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PERIODIC COMPLIANCE REPORT

CERRO COPPER PRODUCTS COMPANY

SAUGET, ILLINOIS

C435

APRIL, MAY, JUNE
1990

PREPARED BY

PATTERSON SCHAFER, INC.
CHICAGO, ILLINOIS

FIELD SAMPLING REPORT

PERIODIC COMPLIANCE REPORT MONITORING

CERRO COPPER PRODUCTS COMPANY
SAUGET PLANT
SAUGET, ILLINOIS

Prepared By

PATTERSON SCHAFER, INC.
CHICAGO, ILLINOIS

APRIL, 1990

FOREWORD

The Periodic Compliance Report (PCR) monitoring involves various wastewater discharges associated with the Sauget Plant. The field activities related to the work for this reporting period included:

1. Preparation of Sampling Locations/Flow Monitoring Equipment
2. Preparation of Sample Bottles
3. Collection of Wastewater Samples
4. Collection of Flow Data
5. Sample Compositing
6. Record Keeping & Reporting

Activities 1 and 2 took place on April 17, 1990. Activities 3 and 4 were performed over a 24-hour period beginning the morning of April 18, 1990. Activity 5 took place one day after the 24-hour sampling period, and activity 6 was performed throughout.

This report presents the field and analytical results related to the PCR monitoring for all locations during the period described. Its purpose is to document data obtained and field observations made during the conduct of the effluent monitoring in response to the requirements of Administrative Order No. V-W-88-AO-01.

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SECTION I

I. DESCRIPTION OF SAMPLING LOCATIONS

This section provides a brief description of each of the sampling locations, including the significance of the discharge, the flow monitoring method, and the specific sample collection points.

LOCATION 3B

Sampling Location 3B is at the lift station just north of Tube Mill No. 2 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the east. The flow in the pipe represents the wastewater discharge from the Copper Forming operations at Tube Mill No. 2, with the exception of some sanitary wastewater that enters the wet well via a 6-inch diameter cast iron pipe adjacent and above the sampling point.

The wet well is approximately 15 feet deep and the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir insert installed in the 12-inch diameter pipe, and a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 8A

Sampling Location 8A is at the inlet manhole located along the main plant road just west of the Control Center (see Figure I-1). The flow entering the manhole from the west represents the process and non-process flow from the wet-processing areas of the Secondary Copper operations located in the central part of the plant complex. Other flows discharging into the manhole include a stormwater flow from several inlets in the sewer system upstream of the manhole, and a flow associated with the plant laboratory and discharging west of the Control Center.

The manhole is approximately 9 feet deep and serves as access to a 15-inch Leopold Lagco flume installed in a 15-inch diameter PVC pipe. Flow was monitored with a portable ultrasonic flow meter with strip chart recorder associated with the flume. Samples were collected from the flume.

LOCATION 9A

Sampling Location 9A is at the lift station just north of the Shaft Furnace Building No. 19 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the west. The flow in the pipe is non-regulated process and non-process wastewater such as non-contact cooling water, drinking fountains, and other miscellaneous non-regulated wastewaters. The flow may be increased during the winter months to protect the pipes from freezing.

The wet well is approximately 12 feet deep with the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir bolted to the wall in front of the 12-inch pipe, and a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 12C

Sampling Location 12C is the discharge from the East Outfall Lift Station located at the northeast corner of the Main Tube Mill Building (see Figure I-1). The flow discharging into the lift station constitutes all wastewater generated from plant operations North of Old Queeny Avenue. Monitoring at this location allows full quantification of the pollutant discharge via the East Outfall.

Flow was monitored by two continuous-recording doppler-type flow meters. One meter recorded discharge of the 4-inch diameter pump. The second meter recorded the flow in the 12-inch discharge line of the three pump system which is primarily used for storm weather conditions. Samples were collected from the discharge of the lift station.

LOCATION 21A (Cerro West)

Sampling Location 21A is the inlet of the manhole at the west plant entrance located east of Illinois Route 3 (see Figure I-1). Monitoring at this location allows full quantification of discharges leaving the plant complex via the West Outfall. It includes all flow discharged from plant operations South of Old Queeny Avenue.

The manhole is approximately 12 feet deep with an 18-inch Leopold Lagco flume installed in an 18-inch diameter clay pipe. Flow was monitored by a permanent doppler-type flow meter/strip chart recorder associated with the flume. Samples were collected from the flume.

SAMPLING LOCATION 30 (COPPER MOLDING & CASTING TREATMENT PLANT)

Sampling Location 30 is the discharge from the Copper Molding and Casting Pretreatment system for the casting furnace air pollution scrubber blowdown. Periodic blowdown from the direct chill casting cooling tower system is fed, as makeup water, to the recycle tank in the casting furnace air pollution scrubber system for reuse and ultimate inclusion in the blowdown to the pretreatment system. A single grab sample was collected from the well-mixed treated contents of each of the two effluent storage tanks during discharge. The combined discharge from the two tanks is considered a batch.

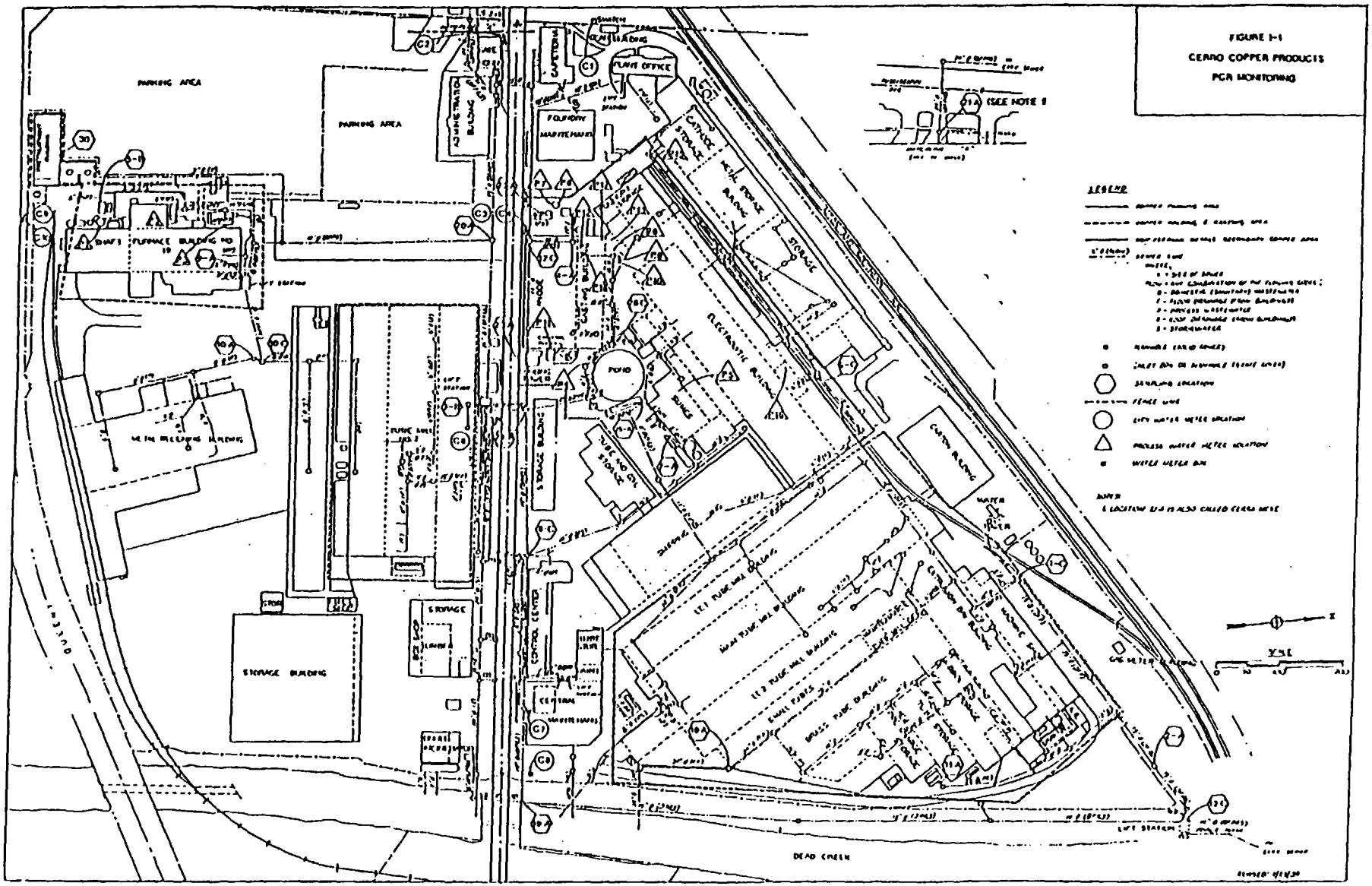

FIGURE I-1
CERRO COPPER PRODUCTS
PCR MONITORING

SECTION II

II. SAMPLE COLLECTION/FLOW MONITORING PROCEDURES

SAMPLE COLLECTION

Grab samples were collected periodically at all locations. Some of the individual grab samples were used to compile 24-hour flow-proportioned composite samples for semi-volatile organics (NVBN + NVA), and metals analyses. Others were submitted as collected for analyses requiring grabs (e.g., O&G). See Table II-1 for a summary of the type of sample bottles and preservatives used.

Grab Samples

During the 24-hour period, twelve grab samples were collected for metals and semi-volatile organics analyses from each sampling location (except Location 30) at 2-hour intervals. In addition, four grab samples were collected at 6-hour intervals for VOA, total phenols, and oil and grease analyses. Furthermore, pH and temperature measurements were taken.

Grab samples were collected at the discharge of the treatment plant associated with the copper molding and casting operations (Location 30) and analyzed for all parameters.

In all cases, the grab samples were collected from the flow exiting the weir or flume at each applicable location. All grab samples were placed on ice after collection.

Grab samples for VOA, total phenol, and oil and grease were collected at each location during runs 3, 6, 9, and 12.

Composite Samples

For each sampling location, 24-hour flow-proportioned composite samples were prepared on-site for metals and semi-volatile organics analyses. The percentage of sample required from each grab sample, based on the flow measured during the twelve 2-hour sampling periods, was compiled and recorded for each location.

FLOW MONITORING

During sample collection, totalizer readings were monitored at each location except Location 30. This was accomplished by totalizing/recording flow meters at each location. Table II-2 provides a summary of the flow measurement devices for each sampling location.

The large pumps at Location 12C were turned "off", preventing water from flowing through the 12-inch discharge line of the three pump system. Flow was only monitored through the 4-inch pipe connected to the small pump.

TABLE II-1

SAMPLE BOTTLES AND PRESERVATIVES

Analysis	Bottle		Preservation
	Type	Size	
VOA(1)	Clear glass Teflon lined cap	40 ml	Cool, 4°C
NVBN+NVA(2)	Clear glass Teflon lined cap	16 oz	Cool, 4°C
Metals (3)	Clear glass Teflon lined cap	8 & 16 oz	Nitric Acid to pH < 2
Oil & Grease	Clear glass Teflon lined cap	32 oz	Sulfuric Acid to pH < 2, Cool, 4°C
Total Phenols	Clear glass Teflon lined cap	16 oz	Sulfuric Acid to pH < 2, Cool, 4°C

Notes:

(1) Volatile Organics Analysis - Method 624 of 40CFR136

(2) Nonvolatile Base and Neutral Extractable Organics, and Nonvolatile Acid Extractable Organics - Method 625 of 40CFR136. Composite sample is kept in a amber glass, 80 oz teflon lined cap bottle.

(3) Analysis includes total chromium, total copper, total lead, total nickel, and total zinc.

TABLE II-2

FLOW MEASURING DEVICE FOR EACH SAMPLING LOCATION

Location	Pipe		Device	
	Type	Size (in)	Type	Size (in)
3B	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
8A	Polyvinyl Chloride	15	Rectangular flume with continuous flow meter/recorder	15
9A	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
12C (1)	Polyvinyl Chloride	4	Sonic flow meter with continuous totalizer/recorder	-
21A	Clay	18	Rectangular Flume with continuous flow meter/recorder	18

Notes:

(1) Discharge from East lift station included discharge of a 4" pump only. The 12" pump system was shut off.

SECTION III

III. SUMMARY OF FLOW MONITORING, FIELD pH AND TEMPERATURE DATA

Flow data were compiled during the 24-hour sampling period by periodically reading the totalizers associated with each flow meter at each location. The data are presented in Table III-1. The flows in the table are calculated differences in the recorded totalizer readings.

Field pH and temperature measurements were taken for the grab samples collected at 6-hour intervals. The data are compiled in Table III-2.

Field information from the metal molding and casting pretreatment plant discharge (Location 30) is provided in Table III-3.

TABLE III-1

FLOW MEASUREMENT SUMMARY

		Station 3B			Station 8A			Station 9A		
Run	Date	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (gal)	Volume	Time	Totalizer Reading (gal)	Volume (gal)
0	4/18	0808	04524	--	0804	035980	--	0812	03757	--
1		1010	05350	826	1006	041420	5440	1015	04413	656
2		1216	06185	835	1212	047870	6450	1220	05040	627
3		1417	06750	565	1410	053160	5290	1426	05715	675
4		1613	07445	695	1609	057770	4610	1616	06260	545
5		1812	08030	585	1805	062830	5060	1815	06870	610
6		2021	08715	685	2012	068390	5560	2029	07445	575
7		2225	09393	678	2223	073850	5460	2229	08070	625
8	4/19	0012	10060	667	0008	078190	4340	0019	08513	443
9		0220	10895	835	0209	082890	4700	0226	08935	422
10		0410	11752	857	0406	087843	4953	0412	09339	404
11		0606	12530	778	0603	092670	4827	0610	09602	263
12		0827	13510	980	0818	100250	7580	0832	10095	493
Total Volume		(gal)		8986			64270			6338
Average flow		(gpd)		8869			63651			6251
		(gpm)		6.2			44.2			4.3

TABLE III-1 (Continued)

FLOW MEASUREMENT SUMMARY

		Station 12C			Station 21A		
Run	Date	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (1000 gal)	Volume (gal)
0	4/18	0800	563020	--	0816	2236522	--
1		1000	564080	10600	1020	2236533	11,000
2		1207	565110	10300	1225	2236543	10,000
3		1402	566055	9450	1433	2236561	18,000
4		1605	567050	9950	1620	2236567	6,000
5		1800	567980	9300	1821	2236574	7,000
6		2003	568985	10050	2036	2236582	8,000
7		2212	570110	11250	2236	2236587	5,000
8	4/19	0002	571025	9150	0029	2236594	7,000
9		0200	572059	10340	0234	2236600	6,000
10		0400	573065	10060	0416	2236603	3,000
11		0600	573986	9210	0615	2236609	6,000
12		0810	575170	11840	0839	2236617	8,000
Total Volume		(gal)		121,500			95,000
Average Flow		(gpd)		120,662			93,506
		(gpm)		83.8			64.9

TABLE III-2

pH AND TEMPERATURE DATA (1)

Station		3B			8A			9A			12C			21A		
Date	Run	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)
4/18	2	1216	7.78	66	1212	8.78	82	1220	7.97	68	1207	7.85	66	1225	7.79	88
4/18	5	1812	8.14	66	1805	9.28	78	1815	8.62	69	1800	8.81	68	1821	8.08	69
4/19	8	0012	8.06	78	0008	9.30	72	0019	7.75	58	0002	8.85	66	0029	8.20	64
4/19	11	0606	8.01	65	0603	9.01	70	0612	8.31	62	0600	8.42	65	0615	7.97	64
Minimum			7.78	65		8.78	70		7.75	58		7.85	65		7.79	64
Maximum			8.14	78		9.30	82		8.62	69		8.85	68		8.20	88

Notes:

(1) Temperature was measured at each site after collection of samples. pH was measured after all samples from all stations were collected.

TABLE III-3

METAL MOLDING AND CASTING
PRETREATMENT PLANT INFORMATION

	Process Tank Discharge	Storage Tank Discharge
Date	April 18, 1990	April 18, 1990
Volume Discharged (gal)	7,000	7,000
Discharge Time	11:30	08:45
Sampling Time	11:30	09:00
Volume Collected (L)	5	5
pH (SU)	8.93	8.93
Temperature (°F)	110	90

Composite Sample: Two 2.5 liter samples were collected from each tank. Four liters, 1 liter from each container, were mixed in a clean 2.5 gal bucket. Required samples were taken from the bucket. pH and temperature were measured immediately after collecting the samples.

SECTION IV

TABLE IV-1

IDENTIFICATION OF SAMPLES WITH SAMPLING LOCATIONS

Sampling Location	Site Number (1)	Sample I.D.
3B	61	3,6,9,12
8A	49	3,6,9,12
8A	31	(2)
9A	29	3,6,9,12
12C	85	3,6,9,12
21A	72	3,6,9,12
30	20	

Notes:

(1) Composite samples are identified by the site number.

(2) Composite sample is a replicate of metals sample 49.

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METHOD SUMMARY

Except where noted, EAI employs the methods stated in the USEPA's current "Contract Laboratory Statement of work for Organics Analysis - Multi-Media Multi Concentration", Rev. 7/87.

VOLATILES

For a solid, 5 g of sample is taken and surrogate compounds are added. For a water sample, a 5 ml aliquot is taken with surrogates added. An inert gas is bubbled through the sample in a specifically designed purging chamber at ambient temperature. The purgeables are transferred to the vapor phase where they are swept through a sorbent column and trapped. The sorbent column is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to seperate the purgeables which are then detected with a mass spectrometer.

ACIDS/BASE NEUTRALS

For a solid, a weighed amount of sample is mixed with anhydrous sodium sulfate, surrogates are added and the sample is extracted with 1:1 acetone/methylene chloride using an ultrasonic probe. The extract is then concentrated. For a water sample, a measured volume plus surrogates is serially extracted with methylene chloride at a pH greater than 11 and again at a pH less than 2, using a seperatory funnel. The extracts are dried and concentrated. The extracts are injected onto a gas chromatographic column. The gas chromatograph is temperature programmed to seperate the compounds which are then detected with a mass spectrometer.

SURROGATES

Surrogate standards are deuterated compounds and/or select compounds which analytically mimic the response of certain analytes. A known concentration is added to the sample and the percent recovery calculated. This recovery acts as a barometer of the method efficiency for the individual sample matrix.

SOLID SAMPLES

Results for solid samples are reported on a an as received basis, unless noted otherwise.

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1990
E&E AFFAIRS

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P.O. BOX 668ØØ
ST. LOUIS MO 63166

PAGE NO : 1
REPORT NO : 38639
DATE : Ø5/16/9Ø
P.O. No. : 77395

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in acco rdance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monit oring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115911	61 COMP 4/19/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 38639
DATE : Ø5/16/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
15911 61	COMP 4/19/9Ø c	Chromium	Ø.125	mg Cr/l	218.1
		Copper	Ø.74Ø	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	<Ø.Ø5	mg Ni/l	249.1
		Lead (GTF)	Ø.Ø26	mg Pb/l	239.2
		Zinc	Ø.132	mg Zn/l	289.1

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EAI LAB #1115911
CLIENT CODE: CCP
SAMPLE ID: 61 COMP 4/19/90
REPORT NO: 38639

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 61 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 61 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	15	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 61 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-Diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	26	(35-114)	(23-120)
2-Fluorobiphenyl	44	(43-116)	(30-115)
Terphenyl	63	(33-141)	(18-137)
D-5 phenol	63	(10-94)	(24-113)
2-Fluorophenol	29	(21-100)	(25-121)
2,4,6-Tribromophenol	87	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 38558
DATE : 05/08/90
P.O. No. : 77395

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JUN 27 1990
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REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115912	61-1 COMP 4/19/90 C
1115913	61-2 4/19/90 C
1115914	61-3 4/19/90 C
1115915	61-4 COMP 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.
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CERRO COPPER PROD.

REPORT NO : 38558
DATE : 05/08/90

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1115912	61-1 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	6.3	mg/l	413.1
		Phenols	0.005	mg/l	420.1
1115913	61-2 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	4.1	mg/l	413.1
		Phenols	<0.005	mg/l	420.1
1115914	61-3 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3.9	mg/l	413.1
		Phenols	<0.005	mg/l	420.1
1115915	61-4 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	13.9	mg/l	413.1
		Phenols	<0.005	mg/l	420.1

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EAI LAB #1115912
CLIENT CODE: CCP
SAMPLE ID: 61-1 GRAB 4/19/90
REPORT NO: 38558

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	30	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	15	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	380	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	10	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 61-1 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	101	(76-114)	(70-121)
d8-Toluene	105	(88-110)	(81-117)
4-Bromofluorobenzene	96	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115913
CLIENT CODE: CCP
SAMPLE ID: 61-2 GRAB 4/19/90
REPORT NO: 38558

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	30	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	430	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 61-2 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	99	(76-114)	(70-121)
d8-Toluene	106	(88-110)	(81-117)
4-Bromofluorobenzene	101	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115914
CLIENT CODE: CCP
SAMPLE ID: 61-3 GRAB 4/19/90
REPORT NO: 38558

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	25	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	530	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	10	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	30	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 61-3 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	97	(76-114)	(70-121)
d8-Toluene	96	(88-110)	(81-117)
4-Bromofluorobenzene	104	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115915
CLIENT CODE: CCP
SAMPLE ID: 61-4 GRAB 4/19/90
REPORT NO: 38558

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	30	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	18	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	420	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	10	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 61-4 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	98	(76-114)	(70-121)
d8-Toluene	106	(88-110)	(81-117)
4-Bromofluorobenzene	108	(86-115)	(74-121)

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J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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MAY 1 1990
E & E AFFAIRS

PAGE NO : 1
REPORT NO : 38621
DATE : 05/15/90
P.O. No. : 77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66800
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115924	49 COMP 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.
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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 38621
DATE : Ø5/15/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
1115924	49 COMP 4/19/9Ø c	Chromium	Ø.Ø91	mg Cr/l	218.1
		Copper	2.63	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	1.Ø7	mg Ni/l	249.1
		Lead (GTF)	Ø.33	mg Pb/l	239.2
		Zinc	Ø.27Ø	mg Zn/l	289.1

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EAI LAB #1115924
CLIENT CODE: CCP
SAMPLE ID: 49 COMP 4/19/90
REPORT NO: 38621

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 49 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 49 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	50	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 49 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	23	(35-114)	(23-120)
2-Fluorobiphenyl	42	(43-116)	(30-115)
Terphenyl	55	(33-141)	(18-137)
D-5 phenol	55	(10-94)	(24-113)
2-Fluorophenol	62	(21-100)	(25-121)
2,4,6-Tribromophenol	79	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 38559
DATE : 05/08/90
P.O. No. : 77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66800
ST. LOUIS MO 63166

RECEIVED
JUN 27 1990
E & E AFFAIRS

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115925	49-1 GRAB 4/19/90 C
1115926	49-2 GRAB 4/19/90 C
1115927	49-3 GRAB 4/19/90 C
1115928	49-4 GRAB 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

CERRO COPPER PROD.

REPORT NO : 38559
DATE : Ø5/Ø8/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1115925	49-1 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	2.6	mg/l	413.1
		Phenols	Ø.Ø11	mg/l	420.1
1115926	49-2 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	1Ø.4	mg/l	413.1
		Phenols	Ø.Ø22	mg/l	420.1
1115927	49-3 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	1.9	mg/l	413.1
		Phenols	Ø.Ø1Ø	mg/l	420.1
1115928	49-4 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3.2	mg/l	413.1
		Phenols	Ø.Ø14	mg/l	420.1

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EAI LAB #1115925
CLIENT CODE: CCP
SAMPLE ID: 49-1 GRAB 4/19/90
REPORT NO: 38559

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 49-1 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	99	(76-114)	(70-121)
d8-Toluene	107	(88-110)	(81-117)
4-Bromofluorobenzene	94	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

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EAI LAB #1115926
CLIENT CODE: CCP
SAMPLE ID: 49-2 GRAB 4/19/90
REPORT NO: 38559

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 49-2 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	108	(76-114)	(70-121)
d8-Toluene	102	(88-110)	(81-117)
4-Bromofluorobenzene	104	(86-115)	(74-121)

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E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

EAI LAB #1115927
CLIENT CODE: CCP
SAMPLE ID: 49-3 GRAB 4/19/90
REPORT NO: 38559

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	20	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 49-3 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	106	(76-114)	(70-121)
d8-Toluene	105	(88-110)	(81-117)
4-Bromofluorobenzene	104	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115928
CLIENT CODE: CCP
SAMPLE ID: 49-4 GRAB 4/19/90
REPORT NO: 38559

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	20	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 49-4 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	105	(76-114)	(70-121)
d8-Toluene	104	(88-110)	(81-117)
4-Bromofluorobenzene	105	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 36510
DATE : Ø5/Ø7/9Ø
P.O. No. : 77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66800
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115916	31 COMP 4/19/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. Ferris KC

R. M. FERRIS

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REPORT NO : 38510
DATE : 05/07/90

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
1115916	31 COMP 4/19/90 c	Chromium	0.087	mg Cr/l	218.1
		Copper	2.74	mg Cu/l	220.1
		Nickel	1.12	mg Ni/l	249.1
		Lead (GTF)	0.32	mg Pb/l	239.2
		Zinc	0.273	mg Zn/l	289.1

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ST. LOUIS MO 63166

PAGE NO : 1
REPORT NO : 38623
DATE : 05/15/90
P.O. No. : 77395

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115934	29 COMP 4/19/90 C

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RESPECTFULLY SUBMITTED

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CERRO COPPER PROD.

REPORT NO : 38623

DATE : Ø5/15/9Ø

RESULTS OF ANALYSIS

OG MBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
5934	29 COMP 4/19/9Ø c	Chromium	Ø.498	mg Cr/l	218.1
		Copper	7.32	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	<Ø.Ø5	mg Ni/l	249.1
		Lead (GTF)	Ø.172	mg Pb/l	239.2
		Zinc	2.37	mg Zn/l	289.1

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EAI LAB #1115934
CLIENT CODE: CCP
SAMPLE ID: 29 COMP 4/19/90
REPORT NO: 38623

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 29 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 29 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10. U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	65	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 29 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-Diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	56	(35-114)	(23-120)
2-Fluorobiphenyl	56	(43-116)	(30-115)
Terphenyl	52	(33-141)	(18-137)
D-5 phenol	74	(10-94)	(24-113)
2-Fluorophenol	60	(21-100)	(25-121)
2,4,6-Tribromophenol	18	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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MR. J. GRANA
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ST. LOUIS MO 63166

PAGE NO : 1
REPORT NO : 38561
DATE : 05/08/90
P.O. No. : 77395

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1116001	29-1 GRAB 4/19/90 C
1116002	29-2 GRAB 4/19/90 C
1116003	29-3 GRAB 4/19/90 C
1116004	29-4 GRAB 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

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REPORT NO : 38561
DATE : Ø5/Ø8/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
116ØØ1	29-1 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	74.8	mg/l	413.1
		Phenols	Ø.ØØ6	mg/l	420.1
1116ØØ2	29-2 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	69.3	mg/l	413.1
		Phenols	Ø.ØØ7	mg/l	420.1
1116ØØ3	29-3 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3Ø.7	mg/l	413.1
		Phenols	<Ø.ØØ5	mg/l	420.1
116ØØ4	29-4 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	31.Ø	mg/l	413.1
		Phenols	Ø.ØØ5	mg/l	420.1

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EAI LAB #1116001
CLIENT CODE: CCP
SAMPLE ID: 29-1 GRAB 4/19/90
REPORT NO: 38561

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 29-1 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	82	(76-114)	(70-121)
d8-Toluene	102	(88-110)	(81-117)
4-Bromofluorobenzene	91	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1116002
CLIENT CODE: CCP
SAMPLE ID: 29-2 GRAB 4/19/90
REPORT NO: 38561

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 29-2 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	97	(76-114)	(70-121)
d8-Toluene	90	(88-110)	(81-117)
4-Bromofluorobenzene	99	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1116003
CLIENT CODE: CCP
SAMPLE ID: 29-3 GRAB 4/19/90
REPORT NO: 38561

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 29-3 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	87	(76-114)	(70-121)
d8-Toluene	107	(88-110)	(81-117)
4-Bromofluorobenzene	91	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1116004
CLIENT CODE: CCP
SAMPLE ID: 29-4 GRAB 4/19/90
REPORT NO: 38561

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 29-4 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	85	(76-114)	(70-121)
d8-Toluene	100	(88-110)	(81-117)
4-Bromofluorobenzene	98	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 3864Ø
DATE : Ø5/16/9Ø
P.O. No. : 77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 668ØØ
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115917	85 COMP 4/19/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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REPORT NO : 3864Ø
DATE : Ø5/16/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
1115917	85 COMP 4/19/9Ø c	Chromium	Ø.Ø4Ø	mg Cr/l	218.1
		Copper	1.18	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	1.25	mg Ni/l	249.1
		Lead (GTF)	Ø.25Ø	mg Pb/l	239.2
		Zinc	Ø.165	mg Zn/l	289.1

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EAI LAB #1115917
CLIENT CODE: CCP
SAMPLE ID: 85 COMP 4/19/90
REPORT NO: 38640

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 85 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 85 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 85 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-Diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	4	(35-114)	(23-120)
2-Fluorobiphenyl	6	(43-116)	(30-115)
Terphenyl	10	(33-141)	(18-137)
D-5 phenol	27	(10-94)	(24-113)
2-Fluorophenol	25	(21-100)	(25-121)
2,4,6-Tribromophenol	49	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO :	1
REPORT NO :	38664
DATE :	Ø5/17/9Ø
P.O. No. :	77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 668ØØ
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in acco rdance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monit oring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115918	85-1 GRAB 4/19/9Ø C
1115919	85-2 GRAB 4/19/9Ø C
1115992Ø	85-3 GRAB 4/19/9Ø C
1115921	85-4 GRAB 4/19/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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REPORT NO : 38664
DATE : Ø5/17/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
115918	85-1 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	27Ø	mg/l	413.1
		Phenols	Ø.Ø1Ø	mg/l	420.1
1115919	85-2 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	197	mg/l	413.1
		Phenols	<Ø.ØØ5	mg/l	420.1
1115921Ø	85-3 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	225	mg/l	413.1
		Phenols	Ø.Ø11	mg/l	420.1
115921	85-4 GRAB 4/19/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	158Ø	mg/l	413.1
		Phenols	Ø.Ø22	mg/l	420.1

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EAI LAB #1115918
CLIENT CODE: CCP
SAMPLE ID: 85-1 GRAB 4/19/90
REPORT NO: 38664

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	45 J	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	15	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	820	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	45	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 85-1 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l
Decane,2,6,7-trimethyl	20 *	ug/l
Undecane	110 *	ug/l
Dodecane	125 *	ug/l
Octacosane	75 *	ug/l
Dodecane,2,6,10-trimethyl	60 *	ug/l
Pentatriacontane	60 *	ug/l
Tetradecane	55 *	ug/l

* Estimated value: identification based on search in NBS library; quantification based on relative response calculation with closest internal standard.

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EAI LAB #1115919
CLIENT CODE: CCP
SAMPLE ID: 85-2 GRAB 4/19/90
REPORT NO: 38664

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	80	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	15	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	1100	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	25	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 85-1 GRAB 4/19/90

VOLATILES

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	95	(76-114)	(70-121)
d8-Toluene	100	(88-110)	(81-117)
4-Bromofluorobenzene	106	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
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SAMPLE ID: 85-2 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	105	(76-114)	(70-121)
d8-Toluene	96	(88-110)	(81-117)
4-Bromofluorobenzene	105	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115920
CLIENT CODE: CCP
SAMPLE ID: 85-3 GRAB 4/19/90
REPORT NO: 38664

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	590	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	50	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 85-3 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	87	(76-114)	(70-121)
d8-Toluene	109	(88-110)	(81-117)
4-Bromofluorobenzene	94	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1115921
CLIENT CODE: CCP
SAMPLE ID: 85-4 GRAB 4/19/90
REPORT NO: 38664

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	5 U	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	1400	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	50	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 85-4 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	81	(76-114)	(70-121)
d8-Toluene	110	(88-110)	(81-117)
4-Bromofluorobenzene	92	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
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PAGE NO : 1
REPORT NO : 38622
DATE : 05/15/90
P.O. No. : 77395

MR. J. GRANA
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ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115929	72 COMP 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.
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REPORT NO : 38622
DATE : Ø5/15/9Ø

RESULTS OF ANALYSIS

OG MBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
5929	72 COMP 4/19/9Ø.c	Chromium	Ø.Ø92	mg Cr/l	218.1
		Copper	1.78	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	Ø.Ø7	mg Ni/l	249.1
		Lead (GTF)	Ø.144	mg Pb/l	239.2
		Zinc	Ø.295	mg Zn/l	289.1

Environmental Analysis, Inc.
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EAI LAB #1115929
CLIENT CODE: CCP
SAMPLE ID: 72 COMP 4/19/90
REPORT NO: 38622

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 72 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 72 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	40	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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MPLE ID: 72 COMP 4/19/90

MI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-Diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

rrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
5 Nitrobenzene	32	(35-114)	(23-120)
Fluorobiphenyl	52	(43-116)	(30-115)
rphenyl	61	(33-141)	(18-137)
5 phenol	59	(10-94)	(24-113)
Fluorophenol	64	(21-100)	(25-121)
4,6-Tribromophenol	107	(10-123)	(19-122)

Analyte found in blank as well as sample, indicates possible blank contamination.

Estimated value-result is less than detection limit but greater than zero.

Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 38560
DATE : 05/06/90
P.O. No. : 77395

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66800
ST. LOUIS MO 63166

RECEIVED
JUN 27 1990
E & E AFFAIRS

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115930	72-1 GRAB 4/19/90 C
1115931	72-2 GRAB 4/19/90 C
1115932	72-3 GRAB 4/19/90 C
1115933	72-4 GRAB 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.

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CERRO COPPER PROD.

REPORT NO : 38560

DATE : 05/08/90

RESULTS OF ANALYSIS

SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
72-1 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
	Oil & Grease	18.5	mg/l	413.1
	Phenols	0.011	mg/l	420.1
72-2 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
	Oil & Grease	15.9	mg/l	413.1
	Phenols	0.022	mg/l	420.1
72-3 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
	Oil & Grease	19.9	mg/l	413.1
	Phenols	0.022	mg/l	420.1
72-4 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
	Oil & Grease	11.7	mg/l	413.1
	Phenols	0.018	mg/l	420.1

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LAB #1115930
ENT CODE: CCP
PLE ID: 72-1 GRAB 4/19/90
ORT NO: 38560

ATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	50	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	15	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	690	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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PLE ID: 72-1 GRAB 4/19/90

ATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

urrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
4-1,2-Dichloroethane	101	(76-114)	(70-121)
8-Toluene	106	(88-110)	(81-117)
-Bromofluorobenzene	108	(86-115)	(74-121)

3=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

J=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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LAB #1115931
ENT CODE: CCP
:PLE ID: 72-2 GRAB 4/19/90
'ORT NO: 38560

ATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	60	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	20	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	740	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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PLE ID: 72-2 GRAB 4/19/90

ATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

.rrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
:-1,2-Dichloroethane	106	(76-114)	(70-121)
;-Toluene	109	(88-110)	(81-117)
·Bromofluorobenzene	112	(86-115)	(74-121)

:Analyte found in blank as well as sample, indicates possible blank contamination.

:Estimated value-result is less than detection limit but greater than zero.

:Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

:Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
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: LAB #1115932
:ENT CODE: CCP
1PLE ID: 72-3 GRAB 4/19/90
?ORT NO: 38560

LATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	55	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	15	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	1200	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	20	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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MPLE ID: 72-3 GRAB 4/19/90

LATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

ırrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
4-1,2-Dichloroethane	99	(76-114)	(70-121)
3-Toluene	110	(88-110)	(81-117)
-Bromofluorobenzene	103	(86-115)	(74-121)

=Analyte found in blank as well as sample, indicates possible blank contamination.

=Estimated value-result is less than detection limit but greater than zero.

=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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I LAB #1115933
IENT CODE: CCP
MPLE ID: 72-4 GRAB 4/19/90
PORT NO: 38560

LATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	10	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 72-4 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	110	(76-114)	(70-121)
d8-Toluene	109	(88-110)	(81-117)
4-Bromofluorobenzene	109	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.

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MAY 21 1990

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MR. J. GRANA
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P.O. BOX 668ØØ
ST. LOUIS MO 63166

PAGE NO : 1
REPORT NO : 38641
DATE : Ø5/16/9Ø
P.O. No. : 77395

RECEIVED
JUN 14 1990
PATTERSON SCHAFER, INC.

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
1115922	2Ø COMP 4/19/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

B. M. FERRIS

Environmental Analysis, Inc.
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CERRO COPPER PROD.

REPORT NO : 38641
DATE : Ø5/16/9Ø

RESULTS OF ANALYSIS

LOG UMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
15922	2Ø COMP 4/19/9Ø c	Chromium	Ø.Ø69	mg Cr/l	218.1
		Copper	Ø.179	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	<Ø.Ø5	mg Ni/l	249.1
		Lead (GTF)	Ø.Ø8Ø	mg Pb/l	239.2
		Zinc	Ø.Ø88	mg Zn/l	289.1

Environmental Analysis, Inc.
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EAI LAB #1115922
CLIENT CODE: CCP
SAMPLE ID: 20 COMP 4/19/90
REPORT NO: 38641

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 20 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 20 COMP 4/19/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	25	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 20 COMP 4/19/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-Diphenylhydrazine	100 U	ug/l
N-Nitrosodimethylamine	100 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	4	(35-114)	(23-120)
2-Fluorobiphenyl	15	(43-116)	(30-115)
Terphenyl	46	(33-141)	(18-137)
D-5 phenol	0	(10-94)	(24-113)
2-Fluorophenol	10	(21-100)	(25-121)
2,4,6-Tribromophenol	40	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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JUL 02 1990

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Environmental Analysis, Inc.

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MR. J. GRANA
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P.O. BOX 66800
ST. LOUIS MO 63166

PAGE NO : 1
REPORT NO : 38541
DATE : 05/08/90
P.O. No. : 77395

RECEIVED
JUN 27 1990
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REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Cerro Copper PCR Monitoring Project.

LOG NUMBER	SAMPLE DESCRIPTION
115923	20-1 GRAB 4/19/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

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REPORT NO : 38541
DATE : 05/08/90

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1115923	20-1 GRAB 4/19/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	7.4	mg/l	413.1
		Phenols	<0.005	mg/l	420.1

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

EAI LAB #1115923
CLIENT CODE: CCP
SAMPLE ID: 20-1 GRAB 4/19/90
REPORT NO: 38541

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	50	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	35	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 20-1 GRAB 4/19/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl vinyl ether	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	102	(76-114)	(70-121)
d8-Toluene	110	(88-110)	(81-117)
4-Bromofluorobenzene	105	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

FIELD SAMPLING REPORT

PERIODIC COMPLIANCE REPORT MONITORING

CERRO COPPER PRODUCTS COMPANY
SAUGET PLANT
SAUGET, ILLINOIS

Prepared By

PATTERSON SCHAFER, INC.
CHICAGO, ILLINOIS

MAY, 1990

FOREWORD

The Periodic Compliance Report (PCR) monitoring involves various wastewater discharges associated with the Sauget Plant. The field activities related to the work for this reporting period included:

1. Preparation of Sampling Locations/Flow Monitoring Equipment
2. Preparation of Sample Bottles
3. Collection of Wastewater Samples
4. Collection of Flow Data
5. Sample Compositing
6. Record Keeping & Reporting

Activities 1 and 2 took place on May 16, 1990. Activities 3 and 4 were performed over a 24-hour period beginning the morning of May 17, 1990. Activity 5 took place one day after the 24-hour sampling period, and activity 6 was performed throughout.

This report presents the field and analytical results related to the PCR monitoring for all locations during the period described. Its purpose is to document data obtained and field observations made during the conduct of the effluent monitoring in response to the requirements of Administrative Order No. V-W-88-AO-01.

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SECTION I

I. DESCRIPTION OF SAMPLING LOCATIONS

This section provides a brief description of each of the sampling locations, including the significance of the discharge, the flow monitoring method, and the specific sample collection points.

LOCATION 3B

Sampling Location 3B is at the lift station just north of Tube Mill No. 2 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the east. The flow in the pipe represents the wastewater discharge from the Copper Forming operations at Tube Mill No. 2, with the exception of some sanitary wastewater that enters the wet well via a 6-inch diameter cast iron pipe adjacent and above the sampling point.

The wet well is approximately 15 feet deep and the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir insert installed in the 12-inch diameter pipe, and a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 8A

Sampling Location 8A is at the inlet manhole located along the main plant road just west of the Control Center (see Figure I-1). The flow entering the manhole from the west represents the process and non-process flow from the wet-processing areas of the Secondary Copper operations located in the central part of the plant complex. Other flows discharging into the manhole include a stormwater flow from several inlets in the sewer system upstream of the manhole, and a flow associated with the plant laboratory and discharging west of the Control Center.

The manhole is approximately 9 feet deep and serves as access to a 15-inch Leopold Lagco flume installed in a 15-inch diameter PVC pipe. Flow was monitored with a portable continuous-recording flow meter. Samples were collected from the flume.

LOCATION 9A

Sampling Location 9A is at the lift station just north of the Shaft Furnace Building No. 19 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the west. The flow in the pipe is non-regulated process and non-process wastewater such as non-contact cooling water, drinking fountains, and other miscellaneous non-regulated wastewaters. The flow may be increased during the winter months to protect the pipes from freezing.

The wet well is approximately 12 feet deep with the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir bolted to the wall in front of the 12-inch pipe, nd a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 12C

Sampling Location 12C is the discharge from the East Outfall Lift Station located at the northeast corner of the Main Tube Mill Building (see Figure I-1). The flow discharging into the lift station constitutes all wastewater generated from plant operations North of Old Queeny Avenue. Monitoring at this location allows full quantification of the pollutant discharge via the East Outfall.

Flow was monitored by two continuous-recording doppler-type flow meters. One meter recorded discharge of the 4-inch diameter pump. The second meter recorded the flow in the 12-inch discharge line of the three pump system which is primarily used for storm weather conditions. Samples were collected from the discharge of the lift station.

LOCATION 21A (Cerro West)

Sampling Location 21A is the inlet of the manhole at the west plant entrance located east of Illinois Route 3 (see Figure I-1). Monitoring at this location allows full quantification of discharges leaving the plant complex via the West Outfall. It includes all flow discharged from plant operations South of Old Queeny Avenue.

The manhole is approximately 12 feet deep with an 18-inch Leopold Lagco flume installed in an 18-inch diameter clay pipe. Flow was monitored by a permanent doppler-type flow meter/strip chart recorder associated with the flume. Samples were collected from the flume.

SAMPLING LOCATION 30 (COPPER MOLDING & CASTING TREATMENT PLANT)

Sampling Location 30 is the discharge from the Copper Molding and Casting Pretreatment system for the casting furnace air pollution scrubber blowdown. Periodic blowdown from the direct chill casting cooling tower system is fed, as makeup water, to the recycle tank in the casting furnace air pollution scrubber system for reuse and ultimate inclusion in the blowdown to the pretreatment system. A single grab sample was collected from the well-mixed treated contents of each of the two effluent storage tanks during discharge. The combined discharge from the two tanks is considered a batch.

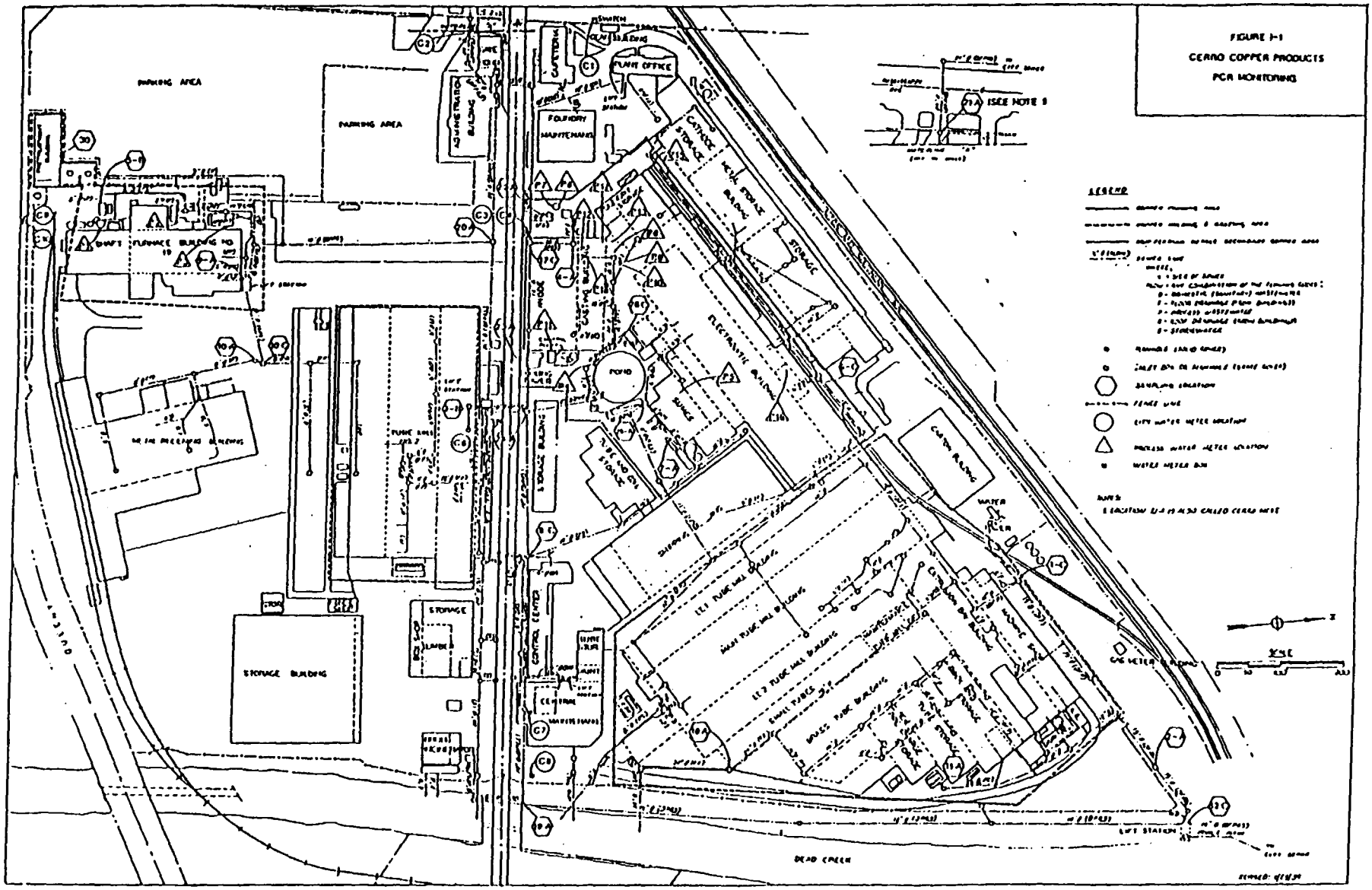

FIGURE I-1
CERRO COPPER PRODUCTS
PCR MONITORING

SECTION II

II. SAMPLE COLLECTION/FLOW MONITORING PROCEDURES

SAMPLE COLLECTION

Grab samples were collected periodically at all locations. Some of the individual grab samples were used to compile 24-hour flow-proportioned composite samples for semi-volatile organics (NVBN + NVA), and metals analyses. Others were submitted as collected for analyses requiring grabs (e.g., O&G). See Table II-1 for a summary of the type of sample bottles and preservatives used.

Grab Samples

During the 24-hour period, twelve grab samples were collected for metals and semi-volatile organics analyses from each sampling location (except Location 30) at 2-hour intervals. In addition, four grab samples were collected at 6-hour intervals for VOA, total phenols, and oil and grease analyses. Furthermore, pH and temperature measurements were taken.

Grab samples were collected at the discharge of the treatment plant associated with the copper molding and casting operations (Location 30) and analyzed for all parameters.

In all cases, the grab samples were collected from the flow exiting the weir or flume at each applicable location. All grab samples were placed on ice after collection.

Grab samples for VOA, total phenol, and oil and grease were collected at each location during runs 3, 6, 9, and 12.

Composite Samples

For each sampling location, twenty-four hour flow-proportioned composite samples were prepared on-site for metals and semi-volatile organics analyses. The percentage of sample required from each grab sample, based on the flow measured during the twelve 2-hour sampling periods, was compiled and recorded for each location.

FLOW MONITORING

During sample collection, totalizer readings were monitored at each location except Location 30 and Location 8A. This was accomplished by totalizing/recording flow meters at each location. Table II-2 provides a summary of the flow measurement devices for each sampling location.

At location 8A, the instantaneous water depth was measured manually because the flow meter failed. The instantaneous flow rate was then calculated using the appropriate formula for the flume.

The large pumps at Location 12C were turned "off", preventing water from flowing through the 12-inch discharge line of the three pump system. Flow was only monitored through the 4-inch pipe connected to the small pump.

TABLE II-1

SAMPLE BOTTLES AND PRESERVATIVES

Analysis	Bottle		Preservation
	Type	Size	
VOA(1)	Clear glass Teflon lined cap	40 ml	Cool, 4°C
NVBN+NVA(2)	Clear glass Teflon lined cap	16 oz	Cool, 4°C
Metals (3)	Clear glass Teflon lined cap	8 & 16 oz	Nitric Acid to pH < 2
Oil & Grease	Clear glass Teflon lined cap	32 oz	Sulfuric Acid to pH < 2, Cool, 4°C
Total Phenols	Clear glass Teflon lined cap	16 oz	Sulfuric Acid to pH < 2, Cool, 4°C

Notes:

(1) Volatile Organics Analysis - Method 624 of 40CFR136

(2) Nonvolatile Base and Neutral Extractable Organics, and Nonvolatile Acid Extractable Organics - Method 625 of 40CFR136. Composite sample is kept in a amber glass, 80 oz teflon lined cap bottle.

(3) Analysis includes total chromium, total copper, total lead, total nickel, and total zinc.

TABLE II-2

FLOW MEASURING DEVICE FOR EACH SAMPLING LOCATION

Location	Pipe		Device	
	Type	Size (in)	Type	Size (in)
3B	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
8A	Polyvinyl Chloride	15	Rectangular flume	15
9A	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
12C (1)	Polyvinyl Chloride	4	Sonic flow meter with continuous totalizer/recorder	-
21A	Clay	18	Rectangular Flume with continuous flow meter/recorder	18

Notes:

(1) Discharge from East lift station included discharge of a 4" pump only. The 12" pump system was shut off.

SECTION III

III. SUMMARY OF FLOW MONITORING, FIELD pH AND TEMPERATURE DATA

Flow data were compiled during the 24-hour sampling period by periodically reading the totalizers associated with each flow meter at each location. At Location 8A, however, the instantaneous flow rates were determined. The data are presented in Table III-1. The flows in the table are calculated differences in the recorded totalizer readings.

Field pH and temperature measurements were taken for the grab samples collected at 6-hour intervals. The data are compiled in Table III-2.

Field information from the metal molding and casting pretreatment plant discharge (Location 30) is provided in Table III-3.

TABLE III-1

FLOW MEASUREMENT SUMMARY

		Station 3B			Station 9A			Station 21A		
Run	Date	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (gal)	Volume (gal)
0	5/17	1515	1286	--	1520	04288	--	1525	2244610	--
1		1706	2037	751	1709	06733	2245	1714	2244623	13,000
2		1915	2497	460	1921	09357	2624	1930	0244640	17,000
3		2122	2856	359	2126	11529	2172	2133	2244654	14,000
4		2311	3325	469	2315	13170	1641	2318	2244664	10,000
5	5/18	0114	4093	768	0121	14937	1767	0126	2244679	15,000
6		0320	4456	363	0326	16420	1483	0334	2244695	16,000
7		0524	5320	864	0529	17780	1360	0532	2244708	13,000
8		0712	5830	510	0716	18820	1040	0722	2244720	12,000
9		0917	6580	750	0924	20140	1320	0931	2244737	17,000
10		1109	6964	384	1113	21120	980	1117	2244752	15,000
11		1320	7420	456	1323	22460	1340	1328	2244773	21,000
12		1530	7860	416	1536	23740	1280	1542	2244793	20,000
Total Volume		(gal)		6550			19452			183,000
Average flow		(gpd)		6482			19238			180,865
		(gpm)		4.5			13.4			125.6

TABLE III-1 (continued)

FLOW MEASUREMENT SUMMARY

Run	Date	Station 12C Time	Station 12C Totalizer Reading (gal)	Station 12C Volume (gal)	Station 8A Time	Station 8A Instantaneous Flow Rate (gpm)
0	5/17	1500	882353	--	--	--
1		1725	883834	14810	1735	122
2		1900	884673	8390	1910	44
3		2103	885597	9240	2114	139
6	5/18	0300	888136	25390	0312	47
7		0514	888989	8530	0520	40
8		0700	889718	7290	0706	34
9		0900	890414	6960	0910	34
10		1100	891200	7860	1102	23
11		1305	892000	8000	1314	40
12		1515	893262	12620	1522	40
13		1604	893778	5160	1610	34
15		1724	894641	8630	1734	40
Total Volume (gal)				122,880		
Average Flow (gpd)				111,709		76,440
(gpm)				77.6		53.1

TABLE III-2

pH AND TEMPERATURE DATA (1)

Station		3B			8A			9A			12C			21A		
Date	Run	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)
5/17	2	1915	7.80	21	1910	8.55	34	1921	7.25	20	1900	8.20	23	1930	7.50	21
5/18	5	0114	7.66	21	0109	9.05	26	0121	7.20	19	0105	8.31	24	0126	6.76	20
5/18	8	0712	7.66	19	0706	8.93	30	0716	7.06	18	0700	8.05	24	0722	7.32	18
5/15	11	1320	7.56	23	1314	8.34	27	1323	7.32	23	1305	8.06	25	1328	8.67	33
Minimum			7.56	19		8.34	26		7.06	18		8.05	23		6.76	18
Maximum			7.80	23		9.05	34		7.32	23		8.31	25		8.67	33

Notes:

(1) Temperature was measured at each site after collection of samples. pH was measured after all samples from all stations were collected.

TABLE III-3

METAL MOLDING AND CASTING
PRETREATMENT PLANT INFORMATION

	Process Tank Discharge	Storage Tank Discharge
Date	May 18, 1990	May 18, 1990
Volume Discharged (gal)	7,000	7,000
Discharge Time	10:45	08:30
Sampling Time	10:45	10:28
Volume Collected (L)	5	5
pH (SU)	8.98	8.91
Temperature (°C)	54	46

Composite Sample: Two 2.5 liter samples were collected from each tank. Four liters, 1 liter from each container, were mixed in a clean 2.5 gal bucket. Required samples were taken from the bucket. pH and temperature were measured immediately after collecting the samples.

SECTION IV

TABLE IV-1

IDENTIFICATION OF SAMPLES WITH SAMPLING LOCATIONS

Sampling Location	Site Number (1)	Sample I.D.
3B	2	3,6,9,12
8A	4	3,6,9,12
9A	7	3,6,9,12
12C	5	3,6,9,12
21A	6	3,6,9,12
30	30	

Notes:

(1) Composite samples are identified by the site number.

INDUSTRIAL
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inc.

Chemists
Engineers
Metallurgists

2350 Seventh Blvd. • St. Louis, Missouri 63104 | 314/771-7111

Report No. 90-05-02746 June 25, 1990

Project: May 1990 Cerro Copper PCR Monitoring

Cerro Copper Products Company
P. O. Box 66800
St. Louis, MO. 63166-6800

P.O.: 77390
Attn: Mr. Joe Grana

On May 21, 1990, the Cerro Copper PCR Monitoring samples for January 1990 were picked-up by Mr. Duane McDowell of Industrial Testing Laboratories, Inc. Mr. Joe Burroughs, Cerro Copper, relinquished custody of these samples. All sample preservation and storage, upon submittal to the laboratory, were performed in accordance with 40 CFR Part 136 requirements.

II. Analytical Methodologies:

A. EPA 600/4-82-022, March 1982.

All methodologies employed in the analysis of Metals, Oil & Grease and Total Phenols were taken from EPA 600/4-82-022, dated March 1982, as shown below.

Parameter	Method No.
Cadmium	200.7
Chromium	200.7
Copper	200.7
Nickel	200.7
Zinc	200.7
Lead	200.7/239.2
Mercury	245.1
Oil & Grease	413.1
Total Phenols	420.1
Cyanide	335.2

II. **Analytical Methodologies:** (con't.)

B. 40 CFR Part 136

All methodologies employed in the analysis of Volatile Organics, Base/Neutral Extractable Organics and Acid Extractable Organics were taken from EPA protocols, as shown below:

Parameter	Method No.
Volatile Organics	624
Base/Neutral Extractable Organics	625
Acid Extractable Organics	625

Respectfully submitted,

Allan M. Siegel, P.E.
Director

INDUSTRIAL
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inc.

ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 2

Sample ID:	3	6	9	12
Matrix:	Water	Water	Water	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	<0.01	0.02	0.02	0.04
Oil & Grease, mg/l	9	18	890	77

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2. Volatile Organics Analysis (VOA), ug/l

Sample ID:	2-3	2-6	2-9	2-12
Analysis Date:	5/23/90	5/23/90	5/23/90	5/23/90
Method:	624	624	624	624
Acrolein	<100	<100	<100	<100
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10
Carbon Tetrachloride	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10
Chloroform	9	9	7	9
Chloromethane	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	27	17	9	11
1,1-Dichloroethane	24	21	21	24
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropylene	<5	<5	<5	<5
trans-1,3-Dichloropropylene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5
1,1,1-Trichloroethane	400	360	480	490
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	6	<5	7	9
Vinyl Chloride	<10	<10	<10	<10
Xylene(s), total	<10	<10	<10	<10

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 4

Sample ID:	3	6	9	12
Matrix:	Water	Water	Water	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	<0.01	<0.01	<0.01	<0.01
Oil & Grease, mg/l	5	19	9	14

2. Volatile Organics Analysis (VOA), ug/l

Sample ID:	4-3*	4-6	4-9	4-12
Analysis Date:	5/29/90	5/29/90	5/29/90	5/29/90
Method:	624	624	624	624
Acrolein	<100	<100	<100	<100
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10
Carbon Tetrachloride	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10
Chloroform	19	12	19	14
Chloromethane	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	8	<5	7
1,1-Dichloroethane	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropylene	<5	<5	<5	<5
trans-1,3-Dichloropropylene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5
1,1,1-Trichloroethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	<5	<5	<5	<5
Vinyl Chloride	<10	<10	<10	<10
Xylene(s), total	<10	<10	<10	<10

*Run in duplicate

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 5

Sample ID:	3	6	9	12
Matrix:	Water	Water	Water	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	0.02	0.01	0.13	0.02
Oil & Grease, mg/l	610	600	500	560

2. Volatile Organics Analysis (VOA), µg/l

Sample ID:	5-3	5-6	5-9	5-12
Analysis Date:	5/29/90	5/29/90	5/29/90	5/29/90
Method:	624	624	624	624
Acrolein	<100	<100	<100	<100
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10
Carbon Tetrachloride	15	<5	<5	7
Chlorobenzene	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10
Chloroform	14	9	11	6
Chloromethane	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropylene	<5	<5	<5	<5
trans-1,3-Dichloropropylene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5
1,1,1-Trichloroethane	50	36	35	35
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	<5	<5	<5	<5
Vinyl Chloride	<10	<10	<10	<10
Xylene(s), total	<10	<10	<10	<10

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 6

Sample ID:	3	6	9	12
Matrix:	Water	Water	Water	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	<0.01	<0.01	<0.01	<0.01
Oil & Grease, mg/l	11	8	8	9

2. Volatile Organics Analysis (VOA), µg/l

Sample ID:	6-3	6-6	6-9	6-12
Analysis Date:	5/30/90	5/30/90	5/30/90	5/30/90
Method:	624	624	624	624
Acrolein	<100	<100	<100	<100
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10
Carbon Tetrachloride	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chloroethane	14	16	13	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10
Chloroform	14	20	15	19
Chloromethane	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	13	<5	<5
1,1-Dichloroethane	81	80	89	13
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropylene	<5	<5	<5	<5
trans-1,3-Dichloropropylene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5
1,1,1-Trichloroethane	4000	3900	3500	400
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	31	32	29	<5
Vinyl Chloride	<10	<10	<10	<10
Xylene(s), total	<10	<10	<10	<10

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 7

Sample ID:	3	6	9	12
Matrix:	Water	Water	Water	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	<0.01	<0.01	<0.01	<0.01
Oil & Grease, mg/l	9	5	8	15

2. Volatile Organics Analysis (VOA), ug/l

Sample ID:	7-3	7-6	7-9	7-12
Analysis Date:	5/30/90	5/30/90	5/30/90	5/30/90
Method:	624	624	624	624
Acrolein	<100	<100	<100	<100
Acrylonitrile	<50	<50	<50	<50
Benzene	<5	<5	<5	<5
Bromodichloromethane	<5	5	<5	<5
Bromoform	<5	<5	<5	<5
Bromomethane	<10	<10	<10	<10
Carbon Tetrachloride	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5
Chloroethane	<10	<10	<10	<10
2-Chloroethylvinyl ether	<10	<10	<10	<10
Chloroform	29	34	31	33
Chloromethane	<10	<10	<10	<10
Dibromochloromethane	<5	<5	<5	<5
1,2-Dichlorobenzene	<5	<5	<5	<5
1,3-Dichlorobenzene	<5	<5	<5	<5
1,4-Dichlorobenzene	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropylene	<5	<5	<5	<5
trans-1,3-Dichloropropylene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Methylene Chloride	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5
1,1,1-Trichloroethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Trichloroethylene	<5	<5	<5	<5
Vinyl Chloride	<10	<10	<10	<10
Xylene(s), total	<10	<10	<10	<10

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746
Client: Cerro Copper
Project: Cerro Copper PCR Monitoring

Date: June 25, 1990
Contact: Mr. Joe Grana
Activity: May 1990 PCR

PART A - GRAB SAMPLES

Site 30

Sample ID:	1
Matrix:	Water

1. Phenols/Oil & Grease

Total Phenols, mg/l	<0.01
Oil & Grease, mg/l	6

2. Volatile Organics Analysis (VOA), ug/l

Sample ID:	30-1
Analysis Date:	Water
Method:	5/30/90
Units:	ug/l
Acrolein	<100
Acrylonitrile	<50
Benzene	<5
Bromodichloromethane	<5
Bromoform	<5
Bromomethane	<10
Carbon Tetrachloride	<5
Chlorobenzene	<5
Chloroethane	<10
2-Chloroethylvinyl ether	<10
Chloroform	12
Chloromethane	<10
Dibromochloromethane	<5
1,2-Dichlorobenzene	<5
1,3-Dichlorobenzene	<5
1,4-Dichlorobenzene	<5
1,1-Dichloroethane	<5
1,2-Dichloroethane	<5
1,1-Dichloroethylene	<5
trans-1,2-Dichloroethylene	<5
1,2-Dichloropropane	<5
cis-1,3-Dichloropropylene	<5
trans-1,3-Dichloropropylene	<5
Ethylbenzene	<5
Methylene Chloride	<5
1,1,2,2-Tetrachloroethane	<5
Tetrachloroethylene	<5
Toluene	<5
1,1,1-Trichloroethane	<5
1,1,2-Trichloroethane	<5
Trichloroethylene	<5
Vinyl Chloride	<10
Xylene(s), total	<10

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ANALYTICAL REPORT

Report No. 90-05-02746 | Date: June 25, 1990
Client: Cerro Copper | Contact: Mr. Joe Grana
Project: Cerro Copper PCR Monitoring | Activity: May 1990 PCR

PART B - COMPOSITE SAMPLES

Sample ID:	Site 2-1	Site 4-1	Site 5-1	Site 6-1
Matrix:	Water	Water	Water	Water

1. Metals, mg/l

Analysis Date:				
Analysis Method:	200.7/239.2	200.7	200.7	200.7
Chromium	<0.05	<0.05	<0.05	<0.05
Copper	2.3	6.1	1.1	3.1
Lead		0.87	0.35	0.25
Nickel	<0.05	19.1	2.7	0.05
Zinc	0.21	2.4	0.24	0.38

2. Base/Neutral Extractable Organics Analysis (BNOA), ug/l

Sample ID:	2-1	4-1	5-1*	6-1
Analysis Date:	6/14/90	6/14/90	6/15/90	6/15/90
Analysis Method:	625	625	625	625
Acenaphthene	<10	<10	<500	<10
Acenaphthylene	<10	<10	<500	<10
Anthracene	<10	<10	<500	<10
Benzidine	<25	<25	<1250	<25
Benzo(a)anthracene	<10	<10	<500	<10
Benzo(a)pyrene	<10	<10	<500	<10
Benzo(b)fluoranthene	<10	<10	<500	<10
Benzo(ghi)perylene	<10	<10	<500	<10
Benzo(k)fluoranthene	<10	<10	<500	<10
bis(2-Chloroethoxy) methane	<10	<10	<500	<10
bis(2-Chloroethyl)ether	<10	<10	<500	<10
bis(2-Chloroisopropyl) ether	<10	<10	<500	<10
bis(2-Ethylhexyl) phthalate	<10	<10	<500	<10
4-Bromophenyl phenyl ether	<10	<10	<500	<10
Butylbenzyl phthalate	<10	<10	<500	<10
2-Chloronaphthalene	<10	<10	<500	<10
4-Chlorophenyl phenyl ether	<10	<10	<500	<10
Chrysene	<10	<10	<500	<10
Dibenzo(a,h)anthracene	<10	<10	<500	<10
1,2-Dichlorobenzene	<10	<10	<500	<10
1,3-Dichlorobenzene	<10	<10	<500	<10
1,4-Dichlorobenzene	<10	<10	<500	<10
3,3'-Dichlorobenzidine	<10	<10	<500	<10

Sample ID:	2-1	4-1	5-1*	6-1
Diethyl phthalate	<10	<10	<500	<10
Dimethyl phthalate	<10	<10	<500	<10
Di-n-butyl phthalate	<10	<10	<500	<10
2,4-Dinitrotoluene	<10	<10	<500	<10
2,6-Dinitrotoluene	<10	<10	<500	<10
Di-n-octyl phthalate	<10	<10	<500	<10
1,2-Diphenylhydrazine	<25	<25	<1250	<25
Fluoranthene	<10	<10	<500	<10
Fluorene	<10	<10	<500	<10
Hexachlorobenzene	<10	<10	<500	<10
Hexachlorobutadiene	<10	<10	<500	<10
Hexachlorocyclo pentadiene	<10	<10	<500	<10
Hexachloroethane	<10	<10	<500	<10
Indeno(1,2,3-cd)pyrene	<10	<10	<500	<10
Isophorone	<10	<10	<500	<10
Naphthalene	<10	<10	<500	<10
Nitrobenzene	<10	<10	<500	<10
N-Nitrosodimethylamine	<25	<25	<1250	<25
N-Nitrosodi-n-propyl amine	<10	<10	<500	<10
N-Nitrosodiphenylamine	<10	<10	<500	<10
Phenanthrene	<10	<10	<500	<10
Pyrene	<10	<10	<500	<10
1,2,4-Trichlorobenzene	<10	<10	<500	<10

*Diluted 50X

3. Acid Extractable Organics Analysis (AOA), µg/l

Sample ID:	2-1	4-1	5-1	6-1
Analysis Date:	6/14/90	6/14/90	6/15/90	6/15/90
Analysis Method:	625	625	625	625
2-Chlorophenol	<10	<10	<500	<10
2,4-Dichlorophenol	<10	<10	<500	<10
2,4-Dimethylphenol	<10	<10	<500	<10
2-Methyl-4,6-dinitrophenol	<50	<50	<2500	<50
2,4-Dinitrophenol	<50	<50	<2500	<50
2-Nitrophenol	<10	<10	<500	<10
4-Nitrophenol	<50	<50	<2500	<50
4-Chloro-3-methylphenol	<20	<20	<1000	<20
Pentachlorophenol	<50	<50	<2500	<50
Phenol	<10	<10	<500	<10
2,4,6-Trichlorophenol	<10	<10	<500	<10

INDUSTRIAL
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ANALYTICAL REPORT

Report No. 90-05-02746 | Date: June 25, 1990
Client: Cerro Copper | Contact: Mr. Joe Grana
Project: Cerro Copper PCR Monitoring | Activity: May 1990 PCR

PART B - COMPOSITE SAMPLES

Sample ID:	Site 7-1	Site 30-1
Matrix:	Water	Water

1. Metals, mg/l

Analysis Date:		
Analysis Method:	200.7/239.2	200.7/239.2
Chromium	<0.05	<0.05
Copper	1.0	<0.05
Lead	0.053	0.028
Nickel	<0.05	<0.05
Zinc	0.10	<0.05

2. **Base/Neutral Extractable Organics Analysis (BNOA), ug/l**

Sample ID:	7-1	30-1
Analysis Date:	6/14/90	6/15/90
Analysis Method:	625	625
Acenaphthene	<10	<10
Acenaphthylene	<10	<10
Anthracene	<10	<10
Benzidine	<25	<25
Benzo(a)anthracene	<10	<10
Benzo(a)pyrene	<10	<10
Benzo(b)fluoranthene	<10	<10
Benzo(ghi)perylene	<10	<10
Benzo(k)fluoranthene	<10	<10
bis(2-Chloroethoxy) methane	<10	<10
bis(2-Chloroethyl)ether	<10	<10
bis(2-Chloroisopropyl) ether	<10	<10
bis(2-Ethylhexyl) phthalate	<10	<10
4-Bromophenyl phenyl ether	<10	<10
Butylbenzyl phthalate	<10	<10
2-Chloronaphthalene	<10	<10
4-Chlorophenyl phenyl ether	<10	<10
Chrysene	<10	<10
Dibenzo(a,h)anthracene	<10	<10
1,2-Dichlorobenzene	<10	<10
1,3-Dichlorobenzene	<10	<10
1,4-Dichlorobenzene	<10	<10
3,3'-Dichlorobenzidine	<10	<10

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Sample ID:	7-1	30-1
Diethyl phthalate	<10	<10
Dimethyl phthalate	<10	<10
Di-n-butyl phthalate	<10	<10
2,4-Dinitrotoluene	<10	<10
2,6-Dinitrotoluene	<10	<10
Di-n-octyl phthalate	<10	<10
1,2-Diphenylhydrazine	<25	<25
Fluoranthene	<10	<10
Fluorene	<10	<10
Hexachlorobenzene	<10	<10
Hexachlorobutadiene	<10	<10
Hexachlorocyclo pentadiene	<10	<10
Hexachloroethane	<10	<10
Indeno(1,2,3-cd)pyrene	<10	<10
Isophorone	<10	<10
Naphthalene	<10	<10
Nitrobenzene	<10	<10
N-Nitrosodimethylamine	<25	<25
N-Nitrosodi-n-propyl amine	<10	<10
N-Nitrosodiphenylamine	<10	<10
Phenanthrene	<10	<10
Pyrene	<10	<10
1,2,4-Trichlorobenzene	<10	<10

3. Acid Extractable Organics Analysis (AOA), µg/l

Sample ID:	7-1	30-1
Analysis Date:	6/14/90	6/15/90
Analysis Method:	625	625
2-Chlorophenol	<10	<10
2,4-Dichlorophenol	<10	<10
2,4-Dimethylphenol	<10	<10
2-Methyl-4,6-dinitrophenol	<50	<50
2,4-Dinitrophenol	<50	<50
2-Nitrophenol	<10	<10
4-Nitrophenol	<50	<50
4-Chloro-3-methylphenol	<20	<20
Pentachlorophenol	<50	<50
Phenol	<10	<10
2,4,6-Trichlorophenol	<10	<10

RECEIVED
JUN 28 1990
E&E AFFAIRS

CHAIN OF CUSTODY - PCR WASTEWATER SAMPLES
CERRO COPPER PRODUCTS- SAUGET, ILLINOIS

SAMPLE LOCATION/ID: 2 SAMPLING DATE: May 17-18, 1990

ampler's Sign: Eduardo Grana

SAMPLES COLLECTED

omposite: _____ Grabs: 2-3 2-6 2-9 2-12

DATE: 5-18-1990 TIME: 16:00

AMPLE I.D.: 2-1

SAMPLE TRANSPORTATION

SAMPLE CARRIER: Duane McDowell (sign) DATE: 5-21-90 TIME: 1100

SAMPLES REC'D By Lab: Duane McDowell (sign) DATE: 5-21-90 TIME: 1325

LABORATORY WORK

LABORATORY: ~~Environmental Analysis~~ Industrial Testing Laboratories PHONE: ~~314/921-4488~~ (314) 771-7111

ADDRESS: ~~3270 N. Lindbergh Florissant, Missouri 63033~~ 2350 S. 7th St St Louis, Missouri 63104

CONTACT: ~~Chris Segafredo~~ Duane McDowell

COMPOSITE SAMPLES ANALYSIS (X)

PARAMETER	DATE	TIME	ANALYST
X Chromium	5-31-90	14:15	GL
X Copper	5-31-90	14:15	GL
X Lead	6-25-90	~~14:15 GL~~ 15:30 6-25-90	GL
Mercury			
X Nickel	5-31-90	14:15	GL
X Zinc	5-31-90	14:5	GL
X Base/Neutr.	6/14/90	14:43	M.M

GRAB SAMPLES ANALYSIS (X)

PARAMETER	DATE	TIME	ANALYST
Cyanide			
X Phenol	5/30/90	16:45	RHB
X Oil & Grease	6/1/90	16:45	RHB
X VOC	5/23/90	16:38	M.M.
Cadmium			
X Acid Extr.	6/14/90	14:43	M.M.

Comments: 1. ALL ANALYSIS IS TO BE PERFORMED IN ACCORDANCE WITH 40 CFR 136.
2. All parameters (X)'d should be analyzed.

Analysis Requested by: Joseph M. Grana
Problems/Question Call: Joseph Grana (618)337-6000 or PSI (312)372-1100

Copy Distribution of Chain-of-Custody
Goldenrod: Sampler's Copy
Yellow: Lab's Copy
Pink: Transporter leaves @ Cerro after signing
White: Lab returns to Cerro after analysis

FIELD SAMPLING REPORT

PERIODIC COMPLIANCE REPORT MONITORING

CERRO COPPER PRODUCTS COMPANY
SAUGET PLANT
SAUGET, ILLINOIS

Prepared By

PATTERSON SCHAFER, INC.
CHICAGO, ILLINOIS

JUNE, 1990

FOREWORD

The Periodic Compliance Report (PCR) monitoring involves various wastewater discharges associated with the Sauget Plant. The field activities related to the work for this reporting period included:

1. Preparation of Sampling Locations/Flow Monitoring Equipment
2. Preparation of Sample Bottles
3. Collection of Wastewater Samples
4. Collection of Flow Data
5. Sample Compositing
6. Record Keeping & Reporting

Activities 1 and 2 took place on June 11, 1990. Activities 3 and 4 were performed over a 24-hour period beginning the morning of June 12, 1990. Activity 5 took place one day after the 24-hour sampling period, and activity 6 was performed throughout.

This report presents the field and analytical results related to the PCR monitoring for all locations during the period described. Its purpose is to document data obtained and field observations made during the conduct of the effluent monitoring in response to the requirements of Administrative Order No. V-W-88-AO-01.

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SECTION I

I. DESCRIPTION OF SAMPLING LOCATIONS

This section provides a brief description of each of the sampling locations, including the significance of the discharge, the flow monitoring method, and the specific sample collection points.

LOCATION 3B

Sampling Location 3B is at the lift station just north of Tube Mill No. 2 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the east. The flow in the pipe represents the wastewater discharge from the Copper Forming operations at Tube Mill No. 2, with the exception of some sanitary wastewater that enters the wet well via a 6-inch diameter cast iron pipe adjacent and above the sampling point.

The wet well is approximately 15 feet deep and the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir insert installed in the 12-inch diameter pipe, and a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 8A

Sampling Location 8A is at the inlet manhole located along the main plant road just west of the Control Center (see Figure I-1). The flow entering the manhole from the west represents the process and non-process flow from the wet-processing areas of the Secondary Copper operations located in the central part of the plant complex. Other flows discharging into the manhole include a stormwater flow from several inlets in the sewer system upstream of the manhole, and a flow associated with the plant laboratory and discharging west of the Control Center.

The manhole is approximately 9 feet deep and serves as access to a 15-inch Leopold Lagco flume installed in a 15-inch diameter PVC pipe. Flow was monitored with a portable continuous-recording flow meter. Samples were collected from the flume.

LOCATION 9A

Sampling Location 9A is at the lift station just north of the Shaft Furnace Building No. 19 (see Figure I-1). The sampling point is the discharge from a 12-inch diameter cast iron pipe entering the wet well from the west. The flow in the pipe is non-regulated process and non-process wastewater such as non-contact cooling water, drinking fountains, and other miscellaneous non-regulated wastewaters. The flow may be increased during the winter months to protect the pipes from freezing.

The wet well is approximately 12 feet deep with the sampling point approximately 4 feet from the bottom. Flow was monitored by means of a 90 degree V-notch weir bolted to the wall in front of the 12-inch pipe, and a portable continuous-recording flow meter. Samples were collected from the flow exiting the weir.

LOCATION 12C

Sampling Location 12C is the discharge from the East Outfall Lift Station located at the northeast corner of the Main Tube Mill Building (see Figure I-1). The flow discharging into the lift station constitutes all wastewater generated from plant operations North of Old Queeny Avenue. Monitoring at this location allows full quantification of the pollutant discharge via the East Outfall.

Flow was monitored by two continuous-recording doppler-type flow meters. One meter recorded discharge of the 4-inch diameter pump. The second meter recorded the flow in the 12-inch discharge line of the three pump system which is primarily used for storm weather conditions. Samples were collected from the discharge of the lift station.

LOCATION 21A (Cerro West)

Sampling Location 21A is the inlet of the manhole at the west plant entrance located east of Illinois Route 3 (see Figure I-1). Monitoring at this location allows full quantification of discharges leaving the plant complex via the West Outfall. It includes all flow discharged from plant operations South of Old Queeny Avenue.

The manhole is approximately 12 feet deep with an 18-inch Leopold Lagco flume installed in an 18-inch diameter clay pipe. Flow was monitored by a permanent doppler-type flow meter/strip chart recorder associated with the flume. Samples were collected from the flume.

SAMPLING LOCATION 30 (COPPER MOLDING & CASTING TREATMENT PLANT)

Sampling Location 30 is the discharge from the Copper Molding and Casting Pretreatment system for the casting furnace air pollution scrubber blowdown. Periodic blowdown from the direct chill casting cooling tower system is fed, as makeup water, to the recycle tank in the casting furnace air pollution scrubber system for reuse and ultimate inclusion in the blowdown to the pretreatment system. A single grab sample was collected from the well-mixed treated contents of each of the two effluent storage tanks during discharge. The combined discharge from the two tanks is considered a batch.

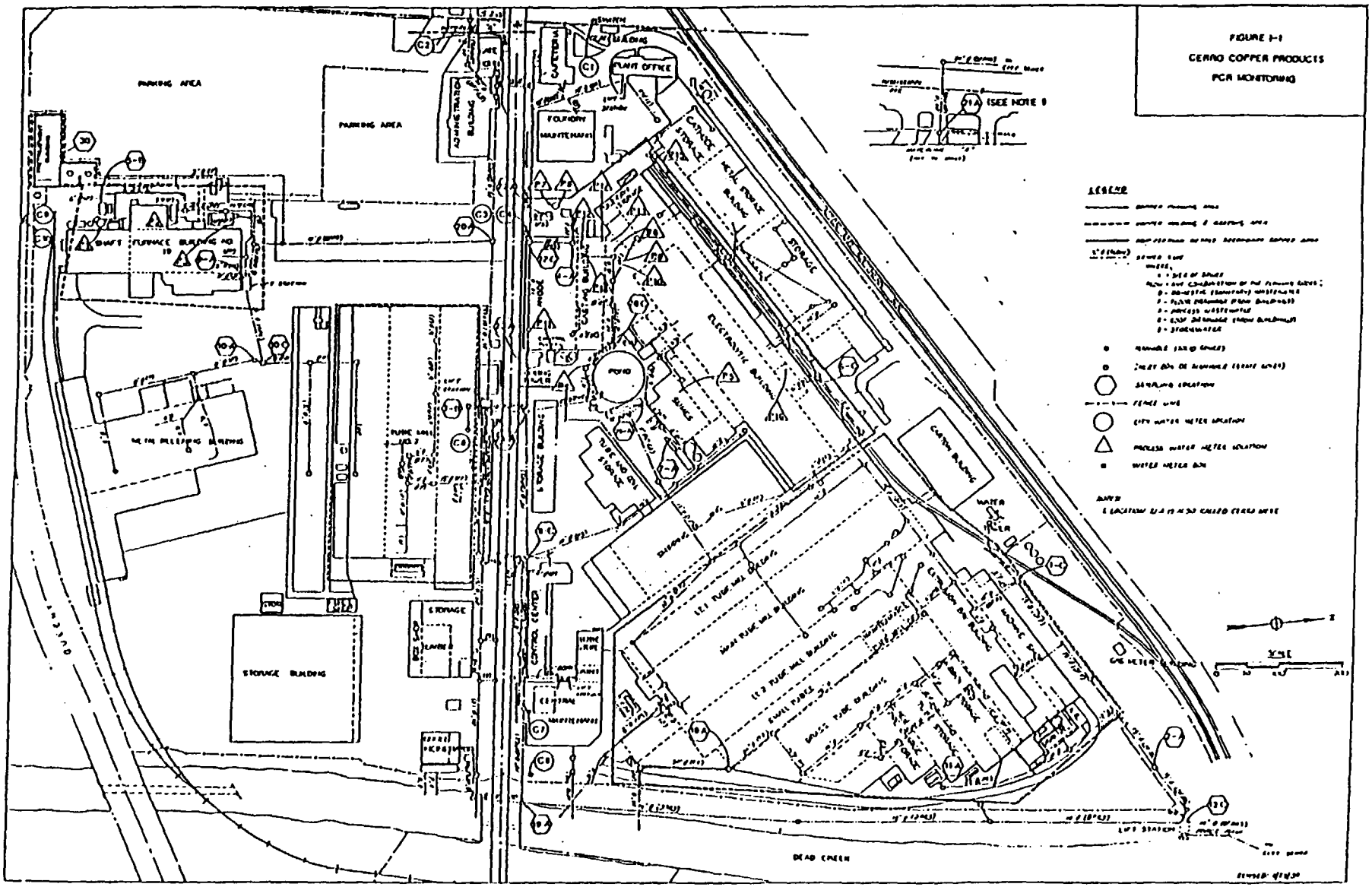

FIGURE I-1
CERRO COPPER PRODUCTS
PCR MONITORING

SECTION II

II. SAMPLE COLLECTION/FLOW MONITORING PROCEDURES

SAMPLE COLLECTION

Grab samples were collected periodically at all locations. Some of the individual grab samples were used to compile 24-hour flow-proportioned composite samples for semi-volatile organics (NVBN + NVA), and metals analyses. Others were submitted as collected for analyses requiring grabs (e.g., O&G). See Table II-1 for a summary of the type of sample bottles and preservatives used.

Grab Samples

During the 24-hour period, twelve grab samples were collected for metals and semi-volatile organics analyses from each sampling location (except Location 30) at 2-hour intervals. In addition, four grab samples were collected at 6-hour intervals for VOA, total phenols, and oil and grease analyses. Furthermore, pH and temperature measurements were taken.

Grab samples were collected at the discharge of the treatment plant associated with the copper molding and casting operations (Location 30) and analyzed for all parameters.

In all cases, the grab samples were collected from the flow exiting the weir or flume at each applicable location. All grab samples were placed on ice after collection.

Grab samples for VOA, total phenol, and oil and grease were collected at each location during runs 3, 6, 9, and 12.

Composite Samples

For each sampling location, 24-hour flow-proportioned composite samples were prepared for metals and semi-volatile organics analyses. The percentage of sample required from each grab sample, based on the flow measured during the twelve 2-hour sampling periods, was compiled and recorded for each location.

FLOW MONITORING

During sample collection, totalizer readings were monitored at each location except Location 30. This was accomplished by totalizing/recording flow meters at each location. Table II-2 provides a summary of the flow measurement devices for each sampling location.

The large pumps at Location 12C were turned "off, preventing water from flowing through the 12-inch discharge line of the three pump system. Flow was only monitored through the 4-inch pipe connected to the small pump.

TABLE II-1

SAMPLE BOTTLES AND PRESERVATIVES

Analysis	Bottle		Preservation
	Type	Size	
VOA(1)	Clear glass Teflon lined cap	40 ml	Cool, 4°C
NVBN+NVA(2)	Clear glass Teflon lined cap	16 oz	Cool, 4°C
Metals (3)	Clear glass Teflon lined cap	8 & 16 oz	Nitric Acid to pH < 2
Oil & Grease	Clear glass Teflon lined cap	32 oz	Sulfuric Acid to pH < 2, Cool, 4°C
Total Phenols	Clear glass Teflon lined cap	16 oz	Sulfuric Acid to pH < 2, Cool, 4°C

Notes:

(1) Volatile Organics Analysis - Method 624 of 40CFR136

(2) Nonvolatile Base and Neutral Extractable Organics, and Nonvolatile Acid Extractable Organics - Method 625 of 40CFR136. Composite sample is kept in a amber glass, 80 oz teflon lined cap bottle.

(3) Analysis includes total chromium, total copper, total lead, total nickel, and total zinc.

TABLE II-2

FLOW MEASURING DEVICE FOR EACH SAMPLING LOCATION

Location	Pipe		Device	
	Type	Size (in)	Type	Size (in)
3B	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
8A	Polyvinyl Chloride	15	Rectangular flume with continuous flow meter/recorder	15
9A	Cast Iron	12	90 Degree V-Notch weir with continuous flow meter/recorder	-
12C (1)	Polyvinyl Chloride	4	Sonic flow meter with continuous totalizer/recorder	-
21A	Clay	18	Rectangular Flume with continuous flow meter/recorder	18

Notes:

(1) Discharge from East lift station included discharge of a 4" pump only. The 12" pump system was shut off.

SECTION III

III. SUMMARY OF FLOW MONITORING, FIELD pH AND TEMPERATURE DATA

Flow data were compiled during the 24-hour sampling period by periodically reading the totalizers associated with each flow meter at each location. The data are presented in Table III-1. The flows in the table are calculated differences in the recorded totalizer readings.

Field pH and temperature measurements were taken for the grab samples collected at 6-hour intervals. The data are compiled in Table III-2.

Field information from the metal molding and casting pretreatment plant discharge (Location 30) is provided in Table III-3.

TABLE III-1

FLOW MEASUREMENT SUMMARY

		Station 3B			Station 8A			Station 9A		
Run	Date	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (gal)	Volume (gal)
0	6/12	0721	28688	--	0716	054660	--	0730	26225	--
1		0920	29563	875	0915	058490	3830	0926	29503	3278
2		1116	30390	827	1010	062390	3900	1125	32117	2614
3		1332	31154	764	1321	069820	7430	1342	33907	1790
4		1512	31759	605	1507	074580	4760	1518	36086	2179
5		1716	32683	924	1710	081280	6700	1722	38299	2213
6		1915	33287	604	1907	084980	3700	1923	41162	2863
7		2127	34251	964	2118	091500	6520	2134	43630	2468
8		2319	35110	859	2313	094950	3450	2325	46350	2720
9	6/13	0124	35970	860	0115	105800	10850	0130	48800	2450
10		0313	36850	880	0308	110350	4550	0317	50600	1800
11		0510	37550	700	0504	116750	6400	0514	52440	1840
12		0726	38478	928	0718	120680	3930	0734	53520	1080
Total Volume		(gal)		9790			66,020			27,295
Average flow		(gpd)		9756			65,928			27,219
		(gpm)		6.8			45.8			18.9

TABLE III-1 (Continued)

FLOW MEASUREMENT SUMMARY

		Station 12C			Station 21A		
Run	Date	Time	Totalizer Reading (gal)	Volume (gal)	Time	Totalizer Reading (1000 gal)	Volume (gal)
0	6/12	0703	2320180	--	0735	2252183	--
1		0904	2330040	9860	0931	2252200	17,000
2		1101	2336860	6820	1132	2252219	19,000
3		1308	2346200	9340	1350	2252241	22,000
4		1501	2354170	7970	1525	2252256	15,000
5		1659	2362580	8410	1730	2252278	22,000
6		1857	2371240	8660	1937	2252298	20,000
7		2109	2381130	9890	2149	2252320	22,000
8		2305	2388860	7730	2334	2252335	15,000
9	6/13	0104	2397900	9040	0135	2252356	21,000
10		0300	2408500	10600	0322	2252373	17,000
11		0456	2417570	9070	0518	2252390	17,000
12		0703	2425880	8310	0746	2252412	22,000
Total Volume		(gal)		105,700			229,000
Average Flow		(gpd)		105,700			227,264
		(gpm)		73.4			157.8

TABLE III-2

pH AND TEMPERATURE DATA (1)

Station		3B			8A			9A			12C			21A		
Date	Run	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)	Time	pH (SU)	T (°F)
6/12	2	1116	7.59	26	1110	8.63	33	1125	7.74	27	1101	7.78	28	1032	7.31	27
6/12	5	1716	7.95	27	1710	8.98	32	1722	7.26	26	1659	7.43	27	1730	7.60	28
6/12	8	2319	7.14	26	2313	8.93	29	2325	7.35	25	2305	7.14	28	2334	7.34	24
6/13	11	0510	7.68	23	0504	9.04	30	0514	7.30	24	0456	7.76	24	0518	7.40	23
Minimum			7.14	23		8.63	29		7.30	24		7.14	24		7.31	23
Maximum			7.95	27		9.04	33		7.74	27		7.78	28		7.60	28

Notes:

(1) Temperature was measured at each site after collection of samples. pH was measured after all samples from all stations were collected.

TABLE III-3

METAL MOLDING AND CASTING
PRETREATMENT PLANT INFORMATION

	Process Tank Discharge	Storage Tank Discharge
Date	June 13, 1990	June 13, 1990
Volume Discharged (gal)	7,000	7,000
Discharge Time	12:00 (1)	08:00
Sampling Time	09:15	09:11
Volume Collected (L)	5	5
pH (SU)	8.49	8.70
Temperature (°C)	54	46

Composite Sample: Two 2.5 liter samples were collected from each tank. Four liters, 1 liter from each container, were mixed in a clean 2.5 gal bucket. Required samples were taken from the bucket. pH and temperature were measured immediately after collecting the samples.

Notes:

(1) Estimated

SECTION IV

TABLE IV-1

IDENTIFICATION OF SAMPLES WITH SAMPLING LOCATIONS

Sampling Location	Site Number (1)	Sample I.D.
3B	3	3,6,9,12
8A	8	3,6,9,12
9A	9	3,6,9,12
12C	12	3,6,9,12
21A	21	3,6,9,12
30	30	

Notes:

(1) Composite samples are identified by the site number.

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METHOD SUMMARY

Except where noted, EAI employs the methods stated in the USEPA's current "Contract Laboratory Statement of work for Organics Analysis - Multi-Media Multi Concentration", Rev. 7/87.

VOLATILES

For a solid, 5 g of sample is taken and surrogate compounds are added. For a water sample, a 5 ml aliquot is taken with surrogates added. An inert gas is bubbled through the sample in a specifically designed purging chamber at ambient temperature. The purgeables are transferred to the vapor phase where they are swept through a sorbent column and trapped. The sorbent column is heated and backflushed with the inert gas to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to seperate the purgeables which are then detected with a mass spectrometer.

ACIDS/BASE NEUTRALS

For a solid, a weighed amount of sample is mixed with anhydrous sodium sulfate, surrogates are added and the sample is extracted with 1:1 acetone/methylene chloride using an ultrasonic probe. The extract is then concentrated. For a water sample, a measured volume plus surrogates is serially extracted with methylene chloride at a pH greater than 11 and again at a pH less than 2, using a seperatory funnel. The extracts are dried and concentrated. The extracts are injected onto a gas chromatographic column. The gas chromatograph is temperature programmed to seperate the compounds which are then detected with a mass spectrometer.

SURROGATES

Surrogate standards are deuterated compounds and/or select compounds which analytically mimic the response of certain analytes. A known concentration is added to the sample and the percent recovery calculated. This recovery acts as a barometer of the method efficiency for the individual sample matrix.

SOLID SAMPLES

Results for solid samples are reported on a an as received basis, unless noted otherwise.

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PAGE NO : 1
REPORT NO : 39151
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66600
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121722	3 1-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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PAGE NO : 2
REPORT NO : 39151
DATE : Ø6/27/9Ø

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RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1121722	3 1-12 6/12-13/9Ø C	Chromium	Ø.139	mg Cr/l	218.1
		Copper	1.86	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	Ø.1Ø	mg Ni/l	~~XXXXX~~ 249.1
		Lead (GTF)	Ø.21	mg Pb/l	239.2
		Zinc	Ø.182	mg Zn/l	289.1

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EAI LAB #1121722
CLIENT CODE: CCP
SAMPLE ID: 3 1-12 6/12-13/90
REPORT NO: 39151

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 3 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 3 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 3 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	29	(35-114)	(23-120)
2-Fluorobiphenyl	47	(43-116)	(30-115)
Terphenyl	59	(33-141)	(18-137)
D-5 phenol	80	(10-94)	(24-113)
2-Fluorophenol	52	(21-100)	(25-121)
2,4,6-Tribromophenol	18	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39165
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66949
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121723	3-3 6/12-13/90 C
1121724	3-6 6/12-13/90 C
1121725	3-9 6/12-13/90 C
1121726	3-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39166
DATE : Ø6/27/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
121723	3-3 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	8.8	mg/l	413.1
		Phenols	Ø.Ø16	mg/l	420.1
121724	3-6 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	6.9	mg/l	413.1
		Phenols	<Ø.ØØ5	mg/l	420.1
121725	3-9 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	13.Ø	mg/l	413.1
		Phenols	Ø.ØØ5	mg/l	420.1
121726	3-12 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	5.4	mg/l	413.1
		Phenols	Ø.ØØ5	mg/l	420.1

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EAI LAB #1121723
CLIENT CODE: CCP
SAMPLE ID: 3-3 6/12-13/90
REPORT NO: 39166

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	60	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	30	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	270	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	8	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 3-3 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	90	(76-114)	(70-121)
d8-Toluene	101	(88-110)	(81-117)
4-Bromofluorobenzene	108	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121724
CLIENT CODE: CCP
SAMPLE ID: 3-6 6/12-13/90
REPORT NO: 39166

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	80	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	30	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	40	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	300	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	13	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 3-6 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	81	(76-114)	(70-121)
d8-Toluene	88	(88-110)	(81-117)
4-Bromofluorobenzene	107	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121725
CLIENT CODE: CCP
SAMPLE ID: 3-9 6/12-13/90
REPORT NO: 39166

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	50	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	35	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	50	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	250	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	10	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 3-9 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	96	(76-114)	(70-121)
d8-Toluene	98	(88-110)	(81-117)
4-Bromofluorobenzene	95	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121726
CLIENT CODE: CCP
SAMPLE ID: 3-12 6/12-13/90
REPORT NO: 39166

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	150	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	40	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	75	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	260	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 3-12 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	84	(76-114)	(70-121)
d8-Toluene	88	(88-110)	(81-117)
4-Bromofluorobenzene	109	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39154
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66600
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121803	8 1-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

H. M. FERRIS

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PAGE NO : 2
REPORT NO : 39154
DATE : 06/27/90

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RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1121803 8 1-12 6/12-13/90 c		Chromium	0.078	mg Cr/l	218.1
		Copper	1.01	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	0.45	mg Ni/l	249.1
		Lead (GTF)	0.42	mg Pb/l	239.2
		Zinc	0.277	mg Zn/l	289.1

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EAI LAB #1121803
CLIENT CODE: CCP
SAMPLE ID: 8 1-12 6/12-13/90
REPORT NO: 39154

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 8 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 8 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 8 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	55	(35-114)	(23-120)
2-Fluorobiphenyl	31	(43-116)	(30-115)
Terphenyl	47	(33-141)	(18-137)
D-5 phenol	41	(10-94)	(24-113)
2-Fluorophenol	37	(21-100)	(25-121)
2,4,6-Tribromophenol	78	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39169
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRAHA
CERRO COPPER PROD.
P.O. BOX 6000
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121804	8-3 6/12-13/90 C
1121805	8-6 6/12-13/90 C
1121806	8-9 6/12-13/90 C
1121807	8-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

W. M. FERRIS

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PAGE NO : 2
REPORT NO : 39169
DATE : Ø6/27/9Ø

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RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1121Ø04	8-3 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	5.9	mg/l	413.1
		Phenols	Ø.ØØ7	mg/l	420.1
1121Ø05	8-6 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	2.3	mg/l	413.1
		Phenols	Ø.ØØ5	mg/l	420.1
1121Ø06	8-9 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	1.9	mg/l	413.1
		Phenols	Ø.ØØ7	mg/l	420.1
1121Ø07	8-12 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	4.9	mg/l	413.1
		Phenols	Ø.ØØ9	mg/l	420.1

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EAI LAB #1121804
CLIENT CODE: CCP
SAMPLE ID: 8-3 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	10	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 8-3 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	106	(76-114)	(70-121)
d8-Toluene	92	(88-110)	(81-117)
4-Bromofluorobenzene	98	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated valuc-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not dctected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121805
CLIENT CODE: CCP
SAMPLE ID: 8-6 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 8-6 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	112	(76-114)	(70-121)
d8-Toluene	94	(88-110)	(81-117)
4-Bromofluorobenzene	99	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121806
CLIENT CODE: CCP
SAMPLE ID: 8-9 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	20	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	75	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	10	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 8-9 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	115	(76-114)	(70-121)
d8-Toluene	95	(88-110)	(81-117)
4-Bromofluorobenzene	98	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121807
CLIENT CODE: CCP
SAMPLE ID: 8-12 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	25	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 8-12 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	112	(76-114)	(70-121)
d8-Toluene	97	(88-110)	(81-117)
4-Bromofluorobenzene	105	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39152
DATE : Ø6/27/9Ø
P.O. No. : 9232Ø

MR. J. GHANA
CERRO COPPER PROD.
P.O. BOX 6630Ø
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste Water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121727	9 1-12 6/12-13/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. PERRIS

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39152
DATE : 06/27/90

RESULTS OF ANALYSIS

LCO NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
121727 9 1-12 6/12-13/90 c		Chromium	0.144	mg Cr/l	218.1
		Copper	3.59	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	<0.05	mg Ni/l	249.1
		Lead (GTF)	0.049	mg Pb/l	239.2
		Zinc	0.106	mg Zn/l	289.1

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EAI LAB #1121727
CLIENT CODE: CCP
SAMPLE ID: 9 1-12 6/12-13/90
REPORT NO: 39152

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 9 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: 9 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: 9 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	18	(35-114)	(23-120)
2-Fluorobiphenyl	40	(43-116)	(30-115)
Terphenyl	37	(33-141)	(18-137)
D-5 phenol	56	(10-94)	(24-113)
2-Fluorophenol	29	(21-100)	(25-121)
2,4,6-Tribromophenol	80	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39167
DATE : 06/27/90
P.O. NO. : 02320

MR. J. GIANNA
CERRO COPPER PROD.
P.O. BOX 66600
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121728	9-3 6/12-13/90 C
1121729	9-6 6/12-13/90 C
1121730	9-9 6/12-13/90 C
1121731	9-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39167
DATE : Ø6/27/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
121728	9-3 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3.8	mg/l	413.1
		Phenols	Ø.ØØ9	mg/l	420.1
121729	9-6 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3.Ø	mg/l	413.1
		Phenols	Ø.ØØ9	mg/l	420.1
121730	9-9 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	3.2	mg/l	413.1
		Phenols	Ø.ØØ9	mg/l	420.1
121731	9-12 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	4.2	mg/l	413.1
		Phenols	<Ø.ØØ5	mg/l	420.1

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EAI LAB #1121728
CLIENT CODE: CCP
SAMPLE ID: 9-3 6/12-13/90
REPORT NO: 39167

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	60	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	75	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethanc	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	10	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 9-3 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	103	(76-114)	(70-121)
d8-Toluene	98	(88-110)	(81-117)
4-Bromofluorobenzene	95	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121729
CLIENT CODE: CCP
SAMPLE ID: 9-6 6/12-13/90
REPORT NO: 39167

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	140	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	75	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	15	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 9-6 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	97	(76-114)	(70-121)
d8-Toluene	86	(88-110)	(81-117)
4-Bromofluorobenzene	112	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121730
CLIENT CODE: CCP
SAMPLE ID: 9-9 6/12-13/90
REPORT NO: 39167

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	75	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	60	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	10	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 9-9 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	101	(76-114)	(70-121)
d8-Toluene	91	(88-110)	(81-117)
4-Bromofluorobenzene	95	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121731
CLIENT CODE: CCP
SAMPLE ID: 9-12 6/12-13/90
REPORT NO: 39167

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	160	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	65	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 9-12 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	104	(76-114)	(70-121)
d8-Toluene	87	(88-110)	(81-117)
4-Bromofluorobenzene	110	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39155
DATE : Ø6/27/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
112168Ø6	12 1-12 6/12-13/9Ø c	Chromium	Ø.Ø67	mg Cr/l	218.1
		Copper	2.58	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	3.95	mg Ni/l	249.1
		Lead (GTF)	Ø.24	mg Pb/l	239.2
		Zinc	1.Ø9	mg Zn/l	289.1

Environmental Analysis, Inc.
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EAI LAB #1121808
CLIENT CODE: CCP
SAMPLE ID: 12 1-12 6/12-13/90
REPORT NO: 39155

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: 12 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

Environmental Analysis, Inc.
3278 N. Lindbergh Blvd. · Florissant, MO 63033 · 314-921-4488

SAMPLE ID: 12 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 12 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine,	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	59	(35-114)	(23-120)
2-Fluorobiphenyl	27	(43-116)	(30-115)
Terphenyl	58	(33-141)	(18-137)
D-5 phenol	27	(10-94)	(24-113)
2-Fluorophenol	46	(21-100)	(25-121)
2,4,6-Tribromophenol	65	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39170
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRAHA
CERRO COPPER PROD.
P.O. BOX 66949
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121809	12-3 6/12-13/90 C
1121810	12-6 6/12-13/90 C
1121811	12-9 6/12-13/90 C
1121812	12-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

M.M. FERRIS

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PAGE NO : 2
REPORT NO : 39170
DATE : 06/27/90

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
121809	12-3 6/12-13/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	500	mg/l	413.1
		Phenols	0.015	mg/l	420.1
121810	12-6 6/12-13/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	461	mg/l	413.1
		Phenols	0.013	mg/l	420.1
121811	12-9 6/12-13/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	428	mg/l	413.1
		Phenols	0.007	mg/l	420.1
121812	12-12 6/12-13/90 c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	442	mg/l	413.1
		Phenols	0.022	mg/l	420.1

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EAI LAB #1121809
CLIENT CODE: CCP
SAMPLE ID: 12-3 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	5 U	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	15	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	10	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 12-3 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	89	(76-114)	(70-121)
d8-Toluene	90	(88-110)	(81-117)
4-Bromofluorobenzene	96	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121810
CLIENT CODE: CCP
SAMPLE ID: 12-6 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	15	ug/l
Acetone	450 E	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	30	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	35	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 12-6 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	106	(76-114)	(70-121)
d8-Toluene	93	(88-110)	(81-117)
4-Bromofluorobenzene	100	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
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EAI LAB #1121811
CLIENT CODE: CCP
SAMPLE ID: 12-9 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	15	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	15	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	10	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 12-9 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	89	(76-114)	(70-121)
d8-Toluene	91	(88-110)	(81-117)
4-Bromofluorobenzene	94	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

Environmental Analysis, Inc.
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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39150
DATE : 06/27/90

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
1121715	BATCH GRB30 6/12-13c	Chromium	0.047	mg Cr/l	218.1
		Copper	0.420	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Volatiles (GCMS)	See Attach		624
		Nickel	<0.05	mg Ni/l	249.1
		Oil & Grease	2.7	mg/l	413.1
		Lead (GTF)	0.21	mg Pb/l	239.2
		Phenols	<0.005	mg/l	420.1
		Zinc	0.114	mg Zn/l	289.1

Environmental Analysis, Inc.
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EAI LAB #1121812
CLIENT CODE: CCP
SAMPLE ID: 12-12 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	10	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	7	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	25	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 12-12 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichlorocthane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzenc	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	94	(76-114)	(70-121)
d8-Toluene	84	(88-110)	(81-117)
4-Bromofluorobenzene	94	(86-115)	(74-121)

B=Analytc found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 2
CERRO COPPER PROD. REPORT NO : 39153
DATE : Ø6/27/9Ø

RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBERS
1121732 21 1-12 6/12-13/9Ø c		Chromium	Ø.Ø66	mg Cr/l	218.1
		Copper	2.84	mg Cu/l	220.1
		Acid Extract (GCMS)	See Attach		625
		Base Neutrals (GCMS)	See Attach		625
		Nickel	Ø.Ø9	mg Ni/l	XXXXX 249.1
		Lead (GTF)	Ø.182	mg Pb/l	239.2
		Zinc	Ø.176	mg Zn/l	289.1

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PAGE NO : 1
REPORT NO : 39155
DATE : Ø6/27/9Ø
P.O. No. : 92320

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 6688Ø
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste Water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121868	12 1-12 6/12-13/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

BY N. FERRIS

Environmental Analysis, Inc.
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EAI LAB #1121715
CLIENT CODE: CCP
SAMPLE ID: BATCH GRB 30 6/12-13
REPORT NO: 39150

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	30	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	5 U	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	35	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	5 U	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	5 U	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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EAI LAB #1121732
CLIENT CODE: CCP
SAMPLE ID: 21 1-12 6/12-13/90
REPORT NO: 39153

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

Environmental Analysis, Inc.
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PAGE NO : 1
REPORT NO : 39153
DATE : 06/27/90
P.O. No. : 92320

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 66600
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121732	21 1-12 6/12-13/90 C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS

Analyt[illegible] Research • Field Studies

Environmental Analysis, Inc.
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SAMPLE ID: 21 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 12 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

Environmental Analysis, Inc.
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SAMPLE ID: 21 1-12 6/12-13/90

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	18	(35-114)	(23-120)
2-Fluorobiphenyl	106	(43-116)	(30-115)
Terphenyl	70	(33-141)	(18-137)
D-5 phenol	82	(10-94)	(24-113)
2-Fluorophenol	64	(21-100)	(25-121)
2,4,6-Tribromophenol	117	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39168
DATE : Ø6/27/9Ø
P.O. No. : 9232Ø

MR. J. GRANA
CERRO COPPER PROD.
P.O. BOX 6588Ø
ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 6ØØ; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121733	21-3 6/12-13/9Ø C
1121734	21-6 6/12-13/9Ø C
1121881	21-9 6/12-13/9Ø C
1121882	21-12 6/12-13/9Ø C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

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PAGE NO : 2
REPORT NO : 39168
DATE : Ø6/27/9Ø

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RESULTS OF ANALYSIS

LOG NUMBER	SAMPLE DESCRIPTION	TEST NAME	RESULTS OF ANALYSIS	UNITS OF EXPRESSION	METHOD NUMBER
121733	21-3 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	1Ø.4	mg/l	413.1
		Phenols	Ø.Ø12	mg/l	420.1
1121734	21-6 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	9.1	mg/l	413.1
		Phenols	Ø.ØØ8	mg/l	420.1
1121801	21-9 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	12.Ø	mg/l	413.1
		Phenols	Ø.Ø1Ø	mg/l	420.1
1121802	21-12 6/12-13/9Ø c	Volatiles (GCMS)	See Attach		624
		Oil & Grease	8.8	mg/l	413.1
		Phenols	Ø.ØØ9	mg/l	420.1

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EAI LAB #1121733
CLIENT CODE: CCP
SAMPLE ID: 21-3 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	10	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	50	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	45	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	530	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 21-3 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	104	(76-114)	(70-121)
d8-Toluene	88	(88-110)	(81-117)
4-Bromofluorobenzene	95	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121734
CLIENT CODE: CCP
SAMPLE ID: 21-6 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	30	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	20	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	45	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	520	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 21-6 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	109	(76-114)	(70-121)
d8-Toluene	85	(88-110)	(81-117)
4-Bromofluorobenzene	93	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121801
CLIENT CODE: CCP
SAMPLE ID: 21-9 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	130	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	85	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	25	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	1800	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	8	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	25	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 21-9 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	107	(76-114)	(70-121)
d8-Toluene	102	(88-110)	(81-117)
4-Bromofluorobenzene	95	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121802
CLIENT CODE: CCP
SAMPLE ID: 21-12 6/12-13/90
REPORT NO:

VOLATILES	Value	Units
Chloromethane	10 U	ug/l
Bromomethane	10 U	ug/l
Vinyl Chloride	10 U	ug/l
Chloroethane	10 U	ug/l
Methylene Chloride	20	ug/l
Acetone	50 U	ug/l
Carbon Disulfide	50 U	ug/l
1,1-Dichloroethene	5 U	ug/l
1,1-Dichloroethane	35	ug/l
1,2-Dichloroethene (total)	5 U	ug/l
Chloroform	35	ug/l
2-Butanone	50 U	ug/l
1,2-Dichloroethane	5 U	ug/l
1,1,1-Trichloroethane	780	ug/l
Carbon Tetrachloride	5 U	ug/l
Vinyl Acetate	50 U	ug/l
Bromodichloromethane	5 U	ug/l
1,2-Dichloropropane	5 U	ug/l
trans-1,3-Dichloropropene	5 U	ug/l
Trichloroethene	15	ug/l
Benzene	5 U	ug/l
Dibromochloromethane	5 U	ug/l

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SAMPLE ID: 21-12 6/12-13/90

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	5 U	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	110	(76-114)	(70-121)
d8-Toluene	103	(88-110)	(81-117)
4-Bromofluorobenzene	100	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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EAI LAB #1121715
CLIENT CODE: CCP
SAMPLE ID: BATCH GRB 30 6/12-13
REPORT NO: 39150

Page 1

SEMI-VOLATILES	Value	Units
Aniline	10 U	ug/l
Phenol	10 U	ug/l
bis(2-chloroethyl)ether	10 U	ug/l
2-Chlorophenol	10 U	ug/l
1,3-Dichlorobenzene	10 U	ug/l
1,4-Dichlorobenzene	10 U	ug/l
Benzyl Alcohol	10 U	ug/l
1,2-Dichlorobenzene	10 U	ug/l
2-Methylphenol	10 U	ug/l
bis(2-chloroisopropyl)ether	10 U	ug/l
4-Methylphenol	10 U	ug/l
N-Nitroso-Di-propylamine	10 U	ug/l
Hexachloroethane	10 U	ug/l
Nitrobenzene	10 U	ug/l
Isophorone	10 U	ug/l
2-Nitrophenol	10 U	ug/l
2,4-Dimethylphenol	10 U	ug/l
bis(2-chloroethoxy)methane	10 U	ug/l
Benzoic Acid	50 U	ug/l
2,4-Dichlorophenol	10 U	ug/l
1,2,4-Trichlorobenzene	10 U	ug/l

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SAMPLE ID: BATCH GRB 30 6/12-13

SEMI-VOLATILES	Value	Units
Naphthalene	10 U	ug/l
4-Chloroaniline	10 U	ug/l
Hexachlorobutadiene	10 U	ug/l
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	10 U	ug/l
2-Methylnaphthalene	10 U	ug/l
Hexachlorocyclopentadiene	10 U	ug/l
2,4,6-Trichlorophenol	10 U	ug/l
2,4,5-Trichlorophenol	50 U	ug/l
2-Chloronaphthalene	10 U	ug/l
2-Nitroaniline	50 U	ug/l
Dimethylphthalate	10 U	ug/l
Acenaphthylene	10 U	ug/l
2,6-Dinitrotoluene	10 U	ug/l
3-Nitroaniline	50 U	ug/l
Acenaphthene	10 U	ug/l
2,4-Dinitrophenol	50 U	ug/l
4-Nitrophenol	50 U	ug/l
Dibenzofuran	10 U	ug/l
2,4-Dinitrotoluene	10 U	ug/l
Diethylphthalate	10 U	ug/l
Fluorene	10 U	ug/l
4-Chlorophenyl-phenyl ether	10 U	ug/l

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SAMPLE ID: BATCH GRB 30 6/12-13

VOLATILES	Value	Units
cis-1,3-Dichloropropene	5 U	ug/l
1,1,2-Trichloroethane	5 U	ug/l
Bromoform	20	ug/l
2-Hexanone	50 U	ug/l
4-Methyl-2-pentanone	50 U	ug/l
Tetrachloroethene	5 U	ug/l
1,1,2,2-Tetrachlorothane	5 U	ug/l
Toluene	5 U	ug/l
Chlorobenzene	5 U	ug/l
Ethyl Benzene	5 U	ug/l
Styrene	5 U	ug/l
Total Xylenes	5 U	ug/l
Acrolein	100 U	ug/l
Acrylonitrile	50 U	ug/l
2-Chloroethyl Vinyl Ether	10 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
d4-1,2-Dichloroethane	89	(76-114)	(70-121)
d8-Toluene	81	(88-110)	(81-117)
4-Bromofluorobenzene	98	(86-115)	(74-121)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

J=Estimated value-result is less than detection limit but greater than zero.

U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit.

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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SAMPLE ID: BATCH GRB 30 6/12-13

SEMI-VOLATILES	Value	Units
4-Nitroaniline	50 U	ug/l
4,6-Dinitro-2-methylphenol	50 U	ug/l
N-Nitrosodiphenylamine	10 U	ug/l
4-Bromophenyl-phenyl ether	10 U	ug/l
Hexachlorobenzene	10 U	ug/l
Pentachlorophenol	50 U	ug/l
Phenanthrene	10 U	ug/l
Anthracene	10 U	ug/l
Di-N-Butylphthalate	10 U	ug/l
Fluoranthene	10 U	ug/l
Pyrene	10 U	ug/l
Butylbenzyl phthalate	10 U	ug/l
3,3'-Dichlorobenzidine	20 U	ug/l
Chrysene	10 U	ug/l
bis(2-Ethylhexyl)phthalate	10 U	ug/l
Di-N-Octylphthalate	10 U	ug/l
Benzo(b)fluoranthene	10 U	ug/l
Benzo(k)fluoranthene	10 U	ug/l
Benzo(a)pyrene	10 U	ug/l
Indeno(1,2,3-c,d)pyrene	10 U	ug/l
Dibenzo(a,h)anthracene	10 U	ug/l
Benzo(g,h,i)perylene	10 U	ug/l
Benzo(a)anthracene	10 U	ug/l

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SAMPLE ID: BATCH GRB 30 6/12-13

SEMI-VOLATILES	Value	Units
Benzidine	50 U	ug/l
1,2-diphenylhydrazine	50 U	ug/l
N-Nitrosodimethylamine	50 U	ug/l

Surrogate recoveries	% Rec	Control Range Water %	Control Range Soil %
D-5 Nitrobenzene	31	(35-114)	(23-120)
2-Fluorobiphenyl	76	(43-116)	(30-115)
Terphenyl	39	(33-141)	(18-137)
D-5 phenol	67	(10-94)	(24-113)
2-Fluorophenol	82	(21-100)	(25-121)
2,4,6-Tribromophenol	50	(10-123)	(19-122)

B=Analyte found in blank as well as sample, indicates possible blank contamination.

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U=Indicates compound analyzed but not detected. Number reported is minimum detection limit for sample based on necessary concentration/dilution actions (not necessarily the instrument detection limit).

E=Identifies compounds whose concentrations exceed the calibration range of the GC/MS for that specific analysis.

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PAGE NO : 1
REPORT NO : 39150
DATE : 06/27/90
P.O. No. : 92320

MR. J. GIANA
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ST. LOUIS MO 63166

REPORT OF ANALYSIS

SUBJECT : Analysis of water/wastewater/waste samples in accordance with EPA 600; Methods for Chemical Analysis of Water and Wastes, 1983. Samples from PCR Waste water Project.

LOG NUMBER	SAMPLE DESCRIPTION
1121715	DATCH GRB30 6/12-13C

RESULTS OF ANALYSIS APPEAR ON FOLLOWING PAGES

RESPECTFULLY SUBMITTED

R. M. FERRIS