Availability of Ground Water in Marion County, Indiana

U.S. Geological Survey
Open-File Report 75-312

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US EPA RECORDS CENTER REGION 5
1002786

GEOLOGY

The geology of Marion County has been described by Harrison (1963) and the geohydrologic framework has been discussed by McGuinness (1943), Roberts and others (1955), and Cable and others (1971). As reported by these authors, the entire county is covered by unconsolidated glacial drift ranging in thickness from about 10 to 400 ft (3 to 122 m). Underlying the glacial drift are consolidated rocks consisting of limestone, dolomite, siltstone, sandstone and shale ranging in age from Mississippian to Ordovician.

Bedrock

The regional dip of the consolidated rocks is to the southwest, so that from northeast to southwest progressively younger rocks occur at the bedrock surface beneath the glacial drift. As shown in figure 2, limestone occurs immediately beneath the drift in the entire northeastern, eastern and extreme southeastern parts of the county. Over most of the rest of the county shale occurs immediately beneath the drift, with limestone beneath shale.

Glacial Drift

The greater part of the glacial drift in Marion County forms a till plain characterized by predominantly fine-grained deposits. Along the major streams, however, there are outwash sand and gravel deposits, overlain by recent alluvial deposits of sand, silt and clay. Figure 3 shows the surficial geology of the county as mapped by Harrison (1963).

During this study the lithology of the drift was determined through drillers' records (logs) of existing water wells, and through a program of test drilling carried out by U.S. Geological Survey personnel. In analyzing these data the glacial material was separated into four categories: (1) gravel; (2) mixed sand and gravel; (3) sand; and (4) silt or clay. East-west cross sections, spaced at 1-mi (1.6-km) intervals, were prepared to correlate lithology from point to point. The information was then assembled on maps, and ultimately was used to calculate the hydraulic properties of the drift throughout the county.

As a result of the lithologic mapping, three relatively thin, discontinuous sand and gravel aquifers were identified in the upland till-plain area. These aquifers range in thickness from 0 to 40 ft (13 m) although areas with thicknesses greater than 15 to 20 ft (5 to 6 m) are generally small in areal extent. The aquifers are situated one above the other, and are generally separated by varying thicknesses of predominantly finer-grained silt and clay which act as semipervious confining beds. The uppermost of these

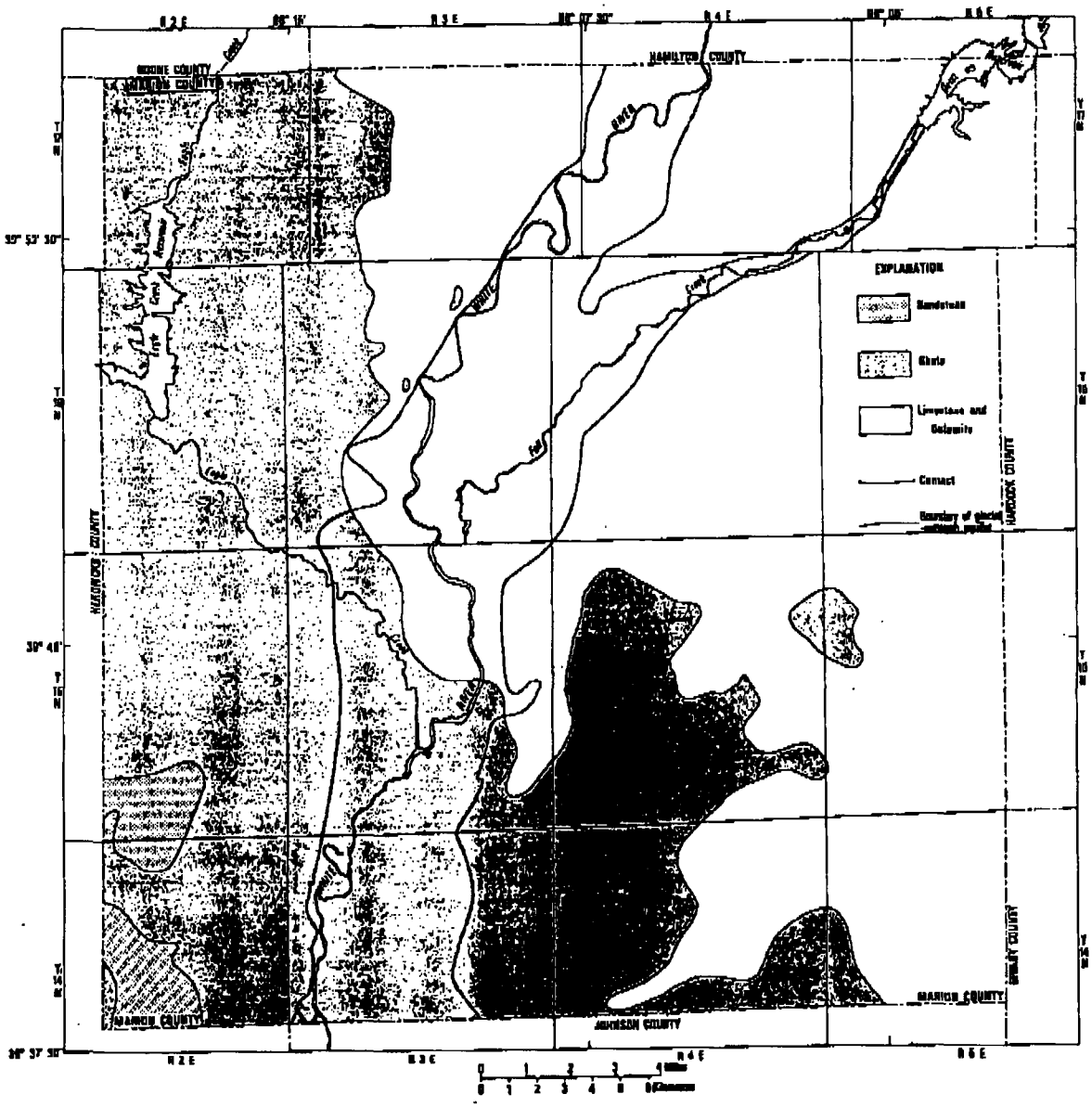
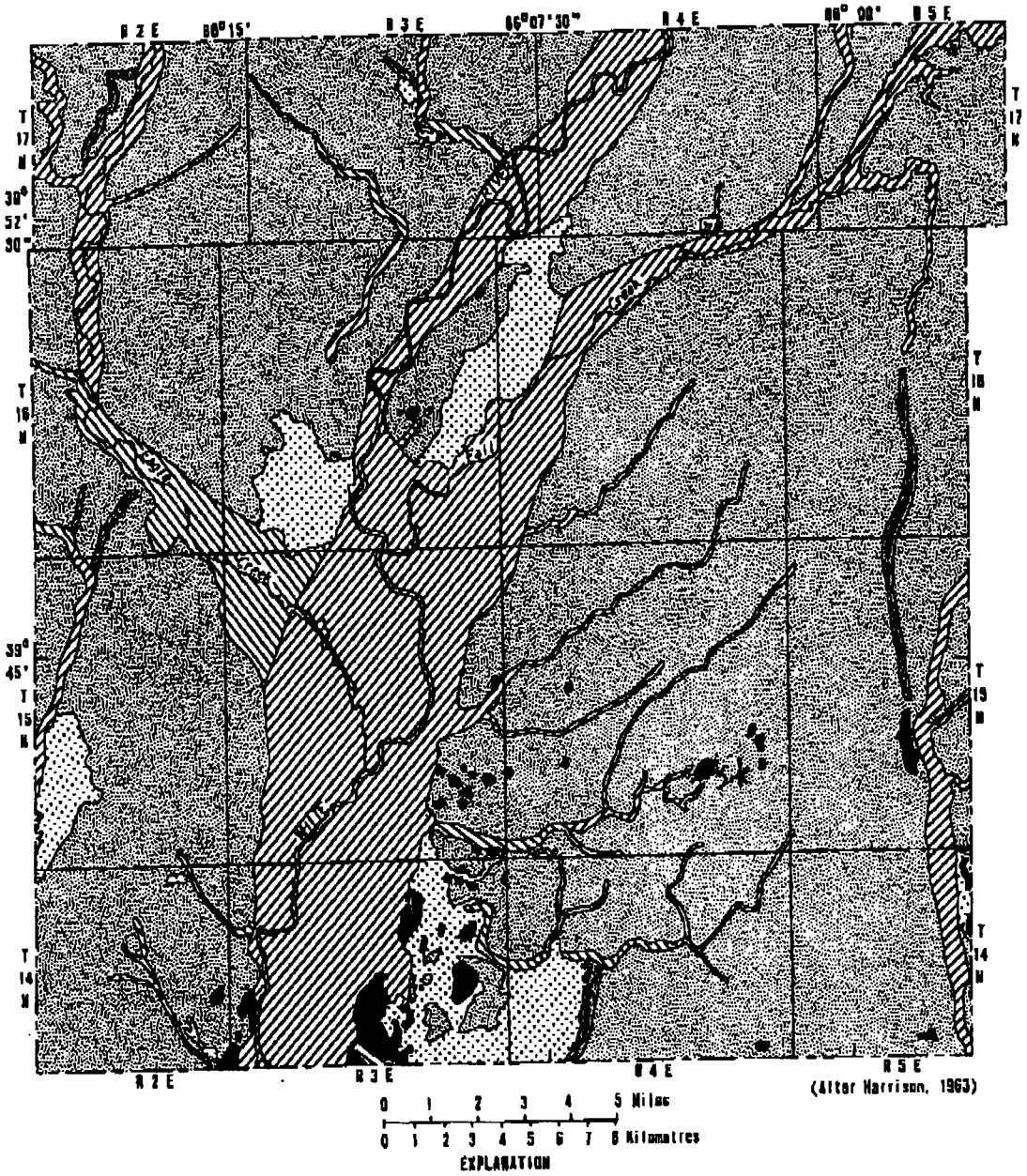


Figure 2.– Bedrock geology of Marion County



EXPLANATION

- Disintegration or end moraine
- Outwash plain
- Kames and linear disintegration ridges of stratified drift
- Valley or valley segment developed by meltwater flow in ice-walled channel
- Valley or valley segment developed by meltwater flow along former ice margin (may have been initiated by meltwater flow in ice-walled channel
- High-level valley developed by meltwater flow in ice-walled channel
- Contact

Figure 3.— Surficial geology of Marion County

aquifers is overlain by a varying thickness of this silt and clay; the potentiometric surface in the till-plain area occurs within this uppermost silt and clay. In some areas, two of the sand and gravel aquifers coalesce into one thicker sand and gravel body. In this report, the three sand and gravel aquifers are referred to as the upper, middle, and lower confined aquifers. Figures 4 through 6 show the areal distribution, approximate elevation of the top, and points of known thickness of the three confined aquifers.

As can be seen in figures 4 through 6, the upper, middle and lower confined aquifers in the till do not cover the county as areally continuous deposits. Large areas of silt and clay often separate one area of an aquifer from another. In addition, the upper confined aquifer does not exist in the till plain area on the west side of the glacial-outwash aquifer, nor in that part of the county between White River and Fall Creek. Figures 4 through 6 are based on the interpolation of field data, and because of the areally discontinuous nature of the confined aquifers, the mapping cannot be regarded as completely accurate. At any given point in the till plain it may be possible to find all three aquifers, none at all, or any combination of the three.

In addition to these three confined aquifers, a major unconfined sand and gravel aquifer was delineated along the White River and Fall Creek (fig. 3). The location of this aquifer generally coincides with the glacial melt water and outwash deposits mapped along these streams by Harrison (1963) as shown in figure 3, although some minor deviations exist. In this report, this aquifer system is referred to as the glacial-outwash aquifer. From an economic point of view it constitutes the most important aquifer in Marion County.

The glacial-outwash aquifer consists predominantly of sand and(or) gravel with discontinuous interbedded layers of finer-grained silt and clay. Well logs that do not show clay layers are rare, but the east-west cross sections indicate that the clay layers generally extend less than 1 mi (1.6 km) horizontally. An exception is the clay lens that occurs below and west of Eagle Creek in section 16 and in parts of sections 15, 17, 20, and 21 in T.15 N., R.3 E. While clay lenses reduce the horizontal transmissivity of the aquifer to some extent, their primary effect is to reduce the vertical hydraulic conductivity; locally, where this reduction is sufficient, semiconfined ground-water conditions may be found in the outwash.

The saturated thickness of the glacial-outwash aquifer was determined by installing 104 small diameter (1.5-in or 40-mm) observation wells throughout the aquifer, contouring the water levels for April 24, 1974, and subtracting the elevation of the top of the underlying bedrock at selected points. Figures 7 and 8 show the contoured water levels and the saturated thickness, respectively of the glacial-outwash aquifer.

In addition to the glacial-outwash aquifer and the three confined aquifers, small outwash deposits of sand and gravel are known to underlie some of the secondary streams in the county, and isolated pockets of sand and gravel are scattered throughout the till-plain area. These smaller deposits are of limited significance for water supply, and could not be mapped in the time available for the present study.

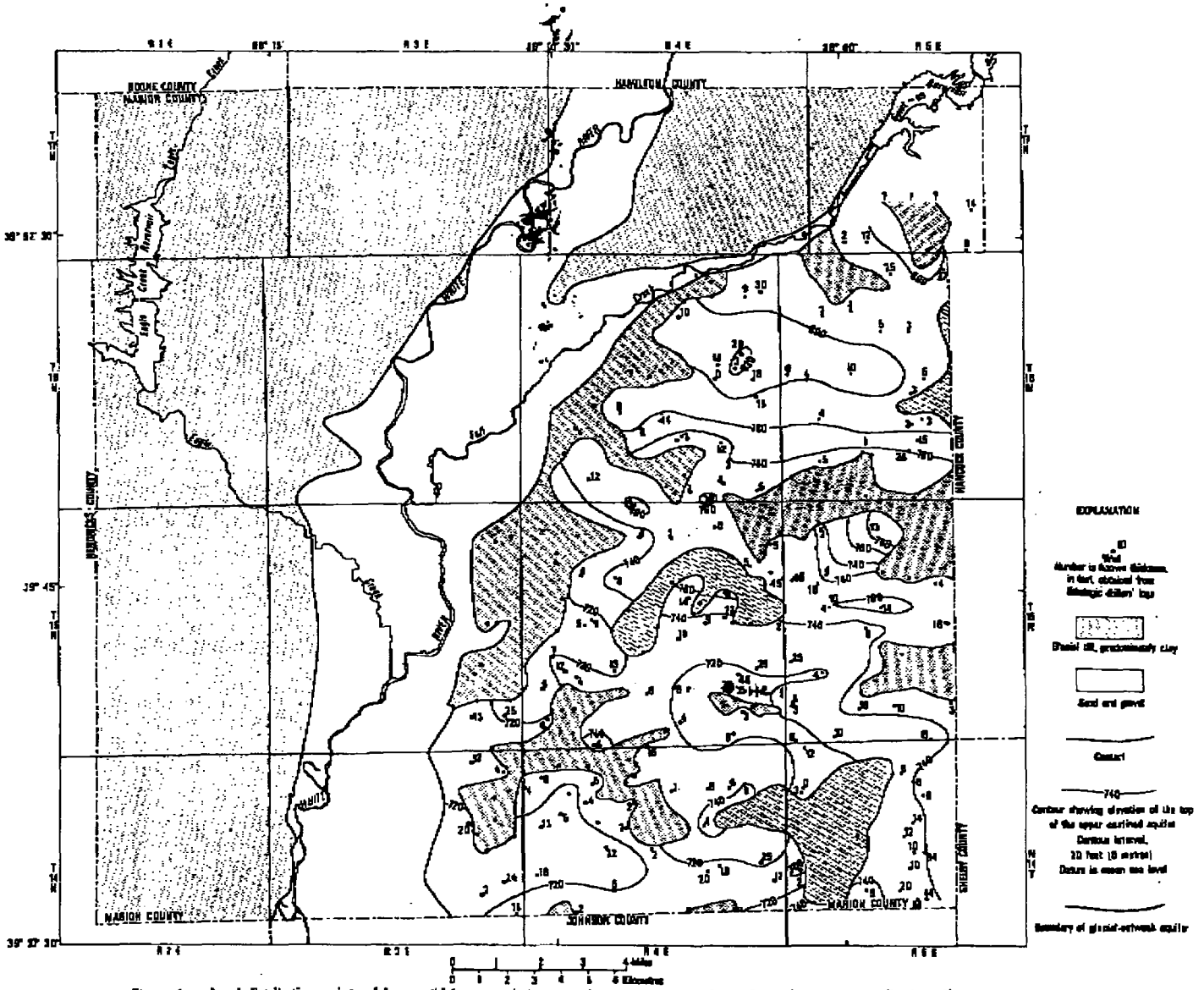


Figure 4. -- Areal distribution, points of known thickness, and the approximate elevation of the surface of the upper confined aquifer

non-responsive

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non-responsive

non-responsive

non-responsive

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
CHICAGO, ILLINOIS

DATE: JUN 15 1989

SUBJECT: **Review of Region 5 data for** REFINED METALS

FROM: **Curtis Ross, Director** CR
Region 5 Central Regional Laboratory

To: **Data User:** RCRA

Attached are the results for:

CRL Data Set Numbers: RCRA 6086 CASE 11789
Sample Numbers: 89KG01S01-S15 (15 samples)
Parameter(s): Total Metals
Laboratory: Keystone Environmental

Results Status:

(X) **DATA ACCEPTABLE FOR USE*** except Arsenic
(X) **DATA QUALIFIED AS TO USE** Arsenic data has a low spike recovery
( ) **DATA UNACCEPTABLE FOR USE**

(Arsenic data only)

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator:

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 3-3805

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

TRANSMITTED BY
JUN 15 1989
U.S. EPA CENTRAL REGIONAL LAB

RECEIVED BY/DATE:
Comments:

DATA SET RCRA	SITE	DU/ACT.
6106/CASE 11789	REFINED METALS	TFA 102

SAMPLES	PARAMETER(S)
89KG01S01-S15	TOTAL METALS

SAMPLED	RECEIVED PAPERWORK	DUE	LAB
	5-1-89	6-13-89	KEYSTONE

SHIPPED	DATA RECEIVED	CONTRACT
4-21-89	5-30-89	

Comments By Reviewer:

THIS REVIEW WAS A SYNOPTIC DATA REVIEW OF 15 SOIL SAMPLES FOR METALS. SPIKE RECOVERY FOR ANTIMONY IS < CRDL (40.2 %) SO IT ~~IS~~ THE DETECTION LIMIT SHOULD BE ELEVATED AND IT IS ESTIMATED "UJ". ARSENIC SPIKE RECOVERY IS LOW AND > CRDL SO IT IS BIASED LOW ESTIMATE "J". ZINC IS ESTIMATED DUE TO INTERFERENCES. ALL OTHER QC/QA IS ACCEPTABLE

Raymond A Pass
6-9-89

( ) REVIEWED ( ) UNREVIEWED TEAM LEADER/DATE

(✓) REVIEWED ( ) UNREVIEWED SECTION CHIEF/DATE CR Acting 6/14/89

( ) REVIEWED ( ) UNREVIEWED QC COORDINATOR/DATE

REVIEWED BY CONTRACT COORDINATOR/DATE

RECEIVED 6/12/89 TRANSMITTED ~~6/12/89~~ 6/15/89 DATA MANAGEMENT COORDINATOR Sylvia Griffin

QUALITY CONTROL COORDINATOR

KEYSTONE
ENVIRONMENTAL RESOURCES, INC.

Phone: 412/825-9600 3000 Tech Center Dr., Monroeville, PA 15146 Fax: 412/825-9699

RECEIVED
MAY 30 1989
US EPA CENTRAL REGIONAL LAB.
536 S. CLARK ST.
CHICAGO, ILLINOIS 60605

May 26, 1989

USEPA Region V, ESD
536 S. Clark Street
Tenth Floor, CRL
Chicago, Illinois 60605

Attention Curtis Ross

Dear Mr. Ross:

Please find enclosed the Inorganic Data Package for RCRA Case No. 11789.

Sincerely,

Mary Anna Babich

Mary Anna Babich
CLP Project Manager

MAB/pb

Enclosure

cc: USEPA Environmental Monitoring
Systems Laboratory (EMSL-LV)
944 East Harmon Executive Center
Las Vegas, Nevada 89109

U.S. Environmental Protection Agency
Sample Management Office (SMO)
209 Madison Street, Suite 200
Alexandria, Virginia 22314

KEYSTONE ENVIRONMENTAL RESOURCES

NARRATIVE
CASE 11789

THE DATA CONTAINED IN THIS PACKAGE IS FOR THE RCRA PROGRAM.

As AND Pb WERE ANALYZED BY BOTH ICP AND HGA METHODS.

THE INITIAL SERIAL DILUTION ANALYZED FOR THIS PACKAGE WAS VOIDED AND ANOTHER SAMPLE WAS ANALYZED WHICH CONTAINED As AND Pb.

THE COMPILER FOR THE IBM WHICH THE EPA PROGRAM IS LOCATED CAN HOLD A FILE UP TO A 100K. THIS PARTICULAR CASE HAD 135K BITES. FOR THIS REASON THE CASE WAS DIVIDED INTO TWO SECTIONS. THE FIRST SECTION CONTAINED: THE SAMPLES, THE FIRST SET OF QC FOR CALIBRATION(ICV,ICB, CCV, CCB), ALL THE ICSA'S AND ICSAB'S, ALL THE CRI'S AND CRA'S, THE PREP BLANK, THE LCS, THE DUPLICATE AND THE SPIKE. THE SECOND SECTION CONTAINED ICV2 THROUGH ICV7 AND THEIR CORRESPONDING CCV'S AND CCB'S. FOR THIS REASON THE FORM II(A)'S AND FORM III'S ARE NOT FILLED-IN IN THE CORRECT ORDER.

U.S. EPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE 000 001

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

SOW No.: 7/87

EPA Sample No.	Lab Sample ID.
MES557	MES557
MES557D	MES557D
MES557S	MES557S
MES558	MES558
MES559	MES559
MES560	MES560
MES561	MES561
MES562	MES562
MES563	MES563
MES564	MES564
MES565	MES565
MES566	MES566
MES567	MES567
MES568	MES568
MES570	MES570
MES570D	MES570D
MES570S	MES570S
MES571	MES571
MES572	MES572

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If Yes-were data generated before application of background corrections? Yes/No NO

Comments:
RCRA
AS AND PB WERE ANALYZED BY HGA AND ICP METHODS

Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: John M Flaherty

Date: 5/26/89

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES557

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES557

Level (low/med): LOW Date Received: 04/22/89

% Solids: 87.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6000.00			P
7440-36-0	Antimony	7.90	U	N	P
7440-38-2	Arsenic	7.50		SN	F
7440-39-3	Barium	44.90	B		P
7440-41-7	Beryllium	0.09	U		P
7440-43-9	Cadmium	4.60			P
7440-70-2	Calcium	101000.00			P
7440-47-3	Chromium	10.70			P
7440-48-4	Cobalt	5.70	B		P
7440-50-8	Copper	19.80			P
7439-89-6	Iron	13700.00			P
7439-92-1	Lead	33.80			F
7439-95-4	Magnesium	31100.00			P
7439-96-5	Manganese	316.00			P
7439-97-6	Mercury	0.11	U		CV
7439-02-0	Nickel	18.20			P
7440-09-7	Potassium	1030.00	B		P
7782-49-2	Selenium	0.55	U		F
7440-22-4	Silver	0.71	U		P
7440-23-5	Sodium	140.00	B		P
7440-28-0	Thallium	0.50	B	W	F
7440-62-2	Vanadium	17.40			P
7440-66-6	Zinc	56.00		E	P
	Cyanide				NR

Probably background sample. (Low)

Color Before: LTBROWN Clarity Before: Texture: MED

Color After: GRAYBROWN Clarity After: Artifacts:

Comments:

5X DILUTION FOR Pb

U.S. EPA - CLP

000003

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES558

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES558

Level (low/med): LOW Date Received: 04/22/89

% 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	9230.00			P
7440-36-0	Antimony	7.60	U	N	P
7440-38-2	Arsenic	8.60		N	F
7440-39-3	Barium	69.70			P
7440-41-7	Beryllium	0.22	B		P
7440-43-9	Cadmium	5.30			P
7440-70-2	Calcium	6690.00			P
7440-47-3	Chromium	13.70			P
7440-48-4	Cobalt	8.20	B		P
7440-50-8	Copper	16.00			P
7439-89-6	Iron	15900.00			P
7439-92-1	Lead	487.00		*E	P
7439-95-4	Magnesium	3920.00			P
7439-96-5	Manganese	635.00			P
7439-97-6	Mercury	0.11	U		CV
7439-02-0	Nickel	15.30			P
7440-09-7	Potassium	658.00	B		P
7782-49-2	Selenium	0.66	B		F
7440-22-4	Silver	0.68	U		P
7440-23-5	Sodium	73.10	B		P
7440-28-0	Thallium	0.37	U	W	F
7440-62-2	Vanadium	25.60			P
7440-66-6	Zinc	72.90		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MED

Color After: LTGRAY Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES559

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES559

Level (low/med): LOW Date Received: 04/22/89

% Solids: 80.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8340.00			P
7440-36-0	Antimony	8.60	U	N	P
7440-38-2	Arsenic	10.20		S*	
7440-39-3	Barium	145.00			P
7440-41-7	Beryllium	0.27	B		P
7440-43-9	Cadmium	2.40			P
7440-70-2	Calcium	6930.00			P
7440-47-3	Chromium	23.60			P
7440-48-4	Cobalt	8.40	B		P
7440-50-8	Copper	120.00			P
7439-89-6	Iron	24600.00			P
7439-92-1	Lead	434.00		*E	P
7439-95-4	Magnesium	3410.00			P
7439-96-5	Manganese	652.00			P
7439-97-6	Mercury	0.12	U		CV
7439-02-0	Nickel	22.00			P
7440-09-7	Potassium	878.00	B		P
7782-49-2	Selenium	0.75	B		F
7440-22-4	Silver	0.77	U		P
7440-23-5	Sodium	141.00	B		P
7440-28-0	Thallium	0.42	U	W	F
7440-62-2	Vanadium	24.50			P
7440-66-6	Zinc	389.00		E	P
	Cyanide				NR

Color Before: DKBROWN Clarity Before: Texture: MED

Color After: GRAY Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1
INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.
MES560

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES560

Level (low/med): LOW Date Received: 04/22/89

% Solids: 81.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10700.00			P
7440-36-0	Antimony	126.00		N	P
7440-38-2	Arsenic	121.00		*	P
7440-39-3	Barium	115.00			P
7440-41-7	Beryllium	0.47	B		P
7440-43-9	Cadmium	56.80			P
7440-70-2	Calcium	67100.00			P
7440-47-3	Chromium	16.80			P
7440-48-4	Cobalt	7.80	B		P
7440-50-8	Copper	79.50			P
7439-89-6	Iron	19700.00			P
7439-92-1	Lead	33900.00		*E	P
7439-95-4	Magnesium	21700.00			P
7439-96-5	Manganese	418.00			P
7439-97-6	Mercury	0.36			CV
7439-02-0	Nickel	50.70			P
7440-09-7	Potassium	1470.00			P
7782-49-2	Selenium	8.40			F
7440-22-4	Silver	0.76	U		P
7440-23-5	Sodium	250.00	B		P
7440-28-0	Thallium	2.30	B		F
7440-62-2	Vanadium	25.90			P
7440-66-6	Zinc	165.00		E	P
	Cyanide				NR

Color Before: GRAYBROWN Clarity Before: Texture: MED

Color After: LTGRAY Clarity After: Artifacts:

Comments:
2X DILUTION FOR Pb
5X DILUTION FOR Se

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES561

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES561

Level (low/med): LOW Date Received: 04/22/89

% Solids: 90.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4440.00			P
7440-36-0	Antimony	3040.00		N	P
7440-38-2	Arsenic	1010.00		*	P
7440-39-3	Barium	207.00			P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	178.00			P
7440-70-2	Calcium	31900.00			P
7440-47-3	Chromium	29.20			P
7440-48-4	Cobalt	6.10	B		P
7440-50-8	Copper	592.00			P
7439-89-6	Iron	23600.00			P
7439-92-1	Lead	244000.00		*E	P
7439-95-4	Magnesium	7460.00			P
7439-96-5	Manganese	321.00			P
7439-97-6	Mercury	1.50			CV
7439-02-0	Nickel	128.00			P
7440-09-7	Potassium	785.00	B		P
7782-49-2	Selenium	83.00		S	F
7440-22-4	Silver	2.20	B		P
7440-23-5	Sodium	598.00	B		P
7440-28-0	Thallium	7.90			F
7440-62-2	Vanadium	12.80			P
7440-66-6	Zinc	476.00		E	P
	Cyanide				NR

Color Before: DKGRAY Clarity Before: Texture: MED

Color After: GRAY Clarity After: Artifacts:

Comments:

20X DILUTION FOR Pb

10X DILUTION FOR Se

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES562

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES562

Level (low/med): LOW Date Received: 04/22/89

% Solids: 90.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3130.00			P
7440-36-0	Antimony	3500.00		N	P
7440-38-2	Arsenic	1040.00		*	P
7440-39-3	Barium	294.00			P
7440-41-7	Beryllium	0.16	B		P
7440-43-9	Cadmium	227.00			P
7440-70-2	Calcium	35600.00			P
7440-47-3	Chromium	28.30			P
7440-48-4	Cobalt	4.10	B		P
7440-50-8	Copper	733.00			P
7439-89-6	Iron	23000.00			P
7439-92-1	Lead	323000.00		*E	P
7439-95-4	Magnesium	6870.00			P
7439-96-5	Manganese	270.00			P
7439-97-6	Mercury	2.10			CV
7439-02-0	Nickel	157.00			P
7440-09-7	Potassium	536.00	B		P
7782-49-2	Selenium	97.90		S	F
7440-22-4	Silver	2.60			P
7440-23-5	Sodium	798.00	B		P
7440-28-0	Thallium	9.50			F
7440-62-2	Vanadium	9.40	B		P
7440-66-6	Zinc	568.00		E	P
	Cyanide				NR

Color Before: DKGRAY Clarity Before: Texture: MED

Color After: DKGRAY Clarity After: Artifacts:

Comments:

20X DILUTION FOR Pb

0X DILUTION FOR Se

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES563

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES563

Level (low/med): LOW Date Received: 04/22/89

% Solids: 84.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3150.00			P
7440-36-0	Antimony	3600.00		N	P
7440-38-2	Arsenic	1780.00		*	P
7440-39-3	Barium	197.00			P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	572.00			P
7440-70-2	Calcium	19200.00			P
7440-47-3	Chromium	19.20			P
7440-48-4	Cobalt	3.70	B		P
7440-50-8	Copper	986.00			P
7439-89-6	Iron	30100.00			P
7439-92-1	Lead	423000.00		*E	P
7439-95-4	Magnesium	5820.00			P
7439-96-5	Manganese	229.00			P
7439-97-6	Mercury	12.00			CV
7439-02-0	Nickel	115.00			P
7440-09-7	Potassium	1290.00			P
7782-49-2	Selenium	137.00			F
7440-22-4	Silver	2.40			P
7440-23-5	Sodium	1210.00			P
7440-28-0	Thallium	31.90			F
7440-62-2	Vanadium	7.70	B		P
7440-66-6	Zinc	686.00		E	P
	Cyanide				NR

Color Before: DKGRAY Clarity Before: Texture: MED

Color After: GRAY Clarity After: Artifacts:

Comments:

50X DILUTION FOR Pb
X DILUTION FOR Hg
10X DILUTION FOR Se
5X DILTUION FOR Tl

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES564

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES564

Level (low/med): LOW Date Received: 04/22/89

% Solids: 84.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7640.00			P
7440-36-0	Antimony	376.00		N	P
7440-38-2	Arsenic	460.00		*	P
7440-39-3	Barium	82.10			P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	344.00			P
7440-70-2	Calcium	59600.00			P
7440-47-3	Chromium	12.70			P
7440-48-4	Cobalt	5.30	B		P
7440-50-8	Copper	113.00			P
7439-89-6	Iron	14900.00			P
7439-92-1	Lead	166000.00		*E	P
7439-95-4	Magnesium	17100.00			P
7439-96-5	Manganese	301.00			P
7439-97-6	Mercury	3.60			CV
7439-02-0	Nickel	35.00			P
7440-09-7	Potassium	2100.00			P
7782-49-2	Selenium	72.40			F
7440-22-4	Silver	0.74	U		P
7440-23-5	Sodium	720.00	B		P
7440-28-0	Thallium	49.30			F
7440-62-2	Vanadium	19.00			P
7440-66-6	Zinc	360.00		E	P
	Cyanide				NR

Color Before: GRAYBLUE Clarity Before: Texture: MED

Color After: LTGRAY Clarity After: Artifacts:

Comments:

10X DILUTION FOR Pb
5X DILUTION FOR Hg
5X DILUTION FOR Se
5X DILTUION FOR Tl

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES565

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES565

Level (low/med): LOW Date Received: 04/22/89

% Solids: 83.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8210.00			P
7440-36-0	Antimony	543.00		N	P
7440-38-2	Arsenic	633.00		*	P
7440-39-3	Barium	96.70			P
7440-41-7	Beryllium	0.41	B		P
7440-43-9	Cadmium	395.00			P
7440-70-2	Calcium	41500.00			P
7440-47-3	Chromium	13.30			P
7440-48-4	Cobalt	5.30	B		P
7440-50-8	Copper	159.00			P
7439-89-6	Iron	16200.00			P
7439-92-1	Lead	227000.00		*E	P
7439-95-4	Magnesium	13700.00			P
7439-96-5	Manganese	259.00			P
7439-97-6	Mercury	5.20			CV
7439-02-0	Nickel	37.50			P
7440-09-7	Potassium	2310.00			P
7782-49-2	Selenium	70.20		S	F
7440-22-4	Silver	0.74	U		P
7440-23-5	Sodium	815.00	B		P
7440-28-0	Thallium	40.60			F
7440-62-2	Vanadium	20.00			P
7440-66-6	Zinc	410.00		E	P
	Cyanide				NR

Color Before: GRAYBLUE Clarity Before: Texture: MED

Color After: LTGRAY Clarity After: Artifacts:

Comments:

20X DILUTION FOR Pb
2X DILUTION FOR Hg
10X DILUTION FOR Se BY MSA
5X DILTUION FOR Tl

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES566

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES566

Level (low/med): LOW Date Received: 04/22/89

% Solids: 80.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10200.00			P
7440-36-0	Antimony	8.70	U	N	P
7440-38-2	Arsenic	20.70		SN	F
7440-39-3	Barium	89.60			P
7440-41-7	Beryllium	0.34	B		P
7440-43-9	Cadmium	10.10			P
7440-70-2	Calcium	5460.00			P
7440-47-3	Chromium	15.00			P
7440-48-4	Cobalt	7.20	B		P
7440-50-8	Copper	21.40			P
7439-89-6	Iron	17500.00			P
7439-92-1	Lead	1100.00		*E	P
7439-95-4	Magnesium	3250.00			P
7439-96-5	Manganese	528.00			P
7439-97-6	Mercury	0.30			CV
7439-02-0	Nickel	16.40			P
7440-09-7	Potassium	817.00	B		P
7782-49-2	Selenium	1.00	B		F
7440-22-4	Silver	0.77	U		P
7440-23-5	Sodium	122.00	B		P
7440-28-0	Thallium	0.60	B	W	F
7440-62-2	Vanadium	26.90			P
7440-66-6	Zinc	123.00		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MED

Color After: LTGRAY Clarity After: Artifacts:

Comments:
2X DILUTION FOR As BY MSA

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES567

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES567

Level (low/med): LOW Date Received: 04/22/89

% 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	4840.00			P
7440-36-0	Antimony	1560.00		N	P
7440-38-2	Arsenic	530.00		*	P
7440-39-3	Barium	210.00			P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	251.00			P
7440-70-2	Calcium	38500.00			P
7440-47-3	Chromium	12.50			P
7440-48-4	Cobalt	4.90	B		P
7440-50-8	Copper	313.00			P
7439-89-6	Iron	16800.00			P
7439-92-1	Lead	295000.00		*E	P
7439-95-4	Magnesium	11000.00			P
7439-96-5	Manganese	264.00			P
7439-97-6	Mercury	5.00			CV
7439-02-0	Nickel	76.60			P
7440-09-7	Potassium	1730.00			P
7782-49-2	Selenium	91.10		S	F
7440-22-4	Silver	2.00	B		P
7440-23-5	Sodium	634.00	B		P
7440-28-0	Thallium	19.30			F
7440-62-2	Vanadium	12.20			P
7440-66-6	Zinc	364.00		E	P
	Cyanide				NR

Color Before: GRAYBROWN Clarity Before: Texture: MED

Color After: GRAY Clarity After: Artifacts:

Comments:

20X DILUTION FOR Pb
5X DILUTION FOR Hg
10X DILUTION FOR Se BY MSA
2X DILUTION FOR Tl

U.S. EPA - CLP

0000013

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES568

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W6-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES568

Level (low/med): LOW Date Received: 04/22/89

% Solids: 84.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7940.00			P
7440-36-0	Antimony	20.70		N	P
7440-38-2	Arsenic	13.70		SN	F
7440-39-3	Barium	153.00			P
7440-41-7	Beryllium	0.23	B		P
7440-43-9	Cadmium	3.50			P
7440-70-2	Calcium	31900.00			P
7440-47-3	Chromium	12.70			P
7440-48-4	Cobalt	7.30	B		P
7440-50-8	Copper	23.40			P
7439-89-6	Iron	19900.00			P
7439-92-1	Lead	4920.00		*E	P
7439-95-4	Magnesium	11400.00			P
7439-96-5	Manganese	940.00			P
7439-97-6	Mercury	0.18			CV
7439-02-0	Nickel	18.50			P
7440-09-7	Potassium	695.00	B		P
7782-49-2	Selenium	1.00	B		F
7440-22-4	Silver	0.73	U		P
7440-23-5	Sodium	127.00	B		P
7440-28-0	Thallium	0.40	U	W	F
7440-62-2	Vanadium	21.50			P
7440-66-6	Zinc	64.90		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MED

Color After: LTBROWN Clarity After: Artifacts:

Comments:

2X DILUTION FOR As BY MSA

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES570

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES570

Level (low/med): LOW Date Received: 04/22/89

% Solids: 82.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9630.00			P
7440-36-0	Antimony	43.40		N	P
7440-38-2	Arsenic	82.30		*	P
7440-39-3	Barium	86.40			P
7440-41-7	Beryllium	0.67	B		P
7440-43-9	Cadmium	29.60			P
7440-70-2	Calcium	47600.00			P
7440-47-3	Chromium	16.10			P
7440-48-4	Cobalt	7.90	B		P
7440-50-8	Copper	40.50			P
7439-89-6	Iron	17600.00			P
7439-92-1	Lead	9620.00		*E	P
7439-95-4	Magnesium	17400.00			P
7439-96-5	Manganese	375.00			P
7439-97-6	Mercury	1.00			CV
7439-02-0	Nickel	26.90			P
7440-09-7	Potassium	1160.00	B		P
7782-49-2	Selenium	27.30			F
7440-22-4	Silver	0.75	U		P
7440-23-5	Sodium	170.00	B		P
7440-28-0	Thallium	2.20	B		F
7440-62-2	Vanadium	25.10			P
7440-66-6	Zinc	142.00		E	P
	Cyanide				NR

Color Before: GRAYBROWN Clarity Before: Texture: MED

Color After: LTBROWN Clarity After: Artifacts:

Comments:

5X DILUTION FOR Se

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES571

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES571

Level (low/med): LOW Date Received: 04/22/89

% Solids: 63.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	17100.00			P
7440-36-0	Antimony	1860.00		N	P
7440-38-2	Arsenic	1410.00		*	P
7440-39-3	Barium	2300.00			P
7440-41-7	Beryllium	1.80			P
7440-43-9	Cadmium	78.90			P
7440-70-2	Calcium	34200.00			P
7440-47-3	Chromium	145.00			P
7440-48-4	Cobalt	43.00			P
7440-50-8	Copper	4080.00			P
7439-89-6	Iron	464000.00			P
7439-92-1	Lead	163000.00		*E	P
7439-95-4	Magnesium	6870.00			P
7439-96-5	Manganese	3230.00			P
7439-97-6	Mercury	1.30			CV
7439-02-0	Nickel	678.00			P
7440-09-7	Potassium	3540.00			P
7782-49-2	Selenium	21.20			F
7440-22-4	Silver	5.70			P
7440-23-5	Sodium	32000.00			P
7440-28-0	Thallium	4.00		+	F
7440-62-2	Vanadium	34.80			P
7440-66-6	Zinc	1510.00		E	P
	Cyanide				NR

Color Before: BROWN Clarity Before: Texture: MED

Color After: GRAY Clarity After: Artifacts:

Comments:
10X DILUTION FOR Pb
5X DILUTION FOR Se

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MES572

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Lab Sample ID: MES572

Level (low/med): LOW Date Received: 04/22/89

% Solids: 99.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7320.00			P
7440-36-0	Antimony	183.00		N	P
7440-38-2	Arsenic	191.00		*	P
7440-39-3	Barium	78.90			P
7440-41-7	Beryllium	0.22	B		P
7440-43-9	Cadmium	163.00			P
7440-70-2	Calcium	19700.00			P
7440-47-3	Chromium	20.10			P
7440-48-4	Cobalt	5.70	B		P
7440-50-8	Copper	151.00			P
7439-89-6	Iron	16600.00			P
7439-92-1	Lead	46200.00		*E	P
7439-95-4	Magnesium	6170.00			P
7439-96-5	Manganese	365.00			P
7439-97-6	Mercury	0.15			CV
7439-02-0	Nickel	60.60			P
7440-09-7	Potassium	891.00	B		P
7782-49-2	Selenium	99.40		S	F
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	288.00	B		P
7440-28-0	Thallium	2.30		W	F
7440-62-2	Vanadium	18.30			P
7440-66-6	Zinc	663.00		E	P
	Cyanide				NR

Color Before: BLACK Clarity Before: Texture: FINE

Color After: GRAY Clarity After: Artifacts:

Comments:
5X DILUTION FOR Pb
10X DILUTION FOR Se BY MSA

U.S. EPA - CLP

000038

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	28.5	U	56.3	B	28.5	U	28.5	U	5.700	U	P
Antimony	34.8	U	34.8	U	34.8	U	34.8	U	6.960	U	P
Arsenic	28.2	U	28.2	U	28.2	U	28.2	U	5.640	U	P
Barium	14.8	U	14.8	U	14.8	U	14.8	U	2.960	U	P
Beryllium	0.4	U	0.4	U	0.4	U	0.4	U	0.080	U	P
Cadmium	3.5	U	3.5	U	3.5	U	3.5	U	0.700	U	P
Calcium	11.0	U	47.7	B	16.6	B	11.0	U	45.122	B	P
Chromium	3.4	U	3.4	U	3.4	U	3.4	U	0.680	U	P
Cobalt	2.8	U	2.8	U	2.8	U	2.8	U	0.560	U	P
Copper	2.8	U	9.1	B	5.6	B	2.8	U	3.528	B	P
Iron	9.6	U	36.4	B	49.0	B	45.4	B	8.920	B	P
Lead	42.2	U	42.2	U	42.2	U	42.2	U	8.440	U	P
Magnesium	28.7	U	39.2	B	28.7	U	28.7	U	5.986	B	P
Manganese	0.9	U	0.9	U	0.9	B	0.9	U	0.252	B	P
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.100	U	CV
Nickel	12.8	U	12.8	U	12.8	U	12.8	U	2.560	U	P
Potassium	594.6	U	594.6	U	594.6	U	594.6	U	118.920	U	P
Selenium	2.9	B	2.4	U	2.5	B	2.4	U	0.520	B	F
Silver	5.8	B	8.1	B	4.9	B	3.1	U	0.620	U	P
Sodium	67.2	B	105.7	B	102.2	B	44.3	U	20.436	B	P
Thallium	1.7	U	1.7	U	1.7	U	1.7	U	0.340	U	F
Vanadium	2.4	U	2.4	U	2.4	U	2.4	U	0.480	U	P
Zinc	7.3	B	6.9	B	12.4	B	2.5	U	0.500	U	P
Cyanide											NR

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3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			28.5	U	28.5	U	28.5	U			P
Antimony			34.8	U	34.8	U	34.8	U			P
Arsenic			28.2	U	28.2	U	28.2	U			P
Barium			14.8	U	14.8	U	14.8	U			P
Beryllium			0.4	U	0.4	U	0.4	U			P
Cadmium			3.5	U	3.5	U	3.5	U			P
Calcium			12.2	B	11.0	U	11.8	B			P
Chromium			3.4	U	3.4	U	3.4	U			P
Cobalt			2.8	U	2.8	U	2.8	U			P
Copper			2.8	U	2.8	U	2.8	U			P
Iron			58.1	B	46.2	B	39.3	B			P
Lead			42.2	U	42.2	U	42.2	U			P
Magnesium			28.7	U	28.7	U	28.7	U			P
Manganese			0.9	U	0.9	U	0.9	U			P
Mercury											
Nickel			12.8	U	12.8	U	12.8	U			P
Potassium			594.6	U	594.6	U	594.6	U			P
Selenium			2.9	B	2.4	B	2.4	U			F
Silver			3.1	U	3.1	U	3.1	B			P
Sodium			44.3	U	44.3	U	44.3	U			P
Thallium			1.7	U	1.7	U					F
Vanadium			2.4	U	2.4	U	2.4	U			P
Zinc			2.5	U	2.5	U	2.5	U			P
Cyanide											NR

U.S. EPA - CLP

9000040

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			28.5	U							P
Antimony			34.8	U							P
Arsenic			28.2	U							P
Barium			14.8	U							P
Beryllium			0.4	U							P
Cadmium			3.5	U							P
Calcium			17.9	B							P
Chromium			3.4	U							P
Cobalt			2.8	U							P
Copper			2.8	U							P
Iron			42.6	B							P
Lead			42.2	U							P
Magnesium			28.7	U							P
Manganese			0.9	U							P
Mercury											
Nickel			12.8	U							P
Potassium			594.6	U							P
Selenium			2.4	U	2.4	U	2.4	B			F
Silver			3.1	U							P
Sodium			44.3	U							P
Thallium											
Vanadium			2.4	U							P
Zinc			2.5	U							P
Cyanide											NR

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3
BLANKS

0000041

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium			4.0	B							F
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

U.S. EPA - CLP

0000042

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	28.5	U	28.5	U	28.5	U	28.5	U			P
Antimony	34.8	U	34.8	U	34.8	U	34.8	U			P
Arsenic	28.2	U	28.2	U	28.2	U	28.2	U			P
Barium	14.8	U	14.8	U	14.8	U	14.8	U			P
Beryllium	0.4	U	0.4	U	0.4	U	0.4	U			P
Cadmium	3.5	U	3.5	U	3.5	U	3.5	U			P
Calcium	-12.9	B	11.0	U	11.0	U	11.0	U			P
Chromium	3.4	U	3.4	U	3.4	U	3.4	U			P
Cobalt	2.8	U	2.8	U	2.8	U	2.8	U			P
Copper	2.8	U	4.9	B	9.6	B	7.5	B			P
Iron	9.6	U	9.6	U	9.6	U	9.7	B			P
Lead	42.2	U	42.2	U	42.2	U	42.2	U			P
Magnesium	28.7	U	28.7	U	28.7	U	28.7	U			P
Manganese	0.9	U	0.9	U	0.9	U	0.9	U			P
Mercury	0.2	U	0.2	U	0.2	U					CV
Nickel	12.8	U	12.8	U	12.8	U	12.8	U			P
Potassium	594.6	U	594.6	U	594.6	U	594.6	U			P
Selenium	2.4	U	2.4	U	2.4	U	2.4	U			F
Silver	3.1	U	3.1	U	3.1	U	3.1	U			P
Sodium	44.3	U	44.3	U	44.3	U	44.3	U			P
Thallium	1.7	U	1.7	U	1.7	U	1.7	U			F
Vanadium	2.4	U	2.4	U	2.4	U	2.4	U			P
Zinc	-2.8	B	2.5	U	2.5	U	4.3	B			P
Cyanide											NR

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum			28.5	U	28.5	U					P
Antimony			34.8	U	34.8	U					P
Arsenic			28.2	U	28.2	U					P
Barium			14.8	U	14.8	U					P
Beryllium			0.4	U	0.4	U					P
Cadmium			3.5	U	3.5	U					P
Calcium			11.0	U	11.0	U					P
Chromium			3.4	U	3.4	U					P
Cobalt			2.8	U	2.8	U					P
Copper			7.2	B	7.5	B					P
Iron			9.8	B	15.6	B					P
Lead			42.2	U	42.2	U					P
Magnesium			28.7	U	28.7	U					P
Manganese			0.9	U	0.9	U					P
Mercury											
Nickel			12.8	U	12.8	U					P
Potassium			-601.0	B	594.6	U					P
Selenium			2.4	U							F
Silver			3.1	U	3.1	U					P
Sodium			44.3	U	44.3	U					P
Thallium											
Vanadium			2.4	U	2.4	U					P
Zinc			5.2	B	4.3	B					P
Cyanide											NR

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum	28.5	U	40.0	B	44.0	B					P
Antimony	34.8	U	34.8	U	34.8	U					P
Arsenic	28.2	U	28.2	U	28.2	U					P
Barium	14.8	U	14.8	U	14.8	U					P
Beryllium	0.4	U	0.4	B	0.6	B					P
Cadmium	3.5	U	3.5	U	3.5	U					P
Calcium	11.0	U	32.7	B	43.1	B					P
Chromium	3.4	U	3.4	U	3.4	U					P
Cobalt	2.8	U	2.8	U	2.8	U					P
Copper	2.8	U	9.5	B	11.9	B					P
Iron	-16.8	B	9.6	U	9.6	U					P
Lead	42.2	U	42.2	U	42.2	U					P
Magnesium	28.7	U	37.5	B	58.2	B					P
Manganese	0.9	U	0.9	U	0.9	U					P
Mercury											
Nickel	12.8	U	12.8	U	12.8	U					P
Potassium	594.6	U	594.6	U	594.6	U					P
Selenium											
Silver	3.1	U	3.9	B	3.8	B					P
Sodium	44.5	B	66.2	B	44.3	U					P
Thallium											
Vanadium	2.4	U	2.4	U	2.4	U					P
Zinc	5.8	B	11.1	B	13.8	B					P
Cyanide											NR

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0000045

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic	2.2	U	2.2	U	2.2	U	2.2	U			F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	42.2	U	42.2	U	42.2	U					P
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

U.S. EPA - CLP

0000046

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic			2.2	U	2.2	U					F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	2.6	U	2.6	U	2.6	U					F
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

U.S. EPA - CLP

0000047

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic	2.2	U	2.2	U	2.2	U	2.2	U	0.440	U	F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	2.6	U	2.6	U	2.6	U			1.260		F
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

U.S. EPA - CLP

3
BLANKS

0000048

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic			2.2	U							F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

U.S. EPA - CLP

0000049

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Prepa-ration Blank	C	M
Aluminum											
Antimony											
Arsenic	2.2	U	2.2	U	2.2	U	2.2	U			F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

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0000050

3
BLANKS

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Preparation Blank Matrix (soil/water):

Preparation Blank Concentration Units (ug/L or mg/kg):

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum											
Antimony											
Arsenic	2.2	U	2.2	U	2.2	U					F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											NR

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

ICP ID Number: ICAP61 ICS Source: EMSL-LV

Concentrations Units: UG/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum	511000	508000	540786	531026.4	104.5	556202	550642.0	108.4
Antimony			2	-21.0		68	-1.9	
Arsenic			-97	-122.8		149	76.6	
Barium		483	1	478.1	99.0	2	486.6	100.7
Beryllium		474	-0	446.9	94.3	0	461.4	97.3
Cadmium		909	-1	949.4	104.4	-5	1025.2	112.8
Calcium	476000	470000	490101	479138.5	101.9	511864	504891.8	107.4
Chromium	48	513	41	511.2	99.7	45	533.0	103.9
Cobalt		478	-2	440.3	92.1	-0	468.2	97.9
Copper		534	-1	492.4	92.2	-0	504.3	94.4
Iron	219000	211000	209882	206587.5	97.9	218984	216877.5	102.8
Lead		4850	-61	4703.0	97.0	27	5140.4	106.0
Magnesium	513000	513000	554428	542975.0	105.8	576033	568676.8	110.9
Manganese		470	-3	452.9	96.4	-3	475.8	101.2
Mercury								
Nickel		916	-1	858.6	93.7	-0	913.2	99.7
Potassium			-24	-415.3		452	260.5	
Selenium								
Silver		993	-1	982.8	99.0	1	1027.4	103.5
Sodium			224	234.8		196	195.1	
Thallium								
Vanadium		475	-1	463.5	97.6	1	479.2	100.9
Zinc		973	-4	941.3	96.7	-3	1011.9	104.0

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000052

ICP INTERFERENCE CHECK SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

ICP ID Number: ICAP61 ICS Source: EMSL-LV

Concentrations Units: UG/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	511000	508000	546199	538104.9	105.9	532717	529845.5	104.3
Antimony			-2	-6.5		0	-16.1	
Arsenic			-96	-98.6		-36	-32.5	
Barium		483	1	477.5	98.8	1	471.6	97.6
Beryllium		474	-0	451.7	95.3	-0	451.8	95.3
Cadmium		909	-4	944.8	103.9	-3	938.8	103.3
Calcium	476000	470000	488914	472993.4	100.6	475153	470946.1	100.2
Chromium	48	513	45	511.6	99.7	41	511.2	99.6
Cobalt		478	-3	435.0	91.0	-4	439.4	91.9
Copper		534	1	487.1	91.2	1	480.9	90.1
Iron	219000	211000	211711	207781.2	98.5	208510	207713.0	98.4
Lead		4850	-32	4630.3	95.5	-64	4616.1	95.2
Magnesium	513000	513000	550240	537299.9	104.7	534654	530153.3	103.3
Manganese		470	-2	448.1	95.3	-2	446.3	95.0
Mercury								
Nickel		916	-5	847.9	92.6	-8	860.9	94.0
Potassium			93	-59.7		59	448.2	
Selenium								
Silver		993	-1	988.9	99.6	-1	968.5	97.5
Sodium			210	221.4		199	248.0	
Thallium								
Vanadium		475	-0	465.2	97.9	-1	461.6	97.2
Zinc		973	0	919.9	94.5	2	924.7	95.0

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0000053

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

ICP ID Number: ICAP61 ICS Source: EMSL-LV

Concentrations Units: UG/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	Initial Found %R	Final Found Sol. A	Final Found Sol. AB	Final Found %R
Aluminum	511000	508000	543295	535743.6	105.5	545182	531744.5	104.7
Antimony			8	-37.1		18	-25.3	
Arsenic			-43	-62.5		78	37.4	
Barium		483	2	487.3	100.9	2	487.7	101.0
Beryllium		474	0	454.8	96.0	0	454.9	96.0
Cadmium		909	-5	960.5	105.7	-7	977.1	107.5
Calcium	476000	470000	492558	483806.3	102.9	500204	484245.0	103.0
Chromium	48	513	41	521.3	101.6	45	521.1	101.6
Cobalt		478	-4	444.6	93.0	-2	445.0	93.1
Copper		534	1	493.1	92.3	5	488.6	91.3
Iron	219000	211000	210615	208599.8	98.9	214635	209018.0	99.1
Lead		4850	-98	4660.6	96.1	-65	4653.5	95.9
Magnesium	513000	513000	566948	557705.0	108.7	573361	556545.5	108.5
Manganese		470	1	457.9	97.4	4	457.9	97.4
Mercury								
Nickel		916	-2	861.8	94.1	1	867.1	94.7
Potassium			-35	471.9		641	705.0	
Selenium								
Silver		993	0	995.1	100.2	5	984.6	99.2
Sodium			224	237.1		222	234.1	
Thallium								
Vanadium		475	-2	461.3	97.1	-0	464.4	97.8
Zinc		973	-7	933.9	96.0	-5	925.6	95.1

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

ICP ID Number: ICAP61 ICS Source: EMSL-LV

Concentrations Units: UG/L

Analyte	True Sol. A	True Sol. AB	Initial Found Sol. A	Initial Found Sol. AB	%R	Final Found Sol. A	Final Found Sol. AB	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead		4850	-37	4690.9	96.7	28	4689.5	96.7
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

9000055

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5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.
MES557S

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYFA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Level (low/med): LOW

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony	75-125	45.7788		7.9361	U	114.0	40.2	N	P
Arsenic	75-125	12.7024		7.5017		9.1	57.2	N	F
Barium	75-125	490.1346		44.9327	B	456.1	97.6		P
Beryllium	75-125	10.9282		0.0912	U	11.4	95.9		P
Cadmium	75-125	13.7765		4.6157		11.4	80.4		P
Calcium									NR
Chromium	75-125	54.9373		10.6636		45.6	97.1		P
Cobalt	75-125	110.9259		5.7081	B	114.0	92.3		P
Copper	75-125	70.3261		19.7788		57.0	88.7		P
Iron									NR
Lead		39.4527		33.7514		4.6	123.9		F
Magnesium									NR
Manganese	75-125	434.5907		316.3421		114.0	103.7		P
Mercury	75-125	0.5542		0.1140	U	0.6	92.4		CV
Nickel	75-125	125.7332		18.1779		114.0	94.3		P
Potassium									NR
Selenium	75-125	2.0981		0.5473	U	2.3	91.2		F
Silver	75-125	10.6910		0.7070	U	11.4	93.8		P
Sodium									NR
Thallium	75-125	12.1323		0.5017	B	11.4	102.0		F
Vanadium	75-125	122.4515		17.4116		114.0	92.1		P
Zinc	75-125	170.4789		55.9590		114.0	100.5		P
Cyanide									NR

Comments:
5X DILUTION FOR Pb

U.S. EPA - CLP

000056

5A
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.
MES570S

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Level (low/med): LOW

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony									NR
Arsenic	75-125	562.6562		82.3016		482.5	99.6		P
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead		19013.5992		9623.5586		120.6	7786.1		P
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

5B
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.
MES557A

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Level (low/med): LOW

Concentrations Units: UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum									NR
Antimony		162.68		34.80	U	120.0	135.6		P
Arsenic									NR
Barium									NR
Beryllium									NR
Cadmium									NR
Calcium									NR
Chromium									NR
Cobalt									NR
Copper									NR
Iron									NR
Lead									NR
Magnesium									NR
Manganese									NR
Mercury									NR
Nickel									NR
Potassium									NR
Selenium									NR
Silver									NR
Sodium									NR
Thallium									NR
Vanadium									NR
Zinc									NR
Cyanide									NR

Comments:

U.S. EPA - CLP

0000058A

6
DUPLICATES

EPA SAMPLE NO.

MES557D

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 87.7 % Solids for Duplicate: 87.3

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		6004.9443		6901.7837		13.9		P
Antimony		7.9361	U	7.9361	U			P
Arsenic	2.3	7.5017		6.6289		12.4		F
Barium	45.6	44.9327	B	46.4310		3.3		P
Beryllium		0.0912	U	0.0912	U			P
Cadmium	1.1	4.6157		3.9453		15.7		P
Calcium		101299.0703		97115.0156		4.2		P
Chromium	2.3	10.6636		11.6374		8.7		P
Cobalt		5.7081	B	6.0000	B	5.0		P
Copper	5.7	19.7788		17.7241		11.0		P
Iron		13696.4980		13971.9756		2.0		P
Lead		33.7514		32.8392		2.7		F
Magnesium		31135.0996		31622.8438		1.6		P
Manganese		316.3421		340.8712		7.5		P
Mercury		0.1140	U	0.1140	U			CV
Nickel	9.1	18.1779		19.8632		8.9		P
Potassium	1140.3	1031.9316	B	1330.5085		25.3		P
Selenium		0.5473	U	0.5701	B	200.0		F
Silver		0.7070	U	0.7070	U			P
Sodium		139.9772	B	173.8199	B	21.6		P
Thallium		0.5017	B	0.5245	B	4.4		F
Vanadium	11.4	17.4116		19.4116		10.9		P
Zinc		55.9590		56.1802		0.4		P
Cyanide								NR

U.S. EPA - CLP

0000058B

6
DUPLICATES

EPA SAMPLE NO.

MES570D

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 82.9 % Solids for Duplicate: 83.9

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

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								NR
Antimony								NR
Arsenic		82.3016		240.3305		98.0	*	P
Barium								NR
Beryllium								NR
Cadmium								NR
Calcium								NR
Chromium								NR
Cobalt								NR
Copper								NR
Iron								NR
Lead		9623.5586		87994.0156		160.6	*	P
Magnesium								NR
Manganese								NR
Mercury								NR
Nickel								NR
Potassium								NR
Selenium								NR
Silver								NR
Sodium								NR
Thallium								NR
Vanadium								NR
Zinc								NR
Cyanide								NR

U.S. EPA - CLP

0000059

7

LABORATORY CONTROL SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Solid LCS Source: EMSL-LV

Aqueous LCS Source: EMSL-LV

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	limits		%R
Aluminum				325.0	305.9		225.0	424.0	94.1
Antimony				211.0	236.5		127.0	294.0	112.1
Arsenic				917.0	1033.8		635.0	1199.0	112.7
Barium				4.8	5.4	B	0.0	40.0	112.5
Beryllium				19.4	18.7		16.5	22.3	96.4
Cadmium				45.4	47.8		35.7	55.1	105.3
Calcium				196200.0	180839.8		166800.0	225600.0	92.2
Chromium				99.6	102.3		79.2	120.0	102.7
Cobalt				144.0	143.5		125.0	162.0	99.7
Copper				6910.0	6824.9		6006.0	7820.0	98.8
Iron				22430.0	20896.8		17770.0	27080.0	93.2
Lead				236.0	246.5		188.0	285.0	104.4
Magnesium				118100.0	120605.0		100400.0	129900.0	102.1
Manganese				208.0	203.4		177.0	239.0	97.8
Mercury				12.7	12.8		8.5	17.0	100.8
Nickel				60.9	58.8		49.2	72.6	96.6
Potassium				50.0	139.8	B	0.0	1000.0	279.6
Selenium				39.2	38.0		19.1	59.4	96.9
Silver				22.2	21.8		15.5	29.0	98.2
Sodium				50.0	85.4	B	0.0	1000.0	170.8
Thallium				39.0	39.0		24.6	53.5	100.0
Vanadium				65.8	66.5		51.7	79.9	101.1
Zinc				187.0	176.4		138.0	236.0	94.3
Cyanide									

59B

U.S. EPA - CLP

7

LABORATORY CONTROL SAMPLE

Lab Name: KEYSTONE-MONROEVILLE Contract: 68-W8-0025

Lab Code: KEYPA Case No.: 11789 SAS No.: SDG No.: MES557

Solid LCS Source: EMSL-LV

Aqueous LCS Source: EMSL-LV

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	C	Solid (mg/kg) limits		Solid (mg/kg) %R
Aluminum									
Antimony									
Arsenic				917.0	1052.0		635.0	1199.0	114.7
Barium									
Beryllium									
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead				236.0	265.2		188.0	285.0	112.4
Magnesium									
Manganese									
Mercury									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Thallium									
Vanadium									
Zinc									
Cyanide									

614 890-5501
Ext 302

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
CHICAGO, ILLINOIS

DATE: MAY 25 1989

SUBJECT: Review of Region 5 data for Refined metals

FROM: Curtis Ross, Director Eli Tang for
Region 5 Central Regional Laboratory

To: Data User: RCRA

Attached are the results for:

CRL Data Set Numbers: RCRA 6058
Sample Numbers: 89KG01 504-515
Parameter(s): Hg
Laboratory: CRL

Results Status:

(✓) DATA ACCEPTABLE FOR USE*
( ) DATA QUALIFIED AS TO USE
( ) DATA UNACCEPTABLE FOR USE

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator:

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 353-3805.

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

TRANSMITTED BY
Sylvia Griffin
MAY 25 1989

U.S. EPA CENTRAL
REGIONAL LAB

RECEIVED BY/DATE:

Comments:

9

ENVIRONMENTAL PROTECTION AGENCY
FOR THE TEAM: METALS

DIVISION/BRANCH RCRA SAMPLING DATE 4-20-89 LAB ARRIVAL DATE 4-24-89 DUE DATE 5-15-89

DU NUMBER AGD DATASET NUMBER 6058 STUDY REFINED METALS PRIORITY — CONTRACTOR CRL

OK-PP 5/22/89

CRL LOG NUMBER	SAMPLE DESCRIPTION	MATRIX EP TOX EXTRACT TEST UNITS Bq ~~ME1235826~~ ug/L	EP TOX EXTRACT Cd ug/L	EP TOX EXTRACT Cr ug/L	EP TOX EXTRACT Hg ~~ug/L~~ (PP) mg/L	EP TOX EXTRACT ~~Ni~~ Se ug/L	EP TOX EXTRACT ~~Cr 16~~ Ag ug/L
89KG01							
S04		X	X	X	X 0.0001u	X	X
S05		X	X	X	X 0.0001u	X	X
S06		X	X	X	X 0.0001u	X	X
S07		X	X	X	X 0.0001u	X	X
S08		X	X	X	X 0.0001u	X	X
S09		X	X	X	X 0.0001u	X	X
S10		X	X	X	X 0.0001u	X	X
S11		X	X	X	X 0.0001u	X	X
S12		X	X	X	X 0.0001u	X	X
S13		X	X	X	X 0.0001u	X	X
S14		X	X	X	X 0.0001u	X	X
S15		X	X	X	X 0.0001u	X	X
					5-15-89 RAP		

CRL V.2: 3/85

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION 5
CHICAGO, ILLINOIS

DATE: MAY 2 0 1989

SUBJECT: Review of Region 5 data for Refined Metals

FROM: Curtis Ross, Director Chi Fang for
Region 5 Central Regional Laboratory

To: Data User: RCRA

Attached are the results for:

CRL Data Set Numbers: ~~89KG01504-515~~ RCRA 6058
Sample Numbers: 89KG01504-515
Parameter(s): ICP (EP Tox)
Laboratory: CRL

Results Status:

( ) DATA ACCEPTABLE FOR USE*
(X) DATA QUALIFIED AS TO USE
( ) DATA UNACCEPTABLE FOR USE

* For data acceptability requirements, refer to the method capability statement for the methods referenced.

Comments by the Quality Control Coordinator: Ag estimated (high bias) samples 89KG01504-512.
Al, B, Ba, Cu, Mg estimated (high bias) on samples 89KG01513-515
- CD & Pb violated the regulation.
- Ag, Ba, & Cr do not show violations.

If there are any questions regarding the data, refer them to David Payne, the Quality Control Coordinator, at 353-3805.

Please sign and date this form below and return it with any comments to:

Sylvia Griffin
Data Management Coordinator
Region 5 Central Regional Laboratory
(5SCRL)

RECEIVED BY
Sylvia Griffin
MAY 2 1989
U.S. EPA CENTRAL REGIONAL LAB

RECEIVED BY/DATE:
Comments:

JVM
22 May 89

EP Tox
Refined Metals

SAMPLE REPORT

Sample RCRA6058 KG01S13 Operator

Date analyzed 05/10/89 Factor 89.67000 File name RUN679A

Element	Unit	Concentration	
Silver	ug/L	538.	U
Aluminum	ug/L	7170.	U J
Boron	ug/L	7170.	U J
Barium	ug/L	538.	U J
Beryllium	ug/L	89.7	U
Calcium	mg/L	1790.	U
Cadmium	ug/L	897.	U
Cobalt	ug/L	538.	U
Chromium	ug/L	717.	U
Copper	ug/L	538.	U J
Magnesium	mg/L	10.0	J
Iron	mg/L	1790.	U
Potassium	mg/L	448.	U
Lithium	ug/L	897.	U
Manganese	ug/L	4740.	
Molybdenum	ug/L	1350.	U
Sodium	mg/L	337.	
Nickel	ug/L	1580.	
Lead	ug/L	510000.	
Tin	ug/L	3590.	U
Strontium	ug/L	897.	U
Titianium	ug/L	2240.	U J
Vanadium	ug/L	448.	U J
Yttrium	ug/L	448.	U
Zinc	ug/L	5810.	
Zinc	mg/L	1790.	U

MS 5/16/89

JVM
22 May 89

SAMPLE REPORT EP Tox Refined Metals

Sample RCRA6058 KG01S14 Operator

Date analyzed 05/10/89 Factor 25.62000 File name RUN679A

Element	Unit	Concentration	
Silver	ug/L	154.	U
Aluminum	ug/L	2050.	U J
Boron	ug/L	2050.	U J
Barium	ug/L	1560.	J
Beryllium	ug/L	25.6	U
Calcium	mg/L	946.	
Cadmium	ug/L	423.	
Cobalt	ug/L	154.	U
Chromium	ug/L	205.	U.
Copper	ug/L	154.	U J
Magnesium	mg/L	40.5	J
Iron	ug/L	2050.	U J
Potassium	mg/L	128.	U
Lithium	ug/L	256.	U
Manganese	ug/L	2520.	
Molybdenum	ug/L	384.	U
Sodium	mg/L	25.6	U
Nickel	ug/L	384.	U
Lead	ug/L	363000.	
Tin	ug/L	1020.	U
Strontium	ug/L	1100.	
Titianium	ug/L	641.	U J
Vanadium	ug/L	128.	U J
Yttrium	ug/L	128.	U
Zinc	ug/L	1020.	U

MS 6/16/89

JVM
22May89

SAMPLE REPORT

Sample RCRA6058 KG01S15 Operator

Date analyzed 05/10/89 Factor 25.62000 File name RUN679A

Element	Unit	Concentration	
Silver	ug/L	154.	U
Aluminum	ug/L	2050.	UJ
Boron	ug/L	2050.	UJ
Barium	ug/L	269.	J
Beryllium	ug/L	25.6	U
Calcium	mg/L	512.	U
Cadmium	ug/L	4350.	
Cobalt	ug/L	154.	U
Chromium	ug/L	205.	U
Copper	ug/L	182.	J
Magnesium	mg/L	19.1	J
Iron	ug/L	2050.	UJ
Potassium	mg/L	128.	U
Lithium	ug/L	256.	U
Manganese	ug/L	3760.	
Molybdenum	ug/L	384.	U
Sodium	mg/L	25.6	U
Nickel	ug/L	499.	
Lead	ug/L	350000.	
Tin	ug/L	1020.	U
Strontium	ug/L	576.	
Titianium	ug/L	641.	UJ
Vanadium	ug/L	128.	UJ
Yttrium	ug/L	128.	U
Zinc	ug/L	6590.	

MS 5/16/89

JVM
22 May 89

SAMPLE REPORT EP Tox Refined Metals

Sample RCRA6058 KG01S04 Operator

Date analyzed 05/09/89 Factor 40.26000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	242.	U J
Aluminum	ug/L	3220.	U
Boron	ug/L	3220.	U
Barium	ug/L	529.	
Beryllium	ug/L	40.3	U
Calcium	mg/L	998.	
Cadmium	ug/L	1510.	
Cobalt	ug/L	242.	U
Chromium	ug/L	322.	U
Copper	ug/L	242.	U
Magnesium	mg/L	28.0	
Iron	ug/L	3220.	U
Potassium	mg/L	201.	U
Lithium	ug/L	403.	U
Manganese	ug/L	2240.	
Molybdenum	ug/L	604.	U
Sodium	mg/L	40.3	U
Nickel	ug/L	604.	U
Lead	ug/L	183000.	
Tin	ug/L	1610.	U
Strontium	ug/L	1010.	
Titianium	ug/L	1010.	U
Vanadium	ug/L	201.	U
Yttrium	ug/L	201.	U
Zinc	ug/L	1610.	U

MS 5/16/89

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KB01S05 Operator

Date analyzed 05/09/89 Factor 25.62000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	154.	UJ
Aluminum	ug/L	2050.	U
Boron	ug/L	2050.	U
Barium	ug/L	154.	U
Beryllium	ug/L	25.6	U
Calcium	mg/L	512.	U
Cadmium	ug/L	2780.	
Cobalt	ug/L	154.	U
Chromium	ug/L	205.	U
Copper	ug/L	154.	U
Magnesium	mg/L	7.1	
Iron	ug/L	2050.	U
Potassium	mg/L	128.	U
Lithium	ug/L	256.	U
Manganese	ug/L	969.	
Molybdenum	ug/L	384.	U
Sodium	mg/L	25.6	U
Nickel	ug/L	384.	U
Lead	ug/L	388000.	
Tin	ug/L	1020.	U
Strontium	ug/L	260.	
Titianium	ug/L	641.	U
Vanadium	ug/L	128.	U
Yitrium	ug/L	128.	U
Zinc	ug/L	2880.	

5/16/89 JMS

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KB01S06 Operator

Date analyzed 05/09/89 Factor 25.62000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	154.	UJ
Aluminum	ug/L	2050.	U
Boron	ug/L	2050.	U
Barium	ug/L	154.	U
Beryllium	ug/L	25.6	U
Calcium	mg/L	512.	U
Cadmium	ug/L	2350.	
Cobalt	ug/L	154.	U
Chromium	ug/L	205.	U
Copper	ug/L	154.	U
Magnesium	mg/L	6.5	
Iron	ug/L	2050.	U
Potassium	mg/L	128.	U
Lithium	ug/L	256.	U
Manganese	ug/L	856.	
Molybdenum	ug/L	384.	U
Sodium	mg/L	25.6	U
Nickel	ug/L	384.	U
Lead	ug/L	353000.	
Tin	ug/L	1020.	U
Strontium	ug/L	266.	
Titianium	ug/L	641.	U
Vanadium	ug/L	128.	U
Yttrium	ug/L	128.	U
Zinc	ug/L	2570.	

MS 5/16/89

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S07 Operator

Date analyzed 05/09/89 Factor 153.72000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	922.	UJ
Aluminum	ug/L	12300.	U
Boron	ug/L	12300.	U
Barium	ug/L	922.	U
Beryllium	ug/L	154.	U
Calcium	mg/L	3070.	U
Cadmium	ug/L	6200.	
Cobalt	ug/L	922.	U
Chromium	ug/L	1230.	U
Copper	ug/L	922.	U
Magnesium	mg/L	15.4	U
Iron	ug/L	12300.	U
Potassium	mg/L	769.	U
Lithium	ug/L	1540.	U
Manganese	ug/L	927.	
Molybdenum	ug/L	2310.	U
Sodium	mg/L	154.	U
Nickel	ug/L	2310.	U
Lead	ug/L	1340000.	
Tin	ug/L	6150.	U
Strontium	ug/L	1540.	U
Titianium	ug/L	3840.	U
Vanadium	ug/L	769.	U
Yttrium	ug/L	769.	U
Zinc	ug/L	6150.	U
Zinc	mg/L	3070.	U

MS 5/16/89

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S08 Operator

Date analyzed 05/09/89 Factor 13.42000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	80.5	UJ
Aluminum	ug/L	1070.	U
Boron	ug/L	1070.	U
Barium	ug/L	80.5	U
Beryllium	ug/L	13.4	U
Calcium	mg/L	1010.	
Cadmium	ug/L	11400.	
Cobalt	ug/L	80.5	U
Chromium	ug/L	107.	U
Copper	ug/L	80.5	U
Magnesium	mg/L	26.3	
Iron	ug/L	1070.	U
Potassium	mg/L	67.1	U
Lithium	ug/L	184.	
Manganese	ug/L	3080.	
Molybdenum	ug/L	201.	U
Sodium	mg/L	21.8	
Nickel	ug/L	287.	
Lead	ug/L	67200.	
Tin	ug/L	537.	U
Strontium	ug/L	777.	
Titianium	ug/L	336.	U
Vanadium	ug/L	67.1	U
Yttrium	ug/L	67.1	U
Zinc	ug/L	5340.	

5/16/89
MS

JM
12 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S09 Operator

Date analyzed 05/09/89 Factor 13.42000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	80.5	UJ
Aluminum	ug/L	1070.	U
Boron	ug/L	1070.	U
Barium	ug/L	80.5	U
Beryllium	ug/L	13.4	U
Calcium	mg/L	980.	
Cadmium	ug/L	11500.	
Cobalt	ug/L	80.5	U
Chromium	ug/L	107.	U
Copper	ug/L	80.5	U
Magnesium	mg/L	25.1	
Iron	ug/L	1070.	U
Potassium	mg/L	67.1	U
Lithium	ug/L	212.	
Manganese	ug/L	3070.	
Molybdenum	ug/L	201.	U
Sodium	mg/L	22.6	
Nickel	ug/L	302.	
Lead	ug/L	50200.	
Tin	ug/L	537.	U
Strontium	ug/L	720.	
Titianium	ug/L	336.	U
Vanadium	ug/L	67.1	U
Yttrium	ug/L	67.1	U
Zinc	ug/L	7040.	

5/16/89 MS

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S10 Operator

Date analyzed 05/09/89 Factor 1.22000 File name RUN679

Element	Unit	Concentration
Silver	ug/L	6.0 U I
Aluminum	ug/L	80.0 U
Boron	ug/L	80.0 U
Barium	ug/L	450.
Beryllium	ug/L	1.0 U
Calcium	mg/L	201.
Cadmium	ug/L	116.
Cobalt	ug/L	8.9
Chromium	ug/L	8.0 U
Copper	ug/L	6.0 U
Magnesium	mg/L	28.6
Iron	ug/L	80.0 U
Potassium	mg/L	5.0 U
Lithium	ug/L	15.1
Manganese	ug/L	377.
Molybdenum	ug/L	15.0 U
Sodium	mg/L	1.6
Nickel	ug/L	18.5
Lead	ug/L	2340.
Tin	ug/L	40.0 U
Strontium	ug/L	225.
Titianium	ug/L	25.0 U
Vanadium	ug/L	5.0 U
Yttrium	ug/L	5.0 U
Zinc	ug/L	228.

5/16/89
MS

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S11 Operator

Date analyzed 05/09/89 Factor 281.82000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	1690.	UJ
Aluminum	ug/L	22600.	U
Boron	ug/L	22600.	U
Barium	ug/L	1690.	U
Beryllium	ug/L	282.	U
Calcium	mg/L	5640.	U
Cadmium	ug/L	6120.	
Cobalt	ug/L	1690.	U
Chromium	ug/L	2250.	U
Copper	ug/L	1690.	U
Magnesium	mg/L	28.2	U
Iron	ug/L	22600.	U
Iron	mg/L	5640.	U
Potassium	mg/L	1410.	U
Lithium	ug/L	2820.	U
Manganese	ug/L	1540.	
Molybdenum	ug/L	4230.	U
Sodium	mg/L	282.	U
Nickel	ug/L	4230.	U
Lead	ug/L	2680000.	
Tin	ug/L	11300.	U
Strontium	ug/L	2820.	U
Titianium	ug/L	7050.	U
Vanadium	ug/L	1410.	U
Yttrium	ug/L	1410.	U
Zinc	ug/L	11300.	U
Zinc	mg/L	5640.	U

5/16/89
AMS

JVM
22 May 89

SAMPLE REPORT

Sample RCRA6058 KG01S12 Operator

Date analyzed 05/09/89 Factor 13.42000 File name RUN679

Element	Unit	Concentration	
Silver	ug/L	80.5	UJ
Aluminum	ug/L	1070.	U
Boron	ug/L	1070.	U
Barium	ug/L	80.5	U
Beryllium	ug/L	13.4	U
Calcium	mg/L	937.	
Cadmium	ug/L	564.	
Cobalt	ug/L	80.5	U
Chromium	ug/L	107.	U
Copper	ug/L	80.5	U
Magnesium	mg/L	37.0	
Iron	ug/L	1070.	U
Potassium	mg/L	67.1	U
Lithium	ug/L	156.	
Manganese	ug/L	2090.	
Molybdenum	ug/L	201.	U
Sodium	mg/L	13.4	U
Nickel	ug/L	201.	U
Lead	ug/L	71000.	
Tin	ug/L	537.	U
Strontium	ug/L	355.	
Titianium	ug/L	336.	U
Vanadium	ug/L	67.1	U
Yttrium	ug/L	67.1	U
Zinc	ug/L	537.	U

MS
5/16/89

file: III.C.8b.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

5SMQA

MEMORANDUM

DATE: January 30, 1989

SUBJECT: Site Sampling Plan for Refined Metals, Inc. Facility in Beech Grove, Indiana

FROM: James H. Adams, Jr., Chief
Quality Assurance Section

TO: William Muno, Chief
RCRA Enforcement Branch

We have reviewed the sampling plan for the Refined Metals, Inc. RCRA facility, which we received on January 27, 1989. We require a Quality Assurance Project Plan (QAPjP) for all sampling and analysis efforts. This document covers only one of the 16 QAPjP elements that must be addressed for these projects. We may provide approval of the sampling plan as one of the QAPP elements, however it is deficient in several areas. The following comments are provided to identify those deficiencies and recommend corrective measures.

I. Section 4.0, Sampling Methodology, refers to compositing soil samples. According to the description of soil sampling, the term "Mixing" would be more appropriate.

II. A complete, specific sample numbering system should be described. The system should provide unique sample numbers and consider field duplicates and blanks. Since the samples are proposed to be sent through the CLP, a Region 5 CRL sample number will also have to be assigned to each sample. Please correct section 5.1 to show these changes.

III. Equipment decontamination should add a final air drying step to the procedure listed in section 5.2.

IV. Analytical requirements in section 5.3 are too vague. Please specify what is meant by "total RCRA metals". Please provide specific analytical method references and identification of the project's target analytical parameters. Since these samples will be sent through the CLP, Special Analytical Service (SAS) request forms will have to be completed and submitted for review because the analyses are not from one of the Routine Analytical Service (RAS) Statement of Works (SOWs).

V. Table 2 does not mention preservative (4 degrees C) nor holding time requirements. Metals holding times by region 5 policy are the same for soils as they are for water samples, i.e. 6 months for metals, 28 days for mercury as per 40 CFR Part 136. Equipment rinsates will have to be treated as water samples and appropriately preserved with nitric acid to a pH<2, and kept at 4 degrees C until analysis.

If the TES IV Generic Quality Assurance Project Plan is to be used as a substitute for this project, as is indicated by this document's references to it, we will require more site specific information for each of the 16 QAPjP elements. We will also require a copy of the TES IV QAPP to check the appropriateness of the sampling plan references. Without specific data usage statements, data quality objectives and quality assurance objectives for the project, it is impossible to evaluate the selected metals methods. These items are integral parts of a QAPjP.

If there are any questions or comments concerning this memo, please contact George Schupp, Chemist, at 886-6221.

III.C.8.b.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: JAN 25 1989

SUBJECT: Sampling (QAPP)

FROM: William Muno, Chief P.E.A.
for RCRA Enforcement Branch

TO: James Adams, Chief
Quality Assurance Office (5-SQA)

Please provide an expedited review of the attached sampling project plan for Refined Metals Corporation located in Beech Grove, Indiana. A tentative sampling date has been scheduled for February 20, 1989.

If you have any questions please contact Jonathan Adenuga at (312) 886-7954.

Attachment

U.S. ENVIRONMENTAL PROTECTION AGENCY
TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES IV
CONTRACT NO. 68-01-7351
WORK ASSIGNMENT NO. R05027

SITE SAMPLING PLAN FOR REFINED METALS FACILITY BEECH GROVE, INDIANA

RCRA SAMPLING / ANALYSIS
EPA REGION V

JACOBS ENGINEERING GROUP INC.
PROJECT NUMBER: 05-B978-00

PREPARED BY:
METCALF & EDDY, INC.

JANUARY 1989

SITE SAMPLING PLAN
FOR
THE REFINED METALS FACILITY
BEECH GROVE, INDIANA

PREPARED FOR:
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION V
TECHNICAL ENFORCEMENT CONTRACT NO 68-01-7351
WORK ASSIGNMENT NO R05027
PROJECT NO. 05-8978-0

PREPARED BY:
METCALF AND EDDY, INC.
6480 BUSCH BOULEVARD, SUITE 200
COLUMBUS, OHIO 43229
(614) 436-5550

Dean Geers, Jacobs Engineering Group Inc.
TES IV Manager for Region V

1/12/89
Date

James P. Strayton, Metcalf and Eddy, Inc.
Work Assignment Manager

1/10/89
Date

Jonathan Adenuga, U.S. Environmental Protection Agency - Region V RCRA Primary Contact

Date

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1.0 OBJECTIVE

This sampling plan has been prepared to establish the proper collection of soil samples at the Refined Metals, Inc. facility as part of an on-going Environmental Assessment of the Refined Metals facility for the U.S. EPA, Region V. A Preliminary Review of background documents relating to Refined Metals was conducted in December, 1988. A Visual Site Inspection was carried out on December 19, 1988 to determine sample locations at the facility. The proposed sampling dates are February 8-10, 1988. The objectives of the soil sampling are to determine if heavy metals have been released from the facility process buildings to the surrounding soils and to determine if these soils have become E.P. Toxic.

This sampling plan provides general guidelines for Quality Assurance/Quality Control (QA/QC) and describes sample documentation requirements. Activities to be performed by the TES Contractor will adhere strictly to the TES IV Generic Quality Assurance Project Plan (QAPP) for conducting RCRA Facility Assessments (RFA's) in Region V (Final February 10, 1987). The TES IV QAPP will be used to insure that all QA/QC needs are adequately met during this sampling trip. Specific sections of the QAPP have been cited in the text of this sampling plan where appropriate.

2.0 SITE BACKGROUND AND HISTORY

The Refined Metals facility is located at 3700 South Arlington Street, in Beech Grove, Indiana. It is an active facility that reclaims lead from spent lead-acid batteries and produces lead ingots.

The facility filed a RCRA Part A application with the U.S. EPA in 1980. However, no process codes were specified in the application. A revised Part A application was submitted to U.S. EPA in July 1985. A waste storage pile process code (S03) was specified in this revised application. According to the current plant manager, Ron Witner, another revised Part A application was submitted on October 26, 1988 to U.S. EPA to increase spent battery storage from 200 to 400 cubic yards.

The facility currently operates a feedstock warehouse which they call the Materials Storage Building. U.S. EPA documents indicate the presence of a waste pile on-site, however, none was seen during the inspection. An outside battery storage area is located on the premises. The batteries are whole and are stored on wooden pallets which are on top of a concrete slab with a concrete curb around it. Refined Metals operates 3 baghouses on site: the metallurgic baghouse from the blast furnace, the sanitary baghouse from the blast furnace, and the refinery baghouse from the warehouse. All of the baghouse dust is recycled on-site. The facility has a new wastewater treatment plant on site, which they plan to bring on-line sometime during Spring 1989.

3.0 SAMPLING LOCATIONS

Soil samples will be collected from locations around the facility that were selected during the site inspection visit. Up to 35 samples will be collected from the selected locations. The specific number and locations of the samples will be determined during the sampling visit; however, no less than 15

and no more than 35 samples will be collected. These numbers were determined after conversations with the U.S. EPA Primary Contact (PC), Jonathan Adenuga. One off-site sample will be collected as a background sample. Its location will be upwind of the prevailing wind direction and away from drainage and run-off areas at the site. Figure 1 contains the facility map with 35 proposed soil sample locations.

The number of duplicate samples to be collected on-site will be at least 10 percent of the total number of samples collected. Thus, two to four duplicate samples will be collected. If less than 21 samples are collected, 2 duplicate samples will be collected. If 21 to 30 samples are collected, then 3 duplicates will be collected. If 31 or more samples are collected, then 4 duplicates will be collected.

4.0 SAMPLING METHODOLOGY

Two soil samples will be collected from each of the sampling locations in and around the facility. Samples will be collected following the procedures described in Section 6.0 of the TES IV Generic Quality Assurance Project Plan for RFA's in U.S. EPA Region V. Each soil sample will be collected using a heavy duty stainless steel hand auger. A square blade shovel will be used to collect samples if conditions, such as frozen ground, prevent the use of the auger. The auger or shovel will be driven into the ground the full length of the sample tube or blade, the "root" area will be removed, and the sample retrieved. The sample will be placed into a stainless steel bowl and composited. Then the sample will be transferred to the appropriate sample bottle. The bottle will be sealed, labeled, and packaged for shipment to the analytical laboratory for testing.

5.0 SAMPLE HANDLING

Samples will be documented upon collection and strict chain-of-custody procedures will be followed, as outlined in Section 7.0 of the Generic QAPP for RFA's in U.S. EPA Region V.

5.1 Sample Documentation

Field personnel are responsible for identifying and labeling samples in an organized and consistent manner. All sample labels and paper work related to sampling will be supplied by the U.S. EPA Region V Central Regional Lab.

The soil samples will be labeled S-01 through S-39 based on the sampling locations shown in Figure 1. Table 1 lists the number of soil and QA/QC samples to be collected at Refined Metals.

FIGURE 1

FACILITY MAP AND PROPOSED SOIL SAMPLE LOCATIONS AT THE REFINED METALS FACILITY

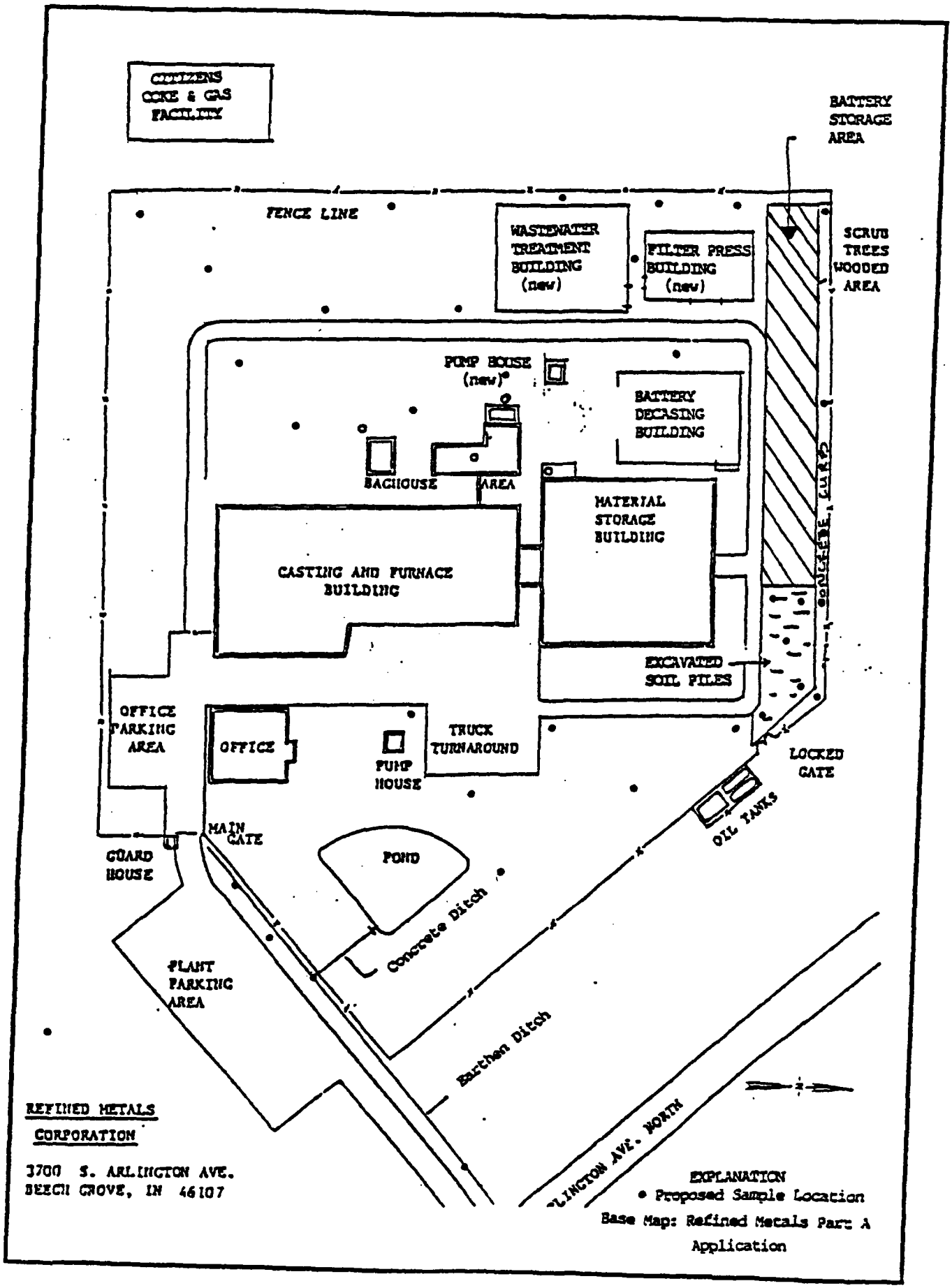

TABLE 1

THE NUMBER OF SOIL AND QA/QC SAMPLES
BEING COLLECTED AT THE REFINED METALS FACILITY

	Total Metals	EP Toxicity
Soil	35	35
Duplicates		
• Soil	4	4
Equipment Blanks		
• Rinsate	2	--

Note: All equipment blanks will be collected after the final rinse during equipment decontamination. The samples are collected rinse water after the final rinse.

If any of the sample sites are not used, those sample numbers will be deleted from the list. The duplicate samples are included in the sample number sequence, and will be submitted to the analytical laboratory as blind field duplicates. Sample numbers and corresponding blind field duplicate sample numbers will be provided to the U.S. EPA Central Regional Lab and the U.S. EPA PC after the samples have been shipped to the analytical laboratory.

Every sample label will include the following information:

*Date;
*Time;
*Case Number;
*Sample Number;
*Sample Matrix;
*Analysis to be performed;
*Sampling Team;

In addition to the above information, sampling procedures, including sampling processes and chain-of-custody procedures, will be recorded in a field logbook.

5.2 Equipment Decontamination

All equipment will be decontaminated before coming on-site and after each use during sampling. The procedure for equipment decontamination will be as follows:

*Wash with lab grade detergent and tap water;
*Initial rinse with deionized water;
*Rinse with dilute nitric acid solution;
*Final rinse with isopropanol.

5.3 Analytical Requirements

Two samples will be collected from each location. One sample will be analyzed for total RCRA metals and the other sample will be analyzed for E.P. Toxicity for the RCRA metals. The total metals samples will be characterized using ICP emission methods listed in SW-846, 3rd edition. The E.P. Toxicity samples will be characterized using methods listed in SW-846, 3rd edition, by having their extract analyzed for the RCRA metals. All samples will be placed in an 8 oz. glass sample bottle provided by the U.S. EPA RCRA bottle supplier and prepared for shipment to the analytical laboratory for analysis. Analyses will be performed through the U.S. EPA Contract Laboratory Program. Table 2 lists glassware needs for this sampling visit.

TABLE 2

THE NUMBER AND TYPE OF GLASSWARE
NEEDED FOR SAMPLING AT REFINED METALS

	8 oz Glass Jar	1 Liter Polyethylene
Soil		
• Total Metals	39	--
• E. P. Toxicity	39	--
Equipment Blank	--	2

The samples will be packaged as follows:

*Place sample in 8 oz. glass jar and cap jar;
*No preservation is necessary;
*Seal cap with electrical tape;
*Put appropriate chain-of-custody tags on sample jar;
*Put vermiculite into cooler;
*Put sample jars on top of vermiculite;
*Cover jars with ice packs;
*Cover ice packs with vermiculite;
*Seal chain-of-custody forms in a ziplock;
*Tape this ziplock to inside top of cooler;
*Seal cooler and place chain-of-custody seals on cooler.

5.4 Chain of Custody

The ability to demonstrate that samples have been obtained from the locations stated and that they have reached the laboratory without alteration is accomplished through chain-of-custody records. A chain-of-custody record will identify each sample and the individual responsible for sample collection, preparation, shipment and receipt.

Sample custody will be initiated by field personnel upon collection of samples. Documents specifically prepared for such purposes will be used for recording pertinent information about the type and numbers of samples collected and shipped for analysis.

The samples collected will first be brought to an on-site location for testing and paperwork checks. Labels and log information are checked to be sure there is no error in identification. Samples are packaged to prevent breakage or leakage, and labeled according to DOT regulations for transport by air as laboratory samples.

5.5 Split Samples

The opportunity to split samples will be offered to Mr. Ron Witner of Refined Metals. The TES contractor will collect and composite all samples for both parties. However, Refined Metals will have to supply their own sample containers, preserve and package their own samples, and arrange for laboratory analysis themselves.

Refined Metals Corporation (RMC)

Refined Metals Corp. reclaims lead from spent Lead - Acid batteries. The batteries are stored in a waste pile prior to recycling. It has been determined that these waste piles, puddles of contaminated water and several areas of soil contamination at this facility could be acting as potential sources of significant lead contamination.

Results of soil samples taken by the Indiana Department of Environmental Management in November 1985, at this facility showed the presence of arsenic, lead and cadmium. On April 20, 1989, the U.S. EPA conducted an independent investigation at this facility. Several samples of soils and waste were taken and analyzed. The results showed that the soils and waste were E.P. Toxic for lead, cadmium and selenium. The maximum concentration for characteristic of E.P Toxicity for lead and cadmium are 5 mg/l and 1.0 mg/l. The concentrations of lead and cadmium detected in the samples of soils and waste taken at the facility were above the regulatory levels. For example, some samples had lead concentrations of 510 mg/l, 1340 mg/l, 383 mg/l and cadmium at 4.4 mg/l and 2.8 mg/l. These concentrations are above the regulatory levels.