 17.8 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 226000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 9.9 | B | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 11.3 | | SN | F |
| 7439-95-4 | Magnesium | 119000 | | | P |
| 7439-96-5 | Manganese | 23.7 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 11.0 | B | | P |
| 7440-09-7 | Potassium | 8640 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 215000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | WN | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 216 | | | P |
| | Cyanide | | | | |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-06

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-4

Level (low/med): LOW Date Received: 11/16/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 610000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-07T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-5T

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | * | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.0 | B | WN | F |
| 7440-39-3 | Barium | 23.7 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 292000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | N* | P |
| 7439-92-1 | Lead | 5.0 | U | | F |
| 7439-95-4 | Magnesium | 136000 | | | P |
| 7439-96-5 | Manganese | 433 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 12.0 | B | | P |
| 7440-09-7 | Potassium | 2420 | B | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 125000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 175 | | | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:
TOTAL ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-07D

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-5D

Level (low/med): LOW Date Received: 11-16-93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 3.0 | B | WN | F |
| 7440-39-3 | Barium | 18.6 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 326000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 3.2 | | WN | F |
| 7439-95-4 | Magnesium | 146000 | | | P |
| 7439-96-5 | Manganese | 460 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.8 | B | | P |
| 7440-09-7 | Potassium | 2550 | B | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 124000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | WN | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 180 | | | P |
| | Cyanide | | | | |

Color Before: COLORLESS Clarity Before: CLEAR Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-07

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-5

Level (low/med): LOW Date Received: 11/16/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 908000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN ILM02.0

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115083

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/17/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1 - Inorganic Analysis Data Package
   b. Volume 2 - Organic Sample Data Summary Package
   c. Volume 3 - VOA Analysis Data Package
   d. Volume 4 - BNA Analysis Data Package
   e. Volume 5 - Pesticide/PCB Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc. P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: Carus Chem. GeoSyntec

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Tot. TCL/TAL Met. | Dis. TCL/TAL Met. | Table 5 Tot. Met. | Table 5 Dis. Met. | Sulfide | Cyanide | Sulfate | TCL VOA | PEST/PCB | BNA | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319-05 | 16Nov93 | | | | 5 | | | 1 | 1 | 1 | 1 | 1 | | | | | | |
| 3319-09 | ↓ | | | | 11 | 2 | 2 | | | 1 | 1 | 1 | 2 | 1 | 1 | BNA - PEST/PCB broken. | | |
| 3319-04 | ↓ | | | | 1 | 1 | | | | | | | | | | Rest in other cooler | | |
| | | | | | | | | | | | | | | | | informed Customer. | | |
| | | | | | | | | | | | | | | | | will try to resample. | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 16Nov93 | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/17/93 | Time 0945 | Shipping Ticket No. 0937112385 |

REMARKS/SPECIAL INSTRUCTIONS:
For Metals samples for 3319-09 -- used trace Metalgrade nitric acid from Fisher Scientific as preservative. Used new nalgene bottles sealed in plastic.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# ARDL, Inc. P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS Chem GEOSYNTEC

SAMPLERS: (Signature) John D Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Total TCL-TAL Metals | Filtered Metals TCL-TAL | Table 5 Filt. Met. | Table 5 Tot. Met. | TCL-VOA | CYANIDE | SULFIDE | SULFATE | PEST/PCB | BNA | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319-01 | 16Nov93 | | | | 2 | | | | | | | | 1 | 1 | | | | | | | Rest taken Yesterday | | |
| 3319-04 | ↓ | | | | 8 | ~~1~~ 1 | | | | 2 | 1 | 1 | 1 | 1 | 1 | | | | | | Total Metal in other cooler | | |
| 3319-08 | ↓ | | | | 5 | | | 1 | 1 | | 1 | 1 | 1 | | | | | | | | (filtered sample not marked) placed by comparing with sulfate sample. | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John D Raymer | 16Nov93 | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lackum | Date 11/17/93 | Time 0945 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
one more shipment Tommorrow --
~~be~~ Two samples for TAL/TCL series

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6128

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 10. | U |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 10. | U |
| 75-35-4 | 1,1-Dichloroethene | 10. | U |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10. | U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 75-27-4 | Bromodichloromethane | 10. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 10. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 10. | U |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.
3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6128

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | BENZENE, ETHYL-METHYL- | 29.13 | 200. | J |
| 2. | | | | |
| 3. | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-5

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >R5895

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: not dec. --- Date Analyzed: 11/26/93

GC column: VOCOL 60M ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 3. | JB |
| 67-64-1 | Acetone | 5. | JB |
| 75-15-0 | Carbon Disulfide | 10. | U |
| 75-35-4 | 1,1-Dichloroethene | 10. | U |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10. | U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 75-27-4 | Bromodichloromethane | 10. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 10. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 10. | U |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-5

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >R5895

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: not dec. --- Date Analyzed: 11/26/93

GC Column: VOCOL 60M ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 5

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 3.25 | 50. | J B |
| 2. 526738 | BENZENE, 1,2,3-TRIMETHYL- | 17.69 | 20. | JN |
| 3. | BENZENE, METHYL-PROPYL- | 21.71 | 8. | J |
| 4. | UNKNOWN | 22.66 | 20. | J |
| 5. | BENZENE, ETHYL-DIMETHYL- | 26.36 | 6. | J |
| 6. | | | | |
| 7. | | | | |
| 8. | | | | |
| 9. | | | | |
| 10. | | | | |
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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-2

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0881

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ---

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)_ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 25. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 25. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |
| 99-09-2 | 3-Nitroaniline | 25. | U |
| 83-32-9 | Acenaphthene | 10. | U |

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-2

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0881

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/23/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ---

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 25. | U |
| 100-02-7 | 4-Nitrophenol | 25. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 25. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 25. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 25. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 86-74-8 | Carbazole | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 2. | JB |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-01

Matrix: (soil/water) WATER Lab Sample ID: 115083-2

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0881

Level: (low/med) LOW Date Received: 11/17/93

% Moisture: not dec. --- decanted:(Y/N) N Date Extracted: 11/18/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.9

Number TICs found: 8

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | UNKNOWN | 14.72 | 300. | J |
| 2. | | UNKNOWN | 19.54 | 2. | J |
| 3. | | UNKNOWN | 23.11 | 7. | J B |
| 4. | | UNKNOWN | 24.89 | 10. | J B |
| 5. | | UNKNOWN | 25.09 | 6. | J |
| 6. | | UNKNOWN | 26.33 | 7. | J |
| 7. | | UNKNOWN | 27.29 | 600. | J B |
| 8. | | UNKNOWN | 31.64 | 6. | J |
| 9. | | | | | |
| 10. | | | | | |
| 11. | | | | | |
| 12. | | | | | |
| 13. | | | | | |
| 14. | | | | | |
| 15. | | | | | |
| 16. | | | | | |
| 17. | | | | | |
| 18. | | | | | |
| 19. | | | | | |
| 20. | | | | | |
| 21. | | | | | |
| 22. | | | | | |
| 23. | | | | | |
| 24. | | | | | |
| 25. | | | | | |
| 26. | | | | | |
| 27. | | | | | |
| 28. | | | | | |
| 29. | | | | | |
| 30. | | | | | |

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115083 SAS No.: SDG No.: 3319-01

Matrix(soil/water) : WATER Lab Sample ID : 115083-1

Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :

% Moisture: -- decanted:(Y/N) N Date Received : 11/17/93

Extraction(SepF/Cont/Sonc) SEPF Date Extracted : 11/19/93

Concentrated Extract Volume:10000(uL) Date Analyzed : 12/02/93

Injection Volume: 1 (uL) Dilution Factor: 1.0

GPC Cleanup:(Y/N) N pH: 6.7 Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 0.05 | U |
| 319-85-7 | beta-BHC | 0.05 | U |
| 319-86-8 | delta-BHC | 0.05 | U |
| 58-89-9 | gamma-BHC(Lindane) | 0.05 | U |
| 76-44-8 | Heptachlor | 0.05 | U |
| 309-00-2 | Aldrin | 0.05 | U |
| 1024-57-3 | Heptachlor Epoxide | 0.05 | U |
| 959-98-8 | Endosulfan I | 0.05 | U |
| 60-57-1 | Dieldrin | 0.10 | U |
| 72-55-9 | 4,4'-DDE | 0.10 | U |
| 72-20-8 | Endrin | 0.10 | U |
| 33213-65-9 | Endosulfan II | 0.10 | U |
| 72-54-8 | 4,4'-DDD | 0.10 | U |
| 1013-07-8 | Endosulfan sulfate | 0.10 | U |
| 50-29-3 | 4,4'-DDT | 0.10 | U |
| 72-43-5 | Methoxychlor | 0.50 | U |
| 53494-70-5 | Endrin ketone | 0.10 | U |
| 7421-36-3 | Endrin aldehyde | 0.10 | U |
| 5103-71-9 | alpha-Chlordane | 0.05 | U |
| 5103-74-2 | gamma-Chlordane | 0.05 | U |
| 8001-35-2 | Toxaphene | 5.0 | U |
| 12674-11-2 | Aroclor 1016 | 1.0 | U |
| 11104-28-2 | Aroclor 1221 | 2.0 | U |
| 11141-16-5 | Aroclor 1232 | 1.0 | U |
| 53469-21-9 | Aroclor 1242 | 1.0 | U |
| 12672-29-6 | Aroclor 1248 | 1.0 | U |
| 11097-69-1 | Aroclor 1254 | 1.0 | U |
| 11096-82-5 | Aroclor 1260 | 1.0 | U |

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115083 SAS No.: SDG No.: 3319-01

Matrix(soil/water) : WATER Lab Sample ID : 115083-2

Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :

% Moisture: -- decanted:(Y/N) N Date Received : 11/17/93

Extraction(SepF/Cont/Sonc) SEPF Date Extracted : 11/19/93

Concentrated Extract Volume:10000(uL) Date Analyzed : 12/02/93

Injection Volume: 1 (uL) Dilution Factor: 1.0

GPC Cleanup:(Y/N) N pH: 6.8 Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 0.05 | U |
| 319-85-7 | beta-BHC | 0.05 | U |
| 319-86-8 | delta-BHC | 0.05 | U |
| 58-89-9 | gamma-BHC(Lindane) | 0.05 | U |
| 76-44-8 | Heptachlor | 0.05 | U |
| 309-00-2 | Aldrin | 0.05 | U |
| 1024-57-3 | Heptachlor Epoxide | 0.05 | U |
| 959-98-8 | Endosulfan I | 0.05 | U |
| 60-57-1 | Dieldrin | 0.10 | U |
| 72-55-9 | 4,4'-DDE | 0.10 | U |
| 72-20-8 | Endrin | 0.10 | U |
| 33213-65-9 | Endosulfan II | 0.10 | U |
| 72-54-8 | 4,4'-DDD | 0.10 | U |
| 1013-07-8 | Endosulfan sulfate | 0.10 | U |
| 50-29-3 | 4,4'-DDT | 0.10 | U |
| 72-43-5 | Methoxychlor | 0.50 | U |
| 53494-70-5 | Endrin ketone | 0.10 | U |
| 7421-36-3 | Endrin aldehyde | 0.10 | U |
| 5103-71-9 | alpha-Chlordane | 0.05 | U |
| 5103-74-2 | gamma-Chlordane | 0.05 | U |
| 8001-35-2 | Toxaphene | 5.0 | U |
| 12674-11-2 | Aroclor 1016 | 1.0 | U |
| 11104-28-2 | Aroclor 1221 | 2.0 | U |
| 11141-16-5 | Aroclor 1232 | 1.0 | U |
| 53469-21-9 | Aroclor 1242 | 1.0 | U |
| 12672-29-6 | Aroclor 1248 | 1.0 | U |
| 11097-69-1 | Aroclor 1254 | 1.0 | U |
| 11096-82-5 | Aroclor 1260 | 1.0 | U |

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-01

Lab Name: ARDL, INC. Contract: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115083-1

Level (low/med): LOW Date Received: 11/17/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1300000 | | | |
| Sulfide | | | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04T

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-2T

Level (low/med): LOW Date Received: 11/17/93

% 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 | 3740 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 9.0 | B | N W | F |
| 7440-39-3 | Barium | 85.1 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 28.9 | | | P |
| 7440-70-2 | Calcium | 603000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 8.2 | B | | P |
| 7440-50-8 | Copper | 21.7 | B | | P |
| 7439-89-6 | Iron | 7280 | | | P |
| 7439-92-1 | Lead | 31.3 | | W | F |
| 7439-95-4 | Magnesium | 48400 | | | P |
| 7439-96-5 | Manganese | 6580 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 30.1 | B | | P |
| 7440-09-7 | Potassium | 96700 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 114000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 15.9 | B | | P |
| 7440-66-6 | Zinc | 7200 | | | P |
| | Cyanide | 6.2 | U | N | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04D

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-2D

Level (low/med): LOW Date Received: 11/17/93

% 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 | 479 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 5.6 | B | N W | F |
| 7440-39-3 | Barium | 41.7 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 12.1 | | | P |
| 7440-70-2 | Calcium | 647000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 8.2 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 1160 | | | P |
| 7439-92-1 | Lead | 10.8 | B | W | F |
| 7439-95-4 | Magnesium | 49800 | | | P |
| 7439-96-5 | Manganese | 7700 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 14.9 | B | | P |
| 7440-09-7 | Potassium | 102000 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 117000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | N W | F |
| 7440-62-2 | Vanadium | 6.8 | B | | P |
| 7440-66-6 | Zinc | 5090 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: Clarity After: Artifacts:

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-04

Lab Name: ARDL, INC. Contract: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115083-2

Level (low/med): LOW Date Received: 11/17/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1480000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-05T

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-3T

Level (low/med): LOW Date Received: 11/17/93

% 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 | 25800 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 22.1 | B | N W | F |
| 7440-39-3 | Barium | 1080 | | | P |
| 7440-41-7 | Beryllium | 3.7 | B | | P |
| 7440-43-9 | Cadmium | 51.0 | | | P |
| 7440-70-2 | Calcium | 706000 | | | P |
| 7440-47-3 | Chromium | 76.7 | | | P |
| 7440-48-4 | Cobalt | 101 | | | P |
| 7440-50-8 | Copper | 312 | | | P |
| 7439-89-6 | Iron | 137000 | | | P |
| 7439-92-1 | Lead | 303 | | | F |
| 7439-95-4 | Magnesium | 140000 | | | P |
| 7439-96-5 | Manganese | 16900 | | | P |
| 7439-97-6 | Mercury | 2.1 | | | CV |
| 7440-02-0 | Nickel | 212 | | | P |
| 7440-09-7 | Potassium | 108000 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 227000 | | | P |
| 7440-28-0 | Thallium | 1.3 | B | W | F |
| 7440-62-2 | Vanadium | 155 | | | P |
| 7440-66-6 | Zinc | 26400 | | | P |
| | Cyanide | 5.0 | U | N | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-05D

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-3D

Level (low/med): LOW Date Received: 11/17/93

% 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 | 780 | | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 7.1 | B | N W | F |
| 7440-39-3 | Barium | 27.8 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 432000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 29.6 | B | | P |
| 7440-50-8 | Copper | 7.4 | B | | P |
| 7439-89-6 | Iron | 3910 | | | P |
| 7439-92-1 | Lead | 24.5 | | S | F |
| 7439-95-4 | Magnesium | 126000 | | | P |
| 7439-96-5 | Manganese | 4020.0 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 14.7 | B | | P |
| 7440-09-7 | Potassium | 108000 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 228000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | N W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 2270 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: Clarity After: Artifacts:

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-05

Lab Name: ARDL, INC. Contract: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115083-3

Level (low/med): LOW Date Received: 11/17/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1460000 | | | |
| Sulfide | | 2300 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-08T

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-4T

Level (low/med): LOW Date Received: 11/17/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 2.5 | B | N W | F |
| 7440-39-3 | Barium | 17.2 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 5.6 | | | P |
| 7440-70-2 | Calcium | 578000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 12.4 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 3050 | | | P |
| 7439-92-1 | Lead | 9.6 | B | W | F |
| 7439-95-4 | Magnesium | 64200 | | | P |
| 7439-96-5 | Manganese | 6240 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 22.2 | B | | P |
| 7440-09-7 | Potassium | 80200 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 129000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 10200 | | | P |
| | Cyanide | 5.0 | U | N | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-08D

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-4D

Level (low/med): LOW Date Received: 11/17/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 7.6 | B | N W | F |
| 7440-39-3 | Barium | 22.3 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 596000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 16.1 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 3210.0 | | | P |
| 7439-92-1 | Lead | 5.2 | B | W | F |
| 7439-95-4 | Magnesium | 68000 | | | P |
| 7439-96-5 | Manganese | 6550 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 22.5 | B | | P |
| 7440-09-7 | Potassium | 83300 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 132000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | N W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 11000 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: Clarity After: Artifacts:

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-08

Lab Name: ARDL, INC. Contract: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115083-4

Level (low/med): LOW Date Received: 11/17/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1520000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09T

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-5T

Level (low/med): LOW Date Received: 11/17/93

% 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 | 108 | B | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 9.6 | B | N | F |
| 7440-39-3 | Barium | 172 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 108000 | | | P |
| 7440-47-3 | Chromium | 10.9 | | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 6.6 | B | | P |
| 7439-89-6 | Iron | 300 | | | P |
| 7439-92-1 | Lead | 15.8 | | S | F |
| 7439-95-4 | Magnesium | 38700 | | | P |
| 7439-96-5 | Manganese | 450 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 10300 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N W | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 94700 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 9.1 | B | | P |
| 7440-66-6 | Zinc | 41.5 | | | P |
| | Cyanide | 43.4 | | N | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

TOTAL ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09D

Lab Name: ARDL, INC. Contract No.: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water) WATER Lab Sample ID: 115083-5D

Level (low/med): LOW Date Received: 11/17/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 3.6 | B | N | F |
| 7440-39-3 | Barium | 164 | B | N | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 115000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 2.0 | B | W | F |
| 7439-95-4 | Magnesium | 43900 | | | P |
| 7439-96-5 | Manganese | 396 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 6970 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | N W | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 114000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | N W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 18.1 | B | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: Clarity After: Artifacts:

Comments:

DISSOLVED ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: 115083

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115083-5

Level (low/med): LOW Date Received: 11/17/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 226000 | | | |
| Sulfide | | 20900 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

ARDL inc. applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115087

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/18/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1 - Inorganic Analysis Data Package
   b. Volume 2 - Organic Sample Data Summary Package
   c. Volume 3 - VOA Analysis Data Package
   d. Volume 4 - BNA Analysis Data Package
   e. Volume 5 - Pesticide/PCB Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS / GeoSYNTEC

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | TCL-TAL TOTAL Metals | TCL-TAL DIS. Metals | TCL-VOA | CYANIDE | SULFIDE | SULFATE | BNA | PEST/PCB | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3319-10 | 17Nov93 | | ✓ | | 7 | 1 | | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | No Diss. Metal | | |
| 3319-11 | ↓ | | ✓ | | 6 | 1 | 1 | 1 | 1 | 1 | 1 | | | | | | | | | No BNA/PEST. | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 17Nov93 | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/18/93 | Time 0930 | Shipping Ticket No. 0937112352 |

REMARKS/SPECIAL INSTRUCTIONS:
Metals bottles preserved with Fisher Scientific Trace Metal Grade Nitric Acid.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6130

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 10. | U |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 10. | U |
| 75-35-4 | 1,1-Dichloroethene | 10. | U |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10. | U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 75-27-4 | Bromodichloromethane | 10. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 10. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 10. | U |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E

# VOLATILE ORGANICS ANALYSIS DATA SHEET
## TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-1

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >J6130

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: not dec. --- Date Analyzed: 11/21/93

GC Column: 1%SP-1000 ID: 2.0 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 6.00 | 5. | J |
| 2. | | | | |
| 3. | | | | |
| 4. | | | | |
| 5. | | | | |
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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-11

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >R5896

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: not dec. --- Date Analyzed: 11/26/93

GC column: VOCOL 60M ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 74-87-3 | Chloromethane | 10. | U |
| 74-83-9 | Bromomethane | 10. | U |
| 75-01-4 | Vinyl Chloride | 10. | U |
| 75-00-3 | Chloroethane | 10. | U |
| 75-09-2 | Methylene Chloride | 4. | JB |
| 67-64-1 | Acetone | 10. | U |
| 75-15-0 | Carbon Disulfide | 10. | U |
| 75-35-4 | 1,1-Dichloroethene | 10. | U |
| 75-34-3 | 1,1-Dichloroethane | 10. | U |
| 540-59-0 | 1,2-Dichloroethene (total) | 10. | U |
| 67-66-3 | Chloroform | 10. | U |
| 107-06-2 | 1,2-Dichloroethane | 10. | U |
| 78-93-3 | 2-Butanone | 10. | U |
| 71-55-6 | 1,1,1-Trichloroethane | 10. | U |
| 56-23-5 | Carbon Tetrachloride | 10. | U |
| 75-27-4 | Bromodichloromethane | 10. | U |
| 78-87-5 | 1,2-Dichloropropane | 10. | U |
| 10061-01-5 | cis-1,3-Dichloropropene | 10. | U |
| 79-01-6 | Trichloroethene | 10. | U |
| 124-48-1 | Dibromochloromethane | 10. | U |
| 79-00-5 | 1,1,2-Trichloroethane | 10. | U |
| 71-43-2 | Benzene | 10. | U |
| 10061-02-6 | trans-1,3-Dichloropropene | 10. | U |
| 75-25-2 | Bromoform | 10. | U |
| 108-10-1 | 4-Methyl-2-Pentanone | 10. | U |
| 591-78-6 | 2-Hexanone | 10. | U |
| 127-18-4 | Tetrachloroethene | 10. | U |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 10. | U |
| 108-88-3 | Toluene | 10. | U |
| 108-90-7 | Chlorobenzene | 10. | U |
| 100-41-4 | Ethylbenzene | 10. | U |
| 100-42-5 | Styrene | 10. | U |
| 1330-20-7 | Xylene (total) | 10. | U |

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-11

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-2

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: >R5896

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: not dec. --- Date Analyzed: 11/26/93

GC Column: VOCOL 60M ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| | CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|---|
| 1. | | UNKNOWN | 26.59 | 8. | J B |
| 2. | | | | | |
| 3. | | | | | |
| 4. | | | | | |
| 5. | | | | | |
| 6. | | | | | |
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1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0889

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)_ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 25. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 25. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |
| 99-09-2 | 3-Nitroaniline | 25. | U |
| 83-32-9 | Acenaphthene | 10. | U |

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0889

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 25. | U |
| 100-02-7 | 4-Nitrophenol | 25. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 25. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 25. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 25. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 86-74-8 | Carbazole | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 3. | JB |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-10

Matrix: (soil/water) WATER Lab Sample ID: 115087-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0889

Level: (low/med) LOW Date Received: 11/18/93

% Moisture: not dec. --- decanted:(Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 17

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 5.46 | 400. | J |
| 2. | UNKNOWN | 5.82 | 4. | J |
| 3. | UNKNOWN | 5.87 | 5. | J |
| 4. | UNKNOWN | 6.29 | 10. | J |
| 5. | UNKNOWN | 7.29 | 5. | J |
| 6. | UNKNOWN | 8.11 | 5. | J |
| 7. | UNKNOWN | 9.49 | 3. | J |
| 8. | UNKNOWN | 11.23 | 5. | J |
| 9. | UNKNOWN | 14.19 | 8. | J |
| 10. | UNKNOWN | 19.09 | 7. | J |
| 11. | UNKNOWN | 22.20 | 4. | J |
| 12. | UNKNOWN | 23.13 | 10. | J B |
| 13. | UNKNOWN | 24.87 | 7. | J B |
| 14. | UNKNOWN | 25.09 | 10. | J B |
| 15. | UNKNOWN | 27.23 | 7. | J B |
| 16. | UNKNOWN | 29.67 | 6. | J B |
| 17. | UNKNOWN | 35.44 | 9. | J |
| 18. | | | | |
| 19. | | | | |
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| 21. | | | | |
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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115087 SAS No.: SDG No.: 3319-10
Matrix(soil/water) : WATER Lab Sample ID : 115087-1
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
% Moisture: -- decanted:(Y/N) N Date Received : 11/18/93
Extraction(SepF/Cont/Sonc) SEPF Date Extracted : 11/19/93
Concentrated Extract Volume:10000(uL) Date Analyzed : 12/02/93
Injection Volume: 1 (uL) Dilution Factor: 1.0
GPC Cleanup:(Y/N) N pH: 6.8 Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 0.05 | U |
| 319-85-7 | beta-BHC | 0.05 | U |
| 319-86-8 | delta-BHC | 0.05 | U |
| 58-89-9 | gamma-BHC(Lindane) | 0.05 | U |
| 76-44-8 | Heptachlor | 0.05 | U |
| 309-00-2 | Aldrin | 0.05 | U |
| 1024-57-3 | Heptachlor Epoxide | 0.05 | U |
| 959-98-8 | Endosulfan I | 0.05 | U |
| 60-57-1 | Dieldrin | 0.10 | U |
| 72-55-9 | 4,4'-DDE | 0.10 | U |
| 72-20-8 | Endrin | 0.10 | U |
| 33213-65-9 | Endosulfan II | 0.10 | U |
| 72-54-8 | 4,4'-DDD | 0.10 | U |
| 1013-07-8 | Endosulfan sulfate | 0.10 | U |
| 50-29-3 | 4,4'-DDT | 0.10 | U |
| 72-43-5 | Methoxychlor | 0.50 | U |
| 53494-70-5 | Endrin ketone | 0.10 | U |
| 7421-36-3 | Endrin aldehyde | 0.10 | U |
| 5103-71-9 | alpha-Chlordane | 0.05 | U |
| 5103-74-2 | gamma-Chlordane | 0.05 | U |
| 8001-35-2 | Toxaphene | 5.0 | U |
| 12674-11-2 | Aroclor 1016 | 1.0 | U |
| 11104-28-2 | Aroclor 1221 | 2.0 | U |
| 11141-16-5 | Aroclor 1232 | 1.0 | U |
| 53469-21-9 | Aroclor 1242 | 1.0 | U |
| 12672-29-6 | Aroclor 1248 | 1.0 | U |
| 11097-69-1 | Aroclor 1254 | 1.0 | U |
| 11096-82-5 | Aroclor 1260 | 1.0 | U |

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10T

Lab Name: ARDL, INC. Contract No.: 115087

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-10

Matrix (soil/water) WATER Lab Sample ID: 115087-1T

Level (low/med): LOW Date Received: 11/18/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 2.3 | B | | F |
| 7440-39-3 | Barium | 210 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 116000 | | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.3 | B | | P |
| 7440-50-8 | Copper | 8.2 | B | | P |
| 7439-89-6 | Iron | 694 | | | P |
| 7439-92-1 | Lead | 1.0 | U | W | F |
| 7439-95-4 | Magnesium | 37700 | | | P |
| 7439-96-5 | Manganese | 618 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 2540 | B | | P |
| 7782-49-2 | Selenium | 1.0 | U | W | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 34900 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | W | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 83.1 | | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: TOTAL ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-10

Lab Name: ARDL, INC. Contract: 115087

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-10

Matrix (soil/water): WATER Lab Sample ID: 115087-1

Level (low/med): LOW Date Received: 11/18/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 114000 | | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-11T

Lab Name: ARDL, INC. Contract No.: 115087

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-10

Matrix (soil/water) WATER Lab Sample ID: 115087-2T

Level (low/med): LOW Date Received: 11/18/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.0 | U | | F |
| 7440-39-3 | Barium | 5.0 | U | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 100 | U | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 5.0 | U | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 1.0 | U | | F |
| 7439-95-4 | Magnesium | 100 | U | | P |
| 7439-96-5 | Manganese | 5.0 | U | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 2000 | U | | P |
| 7782-49-2 | Selenium | 1.0 | U | W | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 900 | U | | P |
| 7440-28-0 | Thallium | 1.0 | U | | F |
| 7440-62-2 | Vanadium | 5.0 | U | | P |
| 7440-66-6 | Zinc | 5.0 | U | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments: TOTAL ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-11D

Lab Name: ARDL, INC. Contract No.: 115087

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-10

Matrix (soil/water) WATER Lab Sample ID: 115087-2D

Level (low/med): LOW Date Received: 11/18/93

% 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 | 100 | U | | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 1.0 | U | N | F |
| 7440-39-3 | Barium | 28.1 | B | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 4.0 | U | | P |
| 7440-70-2 | Calcium | 100 | U | | P |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | 6.8 | B | | P |
| 7440-50-8 | Copper | 5.0 | U | | P |
| 7439-89-6 | Iron | 75.0 | U | | P |
| 7439-92-1 | Lead | 1.0 | U | | F |
| 7439-95-4 | Magnesium | 100 | U | | P |
| 7439-96-5 | Manganese | 5.0 | U | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 10.0 | U | | P |
| 7440-09-7 | Potassium | 2000 | U | | P |
| 7782-49-2 | Selenium | 1.0 | U | | F |
| 7440-22-4 | Silver | 5.0 | U | | P |
| 7440-23-5 | Sodium | 900 | U | | P |
| 7440-28-0 | Thallium | 1.0 | U | | F |
| 7440-62-2 | Vanadium | 6.3 | B | | P |
| 7440-66-6 | Zinc | 5.0 | U | | P |
| | Cyanide | | | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: Clarity After: Artifacts:

Comments: DISSOLVE ANALYSIS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-11

Lab Name: ARDL, INC. Contract: 115087

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-10

Matrix (soil/water): WATER Lab Sample ID: 115087-2

Level (low/med): LOW Date Received: 11/18/93

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| Sulfate | | 1000 | U | | |
| Sulfide | | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

ARDL Inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

17 December 1993

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus
ARDL ID No.: 115093

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/20/93. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1 - Organic Analysis Data Summary Package
   b. Volume 2 - BNA Analysis Data Package
   c. Volume 3 - Pesticide/PCB Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the IEPA.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CARUS / GEOSYNTEC

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | BNA | PEST/PCB | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| 3319-09 | 18Nov93 | | | X | 2 | 1 | 1 | Replaces broken samples collected 16Nov93 | | |

| | | | |
|---|---|---|---|
| Relinquished by: (Signature) John H Raymer | Date 18Nov93 | Time | Received by: (Signature) |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/22/93 | Time 1030 | Shipping Ticket No. 790 0282132 |

REMARKS/SPECIAL INSTRUCTIONS:

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-09

Matrix: (soil/water) WATER Lab Sample ID: 115093-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0890

Level: (low/med) LOW Date Received: 11/20/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.2

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 108-95-2 | Phenol | 10. | U |
| 111-44-4 | bis(2-Chloroethyl)_ether | 10. | U |
| 95-57-8 | 2-Chlorophenol | 10. | U |
| 541-73-1 | 1,3-Dichlorobenzene | 10. | U |
| 106-46-7 | 1,4-Dichlorobenzene | 10. | U |
| 95-50-1 | 1,2-Dichlorobenzene | 10. | U |
| 95-48-7 | 2-Methylphenol | 10. | U |
| 108-60-1 | 2,2'-oxybis(1-Chloropropane) | 10. | U |
| 106-44-5 | 4-Methylphenol | 10. | U |
| 621-64-7 | N-Nitroso-di-n-propylamine | 10. | U |
| 67-72-1 | Hexachloroethane | 10. | U |
| 98-95-3 | Nitrobenzene | 10. | U |
| 78-59-1 | Isophorone | 10. | U |
| 88-75-5 | 2-Nitrophenol | 10. | U |
| 105-67-9 | 2,4-Dimethylphenol | 10. | U |
| 111-91-1 | bis(2-Chloroethoxy)methane | 10. | U |
| 120-83-2 | 2,4-Dichlorophenol | 10. | U |
| 120-82-1 | 1,2,4-Trichlorobenzene | 10. | U |
| 91-20-3 | Naphthalene | 10. | U |
| 106-47-8 | 4-Chloroaniline | 10. | U |
| 87-68-3 | Hexachlorobutadiene | 10. | U |
| 59-50-7 | 4-Chloro-3-methylphenol | 10. | U |
| 91-57-6 | 2-Methylnaphthalene | 10. | U |
| 77-47-4 | Hexachlorocyclopentadiene | 10. | U |
| 88-06-2 | 2,4,6-Trichlorophenol | 10. | U |
| 95-95-4 | 2,4,5-Trichlorophenol | 25. | U |
| 91-58-7 | 2-Chloronaphthalene | 10. | U |
| 88-74-4 | 2-Nitroaniline | 25. | U |
| 131-11-3 | Dimethylphthalate | 10. | U |
| 208-96-8 | Acenaphthylene | 10. | U |
| 606-20-2 | 2,6-Dinitrotoluene | 10. | U |
| 99-09-2 | 3-Nitroaniline | 25. | U |
| 83-32-9 | Acenaphthene | 10. | U |

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-09

Matrix: (soil/water) WATER Lab Sample ID: 115093-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0890

Level: (low/med) LOW Date Received: 11/20/93

% Moisture: --- decanted: (Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.2

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 51-28-5 | 2,4-Dinitrophenol | 25. | U |
| 100-02-7 | 4-Nitrophenol | 25. | U |
| 132-64-9 | Dibenzofuran | 10. | U |
| 121-14-2 | 2,4-Dinitrotoluene | 10. | U |
| 84-66-2 | Diethylphthalate | 10. | U |
| 7005-72-3 | 4-Chlorophenyl-phenylether | 10. | U |
| 86-73-7 | Fluorene | 10. | U |
| 100-01-6 | 4-Nitroaniline | 25. | U |
| 534-52-1 | 4,6-Dinitro-2-methylphenol | 25. | U |
| 86-30-6 | N-Nitrosodiphenylamine (1) | 10. | U |
| 101-55-3 | 4-Bromophenyl-phenylether | 10. | U |
| 118-74-1 | Hexachlorobenzene | 10. | U |
| 87-86-5 | Pentachlorophenol | 25. | U |
| 85-01-8 | Phenanthrene | 10. | U |
| 120-12-7 | Anthracene | 10. | U |
| 86-74-8 | Carbazole | 10. | U |
| 84-74-2 | Di-n-butylphthalate | 2. | JB |
| 206-44-0 | Fluoranthene | 10. | U |
| 129-00-0 | Pyrene | 10. | U |
| 85-68-7 | Butylbenzylphthalate | 10. | U |
| 91-94-1 | 3,3'-Dichlorobenzidine | 10. | U |
| 56-55-3 | Benzo(a)anthracene | 10. | U |
| 218-01-9 | Chrysene | 10. | U |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | 10. | U |
| 117-84-0 | Di-n-octylphthalate | 10. | U |
| 205-99-2 | Benzo(b)fluoranthene | 10. | U |
| 207-08-9 | Benzo(k)fluoranthene | 10. | U |
| 50-32-8 | Benzo(a)pyrene | 10. | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | 10. | U |
| 53-70-3 | Dibenz(a,h)anthracene | 10. | U |
| 191-24-2 | Benzo(g,h,i)perylene | 10. | U |

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 3319-09

Matrix: (soil/water) WATER Lab Sample ID: 115093-1

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: >W0890

Level: (low/med) LOW Date Received: 11/20/93

% Moisture: not dec. --- decanted:(Y/N) N Date Extracted: 11/23/93

Concentrated Extract Volume: 1000.0 (uL) Date Analyzed: 11/29/93

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.2

Number TICs found: 11

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

| CAS NUMBER | COMPOUND NAME | RT | EST. CONC. | Q |
|---|---|---|---|---|
| 1. | UNKNOWN | 9.48 | 9. | J |
| 2. | UNKNOWN | 19.09 | 4. | J |
| 3. | UNKNOWN | 20.93 | 2. | J |
| 4. | UNKNOWN | 23.12 | 20. | J B |
| 5. | UNKNOWN | 24.88 | 10. | J B |
| 6. | UNKNOWN | 25.09 | 10. | J B |
| 7. | UNKNOWN | 28.23 | 4. | J |
| 8. | UNKNOWN | 29.66 | 4. | J B |
| 9. | UNKNOWN | 30.64 | 10. | J |
| 10. | UNKNOWN | 31.00 | 5. | J |
| 11. | UNKNOWN | 35.39 | 3. | J |
| 12. | | | | |
| 13. | | | | |
| 14. | | | | |
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| 28. | | | | |
| 29. | | | | |
| 30. | | | | |

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-09

Lab Name: ARDL, INC. Contract: GEOSYNTEC

Lab Code: Case No.: 115093 SAS No.: SDG No.: 3319-09
Matrix(soil/water) : WATER Lab Sample ID : 115093-1
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
% Moisture: -- decanted:(Y/N) N Date Received : 11/20/93
Extraction(SepF/Cont/Sonc) SEPF Date Extracted : 11/23/93
Concentrated Extract Volume:10000(uL) Date Analyzed : 12/08/93
Injection Volume: 1 (uL) Dilution Factor: 1.0
GPC Cleanup:(Y/N) N pH: 7.2 Sulfur Cleanup : N

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 319-84-6 | alpha-BHC | 0.05 | U |
| 319-85-7 | beta-BHC | 0.05 | U |
| 319-86-8 | delta-BHC | 0.05 | U |
| 58-89-9 | gamma-BHC(Lindane) | 0.05 | U |
| 76-44-8 | Heptachlor | 0.05 | U |
| 309-00-2 | Aldrin | 0.05 | U |
| 1024-57-3 | Heptachlor Epoxide | 0.05 | U |
| 959-98-8 | Endosulfan I | 0.05 | U |
| 60-57-1 | Dieldrin | 0.10 | U |
| 72-55-9 | 4,4'-DDE | 0.10 | U |
| 72-20-8 | Endrin | 0.10 | U |
| 33213-65-9 | Endosulfan II | 0.10 | U |
| 72-54-8 | 4,4'-DDD | 0.10 | U |
| 1013-07-8 | Endosulfan sulfate | 0.10 | U |
| 50-29-3 | 4,4'-DDT | 0.10 | U |
| 72-43-5 | Methoxychlor | 0.50 | U |
| 53494-70-5 | Endrin ketone | 0.10 | U |
| 7421-36-3 | Endrin aldehyde | 0.10 | U |
| 5103-71-9 | alpha-Chlordane | 0.05 | U |
| 5103-74-2 | gamma-Chlordane | 0.05 | U |
| 8001-35-2 | Toxaphene | 5.0 | U |
| 12674-11-2 | Aroclor 1016 | 1.0 | U |
| 11104-28-2 | Aroclor 1221 | 2.0 | U |
| 11141-16-5 | Aroclor 1232 | 1.0 | U |
| 53469-21-9 | Aroclor 1242 | 1.0 | U |
| 12672-29-6 | Aroclor 1248 | 1.0 | U |
| 11097-69-1 | Aroclor 1254 | 1.0 | U |
| 11096-82-5 | Aroclor 1260 | 1.0 | U |

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

SAMPLE NUMBER : C403144
SAMPLING POINT DESC. : CARUS CHEMICAL CO 001

SUBMITTING SOURCE # : DR 09901 SITE # :
DATE COLLECTED : 940906 TIME COLLECTED : 1230 SAMPLING PROGRAM : IN

COLLECTED BY : DM DELIVERED BY : UPS
COMMENTS :
FUNDING CODE : WP06 AGENCY ROUTING : RF UNIT CODE :
SAM TYPE CODE : EFFL SAMPLE PURPOSE CODE : E REPORTING INDICATOR : B

DATE RECEIVED : 940908 TIME RECEIVED : 1205 RECEIVED BY : PAA
LAB OBSERVATIONS : TRIP BL SAM# :
SUPERVISORS INITIALS : JWD NOTE : K = LESS THAN VALUE

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| P00403 | PH-LABORATORY | UNITS : | 8.2 | P70300 | (ROE) TDS @ 180C | MG/L : | 876 |
| P00630 | NITRATE&NO2-NTOTAL | MG/L : | 1.6 | P00610 | AMMONIA-N.TOTAL | MG/L : | 0.70 |
| P00665 | PHOSPHORUS-P.TOTAL | MG/L : | 0.05 | P00310 | BOD 5DAY | MG/L : | 4 |
| P00530 | SOLIDS.TOT.SUS. | MG/L : | 15 | P00076 | TURBIDITY | NTU : | 4.2 |
| P01032 | CHROMIUM.HEX | UG/L : | 10K | P00916 | CALCIUM.TOTAL | MG/L : | 110 |
| P00927 | MAGNESIUM.TOTAL | MG/L : | 39. | P00929 | SODIUM.TOTAL | MG/L : | 120 |
| P00937 | POTASSIUM.TOTAL | MG/L : | 9.5 | P01105 | ALUMINUM.TOTAL | UG/L : | 100K |
| P01007 | BARIUM.TOTAL | UG/L : | 120 | P01022 | BORON.TOTAL | UG/L : | 180 |
| P01012 | BERYLLIUM.TOTAL | UG/L : | 1K | P01027 | CADMIUM.TOTAL | UG/L : | 3K |
| P01034 | CHROMIUM.TOTAL | UG/L : | 11 | P01042 | COPPER.TOTAL | UG/L : | 5K |
| P01037 | COBALT.TOTAL | UG/L : | 10K | P01045 | IRON.TOTAL | UG/L : | 150 |
| P01051 | LEAD.TOTAL | UG/L : | 50K | P01055 | MANGANESE.TOTAL | UG/L : | 170 |
| P01067 | NICKEL.TOTAL | UG/L : | 15K | P01077 | SILVER.TOTAL | UG/L : | 3K |
| P01082 | STRONTIUM.TOTAL | UG/L : | 270 | P01087 | VANADIUM.TOTAL | UG/L : | 7 |
| P01092 | ZINC.TOTAL | UG/L : | 100K | P00400 | PH.FIELD | UNITS : | 7.71 |
| C00000 | COMPOSITE ENDING | DATE : | 940907 | C00001 | COMPOSITE ENDING | TIME : | 1030 |

RECEIVED
ROCKFORD REGION
4 1994
Environmental Protection Agency
State of Illinois

Lab Sheet Color: White IEPA - DWPC - FOS - LAB SHEET C403144 Field ID No.: M 5

09-Funding Code: W P 0 6 10-Agency Routing R F 12-File Code: E E E L 13-Sample Type: E

15-Reporting: B 16-DID: Basin D R County 0 9 9 Plant 0 1 17-Sampling Program: I N

18-Facility/Sample Pt: C A R U S C H E M I C A L C O 0 0 1

19-Begin Date: 9 4 0 9 0 6 (Y Y M M D D) 20-Begin 1 2 3 0 (H H M M) (24 hr.clock)

23-Instructions to Lab:

21-Collected by: D M 22-Transported by: U P S

Composite Sample Ending Date: 5 2 9 F 0 9 4 0 9 0 7 (Y Y M M D D)

Ending Time: 5 2 9 F 0 1 0 3 0 (H H M M) (24-hr.clock)

03-Lab Parameter Group: E F F o 5

| Additional Lab Parameters | Field Parameters | Results |
|---|---|---|
| | 501F0 Air Temp (°C) | |
| Cd | 502F0 Water Temp (°C) | |
| $Cr^6$ | 504F0 Dissolved $O_2$ | |
| Cr Total | 503F0 Conductance | |
| Fe | 500F0 pH | 7.71 |
| Pb | | |
| Mn | | |
| Ni | | |
| Zn | | |
| Turbidity | | |
| ROE | | |

27-Received By: Date: (Y Y M M D D)

Received by: Date: (Y Y M M D D)

Circle One: Effluent, Influent, Sludge, Stream, Process Flows, Cooling Water

Specials: WWTP, Other

Program: 106

NPDES No: IL0002623

Receiving Stream Name: LITTLE VERMILLION RIVER

Receiving Stream Conditions (velocity,etc):

Effluent Conditions: Clear

Weather Conditions: Sunny - 80s

Comments & Unusual Conditions & Severity: (If applicable, Stamp- "No Visible Problem This Visit")

Remarks:

Sampling Techniques: Composite

Mail To:

Carus Chemical Company
1375 8th Street
LaSalle, IL 61301

FOR LABORATORY USE ONLY

LAB ID NO. C403144

Sample Received By: Perry A. Anderson

Date Received: 9-8-94

Time Received: 12:05 AM PM

Lab Section: Chicago

Supervisor: J. Daugherty OCT -3 1994

IL 532-1575

# CARUS CHEMICAL ANALYTICAL LAB REQUEST/REPORT FORM

CC: P. CARUS III
J. MILLER
K. PISARCZYK

FROM: { } CAIROX { } CARULITE { } WATER
{ } DENOX { } CARUSORB { } PDC
{ } NaMnO4 { } WASTEWATER {X} OTHER WATER SAMPLES

SAMPLE: OLD SEWER (M & H SURFACE WATER), M & H POND, AND NEW SEWER.

SAMPLE SUBMITTED: { } SOLUTION { } SLURRY { } COMPOSITE
{ } FILTRATE { } SOLID {X} GRAB

PRESERVATIVE ADDED: NONE

ANALYSIS REQUESTED: AS SHOWN

REQUESTED BY: P. CARUS III DATE SUBMITTED: _____ TIME: _____
SAMPLED BY: _____ DATE FINISHED: 19 OCT 94

SAMPLE DISPOSITION: { } RETURN { } DISPOSE { } HOLD UNTIL RELEASED

**********

RESULTS REPORTED: {X} AS RECEIVED { } DRIED SAMPLE
IF SAMPLE WAS FILTERED, POROSITY OF FILTER USED: _____ um

| | OLD SEWER | M & H POND | NEW SEWER |
|---|---|---|---|
| TOTAL ARSENIC | ND | ND | ND |
| SOLUBLE ARSENIC | ND | ND | ND |
| TOTAL CADMIUM | 0.17 | 0.21 | ND |
| SOLUBLE CADMIUM | 0.11 | 0.15 | ND |
| TOTAL CHROMIUM | ND | ND | ND |
| SOLUBLE CHROMIUM | ND | ND | ND |
| TOTAL IRON | 12.81 | 0.14 | 0.56 |
| SOLUBLE IRON | ND | ND | ND |
| TOTAL MANGANESE | 3.45 | 1.14 | 2.54 |
| SOLUBLE MANGANESE | 0.94 | 1.12 | 1.13 |
| TOTAL SILVER | ND | ND | ND |
| SOLUBLE SILVER | ND | ND | ND |
| TOTAL ZINC | 132.88 | 76.88 | 52.04 |
| SOLUBLE ZINC | 6.05 | 2.45 | 0.30 |
| NITRATE | 14.7 | 9.9 | 17.4 |
| TOC | 3.0 | 3.8 | 3.9 |
| TOTAL LEAD* | 2.3 | 0.021 | 0.015 |
| SOLUBLE LEAD* | 0.019 | 0.002 | <0.002 |

ALL RESULTS ARE IN mg/L ND = NONE DETECTED *ANALYSIS BY GRAPHITE FURNANCE

**********

ANALYST: B. KUEBEL APPROVED BY: BK DATE: 25 Oct 94

CALL OR PAGE _____ AT EXT _____ WHEN RESULTS COMPLETED. TIME: _____

CIRCULATED

REV3/93

ARDL Inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

28 October 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116586

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 10/01/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis Data Package - Total
   b. Volume 1B - Inorganic Analysis Data Package - TCLP

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: Carus Chemical Phase II

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | TCLP Metals | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| P-19 @ 20 | 29 Sep | 1430 | | X | 2 | ✓ | ✓ | Make Lab Composite | Y | None |
| P-18 @ 39 | 28 Sep | | | X | 2 | ✓ | ✓ | " | | |
| P-21 @ 21 | 30 Sep | 1300 | | X | 2 | ✓ | ✓ | " | | |
| P-19 @ 42 | 29 Sep | 1530 | | X | 2 | ✓ | ✓ | " | | |
| P-15A @ 20 | 29 Sep | 1055 | | X | 1 | ✓ | ✓ | " | | |
| P-17 @ 10* | 29 Sep | 1430 | | X | 1 | ✓ | ✓ | " | | |
| P-17 @ 42 | 29 Sep | 1540 | | X | 1 | ✓ | ✓ | " | | |
| P-21 @ 60 | 30 Sep | 1400 | | X | 2 | ✓ | ✓ | " | | |
| P-21 @ 41 | 30 Sep | 1330 | | X | 2 | ✓ | ✓ | " | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 30 Sep | 1800 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) | Date | Time | Shipping Ticket No. |
| Donna Lackrum | 10/01/94 | 1100 | |

REMARKS/SPECIAL INSTRUCTIONS:
Make Lab Composites of each set. Where there are two jars, use both for composite. Second jar is extra. Use TCLP from same composite as Metals Focused.
*See attached sheet & proposal P94-69

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# COOLER RECEIPT REPC
# ARDL, INC.

ARDL #: 116586

Cooler # 32
Number of Coolers In Shipment: 1 of 1

Project:: GeoSyntec/Barnes Chemical Phase II

Date Received: 10-01-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10/3/94 (Signature) Donna Cochrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: Fed Ex 2318193312

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag and taped inside to the lid? ..... (YES) NO
6. Were custody papers filled out properly (ink, signed, etc. )? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES ____ NO X Cooler Temp. 4.9° C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-03-94 (Signature) Donna Cochrum

10. Describe type of packing in cooler: peanuts
11. Were all bottles sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all bottles arrive unbroken and were labels in good condition? ..... YES (NO)
13. Were bottle labels complete ? ..... (YES) NO
14. Did all bottle labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... YES NO (N/A)
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? ..... YES NO (N/A)

Comments and/or Corrective Action:

12) P12@ A2 lid broken

(By:Signature) Donna Cochrum Date 10/01/94

Rev. 5/26/94

# TABLE 1

## ANALYTICAL SUITES
## REQUEST FOR LABORATORY SERVICES
## GEOSYNTEC PROJECT FE2167

### Metals-Focused Suite

| *Metals* | *Anions* |
|---|---|
| Barium | Sulfate |
| Cadmium | Sulfide |
| Chromium | Carbonate |
| Iron | Bicarbonate |
| Lead | Cyanide |
| Manganese | |
| Mercury | |
| Nickel | |
| Zinc | |

### Hydrocarbons-Focused Suite

| *BTEX Group* | *PAH Group* | *UST Metals Group*[1] |
|---|---|---|
| Benzene | Naphthalene | Arsenic |
| Toluene | Acenaphthalene | Barium |
| Ethyl Benzene | Acenapthene | Cadmium |
| Xylenes (Total) | Fluorene | Chromium |
| | Phenanthrene | Lead |
| | Anthracene | Mercury |
| | Fluoranthene | Selenium |
| | Pyrene | |
| | Benzo(a)anthracene | |
| | Chrysene | |
| | Benzo(b)fluoranthene | |
| | Benzo(k)fluoranthene | |
| | Benzo(a)pyrene | |
| | Dibenzo(a,h)anthracene | |
| | Benzo(g,h,i)perylene | |
| | Ideno(1,2,3-cd)pyrene | |

Note: 1. In cases where metals-focused analysis is also performed, dual analysis of metals parameters will not be necessary.

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1920

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-1

Level (low/med): LOW Date Received: 10/01/94

% Solids: 94.6

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 49.8 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 6.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 6.7 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 10600 | | | P |
| 7439-92-1 | Lead | 23.0 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 56.5 | | | P |
| 7439-97-6 | Mercury | 0.10 | U | | CV |
| 7440-02-0 | Nickel | 19.4 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 9120 | | * | P |
| | Cyanide | 0.52 | U | | C |

Color Before: RED Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES, ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1920

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-1

Level (low/med): LOW Date Received: 10/01/94

% Solids: 94.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 193 | | | |
| | Carbonate | 0.052 | | | |
| | Sulfate | 3580 | | | |
| | Sulfide | 24.1 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2121

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-3

Level (low/med): LOW Date Received: 10/01/94

% Solids: 86.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 124 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 2.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 41.1 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 209000 | | | P |
| 7439-92-1 | Lead | 221 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 203 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 24.4 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 2960 | | * | P |
| | Cyanide | 0.55 | U | | C |

Color Before: RED Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2121

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-3

Level (low/med): LOW Date Received: 10/01/94

% Solids: 86.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 479 | | | |
| | Carbonate | 0.057 | | | |
| | Sulfate | 11500 | | | |
| | Sulfide | 78.3 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1942

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-4

Level (low/med): LOW Date Received: 10/01/94

% Solids: 77.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 16.7 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 15.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 21.8 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 55700 | | | P |
| 7439-92-1 | Lead | 34.1 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 217 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 41.0 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 3000 | | * | P |
| | Cyanide | 0.61 | U | | C |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES, ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1942

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-4

Level (low/med): LOW Date Received: 10/01/94

% Solids: 77.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 957 | | | |
| | Carbonate | 0.73 | | | |
| | Sulfate | 3990 | | | |
| | Sulfide | 129 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P15A20

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-5

Level (low/med): LOW Date Received: 10/01/94

% Solids: 76.7

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 258 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 49.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 37.1 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 33000 | | | P |
| 7439-92-1 | Lead | 2340 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 40600 | | | P |
| 7439-97-6 | Mercury | 2.3 | | | CV |
| 7440-02-0 | Nickel | 53.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 21600 | | * | P |
| | Cyanide | 0.59 | U | | C |

Color Before: BLACK/BRO Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE 1

P15420

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-5

Level (low/med): LOW Date Received: 10/01/94

% Solids: 76.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 773 | | | |
| | Carbonate | 7.3 | | | |
| | Sulfate | 176 | | | |
| | Sulfide | 547 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1710

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-6

Level (low/med): LOW Date Received: 10/01/94

% Solids: 85.0

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 236 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 51.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 97.5 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 55800 | | | P |
| 7439-92-1 | Lead | 1400 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1500 | | | P |
| 7439-97-6 | Mercury | 0.42 | | | CV |
| 7440-02-0 | Nickel | 88.7 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 15100 | | * | P |
| | Cyanide | 0.56 | U | | C |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1710

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-6

Level (low/med): LOW Date Received: 10/01/94

% Solids: 85.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 376 | | | |
| | Carbonate | 11.2 | | | |
| | Sulfate | 289 | | | |
| | Sulfide | 20.9 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1742

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-7

Level (low/med): LOW Date Received: 10/01/94

% Solids: 78.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 189 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 45.4 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 11.7 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 60300 | | | P |
| 7439-92-1 | Lead | 47.9 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2030 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 37.7 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 21800 | | * | P |
| | Cyanide | 0.61 | U | | C |

Color Before: RED Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES, ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1742

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-7

Level (low/med): LOW Date Received: 10/01/94

% Solids: 78.9

Concentration Units (mg/kg or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 909 | | | |
| | Carbonate | 17.5 | | | |
| | Sulfate | 774 | | | |
| | Sulfide | 380 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2160

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-8

Level (low/med): LOW Date Received: 10/01/94

% Solids: 88.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 65.4 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 18.2 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 4.1 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 5240 | | | P |
| 7439-92-1 | Lead | 75.5 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 66.8 | | | P |
| 7439-97-6 | Mercury | 0.16 | | | CV |
| 7440-02-0 | Nickel | 4.9 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1270 | | * | P |
| | Cyanide | 0.54 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES, ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE N

P2160

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-8

Level (low/med): LOW Date Received: 10/01/94

% Solids: 88.9

Concentration Units (mg/kg or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 185 | | | |
| | Carbonate | 0.025 | | | |
| | Sulfate | 9300 | | | |
| | Sulfide | 23.9 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2141

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-9

Level (low/med): LOW Date Received: 10/01/94

% Solids: 90.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 117 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.6 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 2.8 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 7920 | | | P |
| 7439-92-1 | Lead | 99.3 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 50.2 | | | P |
| 7439-97-6 | Mercury | 0.15 | | | CV |
| 7440-02-0 | Nickel | 4.4 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 852 | | * | P |
| | Cyanide | 0.53 | U | | C |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2141

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-9

Level (low/med): LOW Date Received: 10/01/94

% Solids: 90.4

Concentration Units (mg/kg or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 183 | | | |
| | Carbonate | 0.014 | | | |
| | Sulfate | 12900 | | | |
| | Sulfide | 12.5 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE

P1920

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-1

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 158 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 62.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 9.7 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 423 | | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 174 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 29.1 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 107000 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1839

Lab Name: ARDL, INC. Contract No.: 116586A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) SOIL Lab Sample ID: 116586A-2

Level (low/med): LOW Date Received: 10/01/94

% Solids: 89.1

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 608 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 22.9 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 22.0 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 54900 | | | P |
| 7439-92-1 | Lead | 290 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2280 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 65.5 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 9700 | | * | P |
| | Cyanide | 0.45 | U | | C |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1839

Lab Name: ARDL, INC. Contract: 116586A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P15A20

Matrix (soil/water): SOIL Lab Sample ID: 116586A-2

Level (low/med): LOW Date Received: 10/01/94

% Solids: 89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 191 | | | |
| | Carbonate | 0.52 | | | |
| | Sulfate | 3080 | | | |
| | Sulfide | 21.6 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1839

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-2

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 248 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 327 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 6.8 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 193 | | | P |
| 7439-92-1 | Lead | 119 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1750 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 254 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 4890 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2121

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-3

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 68.9 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 27.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.4 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 48.4 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 647 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 94.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 4560 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1942

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-4

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 131 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 1100 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 209 | | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 323 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 1100 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 9080 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P15A20

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-5

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 1960 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 173 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 25.0 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 227 | | | P |
| 7439-92-1 | Lead | 5770 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 9470 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 221 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 6190 | | E | P |
| | Cyanide | | | | NR |

Color Before: YELLOW Clarity Before: CLEAR Texture:

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P1710

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-6

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 1470 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 789 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 20.4 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 146 | | | P |
| 7439-92-1 | Lead | 7230 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2810 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 35.1 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 7790 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P174[illegible]

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-7

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 923 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 95.6 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 194 | | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 7390 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 277 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 4450 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2160

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-8

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 108 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 290 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 8.9 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1010 | | | P |
| 7439-92-1 | Lead | 390 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 779 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 6390 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P0141

Lab Name: ARDL, INC. Contract No.: 116586B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P15A20

Matrix (soil/water) TCLP Lab Sample ID: 116586B-9

Level (low/med): LOW Date Received: 10/01/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 101 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 67.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 510 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 670 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1100 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

4 November 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116614

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 10/06/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis Data Package - Total
   b. Volume 1B - Inorganic Analysis Data Package - TCLP

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

116614

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: CarwoChem Phase II

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Total Metals | TCLP Metals | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| P2@42 | 4 Oct | 1400 | | ✓ | 1 | ✓ | ✓ | Make Composite then split into two samples | | |
| P2@42 (dup) | 4 Oct | 1400 | | ✓ | 1 | ✓ | ✓ | | | |
| P21@2.5 | 3 Oct | 0900 | | ✓ | 2 | ✓ | ✓ | | | |
| P1@80 | 3 Oct | 1620 | | ✓ | 2 | ✓ | ✓ | | | |
| P22@41 | 4 Oct | | | ✓ | 2 | ✓ | ✓ | | | |
| P1@21 | 3 Oct | | | ✓ | 1 | ✓ | ✓ | | | |
| P2@19 | 3 Oct | 1500 | | ✓ | 2 | ✓ | ✓ | | | |
| P22@106 | 5 Oct | 0830 | | ✓ | 2 | ✓ | ✓ | | | |
| | | | | | | | | Should also in included anions for a "metals-focused suite" per Jack Raymer - 10/6/94 dlc | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 5 Oct | 1600 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lockrum | Date 10/6/94 | Time 0930 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
Make Lab composite before doing analysis. Second bottle (where there are two) is an extra in case of breakage. Use to make composite if possible.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# TABLE 1

## ANALYTICAL SUITES
## REQUEST FOR LABORATORY SERVICES
## GEOSYNTEC PROJECT FE2167

### Metals-Focused Suite

| *Metals* | *Anions* |
|---|---|
| Barium | Sulfate |
| Cadmium | Sulfide |
| Chromium | Carbonate |
| Iron | Bicarbonate |
| Lead | Cyanide |
| Manganese | |
| Mercury | |
| Nickel | |
| Zinc | |

### Hydrocarbons-Focused Suite

| *BTEX Group* | *PAH Group* | *UST Metals Group*[1] |
|---|---|---|
| Benzene | Naphthalene | Arsenic |
| Toluene | Acenaphthalene | Barium |
| Ethyl Benzene | Acenapthene | Cadmium |
| Xylenes (Total) | Fluorene | Chromium |
| | Phenanthrene | Lead |
| | Anthracene | Mercury |
| | Fluoranthene | Selenium |
| | Pyrene | |
| | Benzo(a)anthracene | |
| | Chrysene | |
| | Benzo(b)fluoranthene | |
| | Benzo(k)fluoranthene | |
| | Benzo(a)pyrene | |
| | Dibenzo(a,h)anthracene | |
| | Benzo(g,h,i)perylene | |
| | Ideno(1,2,3-cd)pyrene | |

Note: 1. In cases where metals-focused analysis is also performed, dual analysis of metals parameters will not be necessary.

# COOLER RECEIPT REPORT
# ARDL, INC.

ARDL #: 116614

Cooler # 101

Number of Coolers In Shipment: 1

Project:: GEOSYNTEC/CARCUS CHEM PHASE II

Date Received: 10-06-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 10/6/94 (Signature) Donna Cochrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: Fed Ex 2318195493

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____ Seal Date: _____ Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag and taped inside to the lid? ..... YES (NO)

6. Were custody papers filled out properly (ink, signed, etc. )? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES____ NO X Cooler Temp. 5.6° C

B. **LOG-IN PHASE:** Date samples were logged-in: 10-6-94 (Signature) Donna Cochrum

10. Describe type of packing in cooler: bubble pack

11. Were all bottles sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all bottles arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were bottle labels complete ? ..... (YES) NO

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... YES NO (N/A)

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? . ..... YES NO (N/A)

**Comments and/or Corrective Action:**

_____

_____

_____

_____

_____

_____ (By:Signature) Donna Cochrum Date 10/06/94

Rev. 5/26/94

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

SOW No.: ILM02.0

| EPA Sample No. | Lab Sample ID. |
|---|---|
| P242 | 116614A-1 |
| P242D | 116614A-1D |
| P242S | 116614A-1S |
| P242DP | 116614A-2 |
| P242DPD | 116614A-2D |
| P212.5 | 116614A-3 |
| P212.5D | 116614A-3D |
| P212.5S | 116614A-3S |
| P180 | 116614A-4 |
| P180D | 116614A-4D |
| P180S | 116614A-4S |
| P2241 | 116614A-5 |
| P121 | 116614A-6 |
| P219 | 116614A-7 |
| P22106 | 116614A-8 |

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 has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Daniel J Gillespie Name: Daniel J. Gillespie

Date: 11/4/94 Title: Technical Services Manager

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

SOW No.: ILMO2.0

## Case Narrative

Eight soil samples were received for analysis on 6 October 1994. The requested analysis included total metals (including barium, cadmium, chromium, iron, lead, manganese, mercury, nickel, and zinc), bicarbonate and carbonate alkalinity, cyanide, sulfate and sulfide which are documented herein and TCLP metals (including barium, cadmium, chromium, iron, lead, manganese, mercury, nickel and zinc) which are documented in ARDL report 116614B.

It is policy at ARDL to follow the guidelines set forth in the SOW relating to the minimum time requirements between analytical samples and CCV's or CCB's. In some cases minor exceptions appear on the Form 14's due to: 1) rounding of the actual times to the nearest minute as required on the forms; and 2) the necessity of reprinting a data page when an incorrect limit checking table was employed.

The level of the CRI standard for lead is 60 ug/L which is approximately three times our IDL.

Due to a printer malfunction, the final ICSA/ICSAB, CRI1 and CRI2 was reprinted from the database for ICP run dated 2 November 1994.

The subject samples were originally analyzed for mercury on 11 October 1994, with a positive result observed for sample P242. This sample was reanalyzed 13 October 1994 with no mercury detected. The latter analysis is reported for this sample.

The ICV and ICB for the second cyanide distillation batch was employed to bracket the samples from the first distillation batch.

Alkalinity results (reported herein as mg CaCO3/kg) were acquired following Method 310.1, with the carbonate and bicarbonate calculations as described in Method 4500-CO2D.

Sulfate was quantitated via Method 300.0.

Sulfide results reported herein were performed by Method 9030A.

Due to their length, customer numbers were modified as follows: P2@42 is now P242. Also, P2@42(dup) is shown as P242DP.

# INORGANIC DATA QUALIFIERS

FORM I-IN includes fields for three types of result qualifiers. These qualifiers are completed as follows:

**C (Concentration) qualifier:**

B - Reported value obtained from a reading between the CRDL and IDL.

U - Analyte was analyzed for but not detected.

**Q qualifier -- Specified entries and their meanings are as follows:**

E - The reported value is estimated because of the presence of interference. This determination is from: 1) ICP serial dilution results exceeding specified limits; or 2) very low (<40%) GFAA post-digestion spike recovery.

M - Duplicate injection precision not met.

N - Spiked sample recovery not within control limits.

S - The reported value was determined by the Method of Standard Additions (MSA).

W - Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

* - Duplicate analysis not within control limits.

+ - Correlation coefficient for the MSA is less than 0.995.

NOTE: Entering 'S', 'W' or '+' is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

**M (Method) qualifier -- Enter:**

'P' for ICP
'A' for Flame AA
'F' for Furnace AA
'CV' for manual Cold Vapor AA
'C' for Manual Spectrophotometric

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-1

Level (low/med): LOW Date Received: 10/06/94

% Solids: 86.0

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 80.4 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 8.4 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 27.3 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 97800 | | E | P |
| 7439-92-1 | Lead | 267 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 23.6 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 13.3 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 488 | | | P |
| | Cyanide | 0.53 | U | | C |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-1

Level (low/med): LOW Date Received: 10/06/94

% Solids: 86.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 93.2 | | | |
| | Carbonate | 0.001 | | | |
| | Sulfate | 12500 | | | |
| | Sulfide | 23.2 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242DP

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-2

Level (low/med): LOW Date Received: 10/06/94

% Solids: 85.1

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 84.6 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 8.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 26.6 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 94600 | | E | P |
| 7439-92-1 | Lead | 261 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 28.1 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 15.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 489 | | | P |
| | Cyanide | 0.74 | | | C |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242DP

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-2

Level (low/med): LOW Date Received: 10/06/94

% Solids: 85.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 96.0 | | | |
| | Carbonate | 0.001 | | | |
| | Sulfate | 12100 | | | |
| | Sulfide | 23.4 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P212.5

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-3

Level (low/med): LOW Date Received: 10/06/94

% Solids: 85.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 471 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 6.3 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 4.0 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 60800 | | E | P |
| 7439-92-1 | Lead | 3850 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 95.6 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 41.3 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 26100 | | | P |
| | Cyanide | 0.53 | U | | C |

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: NONE

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P212.5

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-3

Level (low/med): LOW Date Received: 10/06/94

% Solids: 85.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 191 | | | |
| | Carbonate | 0.021 | | | |
| | Sulfate | 3100 | | | |
| | Sulfide | 23.0 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P180

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-4

Level (low/med): LOW Date Received: 10/06/94

% Solids: 92.8

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 54.5 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 9.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 12.9 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 24500 | | E | P |
| 7439-92-1 | Lead | 2.1 | | S | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 185 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 75.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 8860 | | | P |
| | Cyanide | 0.53 | U | | C |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P180

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-4

Level (low/med): LOW Date Received: 10/06/94

% Solids: 92.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 470 | | | |
| | Carbonate | 0.003 | | | |
| | Sulfate | 19800 | | | |
| | Sulfide | 21.3 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2241

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-5

Level (low/med): LOW Date Received: 10/06/94

% Solids: 95.7

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 136 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 2.6 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 8.6 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 26900 | | E | P |
| 7439-92-1 | Lead | 48.3 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 81.9 | | | P |
| 7439-97-6 | Mercury | 0.10 | U | | CV |
| 7440-02-0 | Nickel | 16.2 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 3770 | | | P |
| | Cyanide | 0.48 | U | | NR |

Color Before: RED/BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2241

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-5

Level (low/med): LOW Date Received: 10/06/94

% Solids: 95.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 1050 | | | |
| | Carbonate | 0.12 | | | |
| | Sulfate | 6120 | | | |
| | Sulfide | 20.8 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P121

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-6

Level (low/med): LOW Date Received: 10/06/94

% Solids: 83.1

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 161 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 1.9 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 6.3 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 14100 | | E | P |
| 7439-92-1 | Lead | 1470 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 38.1 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 10.5 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1090 | | | P |
| | Cyanide | 0.55 | U | | NR |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P121

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-6

Level (low/med): LOW Date Received: 10/06/94

% Solids: 83.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 90.4 | | | |
| | Carbonate | 0.009 | | | |
| | Sulfate | 23200 | | | |
| | Sulfide | 24.0 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P219

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-7

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 152 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 228 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 19.3 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 35100 | | E | P |
| 7439-92-1 | Lead | 2300 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1170 | | | P |
| 7439-97-6 | Mercury | 0.11 | U | | CV |
| 7440-02-0 | Nickel | 9.1 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 5400 | | | P |
| | Cyanide | 0.50 | U | | NR |

Color Before: RED Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P219

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-7

Level (low/med): LOW Date Received: 10/06/94

% Solids: 86.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 374 | | | |
| | Carbonate | 1.5 | | | |
| | Sulfate | 5990 | | | |
| | Sulfide | 22.8 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P22106

Lab Name: ARDL, INC. Contract No.: 116614A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) SOIL Lab Sample ID: 116614A-8

Level (low/med): LOW Date Received: 10/06/94

% Solids: 83.8

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 32.0 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 7.2 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 8.7 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 39700 | | E | P |
| 7439-92-1 | Lead | 5.5 | | | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 859 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 19.9 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 687 | | | P |
| | Cyanide | 0.45 | U | | NR |

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: ROCKS

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P22106

Lab Name: ARDL, INC. Contract: 116614A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

Matrix (soil/water): SOIL Lab Sample ID: 116614A-8

Level (low/med): LOW Date Received: 10/06/94

% Solids: 83.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 2610 | | | |
| | Carbonate | 302 | | | |
| | Sulfate | 472 | | | |
| | Sulfide | 22.4 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ARDL, INC. Contract: 116614B

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

SOW No.: ILM02.0

| EPA Sample No. | Lab Sample ID. |
|---|---|
| P242 | 116614-1 |
| P242D | 116614-1D |
| P242S | 116614-1S |
| P242DP | 116614-2 |
| P212.5 | 116614-3 |
| P180 | 116614-4 |
| P2241 | 116614-5 |
| P121 | 116614-6 |
| P219 | 116614-7 |
| P22106 | 116614-8 |

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 has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Daniel J. Gillespie Name: Daniel J. Gillespie

Date: 11/21/94 Title: Technical Services Manager

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: ARDL, INC. Contract: 116614B

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: P121

SOW No.: ILMO2.0

## Case Narrative

Eight soil samples were received 6 October 1994 for analysis. The requested analysis included TCLP metals (barium, cadmium, chromium, iron, lead, manganese, mercury, nickel and zinc) which are documented herein and total metals (barium, cadmium, chromium, iron, lead, manganese, mercury, nickel and zinc), carbonate and bicarbonate alkalinity, cyanide, sulfate and sulfide which are documented in ARDL report 116614A.

It is policy at ARDL to follow the guidelines set forth in the SOW relating to the minimum time requirements between analytical samples and CCV's or CCB's. In some cases minor exceptions appear on the Form 14's due to: 1) rounding of the actual times to the nearest minute as required on the forms; and 2) the necessity of reprinting a data page when an incorrect limit checking table was employed.

The level of the CRI standard for lead is 60 ug/L which is approximately twice the instrument detection limit.

Due to their length, customer numbers were truncated as follows: P2@42 is now P242.

Two matrix spike solutions were digested and analyzed for the ICP elements. The first contained the normal TCLP analytes at the requisite levels. The second spike aliquot was spiked at normal SOW levels for the non-TCLP analytes. It should be noted that the TCLP barium spike recovery was poor (18.7%) while the TCLP blank spike, SOW level blank spike, and SOW level matrix spike all had good recovery (91.2%, 95.6% and 97.6%, respectively).

# INORGANIC DATA QUALIFIERS

FORM I-IN includes fields for three types of result qualifiers. These qualifiers are completed as follows:

**C (Concentration) qualifier:**

**B** - Reported value obtained from a reading between the CRDL and IDL.

**U** - Analyte was analyzed for but not detected.

**Q qualifier -- Specified entries and their meanings are as follows:**

**E** - The reported value is estimated because of the presence of interference. This determination is from: 1) ICP serial dilution results exceeding specified limits; or 2) very low (<40%) GFAA post-digestion spike recovery.

**M** - Duplicate injection precision not met.

**N** - Spiked sample recovery not within control limits.

**S** - The reported value was determined by the Method of Standard Additions (MSA).

**W** - Post-digestion spike for Furnace AA analysis is out of control limits (85-115%), while sample absorbance is less than 50% of spike absorbance.

***** - Duplicate analysis not within control limits.

**+** - Correlation coefficient for the MSA is less than 0.995.

**NOTE:** Entering 'S', 'W' or '+' is mutually exclusive. No combination of these qualifiers can appear in the same field for an analyte.

**M (Method) qualifier** -- Enter:

'P' for ICP
'A' for Flame AA
'F' for Furnace AA
'CV' for manual Cold Vapor AA
'C' for Manual Spectrophotometric

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# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-1

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 78.0 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 144 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 221 | | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 52.3 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 2140 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P242DP

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-2

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 78.0 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 137 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 339 | | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 53.6 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 2170 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P212.5

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-3

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 54.3 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 39.9 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 2430 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 61.7 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 25.3 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 184000 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P180

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-4

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 78.0 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 213 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 12.8 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 5100 | | | P |
| 7439-92-1 | Lead | 23.3 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 5420 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 780 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 662000 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P2241

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-5

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 74.6 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 20.7 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 9.4 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1530 | | | P |
| 7439-92-1 | Lead | 206 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 69.0 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 6180 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P121

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-6

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 55.2 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 27.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 3410 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 130 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 81.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1730 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P219

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-7

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 125 | B | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 249 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 630 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 7180 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 48.9 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 7570 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

P22106

Lab Name: ARDL, INC. Contract No.: 116614B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: P121

Matrix (soil/water) TCLP Lab Sample ID: 116614B-8

Level (low/med): LOW Date Received: 10/06/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 616 | | N | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 8.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 4890 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1690 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

ARDL Inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

19 November 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116754
Due Date: 12/04/94

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/04/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis Data Package - Total
   b. Volume 1B - Inorganic Analysis Data Package - TCLP
   c. Volume 2 - PAH Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

## CHAIN OF CUSTODY RECORD

PROJECT: Carus Chemical Phase II

SAMPLERS: (Signature) John Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Suite Focused | PAH List | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| 94307-01 | 3Nov94 | 1000 | X | | 2 | X | X | POND LINE 1 - SEDIM. | | |
| 94307-02 | ↓ | 1030 | X | | 2 | X | X | POND LINE 1 - SEDIM. | | |
| 94307-03 | | 1100 | X | | 2 | X | X | POND LINE 2 - SEDIM. | | |
| 94307-04 | | 1520 | X | | 2 | X | X | POND LINE 4 - SEDIM. | | |
| | | | | | | | | per Jack Laymer 11/07/94 - Metals to be Run Both Total + TCLP. PAH To be Run TCLP. d/c | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John Raymer | 3Nov94 | 1800 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lockrum | Date 11/4/94 | Time 0930 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
See Attached List for SPECIFIC PARAMETERS
SAMPLES DESIGNATED COMPOSITES BECAUSE COLLECTED AT A RANGE OF DEPTHS.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# COOLER RECEIPT REPORT
## ARDL, INC.

ARDL #: 116754

Cooler # 139
Number of Coolers In Shipment: 1 of 1

Project:: CARUS CHEMICAL CO.

Date Received: 11-4-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened 11-4-94 (Signature) Donna Cockrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: Federal Express 7900281815 -

2. Were custody seals on outside of cooler? ..... YES NO (N/A)

   How many and where? _____ Seal Date: _____ Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag and taped inside to the lid? ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc. )? ..... (YES) NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES ____ NO ✓ Cooler Temp. 4.3° C

B. **LOG-IN PHASE:** Date samples were logged-in: 11-4-94 (Signature) Donna Cockrum

10. Describe type of packing in cooler: peanuts, free ice
11. Were all bottles sealed in separate plastic bags? ..... YES (NO) N/A
12. Did all bottles arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were bottle labels complete ? ..... YES (NO)
14. Did all bottle labels agree with custody papers? ..... ~~YES~~ (NO)
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... YES NO (N/A)
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO (N/A)
19. Was the ARDL project coordinator notified of any deficiencies? . ..... YES (NO) N/A

Comments and/or Corrective Action:

14) parameter did not match C of C.

(By:Signature) Donna Cockrum Date 11/4/94

Rev. 5/26/94

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430701A

Lab Name: ARDL, INC. Contract No.: 116754A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) SOIL Lab Sample ID: 116754A-1

Level (low/med): LOW Date Received: 11/04/94

% Solids: 39.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 2020 | | N * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 8.3 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 130 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 33800 | | E | P |
| 7439-92-1 | Lead | 133 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 46700 | | | P |
| 7439-97-6 | Mercury | 0.81 | | | CV |
| 7440-02-0 | Nickel | 174 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1620 | | E | P |
| | Cyanide | 1.1 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

10004

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430701A

Lab Name: ARDL, INC. Contract: 116754A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430701

Matrix (soil/water): SOIL Lab Sample ID: 116754A-1

Level (low/med): LOW Date Received: 11/04/94

% Solids: 39.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 638 | | | |
| | Carbonate | 51.1 | | | |
| | Sulfate | 719 | | N | |
| | Sulfide | 142 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10005

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430702A

Lab Name: ARDL, INC. Contract No.: 116754A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) SOIL Lab Sample ID: 116754A-2

Level (low/med): LOW Date Received: 11/04/94

% Solids: 41.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 6770 | | N * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.9 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 277 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 127000 | | E | P |
| 7439-92-1 | Lead | 141 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 103000 | | | P |
| 7439-97-6 | Mercury | 1.4 | | | CV |
| 7440-02-0 | Nickel | 448 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 513 | | E | P |
| | Cyanide | 1.2 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

10006

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430702A

Lab Name: ARDL, INC. Contract: 116754A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430701

Matrix (soil/water): SOIL Lab Sample ID: 116754A-2

Level (low/med): LOW Date Received: 11/04/94

% Solids: 41.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 538 | | | |
| | Carbonate | 47.2 | | | |
| | Sulfate | 967 | | N | |
| | Sulfide | 137 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10007

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430703A

Lab Name: ARDL, INC. Contract No.: 116754A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) SOIL Lab Sample ID: 116754A-3

Level (low/med): LOW Date Received: 11/04/94

% Solids: 36.5

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 7310 | | N * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 255 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 109000 | | E | P |
| 7439-92-1 | Lead | 148 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 76200 | | | P |
| 7439-97-6 | Mercury | 1.9 | | | CV |
| 7440-02-0 | Nickel | 495 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 595 | | E | P |
| | Cyanide | 1.3 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

10008

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430703A

Lab Name: ARDL, INC. Contract: 116754A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430701

Matrix (soil/water): SOIL Lab Sample ID: 116754A-3

Level (low/med): LOW Date Received: 11/04/94

% Solids: 36.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 539 | | | |
| | Carbonate | 49.5 | | | |
| | Sulfate | 1240 | | N | |
| | Sulfide | 155 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10009

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430704A

Lab Name: ARDL, INC. Contract No.: 116754A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) SOIL Lab Sample ID: 116754A-4

Level (low/med): LOW Date Received: 11/04/94

% Solids: 31.9

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 3620 | | N * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 5.2 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 280 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 193000 | | E | P |
| 7439-92-1 | Lead | 130 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 155000 | | | P |
| 7439-97-6 | Mercury | 0.97 | | | CV |
| 7440-02-0 | Nickel | 737 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 551 | | E | P |
| | Cyanide | 1.5 | U | | C |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

10010

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430704A

Lab Name: ARDL, INC. Contract: 116754A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430701

Matrix (soil/water): SOIL Lab Sample ID: 116754A-4

Level (low/med): LOW Date Received: 11/04/94

% Solids: 31.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 289 | | | |
| | Carbonate | 4.9 | | | |
| | Sulfate | 25800 | | N | |
| | Sulfide | 177 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10011

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430701B

Lab Name: ARDL, INC. Contract No.: 116754B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) TCLP Lab Sample ID: 116754B-1

Level (low/med): LOW Date Received: 11/04/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 1560 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 5.4 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 21.2 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1750 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 238 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 490 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10318

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430702B

Lab Name: ARDL, INC. Contract No.: 116754B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) TCLP Lab Sample ID: 116754B-2

Level (low/med): LOW Date Received: 11/04/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 646 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 9.2 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 147000 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 192 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 121 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

9430703B

Lab Name: ARDL, INC. Contract No.: 116754B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) TCLP Lab Sample ID: 116754B-3

Level (low/med): LOW Date Received: 11/04/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 755 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 8.0 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 56.2 | B | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 125000 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 163 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 89.7 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430704B

Lab Name: ARDL, INC. Contract No.: 166754B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430701

Matrix (soil/water) TCLP Lab Sample ID: 116754B-4

Level (low/med): LOW Date Received: 11/04/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 132 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 23.0 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 454000 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 328 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 87.2 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94307-01

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116754 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : TCLP Lab Sample ID : 116754-1
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/04/94
% Moisture(not dec): --- Date Extracted : 11/07/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/16/94
GPC Cleanup (Y/N): N pH: 6.8 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94307-02

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116754 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : TCLP Lab Sample ID : 116754-2
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/04/94
% Moisture(not dec): --- Date Extracted : 11/07/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/16/94
GPC Cleanup (Y/N): N pH: 6.9 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94307-03

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116754 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : TCLP Lab Sample ID : 116754-3
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/04/94
% Moisture(not dec): --- Date Extracted : 11/07/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/16/94
GPC Cleanup (Y/N): N pH: 6.8 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94307-04

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116754 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : TCLP Lab Sample ID : 116754-4
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/04/94
% Moisture(not dec): --- Date Extracted : 11/07/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/16/94
GPC Cleanup (Y/N): N pH: 6.8 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

ARDL Inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

25 November 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116774
Due Date: 12/10/94

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/10/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

    a. Volume 1 - Inorganic Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc.

P.O. Box 1566, Mt. Vernon Airport, RT 15E, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 FAX

## CHAIN OF CUSTODY RECORD

PROJECT: CurusChem Phase II

SAMPLERS: (Signature) John H. Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | | Total Susp. Solids | | | | | | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94313-01 | 9Nov94 | 1000 | | X | 4 | X | | X | | | | | | | | | | | | P-6 | | |
| 94313-02 | ↓ | 1200 | | X | 4 | X | | X | | | | | | | | | | | | MW-2 | | |
| 94313-03 | ↓ | 1430 | | X | 4 | X | | X | | | | | | | | | | | | P-17 | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H. Raymer | | | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/10/94 | Time 0940 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
1. See Attached Sheet.
2. Add ~~Ed~~ total suspended Solids.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

# COOLER RECEIPT REP RT
# ARDL, INC.

ARDL #: 116774

Cooler # 101
Number of Coolers In Shipment: 1

Project:: CARUS CHEM PHASE II

Date Received: 11-10-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 11/10/94 (Signature) Donna Lockrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: FED EX 7900281793

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____, Seal Date: _____, Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag and taped inside to the lid? NOT TAPED TO LID YES (NO)

6. Were custody papers filled out properly (ink, signed, etc. )? no date or time ..... (YES) (NO) N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES____ NO X Cooler Temp. 2.3° C

B. **LOG-IN PHASE:** Date samples were logged-in: 11/10/94 (Signature) Donna Lockrum

10. Describe type of packing in cooler: peanuts / foam + ice

11. Were all bottles sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all bottles arrive unbroken and were labels in good condition? ..... (YES) NO

13. Were bottle labels complete ? ..... YES (NO)

14. Did all bottle labels agree with custody papers? ..... (YES) NO

15. Were correct containers used for the tests indicated? ..... (YES) NO

16. Was pH correct on preserved water samples? ..... YES (NO) N/A

17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO

18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? . ..... YES (NO) N/A

**Comments and/or Corrective Action:**

16) 94313-01 (metals not preserved

(By:Signature) Donna Lockrum Date 11/10/94

Rev. 5/26/94

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431301

Lab Name: ARDL, INC. Contract No.: 116774

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431301

Matrix (soil/water) WATER Lab Sample ID: 116774-1

Level (low/med): LOW Date Received: 11/10/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 91.5 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 163 | | | P |
| 7439-92-1 | Lead | 67.4 | | N S | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2530 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 45.9 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 5260 | | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431301

Lab Name: ARDL, INC. Contract: 116774

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431301

Matrix (soil/water): WATER Lab Sample ID: 116774-1

Level (low/med): LOW Date Received: 11/10/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 396000 | | | |
| | Carbonate | 526 | | | |
| | Sulfate | 157000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 8470 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431302

Lab Name: ARDL, INC. Contract No.: 116774

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431301

Matrix (soil/water) WATER Lab Sample ID: 116774-2

Level (low/med): LOW Date Received: 11/10/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 33.8 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 5900 | | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2650 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 37.7 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1130 | | | P |
| | Cyanide | 6.7 | | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431302

Lab Name: ARDL, INC. Contract: 116774

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431301

Matrix (soil/water): WATER Lab Sample ID: 116774-2

Level (low/med): LOW Date Received: 11/10/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 203000 | | | |
| | Carbonate | 170 | | | |
| | Sulfate | 1170000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 29700 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431303

Lab Name: ARDL, INC. Contract No.: 116774

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431301

Matrix (soil/water) WATER Lab Sample ID: 116774-3

Level (low/med): LOW Date Received: 11/10/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 24.7 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 5380 | | | P |
| 7439-92-1 | Lead | 11.4 | B | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 2020 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 90.7 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 8840 | | | P |
| | Cyanide | 5.0 | U | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431303

Lab Name: ARDL, INC. Contract: 116774

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431301

Matrix (soil/water): WATER Lab Sample ID: 116774-3

Level (low/med): LOW Date Received: 11/10/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 223000 | | | |
| | Carbonate | 276 | | | |
| | Sulfate | 1350000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 27700 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

20 December 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: CarusChemical Phase II
ARDL ID No.: 116788

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/12/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1A - Inorganic Analysis Data Package-Total Water
   b. Volume 1B - Inorganic Analysis Data Package-Total Soil
   c. Volume 1C - Inorganic Analysis Data Package-TCLP

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie

Daniel J. Gillespie

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

# ARDL, Inc.

P.O. Box 1566, Mt. Vernon Airport, RT 15E, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 FAX

## CHAIN OF CUSTODY RECORD

PROJECT: CamsChem--Phase II

SAMPLERS: (Signature) John H. Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | Total Susp. Solids | Metals only | | | | | | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94314-01 | 10Nov94 | 0730 | | X | 4 | X | X | | | | | | | | | | | | | EQUIP BLANK 1 | | |
| 94314-02 | | 0800 | | X | 4 | X | X | | | | | | | | | | | | | EQUIP BLANK 2 | | |
| 94314-03 | | 0900 | | X | 4 | X | X | | | | | | | | | | | | | P-15 | | |
| 94314-04 | | 1100 | | X | 4 | X | X | | | | | | | | | | | | | P-18 | | |
| 94314-05 | | 1130 | | X | 1 | | | X | | | | | | | | | | | | P-18 Filtered | | |
| 94314-06 | | 1325 | | X | 4 | X | X | | | | | | | | | | | | | P-19 | | |
| 94314-07 | | 1800 | | X | 4 | X | X | | | | | | | | | | | | | P-1 | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 11Nov | 1400 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/12/94 | Time 1100 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
1. See Attached Sheet for Suites.
2. 94314-05--do metals only from list for metals-focused suite. This is a QC sample for well purging.
3. Sample 94314-07 in separate cooler

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# ARDL, Inc.

P.O. Box 1566, Mt. Vernon Airport, RT 15E, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 FAX

## CHAIN OF CUSTODY RECORD

PROJECT: Carus Chemical Phase II

SAMPLERS: (Signature) John H Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | TCLP Metals | | | | | | | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94315-01 | 11 Nov 94 | 0800 | X | | 4 | X | X | | | | Sediment at Section line | | | | | | | | | Make lab composite of all 4 bottles | | |
| ~~94315-02~~ | ~~11 Nov 94~~ | ~~1500~~ | ~~X~~ | | ~~4~~ | | | | | | | | | | | | | | | | | |
| 94315-02 | 11 Nov | 1500 | X | | 4 | X | X | | | | Background Soil | | | | | | | | | Make lab composite of all four bottles | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H Raymer | 1800 | 11 Nov | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrane | Date 11/12/94 | Time 1100 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
1. This will be the last shipment for this project.
2. Please make lab composites before analysis.
3. Thank you for working with us!

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory.
Pink copy retained by sampler.

# TABLE 1

## ANALYTICAL SUITES
## REQUEST FOR LABORATORY SERVICES
## GEOSYNTEC PROJECT FE2167

### Metals-Focused Suite

*Metals*
Barium
Cadmium
Chromium
Iron
Lead
Manganese
Mercury
Nickel
Zinc

*Anions*
Sulfate
Sulfide
Carbonate
Bicarbonate
Cyanide

### Hydrocarbons-Focused Suite

*BTEX Group*
Benzene
Toluene
Ethyl Benzene
Xylenes (Total)

*PAH Group*
Naphthalene
Acenaphthalene
Acenapthene
Fluorene
Phenanthrene
Anthracene
Fluoranthene
Pyrene
Benzo(a)anthracene
Chrysene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Benzo(a)pyrene
Dibenzo(a,h)anthracene
Benzo(g,h,i)perylene
Ideno(1,2,3-cd)pyrene

*UST Metals Group*[1]
Arsenic
Barium
Cadmium
Chromium
Lead
Mercury
Selenium

Note: 1. In cases where metals-focused analysis is also performed, dual analysis of metals parameters will not be necessary.

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431401A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-1

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 5.0 | U | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 104 | | | P |
| 7439-92-1 | Lead | 1.0 | U | | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 123 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 5.0 | U | E | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10005

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431401A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-1

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 4960 | U | | |
| | Carbonate | 0.10 | U | | |
| | Sulfate | 2000 | U | | |
| | Sulfide | 1000 | U | | |
| | TSS | 6670 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10006

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431402A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-2

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 5.0 | U | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 136 | | | P |
| 7439-92-1 | Lead | 1.0 | U | | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 157 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 5.0 | U | E | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10007

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431402A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-2

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 4960 | U | | |
| | Carbonate | 0.10 | U | | |
| | Sulfate | 2000 | U | | |
| | Sulfide | 1000 | U | | |
| | TSS | 6670 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10008

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431403A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-3

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 41.5 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 190 | | | P |
| 7439-92-1 | Lead | 10.4 | B | W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 3280 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 517 | | E | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10009

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431403A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-3

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 466000 | | | |
| | Carbonate | 390 | | | |
| | Sulfate | 502000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 6670 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10010

FORM I - IN

ILM02.0

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431404A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-4

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 15.0 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 562 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 17300 | | | P |
| 7439-92-1 | Lead | 5.0 | U | W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 11500 | | E | P |
| 7439-97-6 | Mercury | 0.24 | | | CV |
| 7440-02-0 | Nickel | 485 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 382000 | | E | P |
| | Cyanide | 5.4 | | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10011

U.S. EPA - CLP

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INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431404A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-4

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 124000 | | | |
| | Carbonate | 36.0 | | | |
| | Sulfate | 2450000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 28300 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10012

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431405A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-5

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 15.0 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 552 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 17100 | | | P |
| 7439-92-1 | Lead | 5.0 | U | W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 11400 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 480 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 393000 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

10013

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431406A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-6

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 23.2 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 72.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 130 | | | P |
| 7439-92-1 | Lead | 5.0 | U | W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1210 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 46.0 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 6460 | | E | P |
| | Cyanide | 6.1 | | | C |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

10014

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431406A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-6

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 332000 | | | |
| | Carbonate | 291 | | | |
| | Sulfate | 1300000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 7870 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10015

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431407A

Lab Name: ARDL, INC. Contract No.: 116788A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) WATER Lab Sample ID: 116788A-7

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 6.8 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 2220 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 6.6 | B | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1480 | | | P |
| 7439-92-1 | Lead | 5.0 | U | W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 12400 | | E | P |
| 7439-97-6 | Mercury | 0.25 | | | CV |
| 7440-02-0 | Nickel | 1090 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 831000 | | E | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10016

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431407A

Lab Name: ARDL, INC. Contract: 116788A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431401

Matrix (soil/water): WATER Lab Sample ID: 116788A-7

Level (low/med): LOW Date Received: 11/12/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 4960 | U | | |
| | Carbonate | 0.0 | U | | |
| | Sulfate | 4440000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 16100 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10017

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431501B

Lab Name: ARDL, INC. Contract No.: 116788B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) SOIL Lab Sample ID: 116788B-8

Level (low/med): LOW Date Received: 11/12/94

% Solids: 83.4

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 35.3 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 20.5 | | N * | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 7.1 | | * | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 41500 | | * | P |
| 7439-92-1 | Lead | 55.8 | | N * | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 662 | | | P |
| 7439-97-6 | Mercury | 0.12 | U | | CV |
| 7440-02-0 | Nickel | 25.4 | | * | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1400 | | * | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

10433

Comments: PEBBLES

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431502B

Lab Name: ARDL, INC. Contract No.: 116788B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) SOIL Lab Sample ID: 116788B-9

Level (low/med): LOW Date Received: 11/12/94

% Solids: 78.7

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 127 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 22.3 | | N * | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 22.4 | | * | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 39500 | | * | P |
| 7439-92-1 | Lead | 78.2 | | N * | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1220 | | | P |
| 7439-97-6 | Mercury | 0.15 | | | CV |
| 7440-02-0 | Nickel | 48.2 | | * | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 3030 | | * | P |
| | Cyanide | | | | NR |

Color Before: BROWN/BLA Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

10434

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431501C

Lab Name: ARDL, INC. Contract No.: 116788C

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) TCLP Lab Sample ID: 116788C-8

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 682 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 5.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 25.5 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 4290 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 28.2 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1360 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10634

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431502C

Lab Name: ARDL, INC. Contract No.: 116788C

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431401

Matrix (soil/water) TCLP Lab Sample ID: 116788C-9

Level (low/med): LOW Date Received: 11/12/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 572 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 59.1 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 319 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 1320 | | | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10635

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

12 December 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116763

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/08/94. The data package consists of the following:

1. Letter of Transmittal
2. Tabulated Analytical Results
3. Chain-of-Custody Documentation
4. Data Package - Paginated and submitted in the following order:

   a. Volume 1 - Inorganic Analysis Data Package
   b. Volume 2 - Organic Analysis Data SummaryPackage
   c. Volume 3 - BETX analysis Data Package
   d. Volume 4 - PAH Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

# ARDL, Inc.

P.O. BOX 1566, MT. VERNON AIRPORT, RT. 15E, MT. VERNON, IL 62864

**CHAIN OF CUSTODY RECORD**

PROJECT: Carus Chemical Phase II

SAMPLERS: (Signature) John H. Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | Hydrocarbons Suite | | | | | | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94309-01 | 5Nov | 0930 | | X | 4 | X | | ~~X~~ | | | | | | | | | | | MW-1 | | |
| 94309-02 | ↓ | 1000 | | X | 4 | X | | ~~X~~ | | | | | | | | | | | MW-1d | | |
| | | | | | | | | | | | | | | | | | | | | | |
| 94311-01 | 7Nov | 1100 | | X | 4 | X | | | | | | | | | | | | | P-7 | | |
| 94311-02 | ↓ | 1300 | | X | 4 | X | | | | | | | | | | | | | P-9 | | |
| 94311-03 | ↓ | 1600 | | X | 7 | X | ~~X~~ | X | | | | | | | | | | | G-04 (resample) | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H. Raymer | 7Nov94 | 1800 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Cochrum | Date 11/08/94 | Time 0930 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
1. Suites according to list sent previously
2. Metals in the hydrocarbons suite do not need to be analyzed twice if already in Metals-focused suite.
3. 94311-03 is resample of well G-04; original delivered late by Federal Express and thus discarded by Lab, as directed by GeoSynTec.

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# COOLER RECEIPT REPORT
## ARDL, INC.

ARDL #: 116763

Cooler # 31

Number of Coolers In Shipment: 1 of 1

Project:: Carus Chemical

Date Received: 11-8-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 11-8-94 (Signature) Donna Cochrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: Federal Express 2318187292

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____ Seal Date: _____ Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)
4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO
5. Were custody papers sealed in a plastic bag and taped inside to the lid? ..... YES (NO)
6. Were custody papers filled out properly (ink, signed, etc. )? ..... YES (NO) N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A
9. Was a separate container provided for measuring temperature? YES ____ NO ✓ Cooler Temp. 5.9° C

B. **LOG-IN PHASE:** Date samples were logged-in: 11/8/94 (Signature) Donna Cochrum

10. Describe type of packing in cooler: peanuts + loose ice
11. Were all bottles sealed in separate plastic bags? ..... (YES) NO N/A
12. Did all bottles arrive unbroken and were labels in good condition? ..... (YES) NO
13. Were bottle labels complete ? ..... YES (NO)
14. Did all bottle labels agree with custody papers? ..... (YES) NO
15. Were correct containers used for the tests indicated? ..... (YES) NO
16. Was pH correct on preserved water samples? ..... (YES) NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ..... (YES) NO
18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ (YES) NO N/A
19. Was the ARDL project coordinator notified of any deficiencies? . ..... YES (NO) N/A

**Comments and/or Corrective Action:**

6) Changes not initialed or dated

(By:Signature) Donna Cochrum Date 11/8/94

Rev. 5/26/94

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430901

Lab Name: ARDL, INC. Contract No.: 116763

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430901

Matrix (soil/water) WATER Lab Sample ID: 116763-1

Level (low/med): LOW Date Received: 11/08/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 24.3 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 13.9 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 3910 | | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 9800 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 47.1 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 8370 | | E | P |
| | Cyanide | 8.5 | | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10094

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430901

Lab Name: ARDL, INC. Contract: 116763

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430901

Matrix (soil/water): WATER Lab Sample ID: 116763-1

Level (low/med): LOW Date Received: 11/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 229000 | | | |
| | Carbonate | 206 | | | |
| | Sulfate | 1590000 | | | |
| | Sulfide | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10005

FORM I - IN

ILM02.0

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430902

Lab Name: ARDL, INC. Contract No.: 116763

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430901

Matrix (soil/water) WATER Lab Sample ID: 116763-2

Level (low/med): LOW Date Received: 11/08/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 24.2 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 12.5 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 4450 | | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 10800 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 29.0 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 8280 | | E | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10096

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

430902

Lab Name: ARDL, INC. Contract: 116763

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430901

Matrix (soil/water): WATER Lab Sample ID: 116763-2

Level (low/med): LOW Date Received: 11/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 229000 | | | |
| | Carbonate | 175 | | | |
| | Sulfate | 1640000 | | | |
| | Sulfide | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10007

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431101

Lab Name: ARDL, INC. Contract No.: 116763

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430901

Matrix (soil/water) WATER Lab Sample ID: 116763-3

Level (low/med): LOW Date Received: 11/08/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 46.8 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 14700 | | | P |
| 7439-92-1 | Lead | 10.9 | B | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 20700 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 31.0 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 2670 | | E | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431101

Lab Name: ARDL, INC. Contract: 116763

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430901

Matrix (soil/water): WATER Lab Sample ID: 116763-3

Level (low/med): LOW Date Received: 11/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 384000 | | | |
| | Carbonate | 249 | | | |
| | Sulfate | 1890000 | | | |
| | Sulfide | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10009

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431102

Lab Name: ARDL, INC. Contract No.: 116763

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430901

Matrix (soil/water) WATER Lab Sample ID: 116763-4

Level (low/med): LOW Date Received: 11/08/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 24.3 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 5.2 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 629 | | E | P |
| 7439-97-6 | Mercury | 0.48 | | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 941 | | E | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10010

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431102

Lab Name: ARDL, INC. Contract: 116763

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430901

Matrix (soil/water): WATER Lab Sample ID: 116763-4

Level (low/med): LOW Date Received: 11/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 413000 | | | |
| | Carbonate | 224 | | | |
| | Sulfate | 1510000 | | | |
| | Sulfide | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

1001

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431103

Lab Name: ARDL, INC. Contract No.: 116763

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 430901

Matrix (soil/water) WATER Lab Sample ID: 116763-5

Level (low/med): LOW Date Received: 11/08/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 1.0 | U | N W | F |
| 7440-39-3 | Barium | 16.1 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 12600 | | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 4700 | | E | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 42.3 | | E | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10012

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431103

Lab Name: ARDL, INC. Contract: 116763

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 430901

Matrix (soil/water): WATER Lab Sample ID: 116763-5

Level (low/med): LOW Date Received: 11/08/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 279000 | | | |
| | Carbonate | 204 | | | |
| | Sulfate | 2990000 | | | |
| | Sulfide | 1000 | U | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10013

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

94311-03

ab Name: ARDL, INC. Contract: GEO SYNTEC

ab Code: --- Case No.: --- SAS No.: --- SDG No.: 94309-1

latrix: (soil/water) WATER Lab Sample ID: 116763-5

ample wt/vol: 0.5 (g/ml) ML Lab File ID: >Z8020

evel: (low/med) LOW Date Received: 11/08/94

Moisture: not dec. --- Date Analyzed: 11/10/94

C Column: DB-624 ID: 0.53 (mm) Dilution Factor: 10.0

oil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 870 | |
| 108-88-3 | Toluene | 250 | |
| 100-41-4 | Ethylbenzene | 950 | |
| 1330-20-7 | Xylene (total) | 1400 | |

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94311-03

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116763 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : WATER Lab Sample ID : 116763-5
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/08/94
% Moisture(not dec): --- Date Extracted : 11/09/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/17/94
GPC Cleanup (Y/N): N pH: 6.5 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 1.3 | J |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

ARDL Inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

12 December 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

SUBJECT: Data Package Submittal
Facility: Carus Chemical - Phase II
ARDL ID No.: 116767

Dear Ms. Weeks:

Enclosed please find ARDL's data package for analyses performed on samples delivered to our laboratory on 11/09/94. The data package consists of the following:

1. Letter of Transmittal
2. Chain-of-Custody Documentation
3. Data Package - Paginated and submitted in the following order:

   a. Volume 1A,1B,1C - Inorganic Analysis Data Package
   b. Volume 2 - Organic Analysis Data SummaryPackage
   c. Volume 3 - BETX analysis Data Package
   d. Volume 4 - PAH Analysis Data Package

I have forwarded one (1) copy of the sample results for this package to Jack Raymer, Geosyntec, Atlanta, GA.

We appreciate the opportunity to be of service to the GeoSyntec.

Thank you.

Sincerely yours,

Daniel J. Gillespie
Technical Services Manager

DJG/jcm

Enclosure

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149

# ARDL, Inc.

P.O. Box 1566, Mt. Vernon Airport, RT 15E, Mt. Vernon, IL 62864
(618) 244-3235 Phone (618) 244-1149 FAX

## CHAIN OF CUSTODY RECORD

PROJECT: Carus Chemical Phase II

SAMPLERS: (Signature) John H. Raymer

| SAMPLE NUMBER | DATE | TIME | COMP | GRAB | NO. OF CONTAINERS | Metals Focused Suite | Hydrocarbons Suite Focused | TCLP Suite | Total Susp Solids | | | | | | | | | | | REMARKS OR SAMPLE LOCATION | PRESERVATION: ICED | PRESERVATION: SPECIFY CHEMICALS ADDED AND FINAL pH IF KNOWN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 94312-01 | 8Nov94 | 1430 | | X | 4 | X | | | X | | | | | | | | | | | River, 5th Street Bridge | | |
| 94312-02 | | 1500 | | X | 4 | X | | | X | | | | | | | | | | | River, Section Line | | |
| 94312-03 | | 1530 | | X | 4 | X | | | X | | | | | | | | | | | River, Section Line | | |
| 94312-04 | | 1700 | | X | 4 | X | | | X | | | | | | | | | | | River, Quarry Bridge | | |
| * 94312-05 | | 1430 | | X | 1 | X | | X | | | | separate cooler | | | | | | | | River, 5th Street Bridge | | |
| * 94312-06 | | 1530 | | X | 1 | X | | X | | | | separate cooler | | | | | | | | River, Section Line | X | Container broken |
| * 94312-07 | | 1700 | | X | 1 | X | | X | | | | separate cooler | | | | | | | | River, Quarry Bridge | | |
| 94312-08 | | 1100 | | X | 7 | X | X | | X | | | | | | | | | | | P-6 | | |

| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
|---|---|---|---|
| John H. Raymer | 8Nov | 1800 | |
| Relinquished by: (Signature) | Date | Time | Received by: (Signature) |
| | | | |
| Received for Laboratory by: (Signature) Donna Lochrum | Date 11/9/94 | Time 0940 | Shipping Ticket No. |

REMARKS/SPECIAL INSTRUCTIONS:
1. Add total suspended solids as indicated
2. See Attached Page for "Suites"
3. Samples 94312-05, 94312-06, 94312-07 in a separate Cooler due to space limitations

PURCHASE ORDER NO: _____

COPIES: White & Yellow copies accompany sample shipment to laboratory. Pink copy retained by sampler.

# COOLER RECEIPT REPORT
## ARDL, INC.

ARDL #: 116767

Cooler # –

Number of Coolers In Shipment: 1 of 2

Project:: Carus Chemical Phase II

Date Received: 11-09-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 11/09/94 (Signature) Donna Cochrum

1. Did cooler come with a shipping slip (airbill, etc.)? ..... (YES) NO

   If YES, enter carrier name and airbill number here: Fed Ex 2318187933

2. Were custody seals on outside of cooler? ..... YES (NO) N/A

   How many and where? _____ Seal Date: _____ Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ..... YES NO (N/A)

4. Did you screen samples for radioactivity using a Geiger Counter? ..... (YES) NO

5. Were custody papers sealed in a plastic bag and taped inside to the lid? NOT Taped To Lid YES (NO)

6. Were custody papers filled out properly (ink, signed, etc. )? ..... (YES) NO N/A

7. Were custody papers signed in appropriate place by ARDL personnel? ..... (YES) NO N/A

8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ..... (YES) NO N/A

9. Was a separate container provided for measuring temperature? YES ____ NO X Cooler Temp. 4.6° C

B. **LOG-IN PHASE:** Date samples were logged-in: 11-09-94 (Signature) Donna Cochrum

10. Describe type of packing in cooler: bubble pack, foam + ice

11. Were all bottles sealed in separate plastic bags? ..... YES (NO) N/A

12. Did all bottles arrive unbroken and were labels in good condition? ..... YES (NO)

13. Were bottle labels complete ? ..... YES (NO)

14. Did all bottle labels agree with custody papers? labels not filled out ..... YES NO N/A

15. Were correct containers used for the tests indicated? ..... YES NO

16. Was pH correct on preserved water samples? ..... YES NO (N/A)

17. Was a sufficient amount of sample sent for tests indicated? ..... YES NO

18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO (N/A)

19. Was the ARDL project coordinator notified of any deficiencies? . ..... (YES) NO N/A

**Comments and/or Corrective Action:**

12) 94312-06 broken

Samples (94312-05, 94312-06, 94312-07) (By:Signature) Donna Cochrum Date 11/09/94

Rev. 5/26/94

# COOLER RECEIPT REPORT
# ARDL, INC.

ARDL #: 116767

Cooler # 61

Number of Coolers In Shipment: 2 of 2

Project:: CARUS Chemical Phase II

Date Received: 11-09-94

A. **PRELIMINARY EXAMINATION PHASE:** Date cooler was opened: 11/09/94 (Signature) Donna Cockrum

1. Did cooler come with a shipping slip (airbill, etc.)? ... FEDERAL EXPRESS 9218899453 CUSTOMER PACKAGE TRACKING NUMBER — PULL UP PURPLE TAB ... YES NO

   If YES, enter carrier name and airbill number here: _____

2. Were custody seals on outside of cooler? ... YES NO N/A

   How many and where? _____ Seal Date: _____ Seal Name: _____

3. Were custody seals unbroken and intact at the date and time of arrival? ... YES NO N/A
4. Did you screen samples for radioactivity using a Geiger Counter? ... YES NO
5. Were custody papers sealed in a plastic bag and taped inside to the lid? NOT TAPED TO lid YES NO
6. Were custody papers filled out properly (ink, signed, etc. )? ... YES NO N/A
7. Were custody papers signed in appropriate place by ARDL personnel? ... YES NO N/A
8. Was project identifiable from custody papers? If YES, enter project name at the top of this form ... YES NO N/A
9. Was a separate container provided for measuring temperature? YES ____ NO X Cooler Temp. 4.8° C

B. **LOG-IN PHASE:** Date samples were logged-in: 11/09/94 (Signature) Donna Cockrum

10. Describe type of packing in cooler: peanuts, bubbles pack, foam & ice
11. Were all bottles sealed in separate plastic bags? ... YES NO N/A
12. Did all bottles arrive unbroken and were labels in good condition? labels very wet ... YES NO
13. Were bottle labels complete ? not all were Complete ... YES NO
14. Did all bottle labels agree with custody papers? ... YES NO
15. Were correct containers used for the tests indicated? ... YES NO
16. Was pH correct on preserved water samples? ... YES NO N/A
17. Was a sufficient amount of sample sent for tests indicated? ... YES NO
18. Were bubbles absent in VOA samples? If NO, list by sample #.: _____ YES NO N/A
19. Was the ARDL project coordinator notified of any deficiencies? ... YES NO N/A

Comments and/or Corrective Action:

16) 94312-01 - metals + 94312-08 (metals + Cyanide)

(By:Signature) Donna Cockrum Date 11/09/94

Rev. 5/26/94

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431201A

Lab Name: ARDL, INC. Contract No.: 116767A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) WATER Lab Sample ID: 116767A-1

Level (low/med): LOW Date Received: 11/24/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 115 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1930 | | | P |
| 7439-92-1 | Lead | 2.0 | B | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 106 | | | P |
| 7439-97-6 | Mercury | 0.22 | | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 96.3 | | | P |
| | Cyanide | 6.2 | U | | C |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10005

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431201A

Lab Name: ARDL, INC. Contract: 116767A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431201

Matrix (soil/water): WATER Lab Sample ID: 116767A-1

Level (low/med): LOW Date Received: 11/09/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 246000 | | | |
| | Carbonate | 3050 | | | |
| | Sulfate | 40400 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 102000 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10006

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431202A

Lab Name: ARDL, INC. Contract No.: 116767A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) WATER Lab Sample ID: 116767A-2

Level (low/med): LOW Date Received: 11/24/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 113 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 3180 | | | P |
| 7439-92-1 | Lead | 7.6 | | N S | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1240 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 88.7 | | | P |
| | Cyanide | 8.2 | | | C |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10007

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431202A

Lab Name: ARDL, INC. Contract: 116767A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431201

Matrix (soil/water): WATER Lab Sample ID: 116767A-2

Level (low/med): LOW Date Received: 11/09/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 246000 | | | |
| | Carbonate | 3190 | | | |
| | Sulfate | 38600 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 65800 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10008

FORM I - IN

ILM02.0

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431203A

Lab Name: ARDL, INC. Contract No.: 116767A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) WATER Lab Sample ID: 116767A-3

Level (low/med): LOW Date Received: 11/24/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 113 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 3540 | | | P |
| 7439-92-1 | Lead | 2.2 | B | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1770 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 28.4 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 116 | | | P |
| | Cyanide | 10.0 | | | C |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10009

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431203A

Lab Name: ARDL, INC. Contract: 116767A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431201

Matrix (soil/water): WATER Lab Sample ID: 116767A-3

Level (low/med): LOW Date Received: 11/09/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 251000 | | | |
| | Carbonate | 3330 | | | |
| | Sulfate | 39100 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 72400 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10010

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431204A

Lab Name: ARDL, INC. Contract No.: 116767A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) WATER Lab Sample ID: 116767A-4

Level (low/med): LOW Date Received: 11/24/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 98.4 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | U | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1400 | | | P |
| 7439-92-1 | Lead | 2.8 | B | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 187 | | | P |
| 7439-97-6 | Mercury | 0.20 | | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 27.6 | | | P |
| | Cyanide | 10.0 | | | C |

Color Before: COLORLESS Clarity Before: CLOUDY Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10011

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431204A

Lab Name: ARDL, INC. Contract: 116767A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431201

Matrix (soil/water): WATER Lab Sample ID: 116767A-4

Level (low/med): LOW Date Received: 11/09/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 251000 | | | |
| | Carbonate | 3040 | | | |
| | Sulfate | 37100 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 29600 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10012

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431208A

Lab Name: ARDL, INC. Contract No.: 116767A

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) WATER Lab Sample ID: 116767A-5

Level (low/med): LOW Date Received: 11/24/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | 1.0 | U | N W | F |
| 7440-39-3 | Barium | 47.8 | B | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 3.0 | B | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 1290 | | | P |
| 7439-92-1 | Lead | 5.0 | U | N W | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 25300 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 31.9 | B | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | 5.0 | U | N E | F |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 921 | | | P |
| | Cyanide | 5.0 | U | | C |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431208A

Lab Name: ARDL, INC. Contract: 116767A

Lab Code: ARDL Case No.: _____ SAS No.: _____ SDG No.: 431201

Matrix (soil/water): WATER Lab Sample ID: 116767A-5

Level (low/med): LOW Date Received: 11/09/94

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| | Alkalinity | | | | |
| | Bicarbonate | 453000 | | | |
| | Carbonate | 331 | | | |
| | Sulfate | 1890000 | | | |
| | Sulfide | 1000 | U | | |
| | TSS | 252000 | | | |

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

10014

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431205B

Lab Name: ARDL, INC. Contract No.: 116767B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) SOIL Lab Sample ID: 116767B-6

Level (low/med): LOW Date Received: 11/09/94

% Solids: 78.1

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 42.2 | B | * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 4.3 | | * | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 4.6 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 9990 | | * | P |
| 7439-92-1 | Lead | 31.2 | | | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 313 | | N * | P |
| 7439-97-6 | Mercury | 0.13 | U | | CV |
| 7440-02-0 | Nickel | 12.8 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 598 | | * | P |
| | Cyanide | | | | NR |

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

10100

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431207B

Lab Name: ARDL, INC. Contract No.: 116767B

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) SOIL Lab Sample ID: 116767B-7

Level (low/med): LOW Date Received: 11/09/94

% Solids: 48.2

Concentration Units: (ug/L or mg/kg dry weight): MG/KG

| CAS No. | Analyte | Concentration | C | Q | M |
|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 101 | | * | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 2.4 | | * | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 13.1 | | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 16100 | | * | P |
| 7439-92-1 | Lead | 101 | | | F |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 584 | | N * | P |
| 7439-97-6 | Mercury | 0.35 | | | CV |
| 7440-02-0 | Nickel | 24.0 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 175 | | * | P |
| | Cyanide | | | | NR |

Color Before: GRAY/BROW Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts: YES

Comments: PEBBLES

10401

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431205C

Lab Name: ARDL, INC. Contract No.: 116767C

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) TCLP Lab Sample ID: 116767C-6

Level (low/med): LOW Date Received: 11/09/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 821 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 33.0 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 32.4 | | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 5010 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 40.4 | | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 6810 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

10632

Comments:

1

# INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

431207C

Lab Name: ARDL, INC. Contract No.: 116767C

Lab Code: ARDL Case No.: ____ SAS No.: ____ SDG No.: 431201

Matrix (soil/water) TCLP Lab Sample ID: 116767C-7

Level (low/med): LOW Date Received: 11/09/94

% 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 | | | | NR |
| 7440-36-0 | Antimony | | | | NR |
| 7440-38-2 | Arsenic | | | | NR |
| 7440-39-3 | Barium | 830 | | | P |
| 7440-41-7 | Beryllium | | | | NR |
| 7440-43-9 | Cadmium | 5.8 | | | P |
| 7440-70-2 | Calcium | | | | NR |
| 7440-47-3 | Chromium | 5.0 | U | | P |
| 7440-48-4 | Cobalt | | | | NR |
| 7440-50-8 | Copper | | | | NR |
| 7439-89-6 | Iron | 50.0 | U | | P |
| 7439-92-1 | Lead | 20.0 | U | | P |
| 7439-95-4 | Magnesium | | | | NR |
| 7439-96-5 | Manganese | 1560 | | | P |
| 7439-97-6 | Mercury | 0.20 | U | | CV |
| 7440-02-0 | Nickel | 20.0 | U | | P |
| 7440-09-7 | Potassium | | | | NR |
| 7782-49-2 | Selenium | | | | NR |
| 7440-22-4 | Silver | | | | NR |
| 7440-23-5 | Sodium | | | | NR |
| 7440-28-0 | Thallium | | | | NR |
| 7440-62-2 | Vanadium | | | | NR |
| 7440-66-6 | Zinc | 349 | | E | P |
| | Cyanide | | | | NR |

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

10633

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKA1

Lab Name: ARDL, INC. Contract: GEO SYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 94312-01

Matrix: (soil/water) WATER Lab Sample ID: BK1 11/10/94

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: >Z8018

Level: (low/med) LOW Date Received: NA

% Moisture: not dec. --- Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 5 | U |
| 108-88-3 | Toluene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

94312-08

Lab Name: ARDL, INC. Contract: GEO SYNTEC

Lab Code: --- Case No.: --- SAS No.: --- SDG No.: 94312-01

Matrix: (soil/water) WATER Lab Sample ID: 116767-5

Sample wt/vol: 5.0 (g/ml) ML Lab File ID: >Z8019

Level: (low/med) LOW Date Received: 11/09/94

% Moisture: not dec. --- Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: --- (uL) Soil Aliquot Volume: --- (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q |
|---|---|---|---|
| 71-43-2 | Benzene | 5 | U |
| 108-88-3 | Toluene | 5 | U |
| 100-41-4 | Ethylbenzene | 5 | U |
| 1330-20-7 | Xylene (total) | 5 | U |

30007

POLYNUCLEAR AROMATIC HYDROCARBONS ANALYSIS

Customer Sample No.

94312-08

Lab Name: ARDL, Inc. Contract: GEOSYNTEC
Lab Code: _____ Case No.: 116767 SAS No.: ____ SDG No.: ____

Matrix(soil/water) : WATER Lab Sample ID : 116767-5
Sample(wt/vol) : 1000 (g/mL) mL Lab File ID :
Level(low/med) : LOW Date Received : 11/09/94
% Moisture(not dec): --- Date Extracted : 11/10/94
Extraction(Sepf/Conc/Sonc) SEPF Date Analyzed : 11/17/94
GPC Cleanup (Y/N): N pH: 6.8 Dilution Factor: 1.0
Final Extraction Volume: 1.0 mL

| Cas No. | Compound | Concentration Units: (ug/L or ug/Kg) ug/L | Q |
|---|---|---|---|
| 91-20-3 | Naphthalene | 10 | U |
| 208-96-8 | Acenaphthylene | 10 | U |
| 83-32-9 | Acenaphthene | 18 | U |
| 86-73-7 | Fluorene | 2.1 | U |
| 85-04-8 | Phenanthrene | 6.4 | U |
| 120-12-7 | Anthracene | 6.6 | U |
| 206-44-0 | Fluoranthene | 2.1 | U |
| 129-00-0 | Pyrene | 2.7 | U |
| 56-55-3 | Benzo(a)anthracene | .13 | U |
| 218-01-9 | Chrysene | 1.5 | U |
| 205-99-2 | Benzo(b)fluoranthene | .18 | U |
| 207-08-9 | Benzo(k)fluoranthene | .17 | U |
| 50-32-8 | Benzo(a)pyrene | .23 | U |
| 53-70-3 | Dibenzo(a,h)anthracene | .30 | U |
| 191-24-2 | Benzo(g,h,i)perylene | .76 | U |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | .43 | U |

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115083 / SDG NO.: 3319-01

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-2-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL NO.: 115083 / SDG NO.: 3319-01**

## OVERVIEW

This data validation review consists of five water samples collected on 11-16-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for total and dissolved Target Analyte List (TAL), Sulfate, and Sulfide as described in the following.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| SAMPLE ID | SAMPLE ID |
|---|---|
| 3319-01 * | 3319-08 |
| 3319-04 | 3319-09 |
| 3319-05 | |

* This sample was analyzed for sulfate analysis only.

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon rigorous review of the following criteria:

* • Technical Holding Time
• Calibration
• Contract Required Detection Limit Samples
• Blank Samples
• Interference Check Samples
• Matrix Spike/Matrix Spike Duplicate
* • Duplicate Digestion Sample Analyses
* • Laboratory Control Sample
* • Serial Dilution Sample
• Graphite Furnace
* • Quarterly Verification of Instrument Parameters
* • Sample Result Verification
* • Preparation Logs
* • Run Logs
* • Data Completeness

* All criteria were met for this classification; therefore, a narrative section is not provided.

## CALIBRATION ANALYSIS

The percent recoveries for Ba (82.6%), Ca (112.9%), Cu (86.1%), and Na (87%) in continuing calibration standards analyzed on 12-9-93 at 11:23 and Ag (86.8%) analyzed on 12-13-93 at 18:39 did not meet the requirement limits of 90-110%. Since these calibration standards are analyzed after the sample analyses, the data are accepted unqualified. Note: Date 12-9-93 was inadvertently reported as 12-12-93 in the case narrative.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (69.4/65.3%) and Ag (75%) were outside the data validation requirement limits of 80-120%. The non-detected values for antimony and silver are considered estimated.

## BLANK ANALYSIS

The preparation blanks were free of target analytes. The continuing calibration blanks had barium at levels below the CRDL, and copper at negative IDL levels. Since these analytes were not detected in the preparation blanks, the data could be accepted unqualified.

## ICP INTERFERENCE CHECK SAMPLE ANALYSES

The percent recovery for Al (79.5%) in the ICP interference check sample analyzed on 12-13-93 at 18:33 was below the requirement limit of 80%. Since the deviation is marginal, the data are accepted unqualified. Also, the recovery for Fe (235.1%) in this sample analyzed on 12-23-93 at 14:42 was above the upper requirement limit of 120%. The analytical spike sample 3319-04D A was analyzed for barium under this calibration. Since there is no interelement correction factors for these two analytes, the data are accepted unqualified.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recoveries for As (50.9%), Se (0.0%), Ag (49%), and CN (58.7%) in total samples and As (73.9%), Ba (14%), Se (0.0%), Ag (0.0%), and Tl (62.9%) in dissolved sample analyses were outside the requirement limits of 75-125%. The reported data for selenium in all samples (total and dissolved) and barium and silver in dissolved sample analyses are considered extremely low and the possibility of false negatives exist. Therefore, the reported sample results are qualified "J" and non-detected values are rejected in the data summary. The reported results and non-detected values for the other analytes are considered estimated.

## GRAPHITE FURNACE

The following samples analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| 3319-04T | As/Pb/Tl | 50.3/79.1/81.8 |
| 3319-04D | As/Pb/Tl | 68.7/76.4/58.8 |
| 3319-05T | As/Tl | 64.4/41 |
| 3319-05D | As/Tl | 79.3/63.6 |
| 3319-08T | As/Pb/Tl | 48/81.5/78 |
| 3319-08D | As/Pb/Tl | 74.2/79.2/72.1 |
| 3319-09T | Se/Tl | 57.9/83.4 |
| 3319-09D | Pb/Se/Tl | 81.5/66.1/66 |

The reported results and non-detected values for the above analytes in the corresponding samples are qualified estimated, "J and UJ", due to possible matrix interferences.

Due to the severe interferences and/or laboratory problems, the analytical spike recoveries for selenium in all samples, with the exception of sample 3319-09T/D, were below 40%. The reported data are considered biased low. The data for selenium have already been rejected due to the 0.0% matrix spike recovery.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace were not identified with a "+" flag on Form XIV.

The case narrative stated that due to the amount of samples provided by the customer, the volume used to analyze samples 3319-09, 09S, 04, and 04 duplicate for cyanide was 400 mls instead of 500 mls. Therefore, the detection limits elevated to 6.2 ug/L.

Comparison of the total and dissolved sample analyses gave satisfactory analyses results.

## SUMMARY

The data package assembly was fair. The laboratory control samples and serial dilution sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Due to the matrix interferences and/or the analytical problem, the data for selenium and silver are rejected. The other data quality was fair and could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | | | 3319-08T | 3319-08D | 3319-09T | 3319-09D |
|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER | WATER |
| UNITS: | | | | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | |
| Aluminum | P | 200 | 100 | | | 108 | |
| Antimony | P | 60 | 25 | UJ | UJ | UJ | UJ |
| Arsenic | F | 10 | 1 | 2.5 J | 7.6 J | 9.6 J | 3.6 J |
| Barium | P | 200 | 5 | 17.2 | 22.3 J | 172 | 164 J |
| Beryllium | P | 5 | 1 | | | | |
| Cadmium | P | 5 | 4 | 5.6 | | | |
| Calcium | P | 5000 | 100 | 578000 | 596000 | 108000 | 115000 |
| Chromium | P | 10 | 5 | | | 10.9 | |
| Cobalt | P | 50 | 5 | 12.4 | 16.1 | | |
| Copper | P | 25 | 5 | | | 6.6 | |
| Iron | P | 100 | 75 | 3050 | 3210 | 300 | |
| Lead | F | 3 | 1 | 9.6 J | 5.2 J | 15.8 | 2 J |
| Magnesium | P | 5000 | 100 | 64200 | 68000 | 38700 | 43900 |
| Manganese | P | 15 | 5 | 6240 | 6550 | 450 | 396 |
| Mercury | CV | 0.2 | 0.2 | | | | |
| Nickel | P | 40 | 10 | 22.2 | 22.5 | | |
| Potassium | P | 5000 | 2000 | 80200 | 83300 | 10300 | 6970 |
| Selenium | F | 5 | 1 | R | R | R | R |
| Silver | P | 10 | 5 | UJ | R | UJ | R |
| Sodium | P | 5000 | 900 | 129000 | 132000 | 94700 | 114000 |
| Thallium | F | 10 | 1 | UJ | UJ | UJ | UJ |
| Vanadium | P | 50 | 5 | | | 9.1 | |
| Zinc | P | 20 | 5 | 10200 | 11000 | 41.5 | 18.1 |
| Cyanide | C | 10 | 5 | UJ | NA | 43.4 J | NA |

NA = Not Analyzed

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | | | 3319-04T | | 3319-04D | | 3319-05T | | 3319-05D | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | | WATER | | WATER | | WATER | |
| UNITS: | | | | ug/L | | ug/L | | ug/L | | ug/L | |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | | | | | |
| Aluminum | P | 200 | 100 | 3740 | | 479 | | 25800 | | 780 | |
| Antimony | P | 60 | 25 | | UJ | | UJ | | UJ | | UJ |
| Arsenic | F | 10 | 1 | 9 | J | 5.6 | J | 22.1 | J | 7.1 | J |
| Barium | P | 200 | 5 | 85.1 | | 41.7 | J | 1080 | | 27.8 | J |
| Beryllium | P | 5 | 1 | | | | | 3.7 | | | |
| Cadmium | P | 5 | 4 | 28.9 | | 12.1 | | 51 | | | |
| Calcium | P | 5000 | 100 | 603000 | | 647000 | | 706000 | | 432000 | |
| Chromium | P | 10 | 5 | | | | | 76.7 | | | |
| Cobalt | P | 50 | 5 | 8.2 | | 8.2 | | 101 | | 29.6 | |
| Copper | P | 25 | 5 | 21.7 | | | | 312 | | 7.4 | |
| Iron | P | 100 | 75 | 7280 | | 1160 | | 137000 | | 3910 | |
| Lead | F | 3 | 1 | 31.3 | J | 10.8 | J | 303 | | 24.5 | |
| Magnesium | P | 5000 | 100 | 48400 | | 49800 | | 140000 | | 126000 | |
| Manganese | P | 15 | 5 | 6580 | | 7700 | | 169000 | | 4020 | |
| Mercury | CV | 0.2 | 0.2 | | | | | 2.1 | | | |
| Nickel | P | 40 | 10 | 30.1 | | 14.9 | | 212 | | 14.7 | |
| Potassium | P | 5000 | 2000 | 96700 | | 102000 | | 108000 | | 108000 | |
| Selenium | F | 5 | 1 | | R | | R | | R | | R |
| Silver | P | 10 | 5 | | UJ | | R | | UJ | | R |
| Sodium | P | 5000 | 900 | 114000 | | 117000 | | 227000 | | 228000 | |
| Thallium | F | 10 | 1 | | UJ | | UJ | 1.3 | J | | UJ |
| Vanadium | P | 50 | 5 | 15.9 | | 6.8 | | 155 | | | |
| Zinc | P | 20 | 5 | 7200 | | 5090 | | 26400 | | 2270 | |
| Cyanide | C | 10 | 5 | | UJ | NA | | | UJ | NA | |

NA = Not Analyzed

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319–01

| TRAFFIC REPORT SAMPLE NUMBER: | 3319–01 | 3319–04 | 3319–05 | 3319–08 | 3319–09 |
|---|---|---|---|---|---|
| MATRIX: | WATER | WATER | WATER | WATER | WATER |
| UNITS: | ug/L | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | | | | |
| Sulfate | 1300000 | 1480000 | 1460000 | 1520000 | 226000 |
| Sulfide | | 1000 U | 2300 | 1000 U | 20900 |

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS**

NA

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**END OF DATA VALIDATION REPORT**

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115087 / SDG NO.: 3319-10

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-7-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL NO.: 115087 / SDG NO.: 3319-10**

## OVERVIEW

This data validation review consists of two water samples collected on 11-17-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for total and dissolved Target Analyte List (TAL), Sulfate, and Sulfide.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| SAMPLE ID |
|---|
| 3319-10 * |
| 3319-11 |

* This sample was not analyzed for dissolved sample analysis.

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon rigorous review of the following criteria:

* • Technical Holding Time
• Calibration
• Contract Required Detection Limit Samples
• Blank Samples
* • Interference Check Samples
• Matrix Spike/Matrix Spike Duplicate
* • Duplicate Digestion Sample Analyses
• Laboratory Control Sample
* • Serial Dilution Sample
• Graphite Furnace
* • Quarterly Verification of Instrument Parameters
• Sample Result Verification
* • Preparation Logs
* • Run Logs
* • Data Completeness

* All criteria were met for this classification; therefore, a narrative section is not provided.

## CALIBRATION ANALYSIS

The percent recovery (88.2%) for potassium in continuing calibration standard analyzed on 12-17-93 at 22:58 did not meet the requirement limit of 90%. Since this calibration standard is not associated with the samples and the sample analysis has been stopped, the data are accepted unqualified.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (75.9/57.4%) were outside the data validation requirement limits of 80-120%. The non-detected values for antimony are considered estimated.

## BLANK ANALYSIS

The preparation blanks had Ba (8.8/30.3 ug/L), Pb (1.4 ug/L), V (6.7 ug/L) and Zn (7.3/5.1 ug/L) at levels below the CRDL. Lead was not detected in the samples; therefore, the data are not impacted. Zinc and barium were detected in sample 3319-10T at levels above 5X the blank contaminations; therefore, the data are accepted unqualified. The reported sample results for barium and vanadium in sample 3319-11D are considered as the laboratory artifacts and are qualified "U" in the data summary.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recovery for lead (127.8%) was above the upper requirement limit of 125% in the dissolved sample analysis. This analyte was not detected in the corresponding sample (3319-11D). Therefore, the data are accepted unqualified.

## LABORATORY CONTROL SAMPLE ANALYSES

The percent recoveries for Pb (213.2/210.7%) were above the upper control limit of 120% in the laboratory control samples. This analyte was not detected in the samples; therefore, the data are not impacted.

## GRAPHITE FURNACE

The following samples analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| 3319-10T | Pb/Se/Tl | 76.8/42/66 |
| 3319-11T | Se | 79 |

The reported results and non-detected values for the above analytes in the corresponding samples are qualified estimated, "J and UJ", due to possible matrix interferences.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace were not identified with a "+" flag on Form XIV.

The Forms XIII for dissolved samples were not included in the data package for ICP and graphite furnace analyses.

Barium, cobalt, and vanadium were detected in dissolved sample 3319-11D at levels above the IDLs, but less than the CRDLs. These analytes were not detected in the corresponding total sample analysis. The reported sample results and non-detected values for cobalt are qualified estimated. The results for barium and vanadium are qualified "U" in the dissolved sample, due to the laboratory blank contaminations. Therefore, the data are not impacted for these two elements.

## SUMMARY

The data package assembly was satisfactory. The ICP interference check sample and serial dilution sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319-10

| TRAFFIC REPORT SAMPLE NUMBER: | | | | 3319-10T | 3199-11T | 3319-11D |
|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER |
| UNITS: | | | | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL | IDL | | | |
| Aluminum | P | 200 | 100 | | | |
| Antimony | P | 60 | 25 | UJ | UJ | UJ |
| Arsenic | F | 10 | 1 | 2.3 | | |
| Barium | P | 200 | 5 | 210 | | 28.1 U |
| Beryllium | P | 5 | 1 | | | |
| Cadmium | P | 5 | 4 | | | |
| Calcium | P | 5000 | 100 | 116000 | | |
| Chromium | P | 10 | 5 | | | |
| Cobalt | P | 50 | 5 | 5.3 | UJ | 6.8 J |
| Copper | P | 25 | 5 | 8.2 | | |
| Iron | P | 100 | 75 | 694 | | |
| Lead | F | 3 | 1 | UJ | | |
| Magnesium | P | 5000 | 100 | 37700 | | |
| Manganese | P | 15 | 5 | 618 | | |
| Mercury | CV | 0.2 | 0.2 | | | |
| Nickel | P | 40 | 10 | | | |
| Potassium | P | 5000 | 2000 | 2540 | | |
| Selenium | F | 5 | 1 | UJ | UJ | |
| Silver | P | 10 | 5 | | | |
| Sodium | P | 5000 | 900 | 34900 | | |
| Thallium | F | 10 | 1 | UJ | | |
| Vanadium | P | 50 | 5 | | | 6.3 U |
| Zinc | P | 20 | 5 | 83.1 | | |
| Cyanide | C | 10 | 6.2 | | | NA |

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319-10

| TRAFFIC REPORT SAMPLE NUMBER: | 3319-10 | 3319-11 |
|---|---|---|
| MATRIX: | WATER | WATER |
| UNITS: | ug/L | ug/L |
| COMPOUND | | |
| Sulfate | 114000 | 1000 U |
| Sulfide | 1000 U | 1000 U |

U = Not detected above the reporting limits.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS**

NA

WESTON
MANAGERS DESIGNERS CONSULTANTS

**END OF DATA VALIDATION REPORT**

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115081 / SDG NO.: 3319-01

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-7-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL NO.: 115081 / SDG NO.: 3319-01**

## OVERVIEW

This data validation review consists of five water samples collected on 11-15-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for total and dissolved Target Analyte List (TAL), Sulfate, and Sulfide.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| SAMPLE ID | ANALYSIS |
|---|---|
| 3319-01 | Total/Dissolved, Sulfide |
| 3319-02 | Total/Dissolved * |
| 3319-03 | Total/Dissolved, Sulfide, Sulfate |
| 3319-06 | Total/Dissolved, Sulfide, Sulfate |
| 3319-07 | Total/Dissolved, Sulfide, Sulfate |

* This sample was analyzed for specific target metals (arsenic, barium, cadmium, chromium, lead, mercury, and selenium).

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon rigorous review of the following criteria:

- * Technical Holding Time
- * Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- * Interference Check Samples
- Matrix Spike/Matrix Spike Duplicate
- Duplicate Digestion Sample Analyses
- * Laboratory Control Sample
- * Serial Dilution Sample
- Graphite Furnace
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- * Data Completeness

* All criteria were met for this classification; therefore, a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (53.9/51.3%), Pb (141%), and Se (15.4%) were outside the data validation requirement limits of 80-120%. The positive sample results for lead up to 3X the CRDL are qualified estimated in the corresponding sample: affected samples 3319-01T, 07T, 02T, and 06T. The non-detected values and the positive results up to 3X the CRDL for antimony and selenium are considered estimated.

## BLANK ANALYSIS

The preparation blank analyzed on 12-9-93 at 17:07 had cadmium at a negative IDL level. The corresponding sample results and non-detected values are considered estimated, due to the baseline drift in the laboratory method blank. Affected samples: all dissolved samples.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recoveries for As (32%), Fe (73.6%), Se (0.0%), and Ag (47.6%) in total sample analysis and As (56.4%), Ba (45.7%), Pb (26.6%), Se (59%), and Tl (59.1%) in dissolved sample analyses were outside the requirement limits of 75-125%. The reported sample results and non-detected values for Se in total and Pb in dissolved sample analyses are considered extremely low and the possibility of false negatives exist. Therefore, the reported sample results are flagged "J" and the non-detected values are rejected in the sample data. Selenium was not detected in the corresponding samples. The non-detected values are rejected in the data summary. The results for lead in the samples analyzed by graphite furnace are qualified estimated. The reported results and non-detected values for the other analytes are biased low and are flagged "J and UJ", respectively, for the corresponding samples.

The post digestion spike recoveries for Fe (88.5%) and Ba (91.5%) were within the data validation limits of 75-125%.

## LABORATORY AND FIELD DUPLICATE ANALYSES

The RPDs for Al (57.6%) and Fe (39.3%) in total analysis were outside the analysis requirement of 20% in the laboratory matrix duplicate analysis. The RPDs were also outside the data validation requirement limit of 35%. Therefore, the reported positive results for these two analytes are qualified estimated in the total sample analysis.

## GRAPHITE FURNACE

The following sample analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| 3319-01T | As/Pb/Tl | 69/81.3/79 |
| 3319-01D | As/Pb/Tl | 61.9/45.2/51.9 |
| 3319-02T | As | 70.1 |
| 3319-02D | As/Pb | 52/43.8 |
| 3319-03T | As | 51.4 |
| 3319-03D | As/Tl | 66.2/62.6 |
| 3319-06T | As/Tl | 47/62.7 |
| 3319-06D | As/Tl | 73/53.4 |
| 3319-07T | As/Tl | 44.1/74 |
| 3319-07D | As/Pb/Tl | 61.7/48.4/58.8 |

The reported results and non-detected values for the above analytes in the corresponding samples are qualified estimated, "J and UJ", due to possible matrix interferences.

Due to the severe matrix interferences, the analytical spike recovery did not meet the requirement limits in selenium analysis. The reported data for selenium should be qualified estimated.

## SAMPLE RESULT VERIFICATION

Lead analyses in samples 3319-03T and 3319-03D were performed by ICP. Also, the results for lead in samples 3319-02T, 3319-06T, and 3319-06D were obtained by Method of Standard Addition (MSA). The linearity met the requirement limits of "r≥0.995".

The result for zinc in sample 3319-03T was inadvertently reported as 6.4 ug/L. The result has been corrected and resubmitted by the laboratory. The corrected result is listed in the data summary.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace were not identified with a "+" flag on Form XIV.

The Forms XIII for dissolved samples were not included in the data package for ICP and graphite furnace analyses.

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample, laboratory control sample, and serial dilution sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses demonstrated the matrix effect for selenium. The reported data could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | | | 3319-06T | 3319-06D | 3319-07T | 3319-07D |
|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER | WATER |
| UNITS: | | | | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | |
| Aluminum | P | 200 | 100 | | | | |
| Antimony | P | 60 | 25 | | | | |
| Arsenic | F | 10 | 1 | 1.2 J | 2 J | 1 J | 3 J |
| Barium | P | 200 | 5 | 18.2 | 17.8 J | 23.7 | 18.6 J |
| Beryllium | P | 5 | 1 | | | | |
| Cadmium | P | 5 | 4 | | UJ | | UJ |
| Calcium | P | 5000 | 100 | 204000 | 226000 | 292000 | 326000 |
| Chromium | P | 10 | 5 | | | | |
| Cobalt | P | 50 | 5 | | | | |
| Copper | P | 25 | 5 | 13.4 | 9.9 | | |
| Iron | P | 100 | 75 | UJ | | UJ | |
| Lead | F* | 3 | 1 | 11 J | 11.3 J | | 3.2 J |
| Magnesium | P | 5000 | 100 | 111000 | 119000 | 136000 | 146000 |
| Manganese | P | 15 | 5 | 26.3 | 23.7 | 433 | 460 |
| Mercury | CV | 0.2 | 0.2 | | | | |
| Nickel | P | 40 | 10 | 13.6 | 11 | 12 | 10.8 |
| Potassium | P | 5000 | 2000 | 8160 | 8640 | 2420 | 2550 |
| Selenium | F | 5 | 1 | R | UJ | R | UJ |
| Silver | P | 10 | 5 | UJ | | UJ | |
| Sodium | P | 5000 | 900 | 215000 | 215000 | 125000 | 124000 |
| Thallium | F | 10 | 1 | UJ | UJ | UJ | UJ |
| Vanadium | P | 50 | 5 | | | | |
| Zinc | P | 20 | 5 | 229 | 216 | 175 | 180 |
| Cyanide | C | 10 | 5 | | NA | | NA |

NA = Not Applicable

* The IDL for Pb in samples analyzed by ICP is 30 ug/L.

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | | | 3319-01T | 3319-01D | 3319-02T | 3319-02D | 3319-03T | 3319-03D |
|---|---|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER | WATER | WATER | WATER |
| UNITS: | | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | | | |
| Aluminum | P | 200 | 100 | 996 J | | NA | NA | 6310 J | |
| Antimony | P | 60 | 25 | | | NA | NA | | |
| Arsenic | F | 10 | 1 | UJ | 1.3 J | 6.8 J | 2.9 J | 5.5 J | 2.6 J |
| Barium | P | 200 | 5 | 55.2 | 39.8 J | 139 | 72.3 J | 134 | 47.8 J |
| Beryllium | P | 5 | 1 | | | NA | NA | | |
| Cadmium | P | 5 | 4 | | UJ | | UJ | 25.5 | 5.3 J |
| Calcium | P | 5000 | 100 | 437000 | 461000 | NA | NA | 260000 | 274000 |
| Chromium | P | 10 | 5 | 5.7 | | | | 7.7 | |
| Cobalt | P | 50 | 5 | 19 | 20.3 | NA | NA | 22.4 | 13.9 |
| Copper | P | 25 | 5 | 31.1 | 77 | NA | NA | 94 | |
| Iron | P | 100 | 75 | 838 J | | NA | NA | 11200 J | 597 |
| Lead | F* | 3 | 1 | 5.8 J | 2 J | 20.4 J | 3.9 J | 2180 * | 291 * |
| Magnesium | P | 5000 | 100 | 103000 | 95900 | NA | NA | 132000 | 138000 |
| Manganese | P | 15 | 5 | 3830 | 4370 | NA | NA | 3240 | 3150 |
| Mercury | CV | 0.2 | 0.2 | | | | | 12.9 | |
| Nickel | P | 40 | 10 | 41.3 | 38.7 | NA | NA | 38 | 13.6 |
| Potassium | P | 5000 | 2000 | 12800 | 10600 | NA | NA | 77300 | 77300 |
| Selenium | F | 5 | 1 | R | UJ | R | UJ | R | UJ |
| Silver | P | 10 | 5 | UJ | | NA | NA | UJ | |
| Sodium | P | 5000 | 900 | 115000 | 104000 | NA | NA | 151000 | 153000 |
| Thallium | F | 10 | 1 | UJ | UJ | NA | NA | | UJ |
| Vanadium | P | 50 | 5 | | | NA | NA | 15 | |
| Zinc | P | 20 | 5 | 305 | 538 | NA | NA | 6380 | 3280 |
| Cyanide | C | 10 | 5 | | NA | NA | NA | | NA |

NA = Not Applicable

* The IDL for Pb in samples analyzed by ICP is 30 ug/L.

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | 3319-01 | 3319-03 | 3319-06 | 3319-07 |
|---|---|---|---|---|
| MATRIX: | WATER | WATER | WATER | WATER |
| UNITS: | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | | | |
| Sulfate | NA | 885000 | 610000 | 908000 |
| Sulfide | 1000 U | 1000 U | 1000 U | 1000 U |

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# ATTACHMENT III
# RESUBMISSIONS

**GeoSyntec Consultants**
621 N.W. 53rd Street
Suite 650
Boca Raton, Florida 33487 • USA
(407) 995-0900

# TRANSMITTAL

| Date | Job No. |
|---|---|
| 3/1/94 | FE 2147 |

Attention: Ms. Zohreh Hamid Bldg 4-2

Re: Addition to Water and soil data validation for chemical analyses performed by ARDL Inc. (main package delivered 2/9/94)

To Weston Analytical Services
1 Weston Way
West Chester, PA 19380-1449

We are sending you ☐ attached ☐ under separate covers via _____ the following items:

| | | | |
|---|---|---|---|
| ☐ Tracings | ☐ Drilling log | ☑ Test results | ☐ Copy of letter |
| ☐ Photostats | ☐ Contracts | ☐ Documents | ☐ Specifications |
| ☐ Prints | ☐ Photos | ☐ Sepias / Drawings | ☐ For comment |

| Copies | Date | No. | Description |
|---|---|---|---|
| 1 | 3/1/94 | 1 | ARDL correction to data, |
| | | | "RE: Revision of ARDL Report 115081 |
| | | | Lab Sample ID: 115081-3T |

These are transmitted as checked below:

| | | |
|---|---|---|
| ☐ For approval | ☐ Approved as submitted | ☐ Resubmit _____ copies for approval |
| ☑ For your use | ☐ Approved as noted | ☐ Submit _____ copies for distribution |
| ☐ As you requested | ☐ Returned for corrections | ☐ Return _____ corrected prints |

Remarks _____

Copy to _____

Signed Bryan Tindell 3/1/94

ARDL inc.
applied research & development laboratory

CHEMISTRY · BIOLOGY · PHYSIOLOGY
ENGINEERING · ENVIRONMENTAL ANALYSIS

19 February 1994

Ms. Nandra Weeks
Geosyntec Consultants
621 N. W. 53rd Street
1 Park Place
Suite 650
Boca Raton, FL 33487

RE: Revision of ARDL Report 115081
Lab Sample ID: 115081-3T.

Dear Ms. Weeks:

During a recent routine laboratory audit an error was discovered in the zinc result in the above referenced report. Please find amended results enclosed.

We apologize for any inconvenience this may have caused.

Sincerely yours,

Dean S. Dickerson
Inorganic Laboratory Manager

DSD/jcm

Enclosure

cc: J. Raymer

P.O. Box 1566 · Mt. Vernon Airport, Route 15 East · Mt. Vernon, Illinois 62864 · (618) 244-3235 · FAX (618) 244-1149
*"Test Everything - Keep The Good" 1 Thes. 5:21*

AMENDED

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

3319-03T

Lab Name: ARDL, INC. Contract: 115081

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: 3319-01

Matrix (soil/water): WATER Lab Sample ID: 115081-3T

Level (low/med): LOW Date Received: 11-16-93

% 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 | 6310 | | * | P |
| 7440-36-0 | Antimony | 25.0 | U | | P |
| 7440-38-2 | Arsenic | 5.5 | B | WN | F |
| 7440-39-3 | Barium | 134 | | | P |
| 7440-41-7 | Beryllium | 1.0 | U | | P |
| 7440-43-9 | Cadmium | 25.5 | | | P |
| 7440-70-2 | Calcium | 260000 | | | P |
| 7440-47-3 | Chromium | 7.7 | B | | P |
| 7440-48-4 | Cobalt | 22.4 | B | | P |
| 7440-50-8 | Copper | 94.0 | | | P |
| 7439-89-6 | Iron | 11200 | | N* | P |
| 7439-92-1 | Lead | 2180 | | | P |
| 7439-95-4 | Magnesium | 132000 | | | P |
| 7439-96-5 | Manganese | 3240 | | | P |
| 7439-97-6 | Mercury | 12.9 | | | CV |
| 7440-02-0 | Nickel | 38.0 | B | | P |
| 7440-09-7 | Potassium | 77300 | | | P |
| 7782-49-2 | Selenium | 5.0 | U | EN | F |
| 7440-22-4 | Silver | 5.0 | U | N | P |
| 7440-23-5 | Sodium | 151000 | | | P |
| 7440-28-0 | Thallium | 1.0 | U | | F |
| 7440-62-2 | Vanadium | 15.0 | B | | P |
| 7440-66-6 | Zinc | 6380 | | | P |
| | Cyanide | 5.0 | U | | C |

Color Before: BROWN Clarity Before: CLOUDY Texture: _____

Color After: COLORLESS Clarity After: CLEAR Artifacts: _____

Comments:

TOTAL ANALYSIS

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**END OF DATA VALIDATION REPORT**

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115070B / SDG NO.: C-5-12

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-4-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115070B / SDG NO.: C-5-12**

## OVERVIEW

This data validation review consists of eight leachate samples collected on 11-11-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for TCLP target metal list (less sodium) and specific TCLP metals.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and TCLP method. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| | | | |
|---|---|---|---|
| C-8SUR | G04-SU * | C5-3 | C6-5 * |
| C-5-12 * | G04-5 * | G04-15 * | C7-6 * |

* These samples were analyzed for seven specific elements (As, Ba, Cd, Cr, Pb, Hg, and Se).

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

- * Technical Holding Time
- * Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- * Interference Check Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Duplicate Digestion Sample Analyses
- * Laboratory Control Sample
- * Serial Dilution Sample
- * Graphite Furnace
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- * Data Completeness

* All criteria were met for this classification; therefore a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (63.2/72.1%) and Tl (19.7/13.2%) were outside the data validation requirement limits of 80-120%. The non-detected values and the positive results up to 3X the CRDL for antimony and thallium are considered estimated.

## BLANK ANALYSES

The preparation blank had nickel (18.4 ug/L) and vanadium (5.2 ug/L) at levels below the CRDLs. The reported sample results up to 5X the blank contaminations are qualified "U" and should be considered as labortory contaminations.

## SAMPLE RESULTS

All analytes, with the exception of mercury, were analyzed by ICP, consequently, the IDL for arsenic, lead, selenium, and thallium were above the Contract Required Detection Limits (CRDLs).

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample, laboratory control sample, and serial dilution sample analyses met the requirements established in the Method. The recoveries for matrix spike samples and RPDs in matrix duplicate sample analysis were within the analysis requirement limits. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses are satisfactory and the results are accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070B SDG NO.: C-5-12

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-5-12 | G04-SU | G04-5 | G04-15 | C6-5 | C7-6 |
|---|---|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER | WATER | WATER | WATER |
| % SOLIDS: | | | | | | | | | |
| UNITS: | | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL | IDL | | | | | | |
| Arsenic | P | 10 | 50 | | | | | | |
| Barium | P | 200 | 5 | 1670 | 1830 | 1900 | 2030 | 659 | 1430 |
| Cadmium | P | 5 | 4 | | 883 | 95.2 | 6.1 | | |
| Chromium | P | 10 | 5 | | | | | | |
| Lead | P | 3 | 30 | | 94.1 | | | | |
| Mercury | CV | 0.2 | 0.2 | | | | | | |
| Selenium | P | 5 | 50 | | | | | | |

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070B SDG NO.: C-5-12

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-8SUR | C5-3 |
|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER |
| % SOLIDS: | | | | | |
| UNITS: | | | | ug/L | ug/L |
| COMPOUND | | CRDL | IDL | | |
| Aluminum | P | 200 | 100 | | |
| Antimony | P | 60 | 25 | | UJ |
| Arsenic | P | 10 | 50 | | |
| Barium | P | 200 | 5 | 516 | 809 |
| Beryllium | P | 5 | 1 | | |
| Cadmium | P | 5 | 4 | 5.3 | |
| Calcium | P | 5000 | 100 | 557000 | 691000 |
| Chromium | P | 10 | 5 | | |
| Cobalt | P | 50 | 5 | 14.4 | |
| Copper | P | 25 | 5 | | 11 |
| Iron | P | 100 | 75 | | |
| Lead | P | 3 | 30 | | |
| Magnesium | P | 5000 | 100 | 84000 | 38100 |
| Manganese | P | 15 | 5 | 2640 | 5200 |
| Mercury | CV | 0.2 | 0.2 | | |
| Nickel | P | 40 | 10 | 33 U | 23.3 U |
| Potassium | P | 5000 | 2000 | 7530 | 15600 |
| Selenium | P | 5 | 50 | | |
| Silver | P | 10 | 5 | | |
| Sodium | P | 5000 | 900 | NA | NA |
| Thallium | P | 10 | 50 | | UJ |
| Vanadium | P | 50 | 5 | 6 U | |
| Zinc | P | 20 | 5 | 118 | 161 |

NA = Not Analyzed

WESTON
MANAGERS DESIGNERS·CONSULTANTS

**ATTACHMENT III** NA
**RESUBMISSIONS**

WESTON
MANAGERS DESIGNERS/CONSULTANTS

END OF DATA VALIDATION REPORT

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115070A / SDG NO.: C-8SUR

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-6-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115070A / SDG NO.: C-8SUR**

## OVERVIEW

This data validation review consists of two soil samples collected on 11-11-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for Target Analyte List (TAL), Sulfate, and Sulfide.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

C-8 SURFACE

C-5-3

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

| | | |
|---|---|---|
| * | • | Technical Holding Time |
| | • | Calibration |
| | • | Contract Required Detection Limit Samples |
| | • | Blank Samples |
| * | • | Interference Check Samples |
| | • | Matrix Spike/Matrix Spike Duplicate |
| | • | Duplicate Digestion Sample Analyses |
| * | • | Laboratory Control Sample |
| | • | Serial Dilution Sample |
| | • | Graphite Furnace |
| * | • | Quarterly Verification of Instrument Parameters |
| * | • | Sample Result Verification |
| * | • | Preparation Logs |
| * | • | Run Logs |
| * | • | Data Completeness |

* All criteria were met for this classification; therefore a narrative section is not provided.

## CALIBRATION ANALYSIS

The % recovery for all analytes analyzed by ICP, with the exception of iron, nickel, and zinc, are below the lower control limit of 90% in the continuing calibration analyzed on 11-23-93 at 22:50. The sample analysis was not bracketed with this calibration, and the analysis has been stopped. Therefore, the data are accepted unqualified.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (67.7/66.3%) and Cd (73%), (78%) were outside the data validation requirement limits of 80-120%. The non-detected values and the positive results up to 3X the CRDL for antimony and cadmium are considered estimated.

## BLANK ANALYSES

The preparation blank had lead at a level of 0.294 mg/kg. This analyte was detected in the corresponding samples at levels above 5X the blank contamination. Therefore, the data are not impacted based on the laboratory preparation blank contamination. Barium, beryllium, and chromium were detected in the continuing calibration blank (CCB) at levels below the IDLs. The reported sample results and non-detected values are considered biased low and are qualified "J and UJ", due to the baseline drift in the calibration blank.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recoveries for Sb (44.5%), Pb (54.5%), and Se (66.7%) were outside the requirement limits of 75-125%. The reported data for these analytes are considered biased low. The reported results and non-detected values are qualified "J and UJ" on the data summary.

The spike recovery analysis for sulfate was not performed.

The post digestion spike recoveries for Sb (100.5%) was within the data validation control limits.

## LABORATORY AND FIELD DUPLICATE ANALYSES

The RPDs for lead (32.4%) was outside the analysis requirement of 20% in the laboratory matrix duplicate analysis. However, the RPD for this analyte was within the data validation requirement limit of 35%. Therefore, the reported data for lead was not qualified based on the RPD outliers.

## SERIAL DILUTION SAMPLE ANALYSIS

The percent difference for Ca (12.9%) and Mn (16.3%) were above the analysis requirement of 10%. However, the %D for calcium was within the data validation requirement limit of 15%. Therefore, the data are not qualified for this analyte. The reported positive results for Mn are considered estimated, due to the possible interferences.

## GRAPHITE FURNACE

The following sample analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| C-8SUR | Se | 69.3 |
| C-5-3 | As/Se | 67.7/46.6 |

The reported results for arsenic and non-detected values for selenium in the samples are qualified estimated, "J and UJ", due to possible matrix interferences.

## SAMPLE RESULT VERIFICATION

The linearty "r≥0.995" for lead analyzed by Method of Standard Addition (MSA) was not met for sample C-8SUR and the corresponding reanalysis. The reported sample result is qualified estimated.

Also, the result for arsenic in this sample has been obtained by MSA. The linearty "r≥0.9946" did not meet the requirement limit of "r≥0.995". However, the data could be accepted without the qualifier codes since the deviation was marginal.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace was not identified with a "+" flag on Form XIV.

## SUMMARY

The data package assembly was satisfactory. The initial calibration met the requirement limits. The ICP interference check sample and laboratory control sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses demonstrated the matrix effect and the results could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070A SDG NO.: C-8SUR

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-8SUR | C5-3 |
|---|---|---|---|---|---|
| MATRIX: | | | | SOIL | SOIL |
| % SOLIDS: | | | | 88.5 | 84.7 |
| UNITS: | | | | mg/KG | mg/KG |
| COMPOUND | | CRDL ug/L | IDL ug/L | | |
| Aluminum | P | 200 | 100 | 5330 | 9560 |
| Antimony | P | 60 | 25 | 5.6 UJ | 5.9 UJ |
| Arsenic | F | 10 | 1 | 5.4 | 2.3 J |
| Barium | P | 200 | 5 | 25.6 J | 53 J |
| Beryllium | P | 5 | 1 | 0.34 J | 0.66 J |
| Cadmium | P | 5 | 4 | 0.9 UJ | 2.7 J |
| Calcium | P | 5000 | 100 | 66200 | 56700 |
| Chromium | P | 10 | 5 | 9.8 J | 14.4 J |
| Cobalt | P | 50 | 5 | 8.5 | 9.5 |
| Copper | P | 25 | 5 | 17.2 | 20.3 |
| Iron | P | 100 | 75 | 16700 | 16400 |
| Lead | F | 3 | 1 | 14.6 J | 18.6 J |
| Magnesium | P | 5000 | 100 | 36300 | 12400 |
| Manganese | P | 15 | 5 | 395 J | 600 J |
| Mercury | C | 0.2 | 0.2 | 0.11 U | 0.11 U |
| Nickel | P | 40 | 10 | 22.2 | 29.4 |
| Potassium | P | 5000 | 2000 | 1250 | 2210 |
| Selenium | F | 5 | 1 | 0.23 UJ | 0.24 UJ |
| Silver | P | 10 | 5 | 1.1 U | 1.2 U |
| Sodium | P | 5000 | 900 | 203 U | 213 U |
| Thallium | F | 10 | 1 | 0.24 | 0.24 U |
| Vanadium | P | 50 | 5 | 10.6 | 12.3 |
| Zinc | P | 20 | 5 | 71.7 | 443 |
| Cyanide | C | 10 | 5 | 0.53 U | 0.57 U |

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070A SDG NO.: C-8SUR

| TRAFFIC REPORT SAMPLE NUMBER: | C-8SUR | C5-3 |
|---|---|---|
| MATRIX: | SOIL | SOIL |
| % SOLIDS: | 88.5 | 84.7 |
| UNITS: | mg/KG | mg/KG |
| COMPOUND | | |
| Sulfate | 1070 | 479 |
| Sulfide | 19.7 | 8.4 U |

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**ATTACHMENT III**
**RESUBMISSIONS**

NA.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**END OF DATA VALIDATION REPORT**

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PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115063B / SDG NO.: C-10-7

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-4-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115063B / SDG NO.: C-10-7**

## OVERVIEW

This data validation review consists of two leachate samples collected on 11-10-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for TCLP target metal list (less sodium).

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and TCLP method. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

C-10-SURFACE

C-10-7

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

* • Technical Holding Time
* • Calibration
  • Contract Required Detection Limit Samples
  • Blank Samples
* • Interference Check Samples
* • Matrix Spike/Matrix Spike Duplicate
* • Duplicate Digestion Sample Analyses
* • Laboratory Control Sample
* • Serial Dilution Sample
* • Graphite Furnace
* • Quarterly Verification of Instrument Parameters
* • Sample Result Verification
* • Preparation Logs
* • Run Logs
* • Data Completeness

* All criteria were met for this classification; therefore a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (62.3/54.5%) and Tl (144.9/141.7%) were outside the data validation requirement limits of 80-120%. The positive sample results for thallium up to 3X the CRDL are qualified estimated. However, this analyte was not detected in the samples; therefore, the data are accepted unqualified. The non-detected values and the positive results up to 3X the CRDL for antimony are considered estimated.

## BLANK ANALYSES

The preparation blank had zinc at a level of 5.9 mg/kg. This analyte was detected in the corresponding samples at levels above 5X the blank contamination. Therefore, the data are not impacted based on the laboratory preparation blank contamination. Nickel was detected in the continuing calibration blanks (CCBs) at negative IDL levels. The reported sample results are considered estimated due to the baseline drift in the continuing calibrations.

## SAMPLE RESULTS

All analytes, with the exception of mercury, were analyzed by ICP, consequently, the IDL for arsenic, lead, selenium, and thallium were above the Contract Required Detection Limits (CRDLs).

Cadmium was detected in sample C-10-7 at a level of 83.3 ug/L. The result was inadvertantly flagged with a "U" by the laboratory. The Form I should be corrected and resubmitted by the laboratory.

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample, laboratory control sample, and serial dilution sample analyses met the requirements established in the Method. The recoveries for matrix spike samples and RPDs in matrix duplicate sample analysis were within the analysis requirement limits. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses were satisfactory and the results are accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
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# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063B SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-10-S | C-10-7 |
|---|---|---|---|---|---|
| | | MATRIX: | | WATER | WATER |
| | | UNITS: | | ug/L | ug/L |
| COMPOUND | | CRDL | IDL | | |
| Aluminum | P | 200 | 100 | | |
| Antimony | P | 60 | 25 | UJ | UJ |
| Arsenic | P | 10 | 50 | | |
| Barium | P | 200 | 5 | 545 | 1640 |
| Beryllium | P | 5 | 1 | | |
| Cadmium | P | 5 | 4 | 16.4 | 83.3 |
| Calcium | P | 5000 | 100 | 552 | 576000 |
| Chromium | P | 10 | 5 | | |
| Cobalt | P | 50 | 5 | | |
| Copper | P | 25 | 5 | | 7.8 |
| Iron | P | 100 | 75 | | |
| Lead | P | 3 | 30 | | 120 |
| Magnesium | P | 5000 | 100 | 14600 | 17900 |
| Manganese | P | 15 | 5 | 34.9 | 4020 |
| Mercury | CV | 0.2 | 0.2 | | |
| Nickel | P | 40 | 10 | 12.2 J | 13 J |
| Potassium | P | 5000 | 2000 | 66000 | 32600 |
| Selenium | P | 5 | 50 | | |
| Silver | P | 10 | 5 | | |
| Sodium | NA | NA | NA | NA | NA |
| Thallium | P | 10 | 100 | | |
| Vanadium | P | 50 | 5 | | |
| Zinc | P | 20 | 5 | 1640 | 7390 |

NA = Not Applicable

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MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS** NA

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**END OF DATA VALIDATION REPORT**

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PHONE: 215-692-3030
FAX: 215-430-3124

# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115063A / SDG NO.: C-10-7

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** Zohreh Hamid 3-4-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115063A / SDG NO.: C-10-7**

## OVERVIEW

This data validation review consists of two soil samples collected on 11-10-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for Target Analyte List (TAL), Sulfate, and Sulfide.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

C-10-SURFACE

C-10-7

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

| | | |
|---|---|---|
| * | • | Technical Holding Time |
| * | • | Calibration |
| | • | Contract Required Detection Limit Samples |
| | • | Blank Samples |
| * | • | Interference Check Samples |
| | • | Matrix Spike/Matrix Spike Duplicate |
| | • | Duplicate Digestion Sample Analyses |
| * | • | Laboratory Control Sample |
| * | • | Serial Dilution Sample |
| * | • | Graphite Furnace |
| * | • | Quarterly Verification of Instrument Parameters |
| * | • | Sample Result Verification |
| * | • | Preparation Logs |
| * | • | Run Logs |
| * | • | Data Completeness |

* All criteria were met for this classification; therefore a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (75.9%), (64.6/60.6%) and Cd (128.5/136%) were outside the data validation requirement limits of 80-120%. The positive sample results for cadmium up to 3X the CRDL are qualified estimated. However, this analyte was detected at levels above 3X the CRDL; therefore, the data are accepted unqualified. The non-detected values and the positive results up to 3X the CRDL for antimony are considered estimated.

## BLANK ANALYSES

The preparation blank had cadmium at a level of 0.88 mg/kg. This analyte was detected in the corresponding samples at levels above 5X the blank contamination. Therefore, the data are not impacted based on the laboratory preparation blank contamination. Antimony was detected in the initial calibration blank (ICB) at a level of 2.8 ug/L. This analyte was not detected in the samples; therefore, the data are not impacted.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recoveries for Sb (16.2%), Cd (149.8%), Cr (38.6%), Pb (28.9%), Hg (60%), and sulfide (65.8%) were outside the requirement limits of 75-125%. The positive results for cadmium are considered biased high. The reported sample results are qualified "J" on the data summary. The reported data for chromium, mercury, and sulfide are considered biased low. The reported results and non-detected values are qualified "J" and "UJ" on the data summary. The results and non-detected values for antimony and lead are considered extremely low (%R<30%). The positive results are biased low and the possibility of false negatives exist. Therefore, the reported sample results are flagged "J" and non-detected values are rejected, "R", for these two elements.

The spike recovery analysis for sulfate was not performed.

The post digestion spike recoveries for Sb (69.2%), Cd (58.4%), Cr (74%), and Pb (66%) were below the low end of the data validation control limits of 75-125%.

## LABORATORY AND FIELD DUPLICATE ANALYSES

The RPDs for Cd (33.9%), Cr (65.1%), Cu (29.1%), Pb (39.2%), Mg (27.2%), Mn (57.7%), and Zn (41.3%) were outside the analysis requirement of 20% in the laboratory matrix duplicate analysis. However, the RPDs for cadmium, copper, and magnesium were within the data validation requirement limit of 35%. Therefore, the reported data for these three analytes were not qualified based on the RPD outliers. The positive results for chromium, lead, manganese, and zinc were qualified estimated.

## GRAPHITE FURNACE

The following sample analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| C-10-7 | As/Se | 69.4/42.4 |

The reported results for arsenic and non-detected values for selenium in this sample are qualified estimated, "J and UJ", due to possible matrix interferences.

The linearty "r≥0.995" for selenium analyzed by Method of Standard Addition (MSA) was not met for sample C-10-S and the corresponding reanalysis. The result should be flagged with "+" by the laboratory. The reported sample result is accepted unqualified, since the deviation was marginal.

## SAMPLE RESULT VERIFICATION

Lead analyses for both samples were performed by ICP.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace was not identified with a "+" flag on Form XIV.

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample, laboratory control sample, and serial dilution sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses demonstrated the matrix effect and the results could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

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# ATTACHMENT II
# SAMPLE RESULT SUMMARY

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS**

NA

**END OF DATA VALIDATION REPORT**

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063A SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-10-S | C-10-7 |
|---|---|---|---|---|---|
| MATRIX: | | | | SOIL | SOIL |
| % SOLIDS: | | | | 82.6 | 81.6 |
| UNITS: | | | | mg/KG | mg/KG |
| COMPOUND | | CRDL ug/L | IDL ug/L | | |
| Aluminum | P | 200 | 100 | 12400 | 12900 |
| Antimony | P | 60 | 25 | 6.1 R | 6.1 R |
| Arsenic | F | 10 | 1 | 11.9 | 3 J |
| Barium | P | 200 | 5 | 190 | 107 |
| Beryllium | P | 5 | 1 | 0.97 | 0.88 |
| Cadmium | P | 5 | 4 | 9.8 J | 8.4 J |
| Calcium | P | 5000 | 100 | 36400 | 38600 |
| Chromium | P | 10 | 5 | 44.2 J | 20.7 J |
| Cobalt | P | 50 | 5 | 14.7 | 15 |
| Copper | P | 25 | 5 | 59.1 | 38.9 |
| Iron | P | 100 | 75 | 20000 | 18700 |
| Lead | P | 3 | 30 | 190 J | 225 J |
| Magnesium | P | 5000 | 100 | 10100 | 6580 |
| Manganese | P | 15 | 5 | 3980 J | 1350 J |
| Mercury | CV | 0.2 | 0.2 | 0.76 J | 0.12 UJ |
| Nickel | P | 40 | 10 | 37.1 | 36.7 |
| Potassium | P | 5000 | 2000 | 4670 | 3010 |
| Selenium | F | 5 | 1 | 3.5 | 0.25 UJ |
| Silver | P | 10 | 5 | 1.2 U | 1.2 U |
| Sodium | P | 5000 | 900 | 572 | 356 |
| Thallium | F | 10 | 1 | 0.24 U | 0.25 U |
| Vanadium | P | 50 | 5 | 20.1 | 16.3 |
| Zinc | P | 20 | 5 | 2390 J | 4130 J |
| Cyanide | C | 10 | 5 | 0.6 U | 0.61 U |

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063A SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | C-10-S | C-10-7 |
|---|---|---|
| MATRIX: | SOIL | SOIL |
| % SOLIDS: | 82.6 | 81.6 |
| UNITS: | mg/KG | mg/KG |
| COMPOUND | | |
| Sulfate | 637 | 503 |
| Sulfide | 5.6 UJ | 5.7 UJ |

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# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115059B / SDG NO.: G03-5FT

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-2-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115059B / SDG NO.: G03-5FT**

## OVERVIEW

This data validation review consists of seven leachate samples collected on 11-09-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for TCLP analysis on TAL metals (less sodium).

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and TCLP method. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| SAMPLE ID | SAMPLE ID |
|---|---|
| G03-5FT | C-11-SURFACE |
| G03-15FT | C-11-10FT |
| C-9-SURFACE | C-11-15FT |
| C-9-7FT | |

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

- * Technical Holding Time
- * Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- * Interference Check Samples
- * Matrix Spike/Matrix Spike Duplicate
- * Duplicate Digestion Sample Analyses
- * Laboratory Control Sample
- Serial Dilution Sample
- Graphite Furnace
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- * Data Completeness

* All criteria were met for this classification; therefore a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (72.9/72.7%), Cr (77%) and Se (77.9%) were outside the data validation requirement limits of 80-120%. The non-detected values and the positive results up to 3X the CRDL for antimony, chromium, and selenium are considered estimated.

## BLANK ANALYSES

The preparation blank had Ca (229.1 ug/L) and Zn (6.5 ug/L) at levels below the CRDL. These analytes were detected in the corresponding samples at levels above 5X the blank contaminations. Therefore, the data are not impacted based on the laboratory preparation blank contamination for these two elements. Chromium was detected in the preparation blank at a negative IDL level. The reported sample results are considered estimated due to the baseline drift in the continuing calibrations.

## SERIAL DILUTION SAMPLE ANALYSES

The %differences for Ca (10.4%), Mn (12.2%), and Zn (11.8%) were above the 10% analysis requirement limit. The reported sample results are qualified estimated.

## GRAPHITE FURNACE

Thallium was analyzed by graphite furnace. The following analytical spike recoveries for thallium were outside the control range of 85-115%.

| SAMPLE ID | % RECOVERY |
|---|---|
| G03-5FT | 46.5 |
| G03-15FT | 45.6 |
| C-9-SUR | 60.7 |
| C-9-7FT | 81.2 |
| C-11-SUR | 68.8 |
| C-11-10FT | 50.7 |

| SAMPLE ID | % RECOVERY |
|---|---|
| C-11-15FT | 77.7 |

The reported sample results and non-detected values are qualified estimated.

## SAMPLE RESULTS

All analytes, with the exception of mercury and thallium, were analyzed by ICP, consequently, the IDL for arsenic, lead, and selenium were above the Contract Required Detection Limits (CRDLs).

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample and laboratory control sample analyses met the requirements established in the Method. The recoveries for matrix spike samples and RPDs in matrix duplicate sample analysis were within the analysis requirement limits. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses were satisfactory and the results are accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059B / SDG NO.: 03–5FT

| TRAFFIC REPORT SAMPLE NUMBER: | | | | G03–5FT | G03–15FT | C–9–SURFACE | C–9–7FT | C–11–15FT | C–11–10FT |
|---|---|---|---|---|---|---|---|---|---|
| MATRIX: | | | | WATER | WATER | WATER | WATER | WATER | WATER |
| UNITS: | | | | ug/L | ug/L | ug/L | ug/L | ug/L | ug/L |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | | | |
| Aluminum | P | 200 | 100 | | | | 4710 | | 1040 |
| Antimony | P | 60 | 25 | UJ | UJ | UJ | UJ | UJ | UJ |
| Arsenic | P | 10 | 50 | | | | | | |
| Barium | P | 200 | 5 | 2410 | 422 | 1270 | 82.5 | 86.3 | 126 |
| Beryllium | P | 5 | 1 | | | | 4.3 | | 1.7 |
| Cadmium | P | 5 | 4 | | | | 108 | 7.5 | 125 |
| Calcium | P | 5000 | 100 | 677000 J | 684000 J | 684000 J | 637000 J | 190000 J | 287000 J |
| Chromium | P | 10 | 5 | UJ | UJ | UJ | 5.5 J | UJ | UJ |
| Cobalt | P | 50 | 5 | | | 7.2 | 28.7 | | 21.6 |
| Copper | P | 25 | 5 | 9.1 | | | 96.7 | | 123 |
| Iron | P | 100 | 75 | | | | 3170 | | 190 |
| Lead | P | 3 | 30 | | | | | | 567 |
| Magnesium | P | 5000 | 100 | 29000 | 39000 | 30900 | 45200 | 6810 | 25700 |
| Manganese | P | 15 | 5 | 1810 J | 6350 J | 6570 J | 3000 J | 819 J | 1390 J |
| Mercury | CV | 0.2 | 0.2 | | | | | | |
| Nickel | P | 40 | 10 | | | | 26.8 | | 20.1 |
| Potassium | P | 5000 | 2000 | | 8270 | 43500 | 7680 | 13100 | 2630 |
| Selenium | P | 5 | 50 | UJ | UJ | UJ | UJ | UJ | UJ |
| Silver | P | 10 | 5 | | | | | | |
| Sodium | P | 5000 | 900 | NA | NA | NA | NA | NA | NA |
| Thallium | F | 10 | 1 | 3.2 J | 2.6 J | 6.1 J | 2 J | 1.5 J | 2.4 J |
| Vanadium | P | 50 | 5 | | | | | | |
| Zinc | P | 20 | 5 | 277 J | 66.2 J | 87.9 J | 2780 J | 84.4 J | 100000 J |

NA = Not Analyzed

Roy F. Weston, Inc.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059B / SDG NO.: 03-5FT

| TRAFFIC REPORT SAMPLE NUMBER: | | | | C-11-SURFACE | |
|---|---|---|---|---|---|
| MATRIX: | | | | WATER | |
| UNITS: | | | | ug/L | |
| COMPOUND | | CRDL ug/L | IDL ug/L | | |
| Aluminum | P | 200 | 100 | | |
| Antimony | P | 60 | 25 | | UJ |
| Arsenic | P | 10 | 50 | | |
| Barium | P | 200 | 5 | 177 | |
| Beryllium | P | 5 | 1 | | |
| Cadmium | P | 5 | 4 | 445 | |
| Calcium | P | 5000 | 100 | 790000 | J |
| Chromium | P | 10 | 5 | | UJ |
| Cobalt | P | 50 | 5 | | |
| Copper | P | 25 | 5 | 11.9 | |
| Iron | P | 100 | 75 | | |
| Lead | P | 3 | 30 | 178 | |
| Magnesium | P | 5000 | 100 | 31100 | |
| Manganese | P | 15 | 5 | 5910 | J |
| Mercury | CV | 0.2 | 0.2 | | |
| Nickel | P | 40 | 10 | 11.4 | |
| Potassium | P | 5000 | 2000 | 14600 | |
| Selenium | P | 5 | 50 | | UJ |
| Silver | P | 10 | 5 | | |
| Sodium | P | 5000 | 900 | NA | |
| Thallium | F | 10 | 1 | 5.2 | J |
| Vanadium | P | 50 | 5 | | |
| Zinc | P | 20 | 5 | 69100 | J |

NA = Not Analyzed

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS**

NA

**END OF DATA VALIDATION REPORT**

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# GEOSYNTEC CONSULTANTS
# TAL ANALYSES
# ARDL NO.: 115059A / SDG NO.: 03-5FT

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**VERIFIED BY:** _____ 3-7-94

**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TAL ANALYSES**
**ARDL ID NO.: 115059A / SDG NO.: 03-5FT**

## OVERVIEW

This data validation review consists of seven soil samples collected on 11-09-93. Laboratory analyses were performed by Applied Research & Development Laboratory (ARDL) for Target Analyte List (TAL), Sulfate, and Sulfide.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines. If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 344-3745.

The following samples are contained within this report:

| SAMPLE ID | SAMPLE ID |
|---|---|
| G03-5FT | C-11-SURFACE |
| G03-15FT | C-11-10FT |
| C-9-SURFACE | C-11-15FT |
| C-9-7FT | |

## QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. The issues are summarized under each criteria:

- * Technical Holding Time
- * Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- * Interference Check Samples
- Matrix Spike/Matrix Spike Duplicate
- Duplicate Digestion Sample Analyses
- * Laboratory Control Sample
- * Serial Dilution Sample
- * Graphite Furnace
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- * Data Completeness

* All criteria were met for this classification; therefore a narrative section is not provided.

## CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (76.3/79.2) & (67.7/66.3%) and Cd (143%) were outside the data validation requirement limits of 80-120%. The positive sample results for cadmium up to 3X the CRDL are qualified estimated. However, this analyte was detected at levels above 3X the CRDL in all samples, with the exception of samples G03-15FT and C-11-10FT. The results in these samples are qualified. The non-detected values and the positive results up to 3X the CRDL for antimony are considered estimated.

## BLANK ANALYSES

The preparation blank had barium at a negative IDL level. The reported sample results and non-detected values are considered biased low due to the baseline drift in the method blank.

## MATRIX SPIKE SAMPLE ANALYSES

The matrix spike recoveries for Sb (14.9%), As (55.3%), Cr (70%), Cu (59.2%), Mn (248.2%), Se (21.4%), and V (70.6%) were outside the requirement limits of 75-125%. The positive results for manganese are considered biased high. The reported sample results are qualified "J" on the data summary. The reported data for arsenic, chromium, copper, and vanadium are considered biased low. The reported results and non-detected values are qualified "J" and "UJ" on the data summary. The results and non-detected values for antimony and selenium are considered extremely low (%R<30%). The positive results are biased low and the possibility of false negatives exist. Therefore, the reported sample results are flagged "J" and non-detected values are rejected, "R", for these two elements.

Also, the matrix spike recovery for lead analyzed by graphite furnace is extremely low (-76.8%). However, the data are not impacted, since the sample result is more than 4X the amount of spike added to the sample.

The spike recovery analysis for sulfate was not performed.

The post digestion spike recoveries for Sb (97.7%), Cr (79.9%), Cu (79.3%), and Mn (82.4%) were within the data validation control limits of 75-125%. The analytical spike recovery for V (71.3%) was below the lower control limit.

## LABORATORY AND FIELD DUPLICATE ANALYSES

The RPDs for Ba (30.1%), Ca (34.5%), Mn (30.6%), Zn (35.6%), and Pb (28.2%) were outside the analysis requirement of 20% and/or ±CRDL in the laboratory matrix duplicate analysis. However, the RPDs for barium, calcium, lead, and manganese were within the data validation requirement limit of 35% and/or 2X the CRDLs. Therefore, the reported data for these four analytes were not qualified based on the RPD outliers. The positive results for zinc are qualified estimated.

## GRAPHITE FURNACE

The following sample analyzed by graphite furnace had analytical spike recoveries outside the acceptable range of 85-115%.

| SAMPLE ID | ANALYTE | % RECOVERY |
|---|---|---|
| G03-5FT | As/Se | 75.6/47.6 |
| G03-15FT | As/Se | 77.7/41 |
| C-9-SUR | As/Se | 72.0/70.8 |
| C-9-7FT | Se | 82.1 |
| C-11-10FT | Se | 77.2 |
| C-11-15FT | Se | 69.5 |

The reported results for arsenic and non-detected values for selenium in this sample are qualified estimated, "J and UJ", due to possible matrix interferences.

The linearty "r≥0.995" for arsenic analyzed by Method of Standard Addition (MSA) was not met for sample C-11-15FT. This sample was reanalyzed. The linearty met the criteria in the reanalysis sample.

Due to the interferences, the analytical spike recovery for Se was below 40% in sample C-11-SUR. The reported result has already been rejected due to the matrix spike recovery.

## SAMPLE RESULT VERIFICATION

Lead analyses for four samples (C-9-7FT, C-11-SUR, C-11-10FT, and C-11-15FT) were performed by ICP; therefore, the IDL for these samples are 30 ug/L.

## DATA PACKAGE COMPLETENESS

The external standard analysis in ICP and graphite furnace analysis was not identified with a "+" flag on Form XIV.

## SUMMARY

The data package assembly was satisfactory. The initial and continuing calibrations met the requirement limits. The ICP interference check sample, laboratory control sample, and serial dilution sample analyses met the requirements established in the Method. The problems and issues were encountered during the sample analyses are listed in the aforementioned sections. Overall, the sample analyses demonstrated the matrix effect for selenium. The results could be accepted with the applied qualifier codes.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059A / SDG NO.: 03-5FT

| TRAFFIC REPORT SAMPLE NUMBER: | | | | G03-5FT | G03-15FT | C-9-SURFACE | C-9-7FT | C-11-SURFACE | C-11-10FT |
|---|---|---|---|---|---|---|---|---|---|
| MATRIX: | | | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| % SOLIDS: | | | | 85.7 | 94.6 | 88.5 | 88.2 | 88.9 | 91.4 |
| UNITS: | | | | mg/KG | mg/KG | mg/KG | mg/KG | mg/KG | mg/KG |
| COMPOUND | | CRDL ug/L | IDL ug/L | | | | | | |
| Aluminum | P | 200 | 100 | 15000 | 10900 | 9260 | 11600 | 4580 | 23100 |
| Antimony | P | 60 | 25 | 5.8 R | 5.3 R | 5.6 R | 5.7 R | 5.6 R | 5.5 R |
| Arsenic | F | 10 | 1 | 4 J | 1.1 UJ | 3.3 J | 8.2 J | 21.1 J | 6.7 J |
| Barium | P | 200 | 5 | 179 J | 19.9 J | 29.3 J | 81.9 J | 217 J | 79.9 J |
| Beryllium | P | 5 | 1 | 1.1 | 0.57 | 0.54 | 2.4 | 0.76 | 2.9 |
| Cadmium | P | 5 | 4 | 0.93 U | 0.97 J | 0.9 U | 8.3 | 38.3 | 2.4 J |
| Calcium | P | 5000 | 100 | 38100 | 78800 | 62300 | 20200 | 16300 | 25500 |
| Chromium | P | 10 | 5 | 26.8 J | 23.1 J | 16.6 J | 22.6 J | 22.1 J | 6.1 J |
| Cobalt | P | 50 | 5 | 10.9 | 8.2 | 12.1 | 6.9 | 16 | 3.5 |
| Copper | P | 25 | 5 | 46.8 J | 11.9 J | 12.8 J | 54.1 J | 232 J | 27.1 J |
| Iron | P | 100 | 75 | 25700 | 24000 | 14300 | 41000 | 59100 | 9980 |
| Lead | F | 30 | 1 | 20.9 | 2.9 | 6.2 | 79.1 | 3660 | 77.4 |
| Magnesium | P | 5000 | 100 | 10600 | 11700 | 12000 | 693 | 5190 | 2390 |
| Manganese | P | 15 | 5 | 417 J | 1560 J | 1530 J | 81 J | 1480 J | 122 J |
| Mercury | CV | 0.2 | 0.2 | 0.12 U | 0.1 U | 0.11 U | 0.11 U | 1.8 | 0.11 U |
| Nickel | P | 40 | 10 | 29.4 | 27.2 | 30.4 | 16.8 | 21.8 | 7.2 |
| Potassium | P | 5000 | 2000 | 2740 | 2320 | 3010 | 5330 | 1470 | 572 |
| Selenium | F | 5 | 1 | 1.2 R | 0.21 R | 1.1 R | 1.1 R | 2.4 J | 1.1 R |
| Silver | P | 10 | 5 | 1.2 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U | 1.1 U |
| Sodium | P | 5000 | 900 | 210 U | 336 | 203 U | 1050 | 334 | 1130 |
| Thallium | F | 10 | 1 | 0.23 U | 0.21 U | 0.23 U | 0.23 U | 0.25 | 0.22 U |
| Vanadium | P | 50 | 5 | 30 J | 13.5 J | 13.5 J | 53.7 J | 28.1 J | 26.8 J |
| Zinc | P | 20 | 5 | 45.5 J | 39.4 J | 49.1 J | 506 J | 8550 J | 2160 J |
| Cyanide | C | 10 | 5 | 0.53 U | 0.52 U | 0.55 U | 0.54 U | 0.56 U | 0.52 U |

Roy F. Weston, Inc.
Inorganic Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059A / SDG NO.: 03–5FT

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | C–11–15FT |
| MATRIX: | SOIL |
| % SOLIDS: | 82.4 |
| UNITS: | mg/KG |

| COMPOUND | | CRDL ug/L | IDL ug/L | | |
|---|---|---|---|---|---|
| Aluminum | P | 200 | 100 | 14600 | |
| Antimony | P | 60 | 25 | 6.1 | R |
| Arsenic | F | 10 | 1 | 2.8 | J |
| Barium | P | 200 | 5 | 59.2 | J |
| Beryllium | P | 5 | 1 | 1.1 | |
| Cadmium | P | 5 | 4 | 20.9 | |
| Calcium | P | 5000 | 100 | 103000 | |
| Chromium | P | 10 | 5 | 40 | J |
| Cobalt | P | 50 | 5 | 16.4 | |
| Copper | P | 25 | 5 | 29.5 | J |
| Iron | P | 100 | 75 | 18600 | |
| Lead | F | 30 | 1 | 510 | |
| Magnesium | P | 5000 | 100 | 5080 | |
| Manganese | P | 15 | 5 | 1440 | J |
| Mercury | CV | 0.2 | 0.2 | 0.12 | U |
| Nickel | P | 40 | 10 | 48.6 | |
| Potassium | P | 5000 | 2000 | 2570 | |
| Selenium | F | 5 | 1 | 1.2 | R |
| Silver | P | 10 | 5 | 1.2 | U |
| Sodium | P | 5000 | 900 | 591 | |
| Thallium | F | 10 | 1 | 0.24 | U |
| Vanadium | P | 50 | 5 | 28.4 | J |
| Zinc | P | 20 | 5 | 3490 | J |
| Cyanide | C | 10 | 5 | 0.6 | U |

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059 SDG NO.: 03–5FT

| TRAFFIC REPORT SAMPLE NUMBER: | G03–5FT | G03–15FT | C–9–SURFACE | C–9–7FT | C–11–SURFACE |
|---|---|---|---|---|---|
| MATRIX: | SOIL | SOIL | SOIL | SOIL | SOIL |
| % SOLIDS: | 85.7 | 94.6 | 88.5 | 88.2 | 88.9 |
| UNITS: | mg/KG | mg/KG | mg/KG | mg/KG | mg/KG |
| COMPOUND | | | | | |
| Sulfate | 498 | 527 | 767 | 8640 | 10800 |
| Sulfide | 8.4 U | 5.7 | 5.7 U | 16.7 | 5.7 |

ROY F. WESTON, INC.
Wet Chemistry Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115059 SDG NO.: 03-5F1

| TRAFFIC REPORT SAMPLE NUMBER: | C-11-10FT | C-11-15FT |
|---|---|---|
| MATRIX: | SOIL | SOIL |
| % SOLIDS: | 91.4 | 82.4 |
| UNITS: | mg/KG | mg/KG |
| COMPOUND | | |
| Sulfate | 4140 | 1830 |
| Sulfide | 5.8 | 5.6 U |

WESTON
MANAGERS DESIGNERS/CONSULTANTS

**ATTACHMENT III**
**RESUBMISSIONS**

NA

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# END OF DATA VALIDATION REPORT

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115093 / SDG NO.: 3319-09

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**PREPARED BY:** Kelly Muir Spittler 03-01-99
**Kelly Muir Spittler** **Date**
**Unit Leader - Data Validation**

**VERIFIED BY:** 3-8-99
**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TCL ORGANIC ANALYSES**
**ARDL ID NO.: 115093 / SDG NO.: 3319-09**

## OVERVIEW

This review consists of one water sample collected on 11-18-93 and received by ARDL, Inc. on 11-20-93. This analysis was performed according to the criteria set forth in USEPA SOW (OLM01.8) for TCL Semivolatile and Pesticide/PCB target compounds. The sample contained in this review is listed below:

3319-09

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

| | | |
|---|---|---|
| * | • | Data Completeness |
| * | • | Technical Holding Time |
| * | • | GC/MS Instrument Performance Check |
| | • | Calibration (Initial and Continuing) |
| | • | Blanks |
| * | • | System Monitoring Compound and Surrogate Recoveries |
| | • | Matrix Spike/Matrix Spike Duplicate |
| | • | Field Duplicate Precision |
| * | • | Internal Standard Performance |
| * | • | Pesticide Instrument Performance |
| * | • | Compound Identification |
| * | • | Compound Quantitations |

* All criteria were met for this classification; therefore a narrative section is not provided.

## CALIBRATION

### Semivolatiles

Up to four compounds had %RSDs and %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

### Pesticide/PCBs

The %RSDs for 4,4-DDE (RTX-5/12-07-93), alpha-BHC, 4,4-DDT (RTX-1701/12-07-93), alpha-BHC, 4,4-DDE (RTX-5/11-30-93), alpha-BHC, 4,4-DDT (RTX-1701/11-30-93), and delta-BHC (RTX-1701/10-15-93) were above the 20% QC limit in the initial calibrations. Since these compounds were not detected in the sample, no action has been taken.

## BLANKS

### Semivolatile

Method blank (SBLKE1) contained common contaminant di-n-butyl-phthalate. The associated positive result is less than 10X the blank level and is believed to be an artifact of laboratory contamination. This result is elevated to the CRQL and flagged "U". This blank also contained six unknown TICs. All associated TIC sample results at levels less than 5X the blank concentration are considered to be laboratory artifacts.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### Semivolatiles and Pesticide/PCBs

The MS/MSD analyses associated with these samples are from ARDL ID No.: 115083. No qualification has been applied based on these QC analyses.

## FIELD DUPLICATE PRECISION

### General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115093 SDG NO.: 3319-09

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-09 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Phenol | 10 | 10 U |
| Bis(2-chloroethyl)ether | 10 | 10 U |
| 2-Chlorophenol | 10 | 10 U |
| 1,3-Dichlorobenzene | 10 | 10 U |
| 1,4-Dichlorobenzene | 10 | 10 U |
| 1,2-Dichlorobenzene | 10 | 10 U |
| 2-Methylphenol | 10 | 10 U |
| 2,2'-Oxybis(1-chloropropane) | 10 | 10 UJ |
| 4-Methylphenol | 10 | 10 U |
| N-Nitroso-di-n-propylamine | 10 | 10 U |
| Hexachloroethane | 10 | 10 U |
| Nitrobenzene | 10 | 10 U |
| Isophorone | 10 | 10 U |
| 2-Nitrophenol | 10 | 10 U |
| 2,4-Dimethylphenol | 10 | 10 U |
| Bis(2-chloroethoxy)methane | 10 | 10 U |
| 2,4-Dichlorophenol | 10 | 10 U |
| 1,2,4-Trichlorobenzene | 10 | 10 U |
| Naphthalene | 10 | 10 U |
| 4-Chloroaniline | 10 | 10 U |
| Hexachlorobutadiene | 10 | 10 U |
| 4-Chloro-3-methylphenol | 10 | 10 U |
| 2-Methylnaphthalene | 10 | 10 U |
| Hexachlorocyclopentadiene | 10 | 10 U |
| 2,4,6-Trichlorophenol | 10 | 10 U |
| 2,4,5-Trichlorophenol | 25 | 25 U |
| 2-Chloronaphthalene | 10 | 10 U |
| 2-Nitroaniline | 25 | 25 U |
| Dimethylphthalate | 10 | 10 U |
| Acenaphthylene | 10 | 10 U |
| 2,6-Dinitrotoluene | 10 | 10 U |
| 3-Nitroaniline | 25 | 25 U |
| Acenaphthene | 10 | 10 U |
| 2,4-Dinitrophenol | 25 | 25 UJ |
| 4-Nitrophenol | 25 | 25 U |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115093 SDG NO.: 3319-09

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-09 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Dibenzofuran | 10 | 10 U |
| 2,4-Dinitrotoluene | 10 | 10 U |
| Diethylphthalate | 10 | 10 U |
| 4-Chlorophenyl-phenylether | 10 | 10 U |
| Fluorene | 10 | 10 U |
| 4-Nitroaniline | 25 | 25 U |
| 4,6-Dinitro-2-methylphenol | 25 | 25 U |
| N-Nitrosodiphenylamine | 10 | 10 U |
| 4-Bromophenyl-phenylether | 10 | 10 U |
| Hexachlorobenzene | 10 | 10 U |
| Pentachlorophenol | 25 | 25 U |
| Phenanthrene | 10 | 10 U |
| Anthracene | 10 | 10 U |
| Carbazole | 10 | 10 U |
| Di-n-butylphthalate | 10 | 10 U |
| Fluoranthene | 10 | 10 U |
| Pyrene | 10 | 10 U |
| Butylbenzylphthalate | 10 | 10 UJ |
| 3,3'-Dichlorobenzidine | 10 | 10 U |
| Benzo(a)anthracene | 10 | 10 U |
| Chrysene | 10 | 10 U |
| Bis(2-ethylhexyl)phthalate | 10 | 10 UJ |
| Di-n-octylphthalate | 10 | 10 UJ |
| Benzo(b)fluoranthene | 10 | 10 U |
| Benzo(k)fluoranthene | 10 | 10 U |
| Benzo(a)pyrene | 10 | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 | 10 U |
| Dibenz(a,h)anthracene | 10 | 10 U |
| Benzo(g,h,i)perylene | 10 | 10 U |

ROY F. WESTON, INC.
Pesticide/PCB Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115093 SDG NO.: 3319-09

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-09 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1.0 |
| UNITS: | ug/L |

| COMPOUND | CRQL | |
|---|---|---|
| alpha-BHC | 0.05 | 0.05 U |
| beta-BHC | 0.05 | 0.05 U |
| delta-BHC | 0.05 | 0.05 U |
| gamma-BHC(Lindane) | 0.05 | 0.05 U |
| Heptachlor | 0.05 | 0.05 U |
| Aldrin | 0.05 | 0.05 U |
| Heptachlor Epoxide | 0.05 | 0.05 U |
| Endosulfan I | 0.05 | 0.05 U |
| Dieldrin | 0.10 | 0.1 U |
| 4,4'-DDE | 0.10 | 0.1 U |
| Endrin | 0.10 | 0.1 U |
| Endosulfan II | 0.10 | 0.1 U |
| 4,4'-DDD | 0.10 | 0.1 U |
| Endosulfan Sulfate | 0.10 | 0.1 U |
| 4,4'-DDT | 0.10 | 0.1 U |
| Methoxychlor | 0.50 | 0.5 U |
| Endrin Ketone | 0.10 | 0.1 U |
| Endrin Aldehyde | 0.10 | 0.1 U |
| alpha-Chlordane | 0.05 | 0.05 U |
| gamma-Chlordane | 0.05 | 0.05 U |
| Toxaphene | 5.0 | 5 U |
| Aroclor-1016 | 1.0 | 1 U |
| Aroclor-1221 | 2.0 | 2 U |
| Aroclor-1232 | 1.0 | 1 U |
| Aroclor-1242 | 1.0 | 1 U |
| Aroclor-1248 | 1.0 | 1 U |
| Aroclor-1254 | 1.0 | 1 U |
| Aroclor-1260 | 1.0 | 1 U |

**END OF DATA VALIDATION REPORT**

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PHONE: 215-692-3030
FAX: 215-430-3124

# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115087 / SDG NO.: 3319-10

**REVIEW PERFORMED BY**
**THE ANALYTICS DIVISION**
**OF**
**ROY F. WESTON, INC.**

**PREPARED BY:** Kelly Muir Spittler — 03-01-94
**Kelly Muir Spittler** — **Date**
**Unit Leader - Data Validation**

**VERIFIED BY:** _____ — 3-7-94
**Zohreh Hamid, Ph.D.** — **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TCL ORGANIC ANALYSES**
**ARDL ID NO.: 115087 / SDG NO.: 3319-10**

## OVERVIEW

This review consists of two water samples collected on 11-17-93 and received by ARDL, Inc. on 11-18-93. These analyses were performed according to the criteria set forth in USEPA SOW (OLM01.8) for TCL Volatiles, Semivolatiles, and Pesticide/PCB target compounds. The samples contained in this review are listed below:

3319-10

3319-11 (VOA Only)

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

| | |
|---|---|
| * | • Data Completeness |
| | • Technical Holding Time |
| * | • GC/MS Instrument Performance Check |
| | • Calibration (Initial and Continuing) |
| | • Blanks |
| | • System Monitoring Compound and Surrogate Recoveries |
| | • Matrix Spike/Matrix Spike Duplicate |
| | • Field Duplicate Precision |
| * | • Internal Standard Performance |
| * | • Pesticide Instrument Performance |
| * | • Compound Identification |
| * | • Compound Quantitations |

* All criteria were met for this classification; therefore a narrative section is not provided.

## TECHNICAL HOLDING TIME

Volatiles

Sample 3319-11 was analyzed 2 days outside of the technical holding time (unpreserved - 7 days from collection to analysis). Due to the exceeded holding time, both positive results and non-detects are qualified estimated, "J and UJ".

## CALIBRATION

Volatiles

Up to four compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Semivolatiles

Up to four compounds had %Ds exceed the 25% QC limit in the continuing calibration. All associated positive results and non-detects are qualified estimated, "J and UJ".

Pesticide/PCBs

The %RSDs for alpha-BHC, 4,4-DDE (RTX-5/11-30-93), alpha-BHC, 4,4-DDT (RTX-1701/11-30-93), and delta-BHC (RTX-1701/10-15-93) were above the 20% QC limit in the initial calibrations. Since these compounds were not detected in the sample, no action has been taken.

## BLANKS

Volatiles

Method blank (VBLKD1) contained common contaminants methylene chloride and acetone. All associated positive results less than 10X the blank levels are believed to be artifacts of laboratory contamination. Results less than the CRQL are elevated to the CRQL and are flagged "U". This blank also contained two unknown Tentatively Identified Compounds (TICs). Associated TIC sample results at levels less than 5X the blank concentrations are believed to be artifacts of laboratory contamination.

Semivolatiles

Method blank (SBLKE1) contained common contaminant di-n-butylphthalate. The associated positive result is less than 10X the blank level, it is believed to be an artifact of laboratory contamination. This result is elevated to the CRQL and is flagged "U". This blank also contained six unknown TICs. All associated TIC sample results at levels less than 5X the blank concentrations are considered to be laboratory artifacts.

## SURROGATE RECOVERIES

Pesticide/PCBs

The following surrogate recoveries were below the QC limits in the sample analysis:

| SAMPLE | SURROGATE | COLUMN | RECOVERY |
|---|---|---|---|
| 3319-10 | TCX | RTX-1701 | 46 |
| | DCB | RTX-5/RTX-1701 | 12/12 |

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Since both DCB surrogate recoveries were below the QC limits, sample results may be biased; therefore, all reported results are qualified estimated, (UJ).

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Volatiles/Semivolatiles/Pesticide/PCBs

The MS/MSD analyses associated with these analyses can be found in ARDL report numbers 115081 (VOA) and 115083 (BNA, Pest/PCB). No action is taken on this batch of samples based on the MS/MSD results.

## FIELD DUPLICATE PRECISION

General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Volatile Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319–10

| TRAFFIC REPORT SAMPLE NUMBER: | | 3319–10 | 3319–11 |
|---|---|---|---|
| MATRIX: | | WATER | WATER |
| DILUTION FACTOR: | | 1 | 1 |
| UNITS: | | ug/L | ug/L |
| COMPOUND | CRQL * | | |
| Chloromethane | 10 | 10 U | 10 UJ |
| Bromomethane | 10 | 10 U | 10 UJ |
| Vinyl Chloride | 10 | 10 U | 10 UJ |
| Chloroethane | 10 | 10 U | 10 UJ |
| Methylene Chloride | 10 | 10 U | 10 UJ |
| Acetone | 10 | 10 UJ | 10 UJ |
| Carbon Disulfide | 10 | 10 U | 10 UJ |
| 1,1–Dichloroethene | 10 | 10 U | 10 UJ |
| 1,1–Dichloroethane | 10 | 10 U | 10 UJ |
| 1,2–Dichloroethene(total) | 10 | 10 U | 10 UJ |
| Chloroform | 10 | 10 U | 10 UJ |
| 1,2–Dichloroethane | 10 | 10 U | 10 UJ |
| 2–Butanone | 10 | 10 U | 10 UJ |
| 1,1,1 –Trichloroethane | 10 | 10 U | 10 UJ |
| Carbon Tetrachloride | 10 | 10 U | 10 UJ |
| Bromodichloromethane | 10 | 10 U | 10 UJ |
| 1,2–Dichloropropane | 10 | 10 U | 10 UJ |
| cis–1,3–Dichloropropene | 10 | 10 U | 10 UJ |
| Trichloroethene | 10 | 10 U | 10 UJ |
| Dibromochloromethane | 10 | 10 U | 10 UJ |
| 1,1,2–Trichloroethane | 10 | 10 U | 10 UJ |
| Benzene | 10 | 10 U | 10 UJ |
| trans–1,3–Dichloropropene | 10 | 10 U | 10 UJ |
| Bromoform | 10 | 10 U | 10 UJ |
| 4–Methyl–2–pentanone | 10 | 10 U | 10 UJ |
| 2–Hexanone | 10 | 10 U | 10 UJ |
| Tetrachloroethene | 10 | 10 U | 10 UJ |
| Toluene | 10 | 10 U | 10 UJ |
| 1,1,2,2–Tetrachloroethane | 10 | 10 U | 10 UJ |
| Chlorobenzene | 10 | 10 U | 10 UJ |
| Ethylbenzene | 10 | 10 U | 10 UJ |
| Styrene | 10 | 10 U | 10 UJ |
| Total Xylenes | 10 | 10 U | 10 UJ |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319-10

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-10 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Phenol | 10 | 10 U |
| Bis(2-chloroethyl)ether | 10 | 10 U |
| 2-Chlorophenol | 10 | 10 U |
| 1,3-Dichlorobenzene | 10 | 10 U |
| 1,4-Dichlorobenzene | 10 | 10 U |
| 1,2-Dichlorobenzene | 10 | 10 U |
| 2-Methylphenol | 10 | 10 U |
| 2,2'-Oxybis(1-chloropropane) | 10 | 10 UJ |
| 4-Methylphenol | 10 | 10 U |
| N-Nitroso-di-n-propylamine | 10 | 10 U |
| Hexachloroethane | 10 | 10 U |
| Nitrobenzene | 10 | 10 U |
| Isophorone | 10 | 10 U |
| 2-Nitrophenol | 10 | 10 U |
| 2,4-Dimethylphenol | 10 | 10 U |
| Bis(2-chloroethoxy)methane | 10 | 10 U |
| 2,4-Dichlorophenol | 10 | 10 U |
| 1,2,4-Trichlorobenzene | 10 | 10 U |
| Naphthalene | 10 | 10 U |
| 4-Chloroaniline | 10 | 10 U |
| Hexachlorobutadiene | 10 | 10 U |
| 4-Chloro-3-methylphenol | 10 | 10 U |
| 2-Methylnaphthalene | 10 | 10 U |
| Hexachlorocyclopentadiene | 10 | 10 U |
| 2,4,6-Trichlorophenol | 10 | 10 U |
| 2,4,5-Trichlorophenol | 25 | 25 U |
| 2-Chloronaphthalene | 10 | 10 U |
| 2-Nitroaniline | 25 | 25 U |
| Dimethylphthalate | 10 | 10 U |
| Acenaphthylene | 10 | 10 U |
| 2,6-Dinitrotoluene | 10 | 10 U |
| 3-Nitroaniline | 25 | 25 U |
| Acenaphthene | 10 | 10 U |
| 2,4-Dinitrophenol | 25 | 25 UJ |
| 4-Nitrophenol | 25 | 25 U |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319-10

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-10 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Dibenzofuran | 10 | 10 U |
| 2,4-Dinitrotoluene | 10 | 10 U |
| Diethylphthalate | 10 | 10 U |
| 4-Chlorophenyl-phenylether | 10 | 10 U |
| Fluorene | 10 | 10 U |
| 4-Nitroaniline | 25 | 25 U |
| 4,6-Dinitro-2-methylphenol | 25 | 25 U |
| N-Nitrosodiphenylamine | 10 | 10 U |
| 4-Bromophenyl-phenylether | 10 | 10 U |
| Hexachlorobenzene | 10 | 10 U |
| Pentachlorophenol | 25 | 25 U |
| Phenanthrene | 10 | 10 U |
| Anthracene | 10 | 10 U |
| Carbazole | 10 | 10 U |
| Di-n-butylphthalate | 10 | 10 U |
| Fluoranthene | 10 | 10 U |
| Pyrene | 10 | 10 U |
| Butylbenzylphthalate | 10 | 10 UJ |
| 3,3'-Dichlorobenzidine | 10 | 10 U |
| Benzo(a)anthracene | 10 | 10 U |
| Chrysene | 10 | 10 U |
| Bis(2-ethylhexyl)phthalate | 10 | 10 UJ |
| Di-n-octylphthalate | 10 | 10 UJ |
| Benzo(b)fluoranthene | 10 | 10 U |
| Benzo(k)fluoranthene | 10 | 10 U |
| Benzo(a)pyrene | 10 | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 | 10 U |
| Dibenz(a,h)anthracene | 10 | 10 U |

ROY F. WESTON, INC.
Pesticide/PCB Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115087 SDG NO.: 3319-10

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-10 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1.0 |
| UNITS: | ug/L |

| COMPOUND | CRQL | |
|---|---|---|
| alpha-BHC | 0.05 | 0.05 UJ |
| beta-BHC | 0.05 | 0.05 UJ |
| delta-BHC | 0.05 | 0.05 UJ |
| gamma-BHC(Lindane) | 0.05 | 0.05 UJ |
| Heptachlor | 0.05 | 0.05 UJ |
| Aldrin | 0.05 | 0.05 UJ |
| Heptachlor Epoxide | 0.05 | 0.05 UJ |
| Endosulfan I | 0.05 | 0.05 UJ |
| Dieldrin | 0.10 | 0.10 UJ |
| 4,4'-DDE | 0.10 | 0.10 UJ |
| Endrin | 0.10 | 0.10 UJ |
| Endosulfan II | 0.10 | 0.10 UJ |
| 4,4'-DDD | 0.10 | 0.10 UJ |
| Endosulfan Sulfate | 0.10 | 0.10 UJ |
| 4,4'-DDT | 0.10 | 0.10 UJ |
| Methoxychlor | 0.50 | 0.50 UJ |
| Endrin Ketone | 0.10 | 0.10 UJ |
| Endrin Aldehyde | 0.10 | 0.10 UJ |
| alpha-Chlordane | 0.05 | 0.05 UJ |
| gamma-Chlordane | 0.05 | 0.05 UJ |
| Toxaphene | 5.0 | 5.0 UJ |
| Arodor-1016 | 1.0 | 1.0 UJ |
| Arodor-1221 | 2.0 | 2.0 UJ |
| Arodor-1232 | 1.0 | 1.0 UJ |
| Arodor-1242 | 1.0 | 1.0 UJ |
| Arodor-1248 | 1.0 | 1.0 UJ |
| Arodor-1254 | 1.0 | 1.0 UJ |
| Arodor-1260 | 1.0 | 1.0 UJ |

END OF DATA VALIDATION REPORT

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# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115083 / SDG NO.: 3319-01

**REVIEW PERFORMED BY**
**THE ANALYTICS DIVISION**
**OF**
**ROY F. WESTON, INC.**

**PREPARED BY:** Kelly Muir Spittler — 03-01-94
**Kelly Muir Spittler** — **Date**
**Unit Leader - Data Validation**

**VERIFIED BY:** _____ — 3-7-94
**Zohreh Hamid, Ph.D.** — **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**TCL ORGANIC ANALYSES**
**ARDL ID NO.: 115083 / SDG NO.: 3319-01**

## OVERVIEW

This review consists of three water samples collected on 11-16-93 and received by ARDL, Inc. on 11-17-93. These analyses were performed according to the criteria set forth in USEPA SOW (OLM01.8) for TCL Volatiles, Semivolatiles, and Pesticide/PCB target compounds. The samples contained in this review are listed below:

3319-01 (Pest/PCB Only)

3319-04

3319-09 (VOA Only)

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

- Data Completeness
- Technical Holding Time
- * GC/MS Instrument Performance Check
- Calibration (Initial and Continuing)
- Blanks
- System Monitoring Compound and Surrogate Recoveries
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Precision
- * Internal Standard Performance
- * Pesticide Instrument Performance
- * Compound Identification
- * Compound Quantitations

* All criteria were met for this classification; therefore a narrative section is not provided.

## DATA COMPLETENESS

Volatiles

The Form IV for sample 3319-09 (VBLKD1) was not found in the volatiles data package. This documentation was located in the summary package; therefore, resubmission is not required.

## TECHNICAL HOLDING TIME

Volatiles

Sample 3319-09 was analyzed 3 days outside of the technical holding time (unpreserved - 7 days from collection to analysis). Due to the exceeded holding time, the sample results are qualified estimated, "UJ".

## CALIBRATION

Volatiles

Up to four compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Semivolatiles

Up to four compounds had %RSDs and %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Pesticide/PCBs

The %RSDs for alpha-BHC, 4,4-DDE (RTX-5/11-30-93), alpha-BHC, 4,4-DDT (RTX-1701/11-30-93), and delta-BHC (RTX1701/10-15-93) were above the 20% QC limit in the initial calibrations. Since these compounds were not detected in the samples, no action has been taken.

## BLANKS

### Volatiles

Method blank (VBLKD1) contained common contaminants methylene chloride and acetone. All associated positive results less than 10X the blank levels are believed to be artifacts of laboratory contamination. Results less than the CRQL are elevated to the CRQL and are flagged "U". This blank also contained three unknown Tentatively Identified Compounds (TICs). Associated TIC sample results at levels less than 5X the blank concentration are believed to be artifacts of laboratory contamination.

### Semivolatile

Method blank (SBLKE1) contained common contaminant di-n-butylphthalate. The associated positive result is less than 10X the blank level, it is believed to be an artifact of laboratory contamination. This result is elevated to the CRQL and flagged "U". This blank also contained ten unknown TICs. All associated TIC sample results at levels less than 5X the blank concentration are considered to be laboratory artifacts.

## SURROGATE RECOVERIES

### Pesticide/PCBs

The following surrogate recoveries were below the QC limits in the sample analyses:

| SAMPLE | SURROGATE | COLUMN | RECOVERY |
|---|---|---|---|
| 3319-01 | TCX | RTX-5/RTX-1701 | 40/28 |
| | DCB | RTX-5/RTX-1701 | 14/14 |
| 3319-01MS | TCX | RTX-5/RTX-1701 | 52/44 |
| | DCB | RTX-5/RTX-1701 | 17/18 |
| 3319-01MSD | TCX | RTX-5/RTX-1701 | 53/38 |
| | DCB | RTX-5/RTX-1701 | 14/13 |
| 3319-04 | TCX | RTX-1701 | 45 |
| | DCB | RTX-5/RTX-1701 | 25/25 |

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Since both DCB and/or both TCX recoveries were below the QC limits, these sample results may be biased; therefore, all sample results in these analyses are qualified estimated, "J and UJ".

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### Volatiles

The MS/MSD analyses associated with these samples are from ARDL ID No.: 115081. No qualification has been applied based on these MS/MSD results.

### Pesticide/PCBs

All MS/MSD recoveries were below the QC limits, with the exception of heptachlor, in the analyses of 3319-01 MS/MSD. These compounds were not detected in the unspiked sample. Sample results may be biased; however, no action is required based on MS/MSD outliers alone.

## FIELD DUPLICATE PRECISION

### General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Volatile Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | 3319-04 | 3319-09 |
|---|---|---|---|
| MATRIX: | | WATER | WATER |
| DILUTION FACTOR: | | 1 | 1 |
| UNITS: | | ug/L | ug/L |
| COMPOUND | CRQL * | | |
| Chloromethane | 10 | 10 U | 10 UJ |
| Bromomethane | 10 | 10 U | 10 UJ |
| Vinyl Chloride | 10 | 10 U | 10 UJ |
| Chloroethane | 10 | 10 U | 10 UJ |
| Methylene Chloride | 10 | 10 U | 10 UJ |
| Acetone | 10 | 10 UJ | 10 UJ |
| Carbon Disulfide | 10 | 10 U | 10 UJ |
| 1,1-Dichloroethene | 10 | 10 U | 10 UJ |
| 1,1-Dichloroethane | 10 | 10 U | 10 UJ |
| 1,2-Dichloroethene(total) | 10 | 10 U | 10 UJ |
| Chloroform | 10 | 10 U | 10 UJ |
| 1,2-Dichloroethane | 10 | 10 U | 10 UJ |
| 2-Butanone | 10 | 10 U | 10 UJ |
| 1,1,1-Trichloroethane | 10 | 10 U | 10 UJ |
| Carbon Tetrachloride | 10 | 10 U | 10 UJ |
| Bromodichloromethane | 10 | 10 U | 10 UJ |
| 1,2-Dichloropropane | 10 | 10 U | 10 UJ |
| cis-1,3-Dichloropropene | 10 | 10 U | 10 UJ |
| Trichloroethene | 10 | 10 U | 10 UJ |
| Dibromochloromethane | 10 | 10 U | 10 UJ |
| 1,1,2-Trichloroethane | 10 | 10 U | 10 UJ |
| Benzene | 10 | 10 U | 10 UJ |
| trans-1,3-Dichloropropene | 10 | 10 U | 10 UJ |
| Bromoform | 10 | 10 U | 10 UJ |
| 4-Methyl-2-pentanone | 10 | 10 U | 10 UJ |
| 2-Hexanone | 10 | 10 U | 10 UJ |
| Tetrachloroethene | 10 | 10 U | 10 UJ |
| Toluene | 10 | 10 U | 10 UJ |
| 1,1,2,2-Tetrachloroethane | 10 | 10 U | 10 UJ |
| Chlorobenzene | 10 | 10 U | 10 UJ |
| Ethylbenzene | 10 | 10 U | 10 UJ |
| Styrene | 10 | 10 U | 10 UJ |
| Total Xylenes | 10 | 10 U | 10 UJ |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-04 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Phenol | 10 | 10 U |
| Bis(2-chloroethyl)ether | 10 | 10 U |
| 2-Chlorophenol | 10 | 10 U |
| 1,3-Dichlorobenzene | 10 | 10 U |
| 1,4-Dichlorobenzene | 10 | 10 U |
| 1,2-Dichlorobenzene | 10 | 10 U |
| 2-Methylphenol | 10 | 10 U |
| 2,2'-Oxybis(1-chloropropane) | 10 | 10 UJ |
| 4-Methylphenol | 10 | 10 U |
| N-Nitroso-di-n-propylamine | 10 | 10 U |
| Hexachloroethane | 10 | 10 U |
| Nitrobenzene | 10 | 10 U |
| Isophorone | 10 | 10 U |
| 2-Nitrophenol | 10 | 10 U |
| 2,4-Dimethylphenol | 10 | 10 U |
| Bis(2-chloroethoxy)methane | 10 | 10 U |
| 2,4-Dichlorophenol | 10 | 10 U |
| 1,2,4-Trichlorobenzene | 10 | 10 U |
| Naphthalene | 10 | 10 U |
| 4-Chloroaniline | 10 | 10 U |
| Hexachlorobutadiene | 10 | 10 U |
| 4-Chloro-3-methylphenol | 10 | 10 U |
| 2-Methylnaphthalene | 10 | 10 U |
| Hexachlorocyclopentadiene | 10 | 10 U |
| 2,4,6-Trichlorophenol | 10 | 10 U |
| 2,4,5-Trichlorophenol | 25 | 25 U |
| 2-Chloronaphthalene | 10 | 10 U |
| 2-Nitroaniline | 25 | 25 U |
| Dimethylphthalate | 10 | 10 U |
| Acenaphthylene | 10 | 10 U |
| 2,6-Dinitrotoluene | 10 | 10 U |
| 3-Nitroaniline | 25 | 25 U |
| Acenaphthene | 10 | 10 U |
| 2,4-Dinitrophenol | 25 | 25 UJ |
| 4-Nitrophenol | 25 | 25 U |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-04 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Dibenzofuran | 10 | 10 U |
| 2,4-Dinitrotoluene | 10 | 10 U |
| Diethylphthalate | 10 | 10 U |
| 4-Chlorophenyl-phenylether | 10 | 10 U |
| Fluorene | 10 | 10 U |
| 4-Nitroaniline | 25 | 25 U |
| 4,6-Dinitro-2-methylphenol | 25 | 25 U |
| N-Nitrosodiphenylamine | 10 | 10 U |
| 4-Bromophenyl-phenylether | 10 | 10 U |
| Hexachlorobenzene | 10 | 10 U |
| Pentachlorophenol | 25 | 25 U |
| Phenanthrene | 10 | 10 U |
| Anthracene | 10 | 10 U |
| Carbazole | 10 | 10 U |
| Di-n-butylphthalate | 10 | 10 U |
| Fluoranthene | 10 | 10 U |
| Pyrene | 10 | 10 U |
| Butylbenzylphthalate | 10 | 10 UJ |
| 3,3'-Dichlorobenzidine | 10 | 10 U |
| Benzo(a)anthracene | 10 | 10 U |
| Chrysene | 10 | 10 U |
| Bis(2-ethylhexyl)phthalate | 10 | 10 UJ |
| Di-n-octylphthalate | 10 | 10 UJ |
| Benzo(b)fluoranthene | 10 | 10 U |
| Benzo(k)fluoranthene | 10 | 10 U |
| Benzo(a)pyrene | 10 | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 | 10 U |
| Dibenz(a,h)anthracene | 10 | 10 U |
| Benzo(g,h,i)perylene | 10 | 10 U |

ROY F. WESTON, INC.
Pesticide/PCB Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115083 SDG NO.: 3319-01

| TRAFFIC REPORT SAMPLE NUMBER: | | 3319-01 | 3319-04 |
|---|---|---|---|
| MATRIX: | | WATER | WATER |
| DILUTION FACTOR: | | 1.0 | 1.0 |
| UNITS: | | ug/L | ug/L |
| COMPOUND | CRQL | | |
| alpha-BHC | 0.05 | 0.05 UJ | 0.05 UJ |
| beta-BHC | 0.05 | 0.05 UJ | 0.05 UJ |
| delta-BHC | 0.05 | 0.05 UJ | 0.05 UJ |
| gamma-BHC(Lindane) | 0.05 | 0.05 UJ | 0.05 UJ |
| Heptachlor | 0.05 | 0.05 UJ | 0.05 UJ |
| Aldrin | 0.05 | 0.05 UJ | 0.05 UJ |
| Heptachlor Epoxide | 0.05 | 0.05 UJ | 0.05 UJ |
| Endosulfan I | 0.05 | 0.05 UJ | 0.05 UJ |
| Dieldrin | 0.10 | 0.1 UJ | 0.1 UJ |
| 4,4'-DDE | 0.10 | 0.1 UJ | 0.1 UJ |
| Endrin | 0.10 | 0.1 UJ | 0.1 UJ |
| Endosulfan II | 0.10 | 0.1 UJ | 0.1 UJ |
| 4,4'-DDD | 0.10 | 0.1 UJ | 0.1 UJ |
| Endosulfan Sulfate | 0.10 | 0.1 UJ | 0.1 UJ |
| 4,4'-DDT | 0.10 | 0.1 UJ | 0.1 UJ |
| Methoxychlor | 0.50 | 0.5 UJ | 0.5 UJ |
| Endrin Ketone | 0.10 | 0.1 UJ | 0.1 UJ |
| Endrin Aldehyde | 0.10 | 0.1 UJ | 0.1 UJ |
| alpha-Chlordane | 0.05 | 0.05 UJ | 0.05 UJ |
| gamma-Chlordane | 0.05 | 0.05 UJ | 0.05 UJ |
| Toxaphene | 5.0 | 5 UJ | 5 UJ |
| Aroclor-1016 | 1.0 | 1 UJ | 1 UJ |
| Aroclor-1221 | 2.0 | 2 UJ | 2 UJ |
| Aroclor-1232 | 1.0 | 1 UJ | 1 UJ |
| Aroclor-1242 | 1.0 | 1 UJ | 1 UJ |
| Aroclor-1248 | 1.0 | 1 UJ | 1 UJ |
| Aroclor-1254 | 1.0 | 1 UJ | 1 UJ |
| Aroclor-1260 | 1.0 | 1 UJ | 1 UJ |

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MANAGERS DESIGNERS/CONSULTANTS

# END OF DATA VALIDATION REPORT

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# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115081 / SDG NO.: 3319-01

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

**PREPARED BY:** Kelly Muir Spittler 03-01-94
**Kelly Muir Spittler** **Date**
**Unit Leader - Data Validation**

**VERIFIED BY:** 3-7-94
**Zohreh Hamid, Ph.D.** **Date**
**Section Manager - Data Validation**

**GEOSYNTEC CONSULTANTS**
**ORGANIC ANALYSES**
**ARDL ID NO.: 115081 / SDG NO.: 3319-01**

## OVERVIEW

This review consists of two water samples collected on 11-15-93 and received by ARDL, Inc. on 11-16-93. These analyses were performed according to the criteria set forth in USEPA SOW (OLM01.8) for TCL Volatile, BTEX (benzene, toluene, ethylbenzene, xylene), and Semivolatile target compounds, along with SW846 Method 8310 for Polynuclear Aromatic Hydrocarbons. The samples contained in this review are listed below:

3319-01 (TCL)

3319-02 (BTEX, PNA)

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

- Data Completeness
- Technical Holding Time
- * GC/MS Instrument Performance Check
- Calibration (Initial and Continuing)
- Blanks
- System Monitoring Compound and Surrogate Recoveries
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Precision
- Internal Standard Performance
- * Pesticide Instrument Performance
- * Compound Identification
- Compound Quantitations

* All criteria were met for this classification; therefore a narrative section is not provided.

## DATA COMPLETENESS

Volatiles (BTEX)

The library search match for the positive toluene result in sample 3319-02 was not found in the data package. The laboratory should resubmit this document.

## TECHNICAL HOLDING TIME

Volatiles (BTEX)

Sample 3319-02 was analyzed 4 days outside of the technical holding time (unpreserved - 7 days from collection to analysis). Due to the exceeded holding time, all sample results are qualified estimated, "J".

## CALIBRATION

Volatiles (TCL and BTEX)

Up to four compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Semivolatiles

Up to two compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Polynuclear Aromatic Hydrocarbons

The correlation coefficients for acenaphthene, fluorene, and anthracene were less than "$r \geq 0.995$" on the instrument HPLC-fluorescence. Since the correlation coefficient met the criteria on the instrument HPLC-UV and these compounds were not detected in the sample, no action is applied on this basis.

## BLANKS

### Volatiles (BTEX)

Method blank (VBLKD1) contained common contaminants methylene chloride and acetone and two unknown Tentatively Identified Compounds (TICs). These compounds were not part of the target list; therefore, no action is taken on this basis.

### Semivolatiles

Method blank (SBLKE1) contained common contaminant di-n-butyl-phthalate. This compound was not detected in the associated sample; therefore, no action is required. This blank also contained ten unknown TICs. All associated TIC sample results at levels less than 5X the blank concentrations are considered to be laboratory artifacts.

## SYSTEM MONITORING COMPOUNDS SURROGATE RECOVERIES

### Volatiles (TCL)

The following surrogate recoveries were below the QC limits in the sample analyses:

| SAMPLE | SURROGATE | RECOVERY |
|---|---|---|
| 3319-01 MSD | Bromofluorobenzene | 116 |
| | 1,2-Dichloroethane-$d_4$ | 118 |

This QC sample was also analyzed at the matrix spike, without surrogate outliers. All sample results in the MSD analysis are considered estimated.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### Semivolatiles

This MS/MSD associated with these samples is from ARDL ID No.: 115083. No qualification is applied based on these MS/MSD analyses.

Polynuclear Aromatic Hydrocarbons

Twelve out of thirty-two MS/MSD recoveries and five RPD results were outside the QC limits in the analyses of 3319-02 MS/MSD. Most of these compounds were not detected in the unspiked sample and since no action is required based on MS/MSD outliers, no qualification is applied on this basis.

## FIELD DUPLICATE PRECISION

General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## INTERNAL STANDARD PERFORMANCE

Volatiles (TCL)

All internal standard (IS) areas were below the control limits for the 3319-01 MSD analysis. This sample was also analyzed as the MS without internal standard outliers. The MSD analysis results are considered estimated due to these IS outliers.

## COMPOUND QUANTITATIONS

Polynuclear Aromatic Hydrocarbons

Sample 3319-02 was reanalyzed at a 10-fold dilution because the level of naphthalene exceeded the calibration range in the original analysis. The diluted result is reported for this compound and is identified with an "*" on the data summary.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

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# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Polynuclear Aromatic Hydrocarbon Analyses – Data Validation Summary
(SW846, Method 8310)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-02 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1.0/10.0 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Naphthalene | 10 U | 45 * |
| Acenaphthylene | 10 U | 10 U |
| Acenaphthene | 18 U | 18 U |
| Fluorene | 2.1 U | 2.1 U |
| Phenanthrene | 6.4 U | 6.4 U |
| Anthracene | 6.6 U | 6.6 U |
| Fluoranthene | 2.1 U | 1 J |
| Pyrene | 2.7 U | 2.7 U |
| Benzo(a)anthracene | 1.5 U | 1.5 U |
| Chrysene | 0.13 U | 2.4 |
| Benzo(b)fluoranthene | 0.18 U | 0.18 U |
| Benzo(k)fluoranthene | 0.17 U | 0.17 U |
| Benzo(a)pyrene | 0.23 U | 0.23 U |
| Dibenzo(a,h)anthracene | 0.3 U | 0.3 U |
| Benzo(g,h,i)perylene | 0.76 U | 0.76 U |
| Indeno(1,2,3-cd)pyrene | 0.43 U | 0.43 U |

ROY F. WESTON, INC.
Volatile Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-01 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Chloromethane | 10 | 10 U |
| Bromomethane | 10 | 10 U |
| Vinyl Chloride | 10 | 10 U |
| Chloroethane | 10 | 10 U |
| Methylene Chloride | 10 | 10 UJ |
| Acetone | 10 | 10 U |
| Carbon Disulfide | 10 | 10 U |
| 1,1-Dichloroethene | 10 | 10 U |
| 1,1-Dichloroethane | 10 | 10 U |
| 1,2-Dichloroethene(total) | 10 | 10 U |
| Chloroform | 10 | 10 U |
| 1,2-Dichloroethane | 10 | 10 U |
| 2-Butanone | 10 | 10 U |
| 1,1,1-Trichloroethane | 10 | 10 U |
| Carbon Tetrachloride | 10 | 10 U |
| Bromodichloromethane | 10 | 10 U |
| 1,2-Dichloropropane | 10 | 10 U |
| cis-1,3-Dichloropropene | 10 | 10 U |
| Trichloroethene | 10 | 10 U |
| Dibromochloromethane | 10 | 10 U |
| 1,1,2-Trichloroethane | 10 | 10 U |
| Benzene | 10 | 10 U |
| trans-1,3-Dichloropropene | 10 | 10 U |
| Bromoform | 10 | 10 U |
| 4-Methyl-2-pentanone | 10 | 10 U |
| 2-Hexanone | 10 | 10 U |
| Tetrachloroethene | 10 | 10 U |
| Toluene | 10 | 10 U |
| 1,1,2,2-Tetrachloroethane | 10 | 10 U |
| Chlorobenzene | 10 | 10 U |
| Ethylbenzene | 10 | 10 U |
| Styrene | 10 | 10 U |
| Total Xylenes | 10 | 10 U |

ROY F. WESTON, INC.
BTEX Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-02 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 10 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | | |
|---|---|---|---|
| Benzene | 10 | 550 | J |
| Toluene | 10 | 360 | J |
| Ethylbenzene | 10 | 390 | J |
| Total Xylenes | 10 | 1200 | J |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-01 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Phenol | 10 | 10 U |
| Bis(2-chloroethyl)ether | 10 | 10 U |
| 2-Chlorophenol | 10 | 10 U |
| 1,3-Dichlorobenzene | 10 | 10 U |
| 1,4-Dichlorobenzene | 10 | 10 U |
| 1,2-Dichlorobenzene | 10 | 10 U |
| 2-Methylphenol | 10 | 10 U |
| 2,2'-Oxybis(1-chloropropane) | 10 | 10 U |
| 4-Methylphenol | 10 | 10 U |
| N-Nitroso-di-n-propylamine | 10 | 10 U |
| Hexachloroethane | 10 | 10 U |
| Nitrobenzene | 10 | 10 U |
| Isophorone | 10 | 10 U |
| 2-Nitrophenol | 10 | 10 U |
| 2,4-Dimethylphenol | 10 | 10 U |
| Bis(2-chloroethoxy)methane | 10 | 10 U |
| 2,4-Dichlorophenol | 10 | 10 U |
| 1,2,4-Trichlorobenzene | 10 | 10 U |
| Naphthalene | 10 | 10 U |
| 4-Chloroaniline | 10 | 10 UJ |
| Hexachlorobutadiene | 10 | 10 U |
| 4-Chloro-3-methylphenol | 10 | 10 U |
| 2-Methylnaphthalene | 10 | 10 U |
| Hexachlorocyclopentadiene | 10 | 10 U |
| 2,4,6-Trichlorophenol | 10 | 10 U |
| 2,4,5-Trichlorophenol | 25 | 25 U |
| 2-Chloronaphthalene | 10 | 10 U |
| 2-Nitroaniline | 25 | 25 U |
| Dimethylphthalate | 10 | 10 U |
| Acenaphthylene | 10 | 10 U |
| 2,6-Dinitrotoluene | 10 | 10 U |
| 3-Nitroaniline | 25 | 25 U |
| Acenaphthene | 10 | 10 U |
| 2,4-Dinitrophenol | 25 | 25 UJ |
| 4-Nitrophenol | 25 | 25 UJ |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115081 SDG NO.: 3319-01

| | |
|---|---|
| TRAFFIC REPORT SAMPLE NUMBER: | 3319-01 |
| MATRIX: | WATER |
| DILUTION FACTOR: | 1 |
| UNITS: | ug/L |

| COMPOUND | CRQL * | |
|---|---|---|
| Dibenzofuran | 10 | 10 U |
| 2,4-Dinitrotoluene | 10 | 10 U |
| Diethylphthalate | 10 | 10 U |
| 4-Chlorophenyl-phenylether | 10 | 10 U |
| Fluorene | 10 | 10 U |
| 4-Nitroaniline | 25 | 25 U |
| 4,6-Dinitro-2-methylphenol | 25 | 25 U |
| N-Nitrosodiphenylamine | 10 | 10 U |
| 4-Bromophenyl-phenylether | 10 | 10 U |
| Hexachlorobenzene | 10 | 10 U |
| Pentachlorophenol | 25 | 25 U |
| Phenanthrene | 10 | 10 U |
| Anthracene | 10 | 10 U |
| Carbazole | 10 | 10 U |
| Di-n-butylphthalate | 10 | 10 U |
| Fluoranthene | 10 | 10 U |
| Pyrene | 10 | 10 U |
| Butylbenzylphthalate | 10 | 10 U |
| 3,3'-Dichlorobenzidine | 10 | 10 U |
| Benzo(a)anthracene | 10 | 10 U |
| Chrysene | 10 | 10 U |
| Bis(2-ethylhexyl)phthalate | 10 | 10 U |
| Di-n-octylphthalate | 10 | 10 U |
| Benzo(b)fluoranthene | 10 | 10 U |
| Benzo(k)fluoranthene | 10 | 10 U |
| Benzo(a)pyrene | 10 | 10 U |
| Indeno(1,2,3-cd)pyrene | 10 | 10 U |
| Dibenz(a,h)anthracene | 10 | 10 U |
| Benzo(g,h,i)perylene | 10 | 10 U |

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MANAGERS DESIGNERS CONSULTANTS

END OF DATA VALIDATION REPORT

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# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115070 / SDG NO.: C-5-12

## REVIEW PERFORMED BY
## THE ANALYTICS DIVISION
## OF
## ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 03-01-94
Kelly Muir Spittler — Date
Unit Leader - Data Validation

VERIFIED BY: _____ — 3-8-94
Zohreh Hamid, Ph.D. — Date
Section Manager - Data Validation

**GEOSYNTEC CONSULTANTS**
**ORGANIC ANALYSES**
**ARDL ID NO.: 115070 / SDG NO.: C-5-12**

## OVERVIEW

This review consists of six soil samples collected on 11-11-93 and received by ARDL, Inc. on 11-12-93. These analyses were performed according to the criteria set forth in USEPA SOW (OLM01.8) for BTEX (benzene, toluene, ethylbenzene, xylene) target compounds and SW846 Method 8310 for Polynuclear Aromatic Hydrocarbons. The samples contained in this review are listed below:

| | |
|---|---|
| C-5-12 | G04-15 |
| G04-SURFACE | C6-5 |
| G04-5 | C7-6 |

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

- Data Completeness
- * Technical Holding Time
- * GC/MS Instrument Performance Check
- Calibration (Initial and Continuing)
- * Blanks
- System Monitoring Compound and Surrogate Recoveries
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Precision
- Internal Standard Performance
- * Pesticide Instrument Performance
- * Compound Identification
- * Compound Quantitations

* All criteria were met for this classification; therefore a narrative section is not provided.

## DATA COMPLETENESS

Volatiles (BTEX)

The library search for the ethylbenzene positive result was not found in the volatiles data package for sample C-5-12RE. This document should be resubmitted by the laboratory.

## CALIBRATION

Volatiles (BTEX)

Up to three compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. These compounds were not included in the analyte list; therefore, no qualification is necessary.

Polynuclear Aromatic Hydrocarbons

The correlation coefficents for acenaphthene, fluorene, and anthracene were less than "r≥0.995" on the instrument HPLC-fluorescence. The correlation coefficient met the criteria on instrument HPLC-UV. Anthracene was detected in sample G04-SURFACE, this result may be biased; therefore, it is considered estimated. No other positive results were detected for these compounds.

## SYSTEM MONITORING COMPOUND AND SURROGATE RECOVERIES

Volatiles (BTEX)

The following surrogate recoveries were outside the QC limits in the sample analyses:

| SAMPLE | SURROGATE | RECOVERY |
|---|---|---|
| C-5-12 | Bromofluorobenzene | 119 |
| G04-SURFACE | Toluene-$d_8$ | 130 |
| G04-SURFACE MS | Toluene-$d_8$ | 118 |
| G04-SURFACE MSD | Toluene-$d_8$ | 129 |

| SAMPLE | SURROGATE | RECOVERY |
|---|---|---|
| G04-15 | Toluene-$d_8$ | 31 |
| | Bromofluorobenzene | 49 |
| C7-6 RE | 1,2-Dichloroethane | 126 |

All samples listed above were reanalyzed, except for G04-SURFACE, which was also analyzed as the MS/MSD. The reanalyses are to be used for samples C-5-12RE and G04-15RE and the original analysis is reported for C7-6. No qualification is required since these reported analyses did not have surrogate outliers. All sample data for G04-SURFACE are qualified estimated due to the surrogate outliers.

Polynuclear Aromatic Hydrocarbons

The following surrogate recoveries were outside the established QC limits of 33-78%:

| SAMPLE | SURROGATE | RECOVERY |
|---|---|---|
| G04-SURFACE | 9-Phenylanthracene | 83 |
| G04-15 | 9-Phenylanthracene | 118 |

Sample results may be biased; therefore, all positive results and non-detects are qualified estimated.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Polynuclear Aromatic Hydrocarbons

Twenty-six out of thirty-two MS/MSD recoveries and twelve RPD results were outside the QC limits. These compounds were not detected in the unspiked sample, and since no action is required based on MS/MSD data alone, no qualification has been applied on this basis.

## FIELD DUPLICATE PRECISION

General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## INTERNAL STANDARD PERFORMANCE

Volatiles (BTEX)

The following internal standard (IS) areas were below the control limits in the sample analyses:

| SAMPLE | INTERNAL STANDARD |
|---|---|
| G04-SURFACE | Chlorobenzene-$d_5$ |
| G04-SURFACE MSD | 1,4-Difluorobenzene<br>Chlorobenzene-$d_5$ |
| G04-15 | Chlorobenzene-$d_5$ |
| C7-6 | All Standards |
| C7-6 RE | All Standards |

Samples G04-SURFACE and C7-6 are exhibiting matrix effects. The original analyses are to be used as the representative results; however, all sample data quantified in reference to the outliers are qualified estimated. Sample G04-15 was reanalyzed without IS outliers, the positive results in the reanalysis are less than 25X those detected in the original analysis. The reanalysis is reported as the representative results; however, the end-user should be aware that the sample results may be biased low.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Polynuclear Aromatic Hydrocarbon Analyses – Data Validation Summary
(SW846, Method 8310)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070 SDG NO.: C–5–12

| TRAFFIC REPORT SAMPLE NUMBER: | | C–5–12 | G04–SURFACE | G04–5 | G04–15 | C6–5 | C7–6 |
|---|---|---|---|---|---|---|---|
| MATRIX: | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| UNITS: | | ug/Kg | ug/Kg | ug/Kg | ug/Kg | ug/Kg | ug/Kg |
| COMPOUND | CRQL * | | | | | | |
| Naphthalene | 25 U | 29 U | 31 UJ | 30 U | 29 UJ | 29 U | 30 U |
| Acenaphthylene | 25 U | 29 U | 31 UJ | 30 U | 40 J | 29 U | 30 U |
| Acenaphthene | 25 U | 29 U | 31 UJ | 30 U | 29 UJ | 29 U | 30 U |
| Fluorene | 25 U | 29 U | 31 UJ | 30 U | 29 UJ | 29 U | 30 U |
| Phenanthrene | 25 U | 29 U | 160 J | 30 U | 29 UJ | 29 U | 30 U |
| Anthracene | 25 U | 29 U | 39 J | 30 U | 29 UJ | 29 U | 30 U |
| Fluoranthene | 25 U | 29 U | 200 J | 30 U | 49 J | 29 U | 30 U |
| Pyrene | 25 U | 29 U | 130 J | 30 U | 42 J | 29 U | 30 U |
| Benzo(a)anthracene | 5 U | 5.7 U | 79 J | 6 U | 5.7 UJ | 5.9 U | 6.1 U |
| Chrysene | 25 U | 29 U | 21 J | 30 U | 29 UJ | 29 U | 30 U |
| Benzo(b)fluoranthene | 8 U | 9.2 U | 100 J | 9.6 U | 9.2 UJ | 9.4 U | 9.8 U |
| Benzo(k)fluoranthene | 8 U | 9.2 U | 55 J | 9.6 U | 9.2 UJ | 9.4 U | 9.8 U |
| Benzo(a)pyrene | 10 U | 11 U | 110 J | 12 U | 11 UJ | 12 U | 12 U |
| Dibenzo(a,h)anthracene | 15 U | 17 U | 120 J | 18 U | 17 UJ | 18 U | 18 U |
| Benzo(g,h,i)perylene | 35 U | 40 U | 44 UJ | 42 U | 40 UJ | 41 U | 43 U |
| Indeno(1,2,3–cd)pyrene | 20 U | 23 U | 25 UJ | 24 U | 23 UJ | 24 U | 24 U |

ROY F. WESTON, INC.
Volatile Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115070 SDG NO.: C-5-12

| TRAFFIC REPORT SAMPLE NUMBER: | | C-5-12RE | G04-SURFACE | G04-5 | G04-15RE | C6-5 | C7-6 |
|---|---|---|---|---|---|---|---|
| MATRIX: | | SOIL | SOIL | SOIL | SOIL | SOIL | SOIL |
| DILUTION FACTOR: | | 1 | 1 | 1 | 1 | 1 | 1 |
| UNITS: | | ug/KG | ug/KG | ug/KG | ug/KG | ug/KG | ug/KG |
| COMPOUND | CRQL * | | | | | | |
| Benzene | 10 | 11 U | 12 UJ | 12 U | 11 U | 12 U | 12 UJ |
| Toluene | 10 | 11 U | 12 UJ | 12 U | 11 U | 12 U | 12 UJ |
| Ethylbenzene | 10 | 6 J | 6 J | 12 U | 5 J | 12 U | 12 UJ |
| Total Xylenes | 10 | 14 | 4 J | 12 U | 11 J | 12 U | 12 UJ |

WESTON
MANAGERS DESIGNERS/CONSULTANTS

END OF DATA VALIDATION REPORT

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

# ORGANIC QUALITY ASSURANCE REVIEW
# GEOSYNTEC CONSULTANTS
# ARDL ID NO.: 115063 / SDG NO.: C-10-7

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 03-01-94
Kelly Muir Spittler — Date
Unit Leader - Data Validation

VERIFIED BY: _____ 3-7-94
Zohreh Hamid, Ph.D. — Date
Section Manager - Data Validation

**GEOSYNTEC CONSULTANTS**
**TCL ORGANIC ANALYSES**
**ARDL ID NO.: 115063 / SDG NO.: C-10-7**

## OVERVIEW

This review consists of two soil samples collected on 11-10-93 and received by ARDL, Inc. on 11-11-93. These analyses were performed according to the criteria set forth in USEPA SOW (OLM01.8) for TCL Volatile, Semivolatile, and Pesticide/PCB target compounds. The samples contained in this review are listed below:

C-10-SURFACE

C-10-7

The validation was performed according to guidelines set forth in the USEPA National Functional Guidelines for Organic Data Review. The data were evaluated based on the following parameters:

- Data Completeness
- Technical Holding Time
- * GC/MS Instrument Performance Check
- Calibration (Initial and Continuing)
- Blanks
- System Monitoring Compound and Surrogate Recoveries
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Precision
- * Internal Standard Performance
- * Pesticide Instrument Performance
- * Compound Identification
- Compound Quantitations

* All criteria were met for this classification; therefore a narrative section is not provided.

## DATA COMPLETENESS

Pesticide/PCBs

The quantitation report was missing from the data package for INDBH80 analyzed on the RTX-1701 column at 12-01-93/02:24. The laboratory should resubmit this document.

## TECHNICAL HOLDING TIME

Pesticide/PCBs

Sample C-10-SURFACE was extracted 19 days outside of the technical holding time. As per the laboratory case narrative, these results are actually a reanalysis. Due to the exceeded holding time, all positive results and non-detects in this analysis are qualified estimated, "J and UJ".

## CALIBRATION

Volatiles

Up to three compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limits in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Semivolatiles

Up to two compounds had %RSDs and/or %Ds exceed the 30% and 25% QC limit in the initial and continuing calibrations, respectively. All associated positive results and non-detects are qualified estimated, "J and UJ".

Pesticide/PCBs

The %RSDs for alpha-BHC, 4,4-DDE (RTX-5/11-30-93), alpha-BHC (RTX-1701/11-30-93), 4,4-DDE (RTX-5/12-07-93), alpha-BHC, 4,4-DDT (RTX-1701/12-07-93) and delta-BHC (RTX1701/10-15-93) were above the 20% QC limit in the initial calibrations. Since these compounds were not detected in the samples, no action has been taken.

## BLANKS

### Volatiles

The method blank contained common contaminants methylene chloride and acetone at levels less than the CRQL. All associated positive results less than 10X the blank levels are believed to be artifacts of laboratory contamination. The acetone result in sample C-10-7 was elevated to the CRQL and was flagged "U". This blank also contained one unknown Tentatively Identified Compound (TIC). Associated TIC sample results at levels less than 5X the blank concentrations are believed to be artifacts of laboratory contamination.

### Semivolatiles

The method blank contained four unknown TICs. The associated TIC sample results less than 5X the blank levels, are believed to be artifacts of laboratory contamination.

### Pesticide/PCBs

Method blank PBLK65 contained target compound dieldrin (3.5 ug/kg) at a level above the CRQL. Similar peaks were detected on both columns in the associated sample C-10-SURFACE; however, the laboratory did not report a positive result for dieldrin in this sample. All sample results are qualified due to the exceeded holding time in this sample; therefore, no additional qualification has been applied.

## SURROGATE RECOVERIES

### Pesticide/PCBs

The following surrogate recoveries were below the QC limits in the sample analyses:

| SAMPLE | SURROGATE | COLUMN | RECOVERY |
|---|---|---|---|
| C-10-SURFACE | TCX | RTX-1701 | 59 |
| | DCB | RTX-5 | 59 |

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Since only one surrogate recovery was outside the QC limits on each column, no action is required based on these outliers.

## MATRIX SPIKE/MATRIX SPIKE DUPLICATE

### Volatiles

The MS/MSD analyses associated with this batch are G104-SURFACE MS/MSD reported in the ARDL report number 115070. No action is taken on this batch of samples based on the MS/MSD results.

### Semivolatiles

The MS recovery for 4-nitrophenol (116%) exceeded the QC limit of 114% in the analysis of C-10-SURFACE MSD. This compound was not detected in the unspiked sample and since no action is required based on MS/MSD data alone, no qualification has been applied based on this outlier.

## FIELD DUPLICATE PRECISION

### General

A field duplicate analysis was not identified for this batch of samples. The sample data are not adversely affected due to the lack of this field QC sample.

## COMPOUND QUANTITATION

The %D between column values exceeded 25% for the positive arochlor-1254 results in both samples. Therefore, these positive results are qualified estimated.

## INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

## ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

# ATTACHMENT I
# GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

# GLOSSARY OF DATA QUALIFIERS

## CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

## CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

## OTHER CODES

Q = NO ANALYTICAL RESULT.

# ATTACHMENT II
# SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063 SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | | C-10-SURFACE | C-10-7 |
|---|---|---|---|
| MATRIX: | | SOIL | SOIL |
| DILUTION FACTOR: | | 1 | 1.0 |
| UNITS: | | ug/KG | ug/KG |
| COMPOUND | CRQL * | | |
| Dibenzofuran | 330 | 400 U | 400 U |
| 2,4-Dinitrotoluene | 330 | 400 U | 400 U |
| Diethylphthalate | 330 | 400 U | 400 U |
| 4-Chlorophenyl-phenylether | 330 | 400 U | 400 U |
| Fluorene | 330 | 400 U | 400 U |
| 4-Nitroaniline | 800 | 980 U | 980 U |
| 4,6-Dinitro-2-methylphenol | 800 | 980 U | 980 U |
| N-Nitrosodiphenylamine | 330 | 400 U | 400 U |
| 4-Bromophenyl-phenylether | 330 | 400 U | 400 U |
| Hexachlorobenzene | 330 | 400 U | 400 U |
| Pentachlorophenol | 800 | 980 U | 980 U |
| Phenanthrene | 330 | 400 U | 400 U |
| Anthracene | 330 | 400 U | 400 U |
| Carbazole | 330 | 400 U | 400 U |
| Di-n-butylphthalate | 330 | 71 J | 97 J |
| Fluoranthene | 330 | 39 J | 400 U |
| Pyrene | 330 | 46 J | 400 U |
| Butylbenzylphthalate | 330 | 400 U | 400 U |
| 3,3'-Dichlorobenzidine | 330 | 400 U | 400 U |
| Benzo(a)anthracene | 330 | 400 U | 400 U |
| Chrysene | 330 | 400 U | 400 U |
| Bis(2-ethylhexyl)phthalate | 330 | 230 J | 58 J |
| Di-n-octylphthalate | 330 | 400 U | 400 U |
| Benzo(b)fluoranthene | 330 | 41 J | 400 U |
| Benzo(k)fluoranthene | 330 | 35 J | 400 U |
| Benzo(a)pyrene | 330 | 400 U | 400 U |
| Indeno(1,2,3-cd)pyrene | 330 | 400 U | 400 U |
| Dibenz(a,h)anthracene | 330 | 400 U | 400 U |
| Benzo(g,h,i)perylene | 330 | 400 U | 400 U |

ROY F. WESTON, INC.
Volatile Analyses – Data Validation Summary
(SOW:OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063 SDG NO.: C–10–7

| TRAFFIC REPORT SAMPLE NUMBER: | | C–10–SURFACE | C–10–7 |
|---|---|---|---|
| MATRIX: | | SOIL | SOIL |
| DILUTION FACTOR: | | 1 | 1 |
| UNITS: | | ug/KG | ug/KG |
| COMPOUND | CRQL * | | |
| Chloromethane | 10 | 12 UJ | 12 UJ |
| Bromomethane | 10 | 12 UJ | 12 UJ |
| Vinyl Chloride | 10 | 12 U | 12 U |
| Chloroethane | 10 | 12 U | 12 U |
| Methylene Chloride | 10 | 12 U | 12 U |
| Acetone | 10 | 12 UJ | 12 UJ |
| Carbon Disulfide | 10 | 12 U | 12 U |
| 1,1–Dichloroethene | 10 | 12 U | 12 U |
| 1,1–Dichloroethane | 10 | 12 U | 12 U |
| 1,2–Dichloroethene(total) | 10 | 12 U | 12 U |
| Chloroform | 10 | 12 U | 12 U |
| 1,2–Dichloroethane | 10 | 12 U | 12 U |
| 2–Butanone | 10 | 12 UJ | 12 UJ |
| 1,1,1–Trichloroethane | 10 | 12 U | 12 U |
| Carbon Tetrachloride | 10 | 12 U | 12 U |
| Bromodichloromethane | 10 | 12 U | 12 U |
| 1,2–Dichloropropane | 10 | 12 U | 12 U |
| cis–1,3–Dichloropropene | 10 | 12 U | 12 U |
| Trichloroethene | 10 | 12 U | 12 U |
| Dibromochloromethane | 10 | 12 U | 12 U |
| 1,1,2–Trichloroethane | 10 | 12 U | 12 U |
| Benzene | 10 | 12 U | 12 U |
| trans–1,3–Dichloropropene | 10 | 12 U | 12 U |
| Bromoform | 10 | 12 UJ | 12 UJ |
| 4–Methyl–2–pentanone | 10 | 12 U | 12 U |
| 2–Hexanone | 10 | 12 UJ | 12 UJ |
| Tetrachloroethene | 10 | 12 U | 12 U |
| Toluene | 10 | 12 U | 12 U |
| 1,1,2,2–Tetrachloroethane | 10 | 12 U | 12 U |
| Chlorobenzene | 10 | 12 U | 12 U |
| Ethylbenzene | 10 | 12 U | 12 U |
| Styrene | 10 | 12 U | 12 U |
| Total Xylenes | 10 | 12 U | 12 U |

ROY F. WESTON, INC.
Semivolatile Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063 SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | | C-10-SURFACE | C-10-7 |
|---|---|---|---|
| MATRIX: | | SOIL | SOIL |
| DILUTION FACTOR: | | 1 | 1.0 |
| UNITS: | | ug/KG | ug/KG |
| COMPOUND | CRQL * | | |
| Phenol | 330 | 400 U | 400 U |
| Bis(2-chloroethyl)ether | 330 | 400 U | 400 U |
| 2-Chlorophenol | 330 | 400 U | 400 U |
| 1,3-Dichlorobenzene | 330 | 400 U | 400 U |
| 1,4-Dichlorobenzene | 330 | 400 U | 400 U |
| 1,2-Dichlorobenzene | 330 | 400 U | 400 U |
| 2-Methylphenol | 330 | 400 U | 400 U |
| 2,2'-Oxybis(1-chloropropane) | 330 | 400 U | 400 U |
| 4-Methylphenol | 330 | 400 U | 400 U |
| N-Nitroso-di-n-propylamine | 330 | 400 U | 400 U |
| Hexachloroethane | 330 | 400 U | 400 U |
| Nitrobenzene | 330 | 400 U | 400 U |
| Isophorone | 330 | 400 U | 400 U |
| 2-Nitrophenol | 330 | 400 U | 400 U |
| 2,4-Dimethylphenol | 330 | 400 U | 400 U |
| Bis(2-chloroethoxy)methane | 330 | 400 U | 400 U |
| 2,4-Dichlorophenol | 330 | 400 U | 400 U |
| 1,2,4-Trichlorobenzene | 330 | 400 U | 400 U |
| Naphthalene | 330 | 400 U | 400 U |
| 4-Chloroaniline | 330 | 400 UJ | 400 UJ |
| Hexachlorobutadiene | 330 | 400 U | 400 U |
| 4-Chloro-3-methylphenol | 330 | 400 U | 400 U |
| 2-Methylnaphthalene | 330 | 400 U | 400 U |
| Hexachlorocyclopentadiene | 330 | 400 U | 400 U |
| 2,4,6-Trichlorophenol | 330 | 400 U | 400 U |
| 2,4,5-Trichlorophenol | 800 | 980 U | 980 U |
| 2-Chloronaphthalene | 330 | 400 U | 400 U |
| 2-Nitroaniline | 800 | 980 U | 980 U |
| Dimethylphthalate | 330 | 400 U | 400 U |
| Acenaphthylene | 330 | 400 U | 400 U |
| 2,6-Dinitrotoluene | 330 | 400 U | 400 U |
| 3-Nitroaniline | 800 | 980 U | 980 U |
| Acenaphthene | 330 | 400 U | 400 U |
| 2,4-Dinitrophenol | 800 | 980 UJ | 980 UJ |
| 4-Nitrophenol | 800 | 980 UJ | 980 UJ |

ROY F. WESTON, INC.
Pesticide/PCB Analyses – Data Validation Summary
(SOW: OLM01.8)

CLIENT: GEOSYNTEC CONSULTANTS
ARDL REPORT NO.: 115063 SDG NO.: C-10-7

| TRAFFIC REPORT SAMPLE NUMBER: | | C-10-SURFACE | C-10-7 |
|---|---|---|---|
| MATRIX: | | SOIL | SOIL |
| DILUTION FACTOR: | | 1.0 | 1.0 |
| UNITS: | | ug/KG | ug/KG |
| COMPOUND | CRQL | | |
| alpha-BHC | 1.7 | 2.1 UJ | 2.1 U |
| beta-BHC | 1.7 | 2.1 UJ | 2.1 U |
| delta-BHC | 1.7 | 2.1 UJ | 2.1 U |
| gamma-BHC(Lindane) | 1.7 | 2.1 UJ | 2.1 U |
| Heptachlor | 1.7 | 2.1 UJ | 2.1 U |
| Aldrin | 1.7 | 2.1 UJ | 2.1 U |
| Heptachlor Epoxide | 1.7 | 2.1 UJ | 2.1 U |
| Endosulfan I | 1.7 | 2.1 UJ | 2.1 U |
| Dieldrin | 3.3 | 4.0 UJ | 4.0 U |
| 4,4'-DDE | 3.3 | 4.0 UJ | 4.0 U |
| Endrin | 3.3 | 4.0 UJ | 4.0 U |
| Endosulfan II | 3.3 | 4.0 UJ | 4.0 U |
| 4,4'-DDD | 3.3 | 4.0 UJ | 4.0 U |
| Endosulfan Sulfate | 3.3 | 4.0 UJ | 4.0 U |
| 4,4'-DDT | 3.3 | 4.0 UJ | 4.0 U |
| Methoxychlor | 17.0 | 21 UJ | 21 U |
| Endrin Ketone | 3.3 | 4.0 UJ | 4.0 U |
| Endrin Aldehyde | 3.3 | 4.0 UJ | 4.0 U |
| alpha-Chlordane | 1.7 | 2.1 UJ | 2.1 U |
| gamma-Chlordane | 1.7 | 2.1 UJ | 2.1 U |
| Toxaphene | 170.0 | 210 UJ | 210 U |
| Aroclor-1016 | 33.0 | 40 UJ | 40 U |
| Aroclor-1221 | 67.0 | 82 UJ | 82 U |
| Aroclor-1232 | 33.0 | 40 UJ | 40 U |
| Aroclor-1242 | 33.0 | 40 UJ | 40 U |
| Aroclor-1248 | 33.0 | 40 UJ | 40 U |
| Aroclor-1254 | 33.0 | 120 J | 11 J |
| Aroclor-1260 | 33.0 | 40 UJ | 40 U |

END OF DATA VALIDATION REPORT

# QUALITY ASSURANCE PLAN

NET Midwest, Inc. - Rockford Division
3548 35th Street
Rockford, Illinois 61109

Approved by:

Brian Wanner
Division Manager

Mary Pearson
Quality Assurance
Coordinator

Deborah Bass
Regional Quality
Assurance Manager

This is copy No. 79 of 100 copies.

Specific project plans may vary.

All information contained in this manual is property
of NET Midwest, Inc. and is subject to revision.

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**9. Data Reduction, Validation and Reporting**

9.1. Data Reduction
9.2. Data Validation
9.3. Data Reporting
9.4. Quality Control Summaries

**10. Performance and System Audits**

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10.2. System Audits
10.3. Corrective Action Reports

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## SECTION 3. QUALITY ASSURANCE PLAN DESCRIPTION

National Environmental Testing, Inc. (NET) goal is to be the leader in Environmental Services, achieved in part, through its quality assurance plan. The following sections describe various laboratory operations and our efforts to assure the highest quality in each area. Each operation is critical for the success of our lab. Section 5, Quality Assurance Objectives, is the cornerstone of this document in its description of internal quality control checks, frequency and corrective action.

The following important information is included in the laboratory's Statement of Qualifications and will not be found in this Quality Assurance Plan:

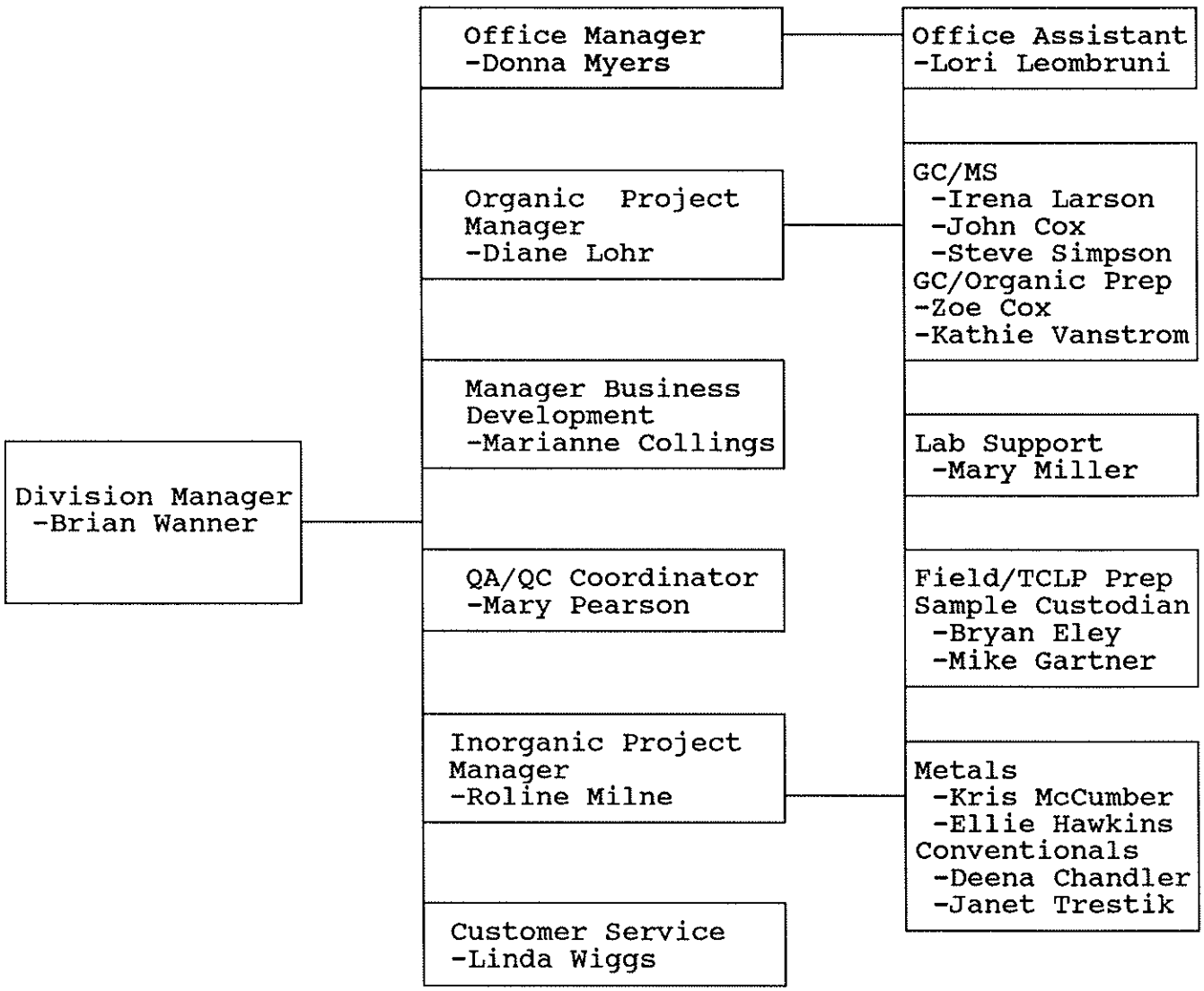
- Instrumentation List
- Methodology List
- Reporting Limits
- Resumes of Key Personnel
- Federal, State and Local Certifications

## SECTION 4. ORGANIZATION - LABORATORY, REGIONAL AND CORPORATE

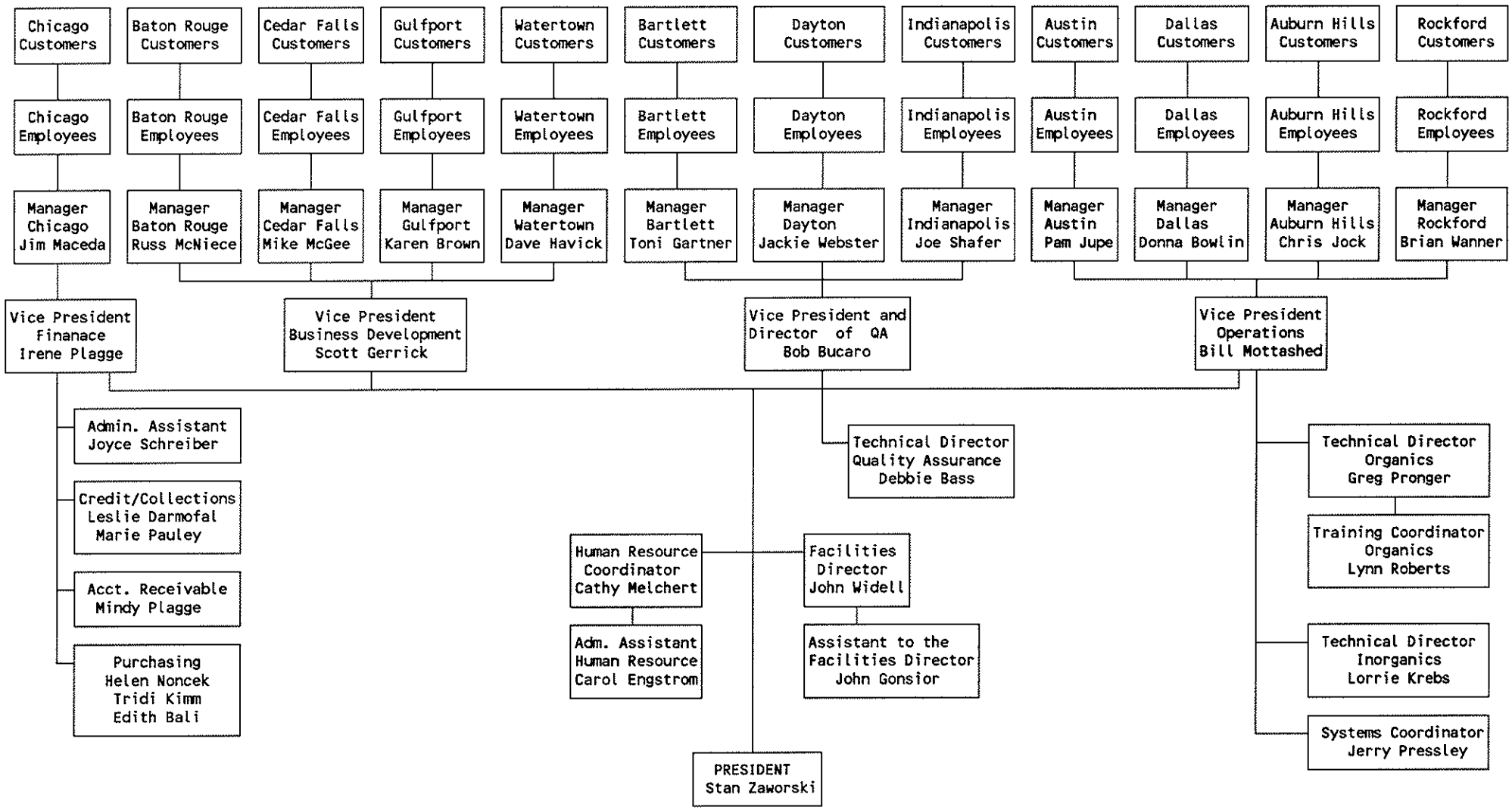
Organizational charts:

NET Midwest, Inc. - Rockford Division
NET Gulf Coast/Midwest Regional
NET Corporate

**ROCKFORD DIVISION**
**ORGANIZATIONAL CHART**



Gulf Coast/Midwest Group
Organizational Structure



# National Environmental Testing, Inc.
## Organizational Chart

**NET Corporate**
Cherry Hill, NJ
Graham Russell, President

**NET Corporate Staff**
Barbara Askinas, VP-Hum. Res.
Chris Mallios, VP-Finance
Steve Smith, VP-Corp. Devel.
Al Tordini, VP-Quality
Marilyn Melton, Data Quality
Jean O'Neill, Health/Safety

**NET Systems Group**
Dave Lloyd, Director

**NET Atlantic**
Thorofare, NJ
Keith Hausknecht, General Manager

- Cambridge, MA — Deborah McGrath, Division Manager
- Syracuse, NY — Rich Balamut, Division Manager
- Thorofare, NJ — Bob Maxfield, Division Manager

**NET Gulf Coast/Midwest**
Bartlett, IL
Stan Zaworski, General Manager

- Auburn Hills, MI — Chris Jock, Division Manager
- Austin, TX — Pam Jupe, Division Manager
- Bartlett, IL — Toni Gartner, Division Manager
- Baton Rouge, LA — Russell McNiece, Division Manager
- Cedar Falls, IA — Mike McGee, Division Manager
- Chicago, IL — Jim Maceda, Division Manager
- Dallas, TX — Donna Bowlin, Division Manager
- Dayton, OH — Jackie Webster, Division Manager
- Gulfport, MS — Karen Brown, Division Manager
- Indianapolis, IN — Joe Shafer, Division Manager
- Rockford, IL — Brian Wanner, Division Manager
- Watertown, WI — Dave Havick, Division Manager

**NET Pacific**
San Bruno, CA
Dick Swenson, General Manager

- Burbank, CA — Greg Anderson, Division Manager
- Pleasanton, CA * — Troy Mikell, Division Manager
- Portland, OR — Kent Patton, Division Manager
- San Diego, CA — Joe Arlauskas, Division Manager
- Santa Rosa, CA — Jules Skamarack, Division Manager

* mobile lab

**NET ATLANTIC, INC.**

100 Grove Road, Thorofare, NJ 08086 (609) 848-2255

**Laboratory Operations:**

| | | |
|---|---|---|
| Cambridge Division/MA<br>Phone: (617) 232-2207 | Syracuse Division/NY<br>Phone: (315) 446-8795 | Thorofare Division/NJ<br>Phone: (609) 848-3939 |

**NET PACIFIC, INC.**

435 Tesconi Circle, Santa Rosa, CA 95401 (707) 526-7200

**Laboratory Operations:**

| | | |
|---|---|---|
| Burbank Division/CA<br>Phone: (213) 849-6591 | Santa Rosa Division/CA<br>Phone: (707) 526-7200 | Pleasanton/CA (Sales)<br>Phone: (415) 462-4004 |

**NET MIDWEST/GULF COAST, INC.**

850 West Bartlett Road, Bartlett, IL 60103 (708) 289-7333

**Laboratory Operations:**

| | | |
|---|---|---|
| Austin Division/TX<br>Phone: (512) 928-8905 | Auburn Hills Division/MI<br>Phone: (313) 391-2050 | Bartlett Division/IL<br>Phone: (708) 289-3100 |
| Baton Rouge Division/LA<br>Phone: (504) 293-1085 | Cedar Falls Division/IA<br>Phone: (319) 277-2401 | Chicago Division/IL<br>Phone: (312) 666-4469 |
| Dallas Division/TX<br>Phone: (214) 406-8100 | Dayton Division/OH<br>Phone: (513) 294-6856 | Gulfport Division/MS<br>Phone: (601) 863-3036 |
| Houston/TX (Sales)<br>Phone: (713) 681-5496 | Indianapolis Division/IN<br>Phone: (317) 842-4261 | Rockford Division/IL<br>Phone: (815) 874-2171 |
| Watertown Division/WI<br>Phone: (414) 261-1660 | | |

# SECTION 5. QUALITY ASSURANCE OBJECTIVES

5.1. Introduction

5.2. Level of QA Efforts
5.2.1. Accuracy and Precision
5.2.2. Completeness
5.2.3. Representativeness
5.2.4. Comparability
5.2.5. Performance Evaluation Samples
5.2.6. Quality Control Charts

5.3. Method Detection Limits, Limits of Quantitation and Reporting Limits

5.4. Method of Standard Additions

5.5. References

## 5.1. INTRODUCTION

The Quality Assurance Objective of NET, Inc. is to be the leader in providing analytical data of known, high quality.

In general, each method specifies the use and frequency of blanks, standards and spike samples.

Inorganic Quality Control (QC) Indicators are outlined in Table 5.1. A suggested analytical sequence is outlined in Table 5.2. Corrective action for outlying QC Indicators is addressed in Table 5.3.

Organic Quality Control (QC) Indicators are outlined in Tables 5.4. and 5.7. A suggested analytical sequence is outlined in both Tables 5.5. and 5.8. Corrective action for outlying QC Indicators is addressed in Tables 5.6. and 5.9.

As stated, the objective of the NET Quality Assurance Program is to provide data of known, high quality. To accomplish this, NET will:

- Maintain an effective, ongoing QA/QC program that measures and verifies laboratory performance.
- Provide sufficient flexibility to allow controlled changes in routine methodology to meet project specific data requirements.
- Recognize, as soon as possible, and provide corrective action for any factors which adversely affect quality.
- Monitor operational performance of the laboratory on a routine basis and provide corrective action as needed.
- Maintain complete records of chain of custody, raw data, laboratory performance, and completed analyses to support reported data.

## 5.2 LEVEL OF QA EFFORTS

### 5.2.1. Accuracy and Precision

Accuracy is a measure of the degree of agreement between an analyzed value and the true or expected reference value. Accuracy is usually expressed as Percent Recovery (%R).

Precision is a measure of the mutual agreement among individual measurements of the same parameter under similar conditions. Precision is usually measured as Relative Percent Difference (RPD).

An accurate archer will hit the bull's eye with an arrow. A precise archer may not hit the bull's eye, but will group the arrows, landing them in the same area of the target. An accurate and precise archer, provided with a good bow and high quality arrows, will land all of the arrows on the bull's eye.

Excellent Precision + Excellent Accuracy + The Highest Quality Stock Solutions = The Highest Quality of Data.

Accuracy and Precision, in the laboratory are assessed by the regular analysis of standard, spike, and duplicate samples.

### 5.2.2. Completeness

Completeness is the measure of the amount of valid data obtained from the analytical measurement system. It is defined as the total number of samples taken for which acceptable analytical data is generated, divided by the total number of samples collected, multiplied by 100.

$$\text{Completeness} = \frac{\text{Number of Samples w/ Acceptable Data}}{\text{Number of Samples Collected}} \times 100$$

Every attempt will be made to generate completely valid data. However, it is recognized that some samples may be invalidated in the laboratory and that some results may be deemed questionable based on internal QC results.

5.2.3. Representativeness

Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the sample. Sample handling protocols (ie: storage, preservation and transportation) been developed to preserve the representativeness of the collected samples. Proper demonstration will establish that the protocols have been followed and sample identification and integrity have been assured. Every attempt will be made to ensure that the aliquots taken for analyses are representative of the samples received.

5.2.4. Comparability

The generation of comparable data is the goal of any analytical program. This characteristic implies strict adherence to published analytical protocols and use of standard reporting units. NET's QA/QC program is structured to ensure adherence to the proper analytical protocols and to fully document these procedures. The QA objective is that all data resulting from these analyses be comparable with other measurements made by NET or other organizations.

5.2.5. Performance Evaluation Samples

Blind performance evaluation (PE) samples are evaluated semi-anually, by all NET labs, as part of NET's Internal Testing Program. Any result that is out of control for a parameter (greater than +/- 2.1 standard deviations from the recovered mean) is flagged and corrective action is taken.

As well as internal PEs, NET is able to test its abilities on external performance samples: PEs from public certifying agencies such as USEPA WP and WS studies, Illinois EPA, state DNRs, and various round-robin performance samples for private certification.

5.2.6. Quality Control Charts

A Quality Control Tabular Chart shall be maintained for inorganic parameters where the QC Chart applies. This chart is a daily record of QC sample performance. When a parameter has been run enough times to fill twenty points on the daily control chart, the Mean and Standard Deviation (SD) are calculated:

Control Limits are set at three times the SD about the Mean.
Warning Limits are set at two times the SD about the Mean.

Next, a new page for that parameter is started with the control limits in place from the previous twenty points. Until the twenty points are established, interim criteria are used.

When the statistical limits are established they will replace the interim control limits. The interim control limits are listed in the following tables.

## 5.3. METHOD DETECTION LIMITS, LIMITS OF QUANTITATION (LOQ) AND REPORTING LIMITS

Method Detection Limit (MDL) - The minimum concentration of a substance that can be qualitatively measured with 99% confidence that the analyte concentration is greater than zero, as compared to DI water, and is determined from analysis of a sample in a given matrix containing the analyte (40 CFR, part 136, Appendix B - Federal Register, Vol. 49, No. 209 - 10/26/84).

Upon addition of a new instrument or method, MDLs shall be verified according to 40 CFR, part 136, Appendix B, before that instrument is put into use.

Limit of Quantitation (LOQ) - The level above which quantitative results may be obtained with a specified degree of confidence. The value for LOQ of 10 times the standard deviation is recommended.

NET Gulf Coast/Midwest Reporting Limits (RL) are based on Limits of Quantitation.

A listing of all NET - Rockford Division Reporting Limits is available in the Rockford Division - Statement of Qualifications.

A Method Detection Limit bulletin is available, upon request, from the NET Gulf Coast/Midwest Regional Office.

Located: 850 W. Bartlett Road
Bartlett, Illinois 60103

phone: (708) 289-3100
fax: (708) 289-5445

## 5.4. METHOD OF STANDARD ADDITIONS (MSA)

The following procedures will be incorporated into MSA analyses:

5.4.1. Data from MSA calculations must be within the linear range as determined by the calibration curve generated at the beginning of the analytical run.

5.4.2. The sample and three spikes must be analyzed consecutively for MSA quantitation (the "initial spike run data is specifically excluded from use in the MSA quantitation). Only single injections are required for MSA quantitation.

5.4.3. Spikes should be prepared such that:

Spike 1 is approximately 50% of the sample absorbance.
Spike 2 is approximately 100% of the sample absorbance.
Spike 3 is approximately 150% of the sample absorbance.

5.4.4. The data for MSA quantitation should be clearly identified in the raw data documentation along with the slope, intercept , correlation coefficient for the least square fit of the data, and the results reported to the client. Reported values obtained by the MSA shall be flagged as such.

5.4.5. If the correlation coefficient for a particular analysis is less than 0.995, the MSA analysis must be repeated once. If the correlation coefficient is still less than 0.995, the result must be flagged.

5.4.6. The X-intercept is the quantified MSA result.

## 5.5 REFERENCES

1. EPA SW-846. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA, SW-846, 3rd Edition, September 1986.

2. USEPA Contract Laboratory Program, Statement of Work No. 788, for Inorganic Analysis. June 1989.

3. Illinois Contract Lab Program QAPP, Scope of work for State. 1989.

4. NET Gulf Coast QAP (Dallas Division). August 1989.

5. Aqualab Training Manual. Bartlett, Il. May 1986.

6. NET Bartlett Division Quality Assurance Plan. May 1991.

7. 40 CFR, Part 136, Appendix B - Federal Register Vol. 49, No. 209 - 10/26/84.

**TABLE 5.1. INORGANIC QC INDICATORS**

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| **5.1.1. CALIBRATION** | | |
| **Flame AA:** 3 standard calibration or per manufacturer's suggestions. | Correlation Coefficient cc = > 0.995.<br>Back calculation of the calibration standards:<br>High Conc. 90-110 % of true value.<br>Mid Conc. 90-110 % of true value.<br>Low Conc. 80-120 % of true value | Analyzed once at the beginning of each run. |
| **Wet Chemistry:** 3 standard daily calibration or a 5 point curve on file that is verified daily. | Correlation Coefficient cc= > 0.995.<br>Back calculation of the calibration standards:<br>High Conc. 90-110 % of true value.<br>Mid Conc. 90-110 % of true value.<br>Low Conc. 90-110 % of true value. | Analyzed once at the beginning of each run.<br>5 point curve run when necessary. (change in analyst, reagents, instrument) The 5 point curve must be verified daily. |

**TABLE 5.1. INORGANIC QC INDICATORS**
(continued)

| QA SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| **5.1.2. BLANKS** | | |
| **Calibration Blank or Reagent Blank (RB)** | Absolute Value of the Reagent Blank must be < Reporting Limit. | One RB at the beginning of an analysis.<br>One RB after every tenth sample.<br>One RB at the end of every analysis. |
| **Procedure Blank (PB):** A reagent blank that is subjected to the same conditions as a prepared sample. | Absolute Value of the Procedure Blank must be < Reporting Limit. The Procedure Blank is not subtracted out of the samples. | One PB per sample batch. Sample batch shall contain no more than 20 samples of a similar matrix. |
| **Trip Blank or Field Blank** | Field or trip blanks are analyzed as requested. | |

TABLE 5.1. INORGANIC QC INDICATORS
(continued)

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| **5.1.3. STANDARDS** | | |
| **Initial Calibration Verification (ICV):** Also known as a Standard Reference Material (SRM) - An independent std. purchased from an outside source. | +/- 10% of the true value. If the result exceeds this +/- 10%, the acceptance range established according to the statistics reported by the agency supplying the standard are taken into consideration. | Immediately following a calibration curve. The ICV is used to verify the curve. |
| **Reporting Limit Verification Standard (RLVS) :** A standard at the Reporting Limit. | 75 - 125% of the true value. Warning only. | One RLVS at beginning of an analysis. Applies only to metals. |
| **Continuing Calibration Verification Standard (CCV) :** Mid-range standard. | 90 - 110% of the true value. | One CCV at the beginning as part of the calib. curve. After every 10 samples. One at the end of the analysis. |
| **Laboratory Control Standard (LCS) :** A standard subjected to the same conditions as a prepared sample. | 80 - 120% of the true value. | One LCS per sample batch. A sample batch shall contain no more than twenty samples of a similar matrix. |

**TABLE 5.1. INORGANIC QC INDICATORS**
(continued)

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| **5.1.4. SPIKES** | | |
| **Matrix Spike (MS) and Matrix Spike Duplicate (MSD):** Subjected to the same conditions that a prepared sample undergoes. | 75 - 125% of the true value for MS: Warning<br><br><20% Relative Percent Difference (RPD) for MSD: Warning | MS/MSD run with every sample batch. A batch shall contain no more than 20 samples of similar matrix. |

**TABLE 5.2. SUGGESTED ANALYTICAL SEQUENCE - INORGANICS**

1. Calibration Blank = Reagent Blank (RB)
2. Calibration Curve
3. Initial Calibration Verification (ICV) - External Standard
4. Reporting Limit Verification Standard (RLVS) - Metals
*5. Procedure Blank (PB)
*6. Laboratory Control Standard (LCS) - May be the same as a digested or distilled ICV: If the digestion/distillation is a requirement for all samples per the methodology.

*Steps 5 and 6 apply if the samples have been prepped.

7. Sample #1 - 10
8. Reagent Blank (RB)
9. Continuing Calibration Verification (CCV)
10. Samples # 11 - 20
11. Matrix Spike (MS)
12. Matrix Spike Duplicate (MSD)
13. Reagent Blank (RB)
14. Continuing Calibration Verification (CCV)
15. Repeat steps 5 and 6 - if applicable
16. Samples #21 - 30
17. Reagent Blank (RB)
18. Continuing Calibration Verification (CCV)
19. Samples #31 - 40
20. Matrix Spike (MS)
21. Matrix Spike Duplicate (MSD)
22. Reagent Blank (RB)
23. Continuing Calibration Verification (CCV)
24. Repeat steps 5 and 6 - if applicable

repeat the cycle .....

**TABLE 5.3. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS INORGANICS**

| QC SAMPLE | ACTION TO TAKE IF OUTSIDE CONTROL LIMITS |
|---|---|
| Calibration Curve | Solve the problem. Restart analysis. Recalibrate. |
| Reagent Blank (Calibration Blank) | Solve the problem. Reanalyze the blank. Run the Procedure Blank. |
| Initial Calibration Verification Standard (ICVS) | Solve the problem. Reanalyze ICVS. Recalibrate if necessary. |
| Reporting Limit Verification Standard | See your supervisor. Warning limit only. |
| Procedure Blank | Rerun the Procedure Blank. If still out of control, check prep. procedure for possible errors. Reprepping may be required. See your supervisor. Cross-reference any reanalyses. |
| Laboratory Control Standard (LCS) (Procedure Standard) | Rerun the Laboratory Control Standard. If still out of control, check prep. for possible errors. Reprepping may be required. See your supervisor. Cross-reference any reanalyses. |
| Matrix Spikes (MS)/ Matrix Spike Duplicates (MSD) | If LCS is also out, reprepping may be required. See your supervisor. Cross-reference any reanalyses. If LCS is in, may be matrix interference. See your supervisor. |
| Continuing Calibration Verification (CCV) | Rerun CCV once. If still out of range, attempt to solve the problem. Rerun the batch of ten samples to which this standard applies. Cross-reference any reanalyses. |
| Continuing Calibration (Reagent) Blank | Rerun Blank once. If still out of range, attempt to solve the problem. Rerun the batch of ten samples to which this blank applies. Cross-reference any reanalyses. |

**TABLE 5.4. VOLATILE AND SEMI-VOLATILE QC INDICATORS - GC/MS**

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| Tune Check<br>- BFB for Volatiles<br>- DFTPP for Semi-Volatiles | Ions must pass USEPA criteria. See SOP and CLP Form 5. | Once every 12 hours. |
| Continuing Calibration Verification Compounds (CCCs) | Per the SOP. CCC and SPCC compounds. See CLP Form 6 or 7. | After Tune Check. Compare CCCs with 5 - point standard calibration curve that is on file. |
| Preparation Blank or Method Blank | No target compounds present, except common laboratory solvents at less than 5 times the reporting limit. | Once per 12 hour sequence, or per matrix type, or as provided by extraction protocol. |
| Matrix Spikes (MS) and Matrix Spike Duplicates (MSD) | Advisory USEPA criteria for spike recovery ranges. See CLP Form 3. | Once per 20 samples of similar matrix. |
| Surrogate Spike | Must meet USEPA Control Limits as required by the specific method. See CLP Form 2. | Surrogate Spike is included with every sample. |
| Internal Standards | Must meet USEPA criteria Internal for Internal Standard Standards Area Range. See CLP Form 8. | Internal Standards are included with every sample. |
| Laboratory Control Standard (LCS) (Procedure Standard) | Analyzed only if MS or MSD is out. Must be within USEPA criteria. | One per prep batch. |

**TABLE 5.5. SUGGESTED ANALYTICAL SEQUENCE FOR GC/MS**
(also see specific SOPs)

VOLATILES

1. BFB Check **
2. Continuing Calibration Standard
3. Method Blank
4. Matrix Spike and Matrix Spike Duplicate
   (Laboratory Control Standard if MS or MSD fails)
5. Samples

** Samples must be analyzed within 12 hours of the BFB tune.

SEMI-VOLATILES

1. DFTPP Check **
2. Continuing Calibration Standard
3. Method Blank
4. Matrix Spike and Matrix Spike Duplicate from extraction
   (Laboratory Control Standard if MS or MSD fails)
5. Samples

** Samples must be analyzed within 12 hours of DFTPP Check.

**TABLE 5.6. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS - GC/MS VOLATILES AND SEMI-VOLATILES**

| QC SAMPLE | | ACTION TO TAKE IF OUTSIDE CONTROL LIMITS |
|---|---|---|
| Tuning Check | | Retune Mass Spectrometer and repeat. |
| Continuing Calibration Compounds (CCCs) | | Rerun 5-standard calibration curve. |
| Method Blank | VOA - | Prepare new blank. Re-run Method Blank. If still out of control, see your supervisor. |
| | Semi-VOA - | Re-inject blank extract. out of control, see your supervisor. |
| Matrix Spike (MS) and Matrix Spike Duplicate (MSD) | | No corrective action outlined by USEPA criteria. Monitor for long term accuracy and precision problems. Analyze Laboratory Control Standard. |
| Surrogate Spike | VOA - | Re-analyze sample. If still out of control, see your supervisor. |
| | Semi-VOA - | Re-inject sample. If still out of control, see your supervisor. |
| Internal Standards | | Same as for Surrogate Spikes. |
| Laboratory Control Standard (LCS) | | Reprep entire batch of samples. |

TABLE 5.7. PESTICIDES/PCBs QC INDICATORS- GC

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| Breakdown Check DDT and Endrin (for runs with pesticides) | < 30% breakdown total<br>< 20% for DDT or Endrin<br>See CLP Form 8. | Every analytical batch. |
| Initial Calibration of Single Component Pesticides at five levels. (Reference Curve) | 15% Relative Standard Deviation (RSD) for: aldrin, g-BHC, DDT & heptachlor. 30% RSD for all others. | As needed |
| Multi-Component Pesticides and PCBs at single level. (Quantitation Standard) | Acceptance Criteria is not applicable. | Every analytical batch. |
| Continuing Calibration INDA-M + INDB-M PCB 1016 PCB 1221/1260 Other PCBs as required by SOP 8080 6.3.3. | aldrin, DDT, dieldrin heptachlor, and lindane < 15% RSD.<br>See CLP Form 9. | Every analytical batch |
| Surrogate Spike | Advisory Control Ranges are: 24-150% Soil<br>24-154% Water<br>See CLP Form 2. | Every sample, blank and MS/MSD |

**TABLE 5.7. PESTICIDES/PCBs QC INDICATORS- GC** (continued)

| QC SAMPLE | ACCEPTANCE CRITERIA | FREQUENCY |
|---|---|---|
| Matrix Spike (MS) and Matrix Spike Duplicate (MSD) | Listed on CLP Form 5 and SOP 8080. | Once per matrix batch of 20 samples. |
| Procedure Blank or Method Blank | No target compound detected above the reporting limit. | With each extraction. |
| Laboratory Control Standard (LCS) | Must meet the acceptance criteria set by the supplying agency. | One per matrix batch of 20 samples. |

**TABLE 5.8. SUGGESTED ANALYTICAL SEQUENCE FOR GC**

1. INDA-M
2. INDB-M
3. PCB 1016
4. PCB 1221/1260
5. Other PCBs, as required per SOP 8080 6.3.3.
6. Method Blank
7. Matrix Spike and Matrix Spike Duplicate
   (Laboratory Control Standard if MS or MSD fails)
8. Samples

**TABLE 5.9. CORRECTIVE ACTION FOR OUTLYING QC INDICATORS - GC - PESTICIDES/PCBs**

| QC SAMPLE | ACTION TO TAKE IF OUTSIDE CONTROL LIMITS |
|---|---|
| Linearity Check | Perform GC maintenance and repeat. |
| Continuing Calibration | Perform Initial Calibration - 5 point Calibration Curve. |
| Surrogate Spikes | No corrective action outlined by USEPA criteria. See your supervisor. Reanalyze/Reevaluate method if necessary. Monitor for long term precision and accuracy. |
| Matrix Spikes (MS) and Matrix Spike Duplicates (MSD) | Same as for Surrogate Spikes. Analyze Laboratory Control Standard. |
| Method Blank | Reanalyze extract. If still out of control, see your supervisor. |
| Laboratory Control Standard (LCS) | Reprep entire batch of samples. See your supervisor. |

# SECTION 6. SAMPLING PROCEDURES

6.1. Introduction

6.2. NET Standards of Procedure
6.2.1. NET Field SOP
6.2.2. Field Survey Forms
6.2.3. Field Log Book

6.3. Initial Set Up

6.4. Quality Control Samples

6.5. On-Site Analysis

6.6. Sample Flow - Sample Stream

6.7. References

## 6.1. INTRODUCTION

Field sampling techniques are designed so the sampler is able to retrieve a sample which is representative of the field area being tested. This sample needs to be of sufficient volume or amount to support the parameters requested. Under some conditions, a client may request a specific point sample which may not be representative of the general area - (ie: an industrial discharge point suspected of contaminating a broader area). This type of judgemental sampling shall be decided upon between the client's and lab's field officers. Otherwise, a sampling site shall be chosen to provide a portion representative of the general test area.

## 6.2. NET STANDARDS OF PROCEDURE

Analysts shall follow NET Field Standards of Procedure when sampling in the field. This field SOP addresses five major sampling types: Grab, Composite, Groundwater, Drum, and Soil Sampling. Methods are referenced in Table 6.1. As other types of field sampling occur, a standard field procedure will be written and approved before sampling begins.

### 6.2.1 NET FIELD SOP

The field SOP covers twelve main points:

1. Scope and Application
2. Summary of Procedures
3. Sample Preservation - Table 6.2. outlines preservation techniques and holding times, and indicates which parameters should be analyzed immediately in the field. This assures good sample and parameter integrity.
4. Approved Apparatus
5. Reagents Needed
6. Interferences - Chemical and Physical

6.2.1. NET FIELD SOP (continued)

7. QA/QC - Methods for assuring that the samples are representative of the area being tested and that these samples contain no possibility of contamination from field, trip, equipment, or other cross-contamination sources.

8. Procedure - Includes techniques for sample site selection.

9. Calculations

10. Clean Up/Waste Disposal/Safety - Field sampling equipment, at a minimum, shall be cleaned with laboratory detergent, parameter specific solvent or acid rinses, and deionized water. Further equipment clean up, or disposal, shall correspond with the procedure, assuring that equipment should not be a contamination source. Waste disposal procedures shall assure that no waste will fall on a sampling area causing possible contamination of that area.

11. Helpful Hints

12. Deviations from Referenced Method

6.2.2. FIELD SURVEY FORMS

Field SOP's shall include forms used to survey the sample area; and, checklists used to assure that proper equipment and reagents are on hand.

### 6.2.3. FIELD LOG BOOK

The field analyst shall carry a log book to record sample area information. Log books shall contain the date and time of day, sample area location and sample site selected, reasons for sampling, weather conditions, sample appearance, calculations, on-site analysis, and any other additional field observations or recommendations. The log book is a diary of events at a sample site. It should be organized neatly so others can look at the log book and derive information that may be deemed vital at a later date.

## 6.3. INITIAL SET UP

The lab's field officer, if possible, shall meet on-site with the client to determine sampling areas, number of samples, equipment used, and quality control samples to be performed.

## 6.4. QUALITY CONTROL SAMPLES

Field QC samples include blanks, duplicates, field spikes and background samples.

**Trip Blanks** - Used to determine existing container and/or deionized water contamination, or any contamination that may have occurred during transport. Trip blanks are prefilled sample jars carried into the field that remain unopened and are sent to the laboratory after the sampling along with the samples. Trip blanks should be supplied by the laboratory if it is supplying deionized water for the blanks and sample jars. If jars are supplied separately from the water, trip blanks should be prepared by the sampling team prior to leaving the office.

**Field Blanks** - Prepared in the field during sampling, field blanks are used to determine container contamination and/or contamination that may have resulted from existing field conditions when the samples were collected. Deionized water is poured from the stock containers into sample jars. The field blank must be collected, preserved and labelled as an aqueous sample.

**Equipment Blanks** - These blanks are used to determine equipment contamination and /or contamination that may have resulted from existing field conditions when the samples were taken. Equipment blanks should be taken after the equipment has been decontaminated on-site in order to match the conditions of actual sample collection closely. Deionized water should be poured through or over equipment, such as bailers and/or filters that may come in contact with the samples. Each piece of equipment must have a unique equipment blank sample.

**Duplicate Samples** - Duplicate samples are used to check laboratory precision and should not be identified to the laboratory.

Duplicates, which normally require one extra volume of sample, should be taken in an area of suspected or known contamination and given a unique sample number. They must be collected at the same time, from exactly the same location, using the same sampling equipment. Variability is expected in duplicate samples due to nonhomogenous sample media.

**Matrix Spike Samples** - Used by the laboratory to determine the effects of the sample matrix on the accuracy of analytical results. Matrix spike samples typically require two to three additional volumes of sample. For the best analytical results, an uncontaminated background location is required. Matrix spike percent recoveries are used to judge the accuracy of sample results only if the indigenous samples do not interfere with spike recovery results. Additional volumes should be collected for all matrices sampled.

**Background Samples** - Collected for all matrices sampled, to determine those parameters indigenous to the area. Background samples are used for comparative purposes when determining the type, amount and extent of contamination present and attributable to the site. In order to attribute contamination to the site, background samples need to be collected from undisturbed areas, but should include off-site influences. Avoid taking background samples near railroads, fence lines, roadways, driveways, telephone poles, and, if possible in active areas of the site. If these potential contamination sources are an integral part of the site, the sampler should identify them as discrete target locations.

Types of QC samples performed will vary according to sampling types, referenced in the NET Field SOP, site, and client sampling requests. For a sampling process, one may wish to make all three types of blanks and analyze only the field blank on a laboratory run as a screening procedure. If a problem is seen in the field blank, then other blanks can be analyzed to pinpoint the problem.

## 6.5. ON-SITE ANALYSIS

On-site analyses shall be performed in conjunction with the method referenced. Equipment calibrations, external standards, method blanks, method duplicates and spikes as well as any appropriate QA, shall be performed in the field, just as they would in the lab, according to the method and section 5 of this manual. Parameters tested in the field are dying parameters that may change in concentration or be altered rapidly. The following parameters are immediately tested in the field: pH, Specific Conductivity, Dissolved Oxygen, Free and Total Chlorine and Temperature. Methods an appropriate QA for these on-site parameters are included in the NET Field SOP, as well as methods for Flow Measurements.

## 6.6. SAMPLE FLOW - SAMPLE STREAM

The complete field process, from choosing the sampling site to handling the sample in the lab, is flowcharted in the following "sample stream".

Meet or confer with the client, on-site if possible. Choose the sampling sites.

Site assessment. Planning for the equipment, containers, preservatives needed, and QA sampling to be performed. Initiate Field Survey and Chain of Custody Forms with known information.

Before Sampling Begins

After Sampling Begins

Set up on-site. Sample staging area.

Samples collected, filtered for dissolved parameters, contained and preserved.

## 6.6. SAMPLE FLOW - SAMPLE STREAM (continued)

Field Survey and Log Book information recorded.

On-site analyses performed.

Chain-of-Custody Form filled out.

Receipt in the laboratory.

Chain of Custody completed.

Responsibility of Field Personnel

---

Responsibility of Lab Personnel

Sample receipt and storage.

Review the established holding times. Prioritize analyses.

## 6.7. REFERENCES

1. "NET Field Standards of Procedure"

2. Environmental Lab. "Sampling in the Field". Mediacom, Inc., Vol. 2, No. 3, June/July 1990.

3. BFI Sampling and Analysis Plan. "Sampling Groundwater Monitoring Wells". BFI - P.O. Box 3151. Houston, Texas 77253.

4. Standard Methods for the Examination of Water and Wastewater. 1989. 17th Edition, Part 1060. "Collection and Preservation of Samples".

5. USEPA. Test Methods for Evaluating Solid Waste. November 1986. SW-846, 3rd Edition. Volume II: Field Manual.

6. NET Bartlett Division - Quality Assurance Plan. May 1991.

**TABLE 6.1. RECOMMENDED CONTAINERIZATION AND PRESERVATION**

| Parameter | Sample Container*/ Preservative | Preferred Volume(ml)* | Holding Time* |
|---|---|---|---|
| Acidity | P,G / A | 250 | 14 Days |
| Alkalinity | P,G / A | 250 | 14 Days |
| Bacteria, Total Coliform | Sterile / F | 250 | 6 Hours |
| Bacteria, Fecal Coliform | Sterile / F | 250 | 6/30 Hours |
| BOD, 5 Day | P,G / A | 500 | 48 Hours |
| Boron | P,G / A | 100 | 28 Days |
| Bromide | P,G / G | 100 | 28 Days |
| Chloride | P,G / G | 250 | 28 Days |
| Chlorine, Total | P,G / G | 100 | Immediately |
| COD | P,G / C | 100 | 28 Days |
| Color, True | P,G / A | 100 | 48 Hours |
| Conductivity | P,G / A | 250 | 28 Days |
| Cyanide, Total | P,G / D | 500 | 14 Days |
| Cyanide, Amenable | P,G / D | 500 | 14 Days |
| Fluoride | P / G | 250 | 28 Days |
| Hardness | P,G / B | 250 | 6 Months |
| MBAS | P,G / A | 500 | 48 Hours |
| Nitrogen, Ammonia | P,G / C | 500 | 28 Days |
| Nitrogen, Kjeldahl | P,G / C | 500 | 28 Days |
| Nitrogen, Nitrate | P,G / C | 250 | 28 Days |
| Nitrogen, Nitrite | P,G / A | 100 | 48 Hours |
| Oil & Grease | G / C | 1000 | 28 Days |
| pH | P,G / G | 100 | Immediately |
| Phenol | G / C | 500 | 28 Days |
| Phosphorus, Total | P,G / C | 250 | 28 Days |
| Phosphorus, Ortho | P,G / A | 100 | 48 Hours |
| Silica | P / A | 100 | 28 Days |
| Sulfate | P,G / A | 250 | 28 Days |
| Sulfide | P,G / E | 500 | 7 Days |
| Sulfite | P,G / G | 500 | Immediately |
| Turbidity | P,G / A | 100 | 48 Hours |
| Total Organic Carbon (TOC) | P,G / C | 100 | 28 Days |
| Total Organic Halogen (TOX) | GA / B | 500 | 28 Days |
| Total Solids | P,G / A | 100 | 7 Days |
| Total Dissolved Solids | P,G / A | 100 | 7 Days |
| Total Suspended Solids | P,G / A | 100 | 7 Days |
| Total Volatile Solids | P,G / A | 100 | 7 Days |
| Metals (except Mercury and Hexavalent Chromium) | P,G / B | 250 | 6 Months |
| Mercury | P,G / B | 250 | 28 Days |
| Hexavalent Chromium | P,G / A | 100 | 24 Hours |

* Section No. 6, page 11 of 11

| Parameter | Sample Container*/ Preservative | Preferred Volume(ml)* | Holding Time* |
|---|---|---|---|
| Volatile Organics | VOA / A | 80 | 14 Days |
| Base Neutrals | GA / A | 1000 | 7 Days Pre-extraction<br>40 Days Post-extraction |
| Acid Extractables | GA / A | 1000 | 7 Days Pre-extraction<br>40 Days Post-extraction |
| Pesticides | GA / A | 1000 | 7 Days Pre-extraction<br>40 Days Post-extraction |
| PCB's | GA / A | 1000 | 7 Days Pre-extraction<br>40 Days Post-extraction |
| Herbicides | GA / A | 1000 | 7 Days Pre-extraction<br>40 Days Post-extraction |

**Sample Container:** P = Plastic G = Glass GA = Glass Amber Bottle with Teflon Lined Cap
VOA = Volatile Organic Analyte requires 40 ml Glass Vial with Teflon Septum

**Sample Preservation:**

A - Cool Only, 4°C
B - $HNO_3$
C - $H_2SO_4$
D - NaOH (Sodium Hydroxide) pH>12
E - Zinc Acetate + NaOH pH>9
F - $Na_2S_2O_3$ (0.008%) (Sodium Thiosulfate)
G - None

With the exception of samples not requiring preservation (G), all samples are kept at 4 degrees centigrade.

*Sample container, preferred volume, and holding time are for water matrix. Consult laboratory for other matrix sampling recommendations.

# SECTION 7. SAMPLE CUSTODY AND LOG-IN PROCEDURES

7.1. Chain of Custody

7.2. Sample Flow

7.3. Paper Flow

7.4. Interlaboratory Shipment

## 7.1. CHAIN OF CUSTODY

Each sample batch submitted shall be tracked by a Chain of Custody (COC). The COC starts at sample collection. It records appropriate sample information and is the client's opportunity to document project requirements. Instructions for completion of the COC are on the reverse side of that document.

Every time the sample passes hands, that transaction is described and the COC is signed by both parties.

The COC is a final statement of request to describe the client's needs for that sampling event. If a question arises at a future date, the COC is a description of the sample and parameters requested. The COC is required for audit compliance and certification.

When the sample analyses are complete, and results are reported, a copy of the COC will accompany the client's report.

A copy of the NET Gulf Coast/Midwest COC is provided here. A client may use specific COCs approved by their firm.

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest Inc
Rockford Division
3548 35th Street
Rockford IL 61109
Tel (815) 874-2171
Fax (815) 874-5622

# CHAIN OF CUSTODY

| | |
|---|---|
| Client | Project Name |
| Send Report to: | |
| Address<br>Telephone # | Collected by: |

| Collection Information | | | | | | | | Parameters | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample ID | Sampling location | Date | Time | GRAB | COMP | Sample Type | No. of Container | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | |

Remarks: _____

| Relinquished by: | Date | Time | Received by: | Date | Time |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| Shipping Notes/Lab Comments | | | Received for NET Midwest by: | | |

Samples Field Filtered: ___ Yes ___ No
Seals Intact Upon Receipt: ___ Yes ___ No ___ N/A

## 7.2. SAMPLE FLOW

Sample Collection - COC started.

Sample received at NET - COC signed at the laboratory.

Sample logged into NET computer system with a unique sample #.

Sample and paperwork given to the Sample Custodian. Proper preservation techniques and holding times are monitored.

If necessary, the sample is split; then distributed to the appropriate areas of the lab for analysis. Access sample is sent to a holding area. This holding area is restricted to analytical personnel and the Sample Custodian only.

Sample analysis.

Sample collection and results reported.

Samples kept in storage or returned to the client.

Sample disposal - after a waiting period of at least one month from the analytical report date. Special handling if the samples are found to be hazardous.

## 7.3. PAPER FLOW

COC signed by the receptionist.

Sample logged into NET computer system. Any special circumstances are noted for reference by analysts.

The log-in sheet and COC, with complete sample information, go to the Sample Custodian for storage and tracking.

The log-in sheet then goes to the appropriate Project Manager to ensure the sample was logged-in according to the customers needs.

The paperwork is filed and matched with the report when the results are complete. The original COC is sent with the report. Copies are kept on file.

## 7.4. INTERLABORATORY SHIPMENT OF SAMPLES

1. Discuss and arrange the following with the NET laboratory that will receive the samples:

   a. Price
   b. Turnaround time
   c. What analyses are required
   d. Number of samples
   e. How samples will be shipped and when they will arrive
   f. Any special methods, detection limits, or certifications
   g. Any special chain-of-custody requirements
   h. Any holding time concerns
   i. Any special information on the nature of the sample
   j. Any special report requirements

2. Fill out the interlaboratory purchase order. Fill in all of the information provided on the purchase order as communicated above and additional information as required.

3. Chain-of-custody is required. Retain a photocopy of the original. Send the original with the samples.

4. Next, HIGHLIGHT your appropriate sample number(s) on the LABSYS logsheet. This will be the receiving labs sample identification for the report.

5. Next, HIGHLIGHT the appropriate analytes that you are requesting the receiving lab to analyze.

6. Send the completed original purchase order along with the samples. Do not FAX this sheet, as the highlighted information will be obliterated in the process.

7. Next, carefully pack the samples into the appropriate container for shipment. Include the pertinent paperwork. Use an appropriate method of shipment to insure sample integrity and timeliness of receipt.

8. Upon receipt of the samples, log-in using the sending Division's Sample Number and Client Name as "Sample Description".

9. Maintain chain-of-custody and sample control as normal.

10. Return original signed chain-of-custody document with the Analytical Report.

11. Do not Interlab any samples or projects that specify analysis only at the Rockford Division.

# SECTION 8. CALIBRATION PROCEDURES AND FREQUENCY

## 8.1. Quantifying Results and Linear Range

## 8.2. Traceability of Standards

Table 8.1 Analysis Type and Calibration Procedure

Volatiles by GC/MS

Semi-Volatiles by GC/MS

Pesticides by GC

PCBs by GC

Metals by Flame AA
Hydride Generation
Cold Vapor

Conventionals

## 8.1. QUANTIFYING RESULTS AND LINEAR RANGE

Any result shall be quantified at a point less than the highest concentration of standard used to construct the calibration curve, or at a point less than the highest standard analyzed and shown to be in control for that run. If the original run is above the highest standard, the sample must be diluted to such a point within that curve. Therefore, the calibration curve or the high standard (linear range standard) indicates the practical linear range for that parameter.

## 8.2. TRACEABILITY OF STANDARDS

Standards for GC/MS and GC are purchased with traceability papers, tracing the reliability of that standard to a reference value at the National Bureau of Standards, Washington D.C.

All standards and reagents are logged into a materials receipt book, with the date received, manufacturer, lot number, and expiration date recorded. All standards and reagents are labelled with date received, date opened, and expiration date.

All standards and reagents are assigned a unique number as to trace the item through any preparation stage.

**TABLE 8.1. ANALYSIS TYPE AND CALIBRATION PROCEDURE**

| Analysis Type | Calibration Procedure |
|---|---|
| **Volatiles by GC/MS** | 1. 5-standard calibration curve on file:<br><br>The Calibration Check Compounds (CCCs) - Percent Relative Standard Deviation (%RSD) must be < 30.0 %.<br>The System Performance Check Compounds (SPCC) - minimum mean Response Factor (RF) must be > 0.05.<br><br>2. 1-standard daily calibration - analyzed to verify the 5-standard curve on file:<br><br>The Calibration Check Compounds (CCCs) - Percent Relative Standard Deviation (%RSD) must be < 25.0 %.<br>The System Performance Check Compounds (SPCC) - minimum mean Response Factor (RF) must be > 0.05.<br><br>3. 5-point standard calibration curves are regenerated when CCC and SPCC criteria are not met. |
| **Semi-Volatiles by GC/MS** | 1. 5 - standard calibration curve on file:<br><br>CCC: %RSD < 30.0 %<br>SPCC: mean RF > 0.25<br>(exception: Bromoform - mean RF > 0.30)<br><br>2. 1 - standard daily calibration - analyzed to verify the 5 - standard curve.<br><br>CCC: % Difference < 25.0 %<br>SPCC: RF > 0.25 (Bromoform > 0.30)<br><br>3. 5 - standard calibration curves are regenrated when CCC and SPCC criteria are not met. |

| Analysis Type | Calibration Procedure |
|---|---|
| **Pesticides by GC/ECD** | 1. 5 - standard calibration curve on file:<br>CCC: %RSD < 20. %<br>other compounds: %RSD < 30. %<br>2. 1 - standard daily calibration:<br>CCC: %Difference <20. % |
| **PCBs by GC/ECD** | 1. 5 - standard calibration curve on file:<br>%RSD < 30. %, warning<br>2. 1 - standard daily calibration:<br>%RSD <20. %, warning |
| **Metals by Flame AA, Cold Vapor, and Hydride Generation** | 1. 3 - standard calibration curve with each run:<br>correlation coefficient: > 0.995. Back calculated standards must agree within 90 - 110 % of the true value. The low-range standard must agree within 80 - 120 % of the true value. |
| **Conventionals** | 1. 3 - standard daily calibration curve:<br>correlation coefficient: > 0.995. Back calculated standards must agree within 90 - 110 % of the true value. |

# SECTION 9. DATA REDUCTION, VALIDATION AND REPORTING

9.1. Data Reduction

9.2. Data Validation

9.3. Data Reporting

9.4. Quality Control Summaries

Table 9.1 NET Analytical Data Reporting Scheme

## 9.1. Data Reduction

Analytical results will be reduced to appropriate concentration units using appropriate methods given in the analytical procedure.

## 9.2. Data Validation

Data validation is the process of examining data and accepting or rejecting it based on pre-defined criteria. NET supervisory and analytical personnel use the following criteria to validate laboratory data:

- Use of approved analytical procedure,
- Use of properly operating and calibrated instrumentation, and
- All Quality Control Indicators (QCIs), specifically discussed in section 5, must be in control. If any of the QCIs are outlying, appropriate measures must be taken to bring the QCI in control. No data shall be reported with out all QCIs in control, unless signed by the appropriate project manager.

Records of all data will be maintained. If any of the above criteria are not met, corrective action must take place before the data is validated.

## 9.3. Data Reporting

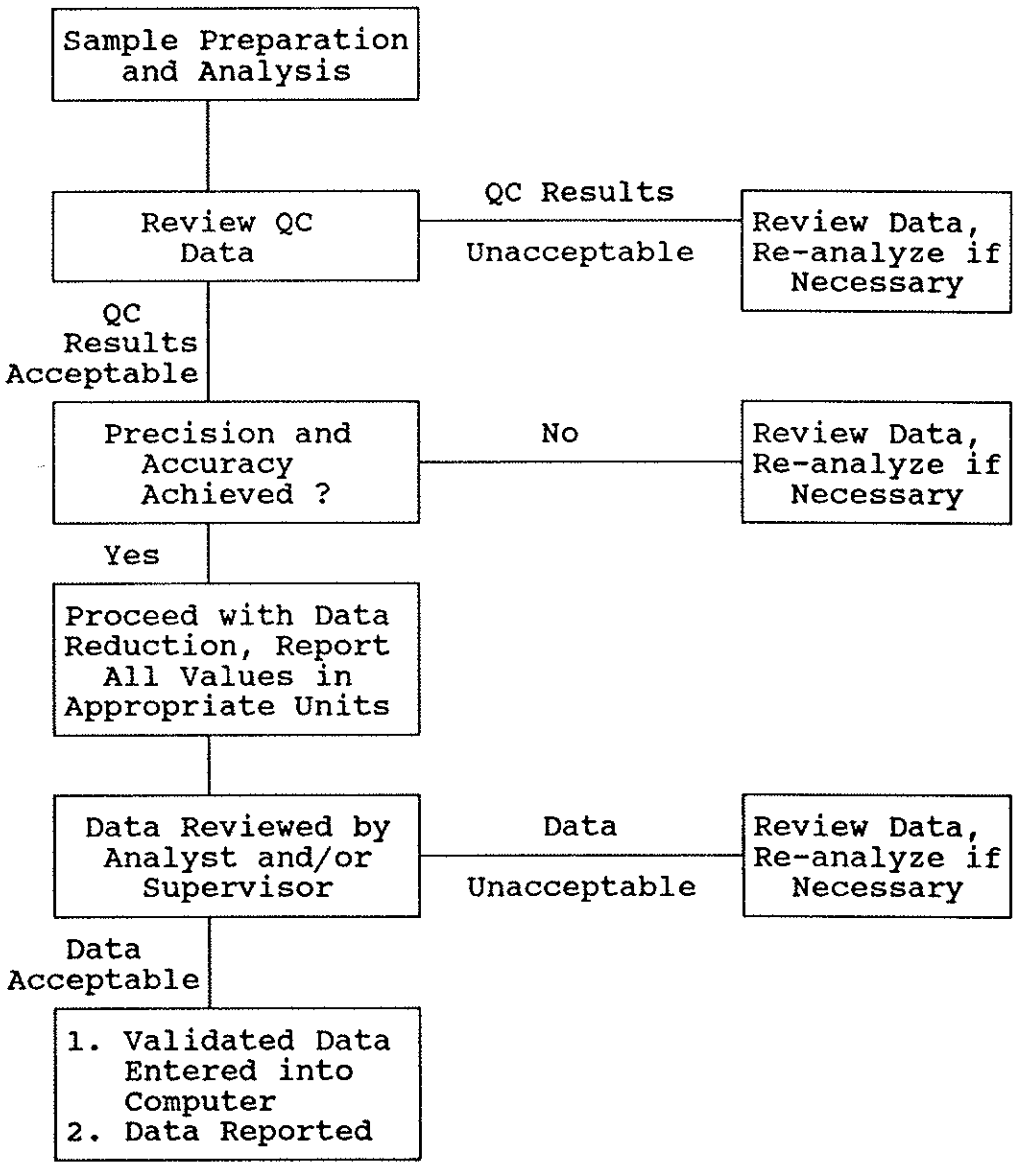
Analytical results will be reported on formats acceptable to the customer. These reports will be assembled by the project manager and delivered to the customer within the time frame specified by the customer and agreed to by the laboratory.

If, for any reason, requirements for data validation are not met, the appropriate result will be flagged on the analytical report - if agreeable to the client.

## 9.4. Quality Control Summaries

The QC Indicators data, from QC indicators listed in Section 5, are recorded for each analytical run. This data is kept on file. If a client should need any information from these QC samples, the information is available at different reporting levels and at different charges. There is no charge for the most basic QC information. The QC data is reportable with the analysis or at a later date, this is dependant upon agreement between the laboratory and client.

**TABLE 9.1. NET Analytical Data Reporting Scheme**



# SECTION 10. PERFORMANCE AND SYSTEM AUDITS

10.1. Performance Audits

10.2. System Audits

10.3. Corrective Action Reports

## 10. PERFORMANCE AND SYSTEM AUDITS

NET - Rockford Division maintains a schedule of both external and internal performance and system audits. The following describes external audits.

### 10.1. PERFORMANCE AUDITS

NET - Rockford Division is audited, in the form of performance evaluation samples (PEs), by the following agencies at the following frequencies:

**Federal Government**

- Water Pollution (WP) and Water Supply (WS) performance samples are analyzed approximately quarterly, between the two studies. Results from these samples are avaliable to the client upon request.

- National Pollution Discharge Elimination System (NPDES) performance samples are analyzed annually for NPDES permitting.

**State Government**

- Annual performance samples are submitted by the State of Illinois for its Safe Drinking Water Act Certification.

- Annual performance samples are analyzed for Wisconsin Department of Natural Resources certification.

**Local Agencies**

- The types and frequency of PE samples analyzed for local industries varies.

**Private Agencies**

- Chemical Waste Management submits quarterly PE samples as part of the Chemical Waste Management Certification Program.

For all of the listed programs, reports are sent from our lab to the existing agency. That agency reports data back to NET - Rockford Division in the form of the true value of analytes tested, the recovered mean, standard deviation, and acceptance ranges. The latter three values are statistically calculated from results supplied by participating laboratories.

Any parameter that falls outside the given acceptance window is flagged. At NET, these parameters undergo a rigorous corrective action report. Additional performance samples are submitted to monitor progress of that method.

A blank Corrective Action Report is supplied in Section 10.3.

## 10.2. SYSTEM AUDITS

System audits are in the form of a visit to our lab by a professional auditor(s). On the government level, state audits are performed periodically by the State of Illinois, and the State of Wisconsin, in order to maintain our certification.

We are audited annually by Chemical Waste Management as part of that certification program.

Private industries perform system audits more frequently. NET Rockford is audited by private firms approximately once every other month.

A system audit will consist of a visit, usually one day. In this time, the auditor makes recommendations from the audit findings. Generally, excellent information is exchanged during the audit. The professional auditors are typically highly experienced and knowledgeable.

The laboratory will review the recommendations, and respond to the findings in the form of changes or future plans.

Detailed files and follow-up are kept for every system of performance audit.

NATIONAL ENVIRONMENTAL TESTING, INC.

# Corrective Action Report

DATE:
cc:

TO: QA Director

RE: Out-of-Control ITP Value Reported

FR: _____

Division: _____ Dept: _____

Analysis: _____ ITP#: _____

True value: _____ Reported value: _____ Units: _____

Control limits (CLs): _____ CL ref: APG; 2*stdev

Method reference & #: _____

Instrument ID and type: _____

Problem Identification - Check ALL Boxes That Apply

- [ ] Training
- [ ] Supervision
- [ ] Method not followed
- [ ] Login
- [ ] QC not performed
- [ ] Reporting
- [ ] QC CLs ignored
- [ ] Laboratory contamination
- [ ] Detection limits problems
- [ ] Instrument or service problem
- [ ] Dilution or calculation
- [ ] Standards supplier problem
- [ ] Other _____
- [ ] Unknown

Corrective Action Taken: 1. _____

_____

_____

_____

Date: _____

_____
Section Supervisor

_____
QA Manager

_____
Division Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

Corrective Action Report Part Two

DATE:

TO: QA Director

cc:

RE: Regionally Administered PE Results

FR: Regional Quality Assurance Manager

ITP#:_____ Analysis:_____ Division:_____

---

PE Sample Source: _____

PE True Value: _____ PE Control Limits: _____

Control Limit reference: _____

Laboratory Result: _____

Date of PE Analysis: _____

Was the PE Single Blind? _____ Double Blind? _____

Is the Analysis now in Control: _____

Comments: _____

_____

_____

_____

_____

_____

_____

Regional Quality Assurance Manager

Corrective Action Report - Quality Control Indicators

ITP#:_____ Anaylsis:_____ Division:_____

| DETECTION LIMIT (DL) | METHOD BLANK |
|---|---|
| Date run Measured DL | Date Concentration Control Limit(CL) |
| Detection Limit Reference | Method Blank CL Reference |

EXTERNAL STANDARD VERIFICATION - INDEPENDENT REFERENCE

| Date run | True Concentration | Measured Concentration | CLs |
|---|---|---|---|
| External Standard Control Limit Reference | | | |

CONTINUING CALIBRATION VERIFICATION-ON-GOING CALIBRATION CHECK

| Date run | True Concentration | Measured Concentration | CLs |
|---|---|---|---|
| LCS Control Limit Reference | | | |

ACCURACY CHECK - SAMPLE SPIKE

| Date run | Sample Conc. | Spike Conc. Added | Total Conc. Observed | Percent Recovery |
|---|---|---|---|---|
| Accuracy CLs | Accuracy Control Limit Reference | | | |

PRECISION CHECK - SPIKE & SPIKE DUPLICATE OR SAMPLE & DUPLICATE

| Date run | True Conc. | Relative % Difference (RPD) | RPD CL | RPD CL Reference |
|---|---|---|---|---|

CALIBRATION

| Date run | # of standards | Lowest standard Concentration | Highest standard Concentration |
|---|---|---|---|
| Calibration CL | Observed | Calibration CL Reference | |

SIGNATURE DATE

## CORRECTIVE ACTION CHECKLIST

Try to identify the real problem, not just the symptoms
Conduct the investigation of items in the order presented

| | | |
|---|---|---|
| ____1) | Transcription Errors | - raw data result vs PE result?<br>- lab notebook result vs computer result?<br>- between any of the raw data? |
| ____2) | Calculation Errors | - are correct raw data values used?<br>- were dilutions, if made, accounted for?<br>- back calculate to check calculation.<br>- was result in correct units? |
| ____3) | Log-In Errors | - was correct sample used?<br>- were correct parameters analyzed?<br>- check chain of custody, if appropriate.<br>- was preservation correct?<br>- was container correct? |
| ____4) | Batch QC Errors | - were proper QC indicators analyzed?<br>- were control limits met?<br>- is result greater than MDL?<br>- does blank show contamination?<br>- is calibration valid?<br>- was ICVS in control and consistent?<br>- did CCVS verify calibration?<br>- was LCS in control?<br>- were MS/MSD or Dup results appropriate?<br>- check QC chart trends. |
| ____5) | Standards Errors | - were standards within shelf life?<br>- are they the right standards?<br>- were they made correctly?<br>- do standards show signs of concentrating?<br>- was standardization necessary?<br>- were new standards compared to old?<br>- was new curve verified with an ICVS? |
| ____6) | Reagent Errors | - were reagents within shelf life?<br>- are they the right reagents?<br>- were they made correctly?<br>- were they obtained from new source?<br>- are reagents contaminated?<br>- check DI water, any problems with system? |
| ____7) | Instrument Errors | - when was instrument last serviced?<br>- is maintenance or cleaning needed?<br>- did instrument malfunction during test?<br>- was response normal? |
| ____8) | Method Errors | - was proper method used?<br>- was an approved SOP available?<br>- was SOP followed?<br>- is there known problem with method?<br>- was holding time met?<br>- was good lab techniques used?<br>- was the analyst properly trained?<br>- were interferences considered?<br>- were prep steps proper & complete?<br>- were dilutions at proper concentration?<br>- review all raw data. |
| ____9) | PE Sample Errors | - reason to question validity of PE sample?<br>- was sample reanalyzed to verify result?<br>- was PE sample prepared per instructions? |

## 11. PREVENTATIVE MAINTENANCE PROCEDURES AND SCHEDULE

Every instrument and pipet has a maintenance schedule of (at a minimum) once per month. Maintenance files include information on routine maintenance steps, frequencies, and provides space for a diary of work done to that instrument.

For major instrumentation (GC/MS, GC, AA) a maintenance log book is kept next to the instrument. Any work done to that instrument is logged into this book.

Service contracts are maintained for GC/MS, GC, and AA.

## 13. LISTING OF ACRONYMS

AA - Atomic Absorption
BFB - Bromofluorobenzene (volatile tuning compound)
CAR - Corrective Action Report
CB - Calibration Blank
CCC - Continuing Calibration Compound
CCV - Continuing Calibration Verification
CFR - Code of Federal Regulations
CL - Control Limit
CLP - Contract Lab Program
COC - Chain of Custody
DFTPP - Decafluorotriphenylphosphate (semi-volatile tuning compound)
GC - Gas Chromatograph
GC/MS - Gas Chromatograph/Mass Spectrophotometer
ICP - Inductively Coupled Plasma
ICV - Initial Calibration Verification
INDA-M - Individual Mix A (pesticide standard)
INDB-M - Individual Mix B (pesticide standard)
ITP - Internal Testing Program
LCS - Laboratory Control Standard
LOQ - Limit of Quantitation
MDL - Method Detection Limit
MSA - Method of Standard Addition
MS/MSD - Matrix Spike/Matrix Spike Duplicate
NET - National Environmental Testing
NPDES - National Pollution Discharge Elimination System
PB - Procedure Blank
PCB - Polychlorinated biphenyl
PES - Performance Evaluation Sample
QA - Quality Assurance
QAP - Quality Assurance Plan
QAPP - Quality Assurance Project Plan
QC - Quality Control
r - Correlation Coefficient
cc - Correlation Coefficient
%R - Percent Recovery
RF - Response Factor
RL - Reporting Limit
RLVS - Reporting Limit Verification Standard
%RSD - Percent Relative Standard Deviation (standard deviation divided by the mean X 100)
RPD - Relative Percent Difference (difference divided by the average X 100)

SD - Standard Deviation
SOP - Standard Operating Procedure
SOQ - Statement of Qualifications
SPCC - System Performance Check Compound
SRM - Standard Reference Material
SW-846 - Solid Waste Manual; USEPA
USEPA - United States Environmental Protection Agency
VOA - Volatile Organic Analysis
VOC - Volatile Organic Compounds
WP - Water Pollution; PE study
WS - Water Supply; PE study