OTHER AREAS OF CONCERN DATA
THE DOE RUN COMPANY
HERCULANEUM, MISSOURI
VOLUME 1

A717
Herculaneum Land
MOD 0062 66 373
1/1
SBD 11/01

40054731
SUPERFUND RECORDS

JACOBS ENGINEERING

NOVEMBER 2001

ST. JOE LEAD COMPANY
SMELTING DIVISION
HERCULANEUM, MO. 63048

TO: C. D. Henderson DATED: November 29, 1977

FROM: D. H. Beilstein

SUBJECT: Water Quality - 1977 and 1983

Listed below are the Standards for Water Quality to be met at Herculaneum in 1977 and 1983:

	1977 (ppm)	1983 (ppm, Total daily) (effluent rate)		
	limit	300 gpm	500 gpm	800 gpm
Pb	0.20	0.29	0.18	0.11
Zn	1.00	2.93	1.76	1.10
Cd	0.40	0.29	0.18	0.11
Tot. Susp. Solids	50	15.4	9.2	5.77
pH	6.0-9.0	→	→	→

There is a further 1983 Standard - Avg. over 30 days

	300 gpm	500 gpm	800 gpm
Pb	0.15	0.09	0.06
Zn	1.46	0.88	0.55
Cd	0.15	0.09	0.06
Tot. Susp. Solids	7.7	4.61	2.88
pH	6.0-9.0	→	→

The reason for the variation with gpm effluent, is because discharge is based on lbs./1000 lbs. of product, to wit:

	Daily	30 day Avg.
Pb	0.0008#/1000 lbs.	0.0004
Zn	0.008 "	0.004
Cd	0.0008 "	0.0008
Total Susp. Solids	0.042 "	0.021
pH	6.0-9.0 →	

Technical Manager

DHB/cds

cc: D. H. DeClue

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: R. E. Peppers

August 22, 1980

From: D. L. Vornberg

Subject: Storm Water Inflow into Herculaneum City Sewer System

I was advised by Jim Evans, consultant to the Herculaneum Sewer District, on Friday, August 15, that he felt St. Joe was contributing a significant amount of storm water into the sanitary sewer district system. For the last week they had a bubble flow meter installed at the point that our lift station discharged into the Herculaneum sewer system. This equipment was owned by Metropolitan Engineers of Jefferson County, their consultant.

Jim indicated that during the week they had observed our pumps had cycled, perhaps being on only 25% of the time. Beginning at 11:30 on August 14 at the time that the rain started the previous evening, the pumps apparently were on continuously during the period of the storm. He showed me the early charts but did not have the one from that day available yet. In fact, the charts indicated that our pump ran about 25 or 30 percent of the time.

After discussions with Don Beilstein we determined to locate the cross-connection, if it existed, and determine whether it would be possible to correct the problem. I talked with Bruce Clark, Jim Jewell, and Joe Williams, and we identified one potential location where there might be a cross-connection. This was at the research building grating. While it appears from the drawings that is the case, in checking the flow-out physically on the site, it was determined that the storm flow in fact went into the industrial section of the sewage system of the plant. There is a storm sewer and sanitary sewer side-by-side at that location. (See attached drawing).

I returned to talk to the city people August 20 and took a look at the chart from August 15. As it turned out, their initial impression was, in fact, wrong, and Vic Pooley, the plant operator, made that observation as we examined the chart. While I was there he volunteered that they had some of the charts analyzed by Bob Vogler at Metropolitan Engineers and had obtained flows of approximately 16,000 gallons per day on August 10 and approximately 21,000 gallons per day on August 13. In my mind, they are no longer concerned about an inflow problem into the sewer district from St. Joe. For the time being, I would consider the matter closed with regard to the city's concern.

There is one cross-connection that has been opened up since August 15. This is the metal plate that separates the industrial sewer from the sanitary sewer on the east side of the refinery loading dock. This has been done temporarily in order to rebuild part of the sewer. However, this does not appear to be related to the incident with the city.

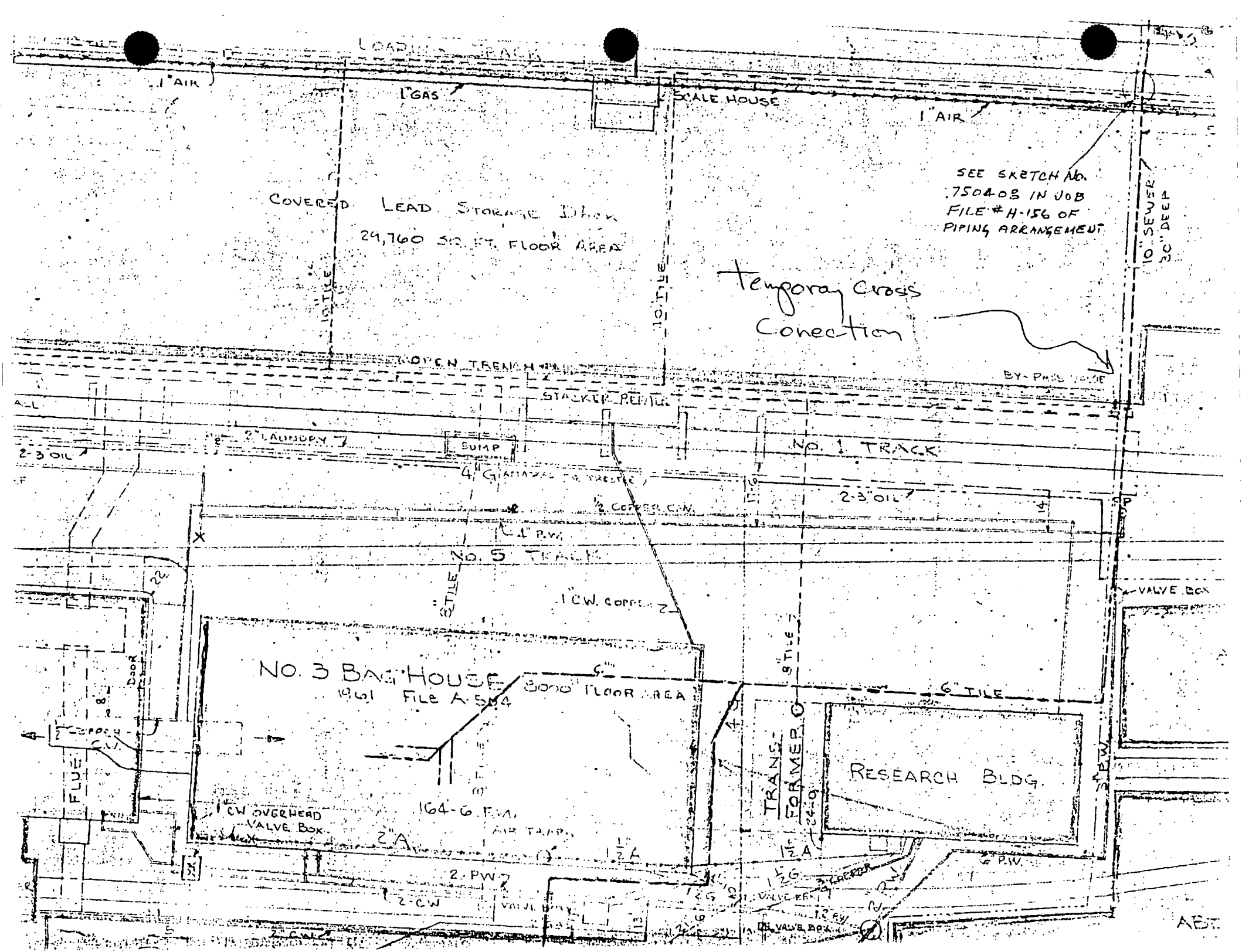
I think it's interesting to note that the city estimates their average flow around 230,000 gallons per day. We are contributing approximately 10 percent of that flow and yet on a population basis as per our agreement with the city, we are contributing about 30% of their revenue.

The flow at the plant during the rain Friday was over 300,000 gallons. This would indicate to me that they have about a 50,000 gallons per day storm water inflow or infiltration above their base of about 250,000 gallons per day. The infiltration problem appears, however, to be coming from elsewhere in the city, not from St. Joe. Ten or 15 percent infiltration is a tolerable number during storm water flow. Thirty and 40 percent is not unheard of in older systems, so their 20% is not so bad that it requires immediate attention. In any case, I don't think we should let them try and put the problem back on us rather than being a general problem throughout their collection system.

D. L. Vornberg

DLV:pjg

cc D. H. Beilstein
B. C. Clark
H. L. Rowland
D. Bailey
File



LOADING TRACK
1" AIR
1" GAS
SCALE HOUSE
1" AIR
SEE SKETCH No. 750408 IN JOB FILE # H-156 OF PIPING ARRANGEMENT
COVERED LEAD STORAGE DOCK
29,760 SQ. FT. FLOOR AREA
10" TILE
10" TILE
10" SEWER 30" DEEP
Temporary Cross Conection
OPEN TRENCH
BY-PASS VALVE
STACKER REPAIR
2" LAUNDRY
SUMP
2-3" OIL
No. 1 TRACK
4" GALVANIZED TO TRESTLE
2-3" OIL
½ COPPER C.W.
4" P.W.
No. 5 TRACK
8" TILE
1" C.W. COPPER
VALVE BOX
NO. 3 BAG HOUSE
1961 FILE A-504
8000 FLOOR AREA
6" TILE
8" TILE
TRANS-FORMER
RESEARCH BLDG.
FLUE
DOOR
2" COPPER C.W.
164-6 F.M.
1" CW OVERHEAD VALVE BOX
AIR TRAP
2" A
1½" A
1½" A
2-PW
2-CW
VALVE BOX
6" P.W.
3" COPPER
VALVE BOX
2" CW
ABT

Form #182

ST. JOE MINERALS CORPORATION
LEAD SMELTING DIVISION

REQUEST FOR SPECIAL ANALYSIS

Requested by: D. Vornberg Dept.: Env Date: 10/28/80

Sample Description

Material taken from Sewer Lift-Station

Screening produced three portions

SAMPLE NO.		%Insol		%Pb	%Fe	%Cu	%S		
#1 (4g) 21%		40.-		12.-	20.-	.3	12.-		
#2 (5g) 26%		36.-		1.2-	8.5	.2	0.3		
#3 (10g) 53%		45.-		3.4	15.2	.2	0.6		
#1 fine / maybe pyrite									
#2 medium - mixture									
#3 coarse - gravel									
Combined Analysis		42.-		4.6	14.5	.3	2.9		

Analysis don by: _____ Date Completed: _____

Total Time: _____ DP Hours: _____ Wet Lab Hours: _____

_____
Chief Chemist

Form #182

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LEAD SMELTING DIVISION

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Analysis don by: _____ Date Completed: _____

Total Time: _____ DR Hours: _____ Wet Lab Hours: _____

_____
Chief Chemist

STUDY OF STORM + SANITARY SEWERS

MARCH AND APRIL 1981

J. BONNER

SANITARY SEWER EFFLUENT DATA

DISCHARGE FROM UPPER (WEST) LIFT STATION

12-80/JFB

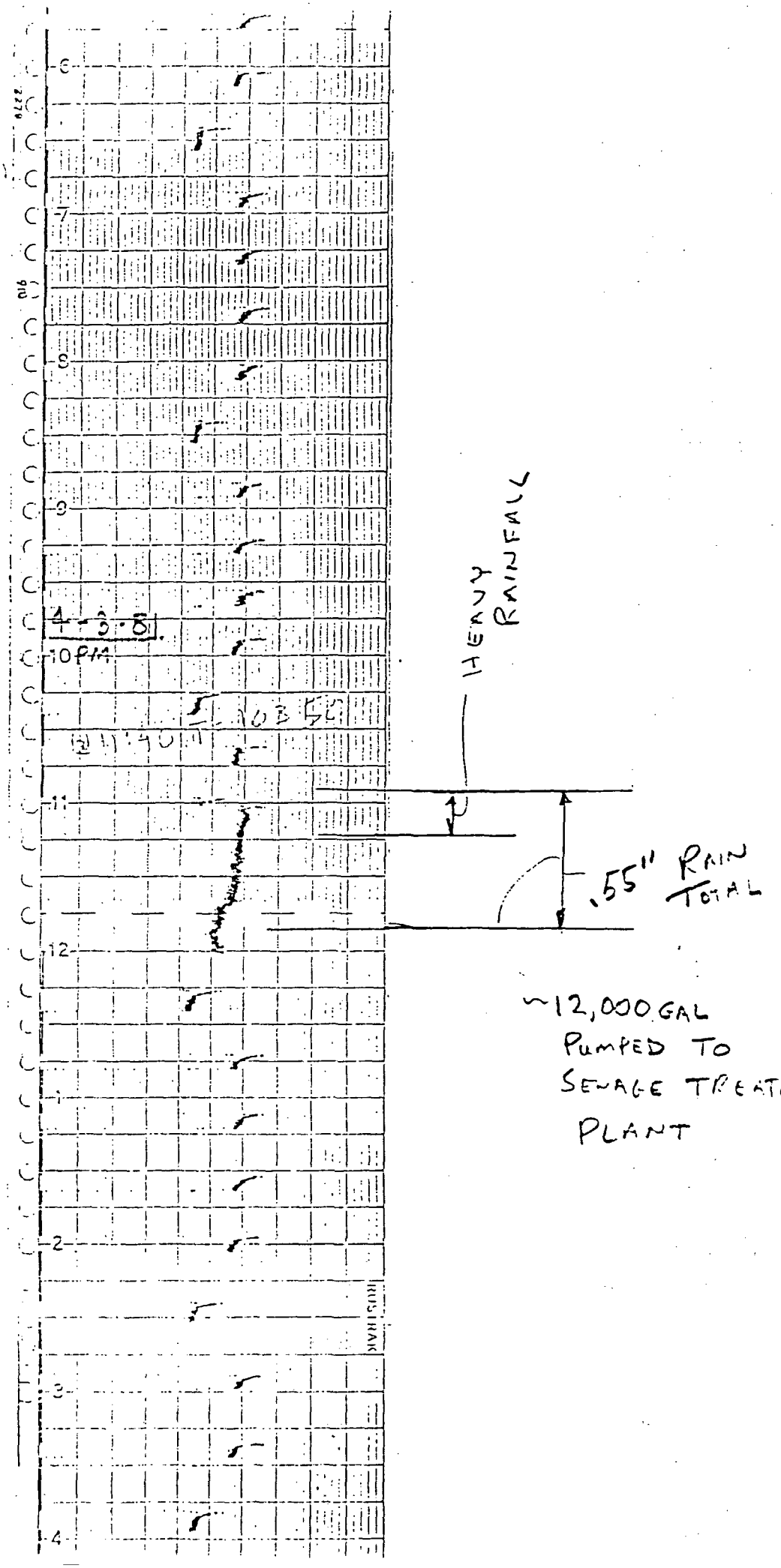
24 HOUR PERIOD ENDING:	TOTAL GALLONS	COMMENTS
12-5-80	79,113	
12-8-80	74,258	3 DAY WEEKEND AVERAGE
12-9-80	85,789	RAINDAY - STORM WATER ENTERING SYSTEM
12-10-80	77,436	
12-11-80	62,296	

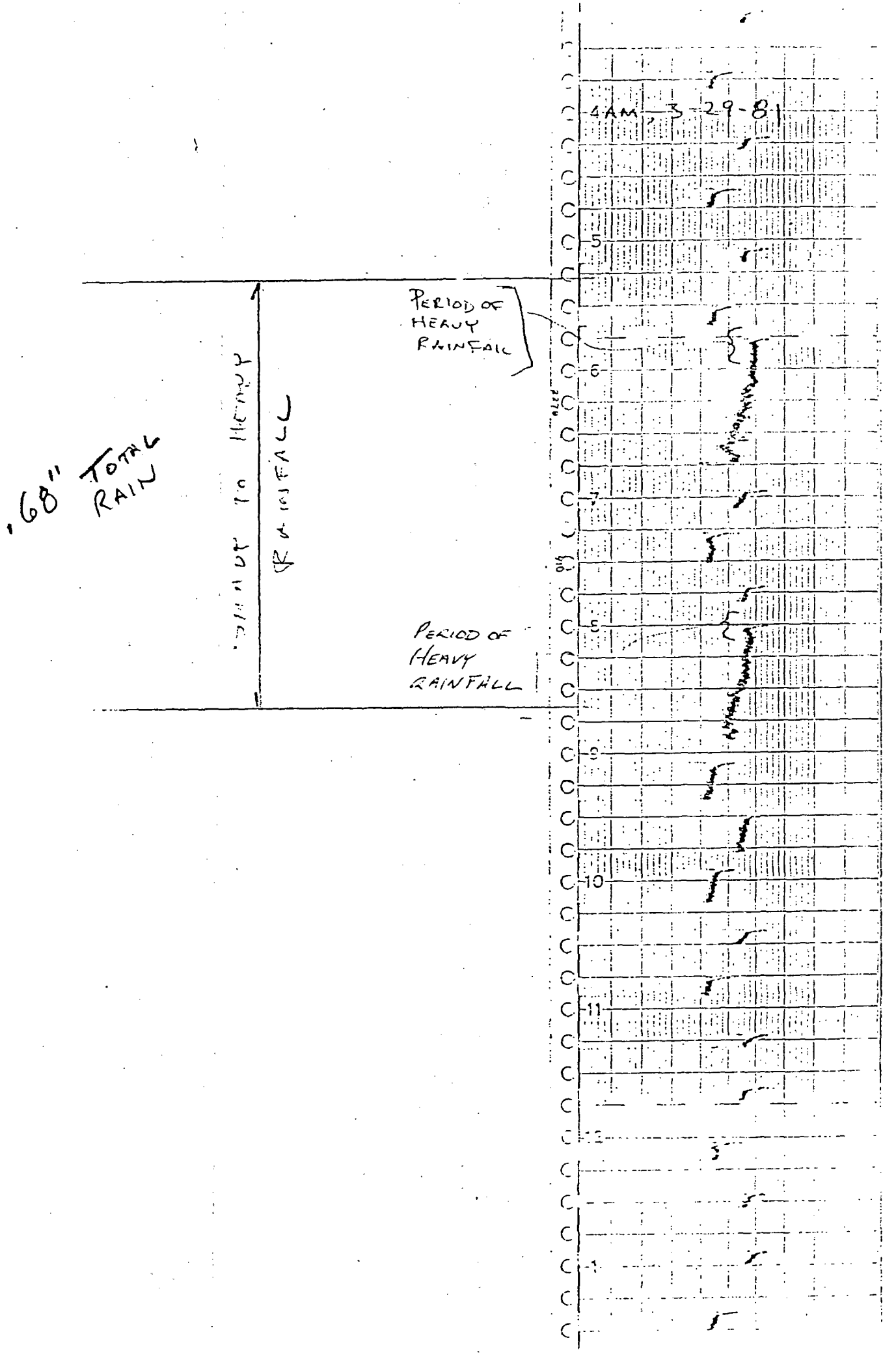
SANITARY SEWER EFFLUENT DATA

DISCHARGE FROM UPPER (WEST) LIFT STATION

4/81 JFB

24 HOUR PERIOD ENDING:	TOTAL GALLONS	COMMENTS
3-11-81	119,001	
3-12-81	93,759	LOWER LIFT STATION DISCHARGING TO 36" TILE
3-13-81	81,943	REPAIRED WATER LEAK IN DEPARTMENTS
3-14-81	70,082	REPAIRED WATER LEAKS IN DEPARTMENTS
3-15-81	74,147	.20" RAIN FALL - INCONCLUSIVE
3-16-81	81,810	
3-17-81	82,810	LOWER LIFT STATION BACK ON LINE
3-18-81	92,140	SURGE BETWEEN 7:30 AM - NOON
3-19-81	82,821	
3-23-81	84,466	4 DAY AVERAGE - .11" RAIN FALL INCONCLUSIVE
3-24-81	87,377	
3-25-81	90,117	
3-26-81	87,912	REPAIRED WASHROOM LEAK
3-30-81	85,913	3 DAY AVERAGE - STORM WATER IN SYSTEM - SEE SHEET
3-31-81	86,870	
4-2-81	77,451	2 DAY AVERAGE
4-3-81	104,812	UNEXPLAINED EXCESS - NO RAINFALL IN PERIOD
4-4-81	84,812	.55" RAIN - STORM WATER IN SYSTEM
4-5-81	84,812	
4-6-81	84,812	
4-7-81	84,812	
4-8-81	84,812	5 DAY AVERAGE


6
7
8
9
10 PM
11
12
1
2
3
4
HEAVY RAINFALL
.55" RAIN TOTAL
~12,000 GAL PUMPED TO SEWAGE TREATMENT PLANT


4AM 3-29-81
5
6
7
8
9
10
11
12
1
.68" TOTAL RAIN
PERIOD OF HEAVY RAINFALL
PERIOD OF HEAVY RAINFALL

RESULTS FROM SMOKE TESTS AND DYE TESTS

SMOKE TEST NO. 1

OBJECTIVE: TO SMOKE EACH LINE IN SHOP SANITARY MANHOLE INDIVIDUALLY, TO DETERMINE WHICH LINE WAS CONNECTED INTO STORM DRAINAGE SYSTEM.

METHOD: A CENTRIFUGAL SMOKE BLOWING MACHINE WITH 25' HOSE ATTATCHMENT WAS INSERTED IN THE VARIOUS INCOMING LINES.

RESULT: NO SMOKE REPORTED FROM ANY STORM DRAINS HOWEVER, MASSIVE LEAKS IN THE BLOWER, HOSE ATTATCHMENT, AND AROUND LINES BEING TESTED CAUSED MOST OF THE SMOKE TO REMAIN IN THE SHOP, MAKING THE TEST INCONCLUSIVE.

SMOKE TEST NO 2

OBJECTIVE: TO SMOKE ALL LINES IN SHOP SANITARY MANHOLE AT ONCE TO VERIFY THAT CONNECTION TO STORM DRAIN EXISTED.

METHOD: SMOKE BLOWER MAIN OUTLET WAS POSITIONED OVER MANHOLE AND SEALED WITH PLYWOOD AND SEALING FOAM.

RESULT: AFTER SEVERAL MINUTES SMOKE REPORTED FIRST AT LIFT STATION THEN AT STORM DRAINS NO. 5* & NO. 3* AND LATER AT NO. 1. SMOKE ALSO REPORTED AT DRAINS NO. 2*, 6*, 8*, 9*, ET AL, BUT ONLY AFTER THE SMOKE HAD SUFFICIENTLY FILLED THE STORM DRAIN SYSTEM.

* SEE MAP

DYE TEST NO. 1

OBJECTIVE: TO DETERMINE WHICH LINE IN THE SHOP SANITARY MANHOLE IS CONNECTED TO STORM WATER DRAINS NO. 5, NO. 3 + NO. 1

METHOD: INTRODUCE DYE INTO THE LINE THAT SMOKED AT NO 5 DRAIN AND CHECK TO SEE WHICH LINE THE DYE USED TO REPORT TO THE SHOP MANHOLE

RESULT: EVEN THOUGH 1/4 LB FLUORESCEIN WAS USED NONE REPORTED TO THE SHOP MANHOLE. THE SEWER DISTRICT NOTED THAT THEIR CLARIFIER WAS DYED GREEN FOR 2 DAYS INDICATING THAT THE DYE REPORTED DIRECTLY TO THE LIFT STATION AND NOT THROUGH THE SHOP MANHOLE

DYE TEST NO 2

OBJECTIVE: TO VERIFY THAT DRAINS Nº 5, NO 3 AND NO 1, DISCHARGE DIRECTLY TO THE LIFT STATION

METHOD: INTRODUCE DYE INTO DRAINS NO 5, 3, 1 AND OBSERVE LIFT STATION

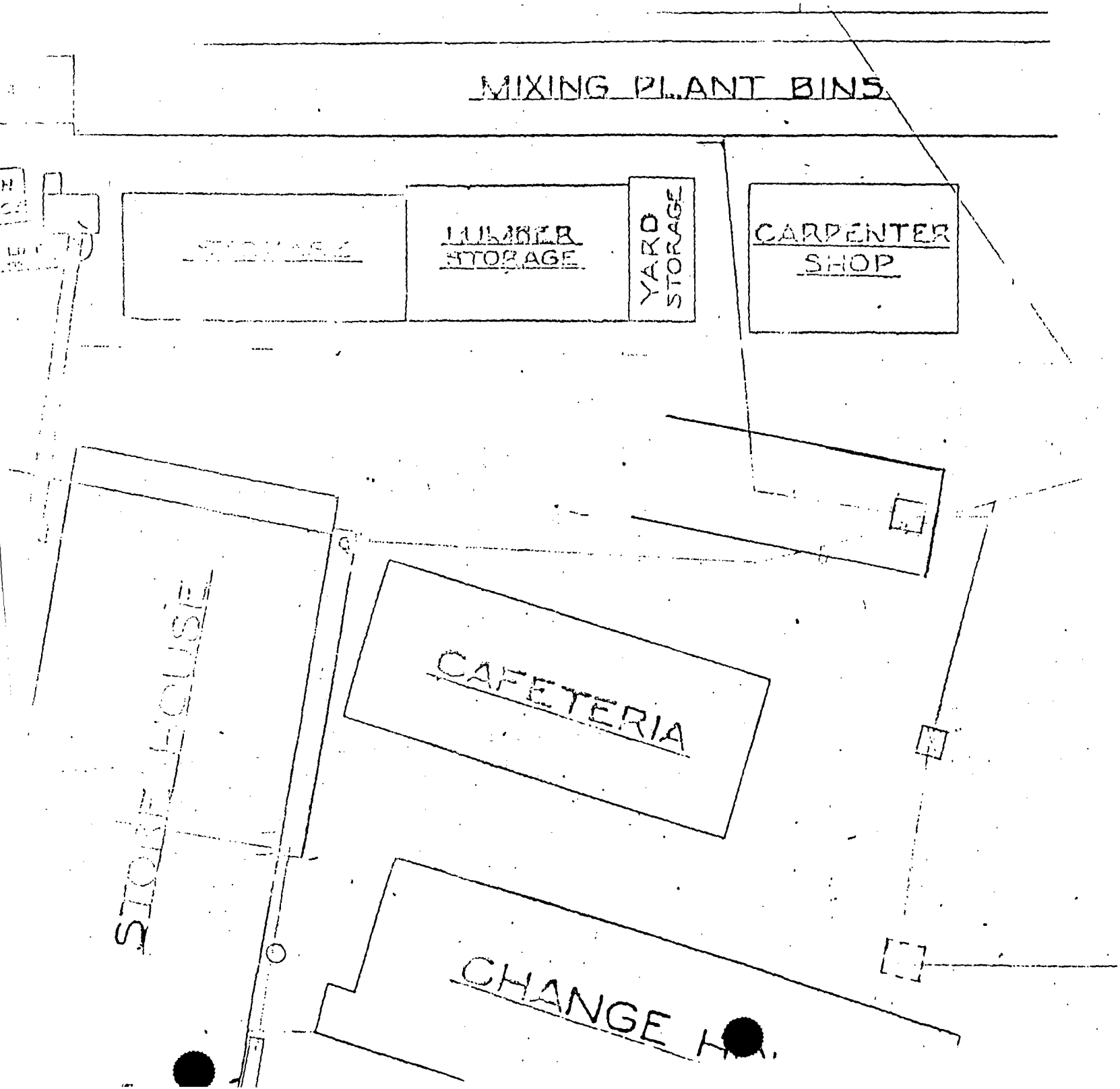
RESULT: DYE REPORTED AS EXPECTED FROM ALL THREE DRAINS.

FLOW TEST AT GARAGE

OBJECTIVE: TO VERIFY THAT GARAGE DRAIN DISCHARGES TO DRAIN Nº3.

METHOD: DIRECT WATER HOSE INTO DRAIN NO 7 AND OBSERVE NO 3.

RESULT: FLOW WAS OBSERVED AFTER SEVERAL MINUTES. TIME LAG WAS PROBABLY DUE TO WATER RUNNING THROUGH DRAIN NO 4 (BENEATH FLOOR


MIXING PLANT BINS
LUMBER STORAGE
YARD STORAGE
CARPENTER SHOP
STORE HOUSE
CAFETERIA
CHANGE H

REVISIONS TO PLANT DRAINAGE

1.	DIG-OUT OLD SCALE PIT UNDER MIXING ROOM	YARD
2.	INSTALL 12" TILE FROM OLD SCALE PIT NORTH TO STORM TUNNEL	YARD
3.	CONCRETE 12" TILE IN COLLECTION BOX IN YARD	SHOP
4.	MOVE 2" GAS LINE FEEDER FOR GARAGE AND DOCTORS OFFICE ABOVE GROUND	SHOP
5.	SAW CONCRETE AND INSTALL 4" TILE FROM GARAGE DRAIN TO STORM DRAIN IN YARD	SHOP & YARD
6.	PLUG OLD GARAGE DRAIN OUTLET	SHOP
7.	SAW AND REMOVE ~10' X 6' SQUARE AROUND DRAIN BOX OUTSIDE CAFETERIA	SHOP & YARD
8.	PLUG SURFACE INLET TO DRAIN BOX AND REPAIR CONCRETE	SHOP
9.	FIX CAFE ROOF DRAIN TO RUN ON PAVEMENT	SHOP
10.	SAW CONCRETE FROM TRENCH SOUTH OF STOREHOUSE TO TRUCK DOCK WALL	SHOP & YARD
11.	INSTALL 8" TILE FROM TRENCH TO TRUCK DOCK WALL.	YARD
12.	FILL 10" OUTLET FROM TRENCH WITH CONCRETE	SHOP

5-13-81 JFB

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: D. H. DeClue May 13, 1982

From: G. L. Walker

Subject: High Zinc Levels at Point 001 (D) Outfall

Three sources of water normally go to point 001 outfall. These were sampled on 5-11-82 to determine where the Zinc was coming from. The table below gives the analytical results. The water collected from the top of the Dewatering Bin had 8.0 milligrams of Zinc per liter of water. The Hot Water Pond and Cold Water Pond had 1.7 and 2.3 milligrams of Zinc per liter of water, respectively.

TABLE 1

SAMPLE LOCATION	Zn mg/l
Dewatering Bin	8.0
Hot Water Pond	1.7
Cold Water Pond	2.3

GLW

GLW/bb

cc: D. L. Vornberg

envirodyne
engineers
12161 Lackland Road
St. Louis, Missouri 63141
(314) 434-6960

REPORT OF ANALYSIS

Environment • Energy • Transportation • Food Processing

SUBMITTED BY: Mr. Duane DeClur
St. Joe Lead
Herculaneum, MO 63048

DATE:
PROJECT NO.
P.O.

DATE RECEIVED: August 5, 1982
SAMPLE ANALYZED: Effluent
METHODS USED: Methods for the Chemical analysis of Water and Wastes, EPA, March 1979, EPA's Methods

RESULTS:

The effluent results for the consolidated permit parameters are enclosed. The additional data are reported here.

	Effluent (mg/l)
Dissolved Lead	0.489
Dissolved Cadmium	0.229
Dissolved Zinc	1.17

/nja

ENVIRODYNE ENGINEERS

BY: Judy Stone

envirodyne
engineers
12161 Lackland Road
St. Louis, Missouri 63141
(314) 434-6960

REPORT OF ANALYSIS

Environment • Energy • Transportation • Food Processing

SUBMITTED BY: Mr. Duane DeClur
St. Joe Lead
Herculaneum, Missouri 63048

DATE: September 16, 1982
PROJECT NO. 1717
P.O.

DATE RECEIVED: August 5, 1982
SAMPLE ANALYZED: Influent
METHODS USED: Methods for the Chemical Analysis of Water and Wastes, EPA, March 1979; EPA's Methods

RESULTS:

Parameter	Influent
Cyanide	<0.005
Fluoride	1.88
Phosphorus	0.08
Sulfate	835
Chloride	44.2
Carbonate	*
Calcium	99.9
Potassium	134
Sodium	121
Cadmium	2.09
Copper	1.53
Lead	13.5
Nickel	0.246
Zinc	26.1

Values are mg/l

*Carbonate could not be run on this sample.

ENVIRODYNE ENGINEERS

BY: Judy Stone

TABLE I

Waste Water Streams Inside the Smelter (PPM)

Parameter	7/1/77 Discharge Permit	Acid Plant Sump	Thickener Overflow	D.F. Granulation	B.F. Granulation	Refinery Water	Hot Water Pond	Point 001	Point 002
Pb	0.20	1.10	1.50	0.15	0.83	0.27	0.10	0.58	0.15
Ag	No Limitation	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zn	1.00	12.0	28.00	0.02	0.15	0.21	0.19	0.12	0.26
Cd	0.30	2.30	6.00	0.01	<0.01	0.05	0.05	0.01	0.15
Fe	No Limitation	135.	0.10	0.08	0.10	0.18	0.05	0.14	0.20
As	No Limitation	190.	200.	124.	59.	50.	47.	66.	270.
Ni	No Limitation	0.70	0.38	0.02	0.01	0.01	0.01	0.01	0.02
Non-filterable Solids	50	21	4029	296	73	11	8	34	32
Sulfate	No Limitation	2060	1322	161	210	148	148	218	797
pH (Units)	6.0-9.0	5.7	6.8	9.4	8.4	7.9	8.0	8.6	8.8

CONSOLIDATED PERMIT
ANALYTICAL RESULTS

Project No./Client 1717 St. Joe Lead Date 8/5/82 Page 1 of 3

Parameter[a]								
Site	Effluent							
Lab No.	40915							
Part A								
BOD_5	<5							
COD	22							
TOC	5							
TSS	12							
Ammonia	<1							
pH (std. units)	8.4							
Part B								
Bromide	<0.1							
Chlorine, residual	<0.1							
Color (Platinum-Cobalt Units)	10							
Fecal Coliform (No./100 ml)	<5							
Fluoride	2.10							
Nitrate (as N)	1.25							
Nitrite (as N)								
Total Organic Nitrogen	2.8							
Oil & Grease	<4							
Phosphorus, total	0.06							
Radioactivity								
Gross Alpha (pCi/l)	5.68± 5.3							
Gross Beta (pCi/l)	43.1± 4.6							
Radium, total (pCi/l)	0.38± .3							
Radium-226 (pCi/l)	<0.16							
Sulfate (as SO_4)	807							
Sulfide (as S)	<1							
Sulfite (as $SO_3^=$)	<2							
Surfactants	0.14							
Aluminum	<0.1							
Barium	<0.1							
Boron	0.18							
Cobalt	0.030							
Iron, total	1.99							
Magnesium, total	20.9							
Molybdenum, total	0.052							
Manganese, total	0.063							
Tin, total	0.085							
Titanium, total	<0.01							
Part C								
Antimony, total	0.032							
Arsenic, total	<0.002							
Beryllium, total	<0.01							
Cadmium, total	0.246							
Chromium, total	<0.002							
Copper, total	0.110							
Lead, total	1.30							
Mercury, total	<0.0002							
Nickel, total	0.053							
Selenium, total	< 0.002							
Silver, total	0.030							
Thallium, total	0.040							
Zinc, total	1.81							
Cyanide, total	<0.005							
Phenol, total	0.094							

NOTE: [a]All results are reported in mg/l unless otherwise specified.

CONSOLIDATED PERMIT
ANALYTICAL RESULTS

Project No./Client 1717/St. Joe Lead Date 8/05/82 Page 2 of 3

Parameter[a]								
		Trip						
Site	Eff.	Blank						
Lab No.	40925	40925						
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin								
Volatile Compounds - FRN No.	19898	19899						
1V acrolein								
2V acrylonitrile								
3V benzene	2	2						
4V bis(chloromethyl)ether								
5V bromoform								
6V carbon tetrachloride								
7V chlorobenzene								
8V chlorodibromomethane								
9V chloroethane								
10V 2-chloroethylvinyl ether								
11V chloroform	2	1						
12V dichlorobromomethane								
13V dichlorodifluoromethane								
14V 1,1-dichloroethane								
15V 1,2-dichloroethane								
16V 1,1-dichloroethylene								
17V 1,2-dichloropropane								
18V 1,3-dichloropropylene								
19V ethylbenzene								
20V methyl bromide								
21V methyl chloride								
22V methylene chloride	25	27						
23V 1,1,2,2-tetrachloroethane								
24V tetrachloroethylene								
25V toluene	7	7						
26V 1,2-trans-dichloroethylene								
27V 1,1,1-trichloroethane	1	<1						
28V 1,1,2-trichloroethane								
29V trichloroethylene								
30V trichlorofluoromethane								
31V vinyl chloride								
Acid Compounds - Lab No. FRN No.	40912 19876	40913 19877	Lab Blank 19878					
1A 2-chlorophenol								
2A 2,4-dichlorophenol								
3A 2,4-dimethylphenol								
4A 4,6-dinitro-o-cresol								
5A 2,4-dinitrophenol								
6A 2-nitrophenol								
7A 4-nitrophenol								
8A p-chloro-m-cresol								
9A pentachlorophenol								
10A phenol	23							
11A 2,4,6-trichlorophenol								
Base/Neutral Compounds - Lab No. FRN No.	40912 19870	40913 19871	Lab Blank 19872					
1B acenaphthene								
2B acenaphthylene								
3B anthracene*	2							
4B benzidine								
5B benzo(a)anthracene*	<1							
6B benzo(a)pyrene								
7B 3,4-benzofluoranthene*								
8B benzo(ghi)perylene								
9B benzo(k)fluoranthene* (see 7B)								
10B bis(2-chloroethoxy)methane								
11B bis(2-chloroethyl)ether								
12B bis(2-chloroisopropyl)ether								
13B bis(2-ethylhexyl)phthalate	<1	<1	1					
14B 4-bromophenyl phenyl ether								

NOTE: [a] All results are reported in μg/l unless otherwise noted.
Where no value appears, the compound was not detected.

CONSOLIDATED PERMIT
ANALYTICAL RESULTS
(Continued)

Project No./Client St. Joe Lead Date 8/5/82 Page 3 of 3

Parameter[a]								
		Trip						
Site	Effluent	Blank	Blank					
Lab No.	40912	40913	(Lab)					
Base/Neutral Compounds (cont'd)								
15B butyl benzyl phthalate	<1	<1						
16B 2-chloronaphthalene								
17B 4-chlorophenyl phenyl ether								
18B chrysene* (see 5B)								
19B dibenzo(a,h)anthracene								
20B 1,2-dichlorobenzene								
21B 1,3-dichlorobenzene								
22B 1,4-dichlorobenzene								
23B 3,3'-dichlorobenzidine								
24B diethyl phthalate	4	5	5					
25B dimethyl phthalate								
26B di-n-butyl phthalate	3	2	2					
27B 2,4-dinitrotoluene								
28B 2,6-dinitrotoluene								
29B di-n-octyl phthalate								
30B 1,2-diphenylhydrazine (as azobenzene)								
31B fluoranthene	1							
32B fluorene								
33B hexachlorobenzene								
34B hexachlorobutadiene								
35B hexachlorocyclopentadiene								
36B hexachloroethane								
37B indeno(1,2,3-cd)pyrene								
38B isophorone								
39B naphthalene								
40B nitrobenzene								
41B N-nitrosodimethylamine								
42B N-nitrosodi-n-propylamine								
43B N-nitrosodiphenylamine								
44B phenanthrene* (see 3B)								
45B pyrene	1							
46B 1,2,3-trichlorobenzene								
Pesticides	All	All						
1P aldrin	<0.1	<0.1						
2P α-BHC								
3P β-BHC								
4P γ-BHC								
5P δ-BHC								
6P chlordane								
7P 4,4'-DDT								
8P 4,4'-DDE								
9P 4,4'-DDD								
10P dieldrin								
11P α-endosulfan								
12P β-endosulfan								
13P endosulfan sulfate								
14P endrin								
15P endrin aldehyde								
16P heptachlor								
17P heptachlor epoxide								
18P PCB-1242								
19P PCB-1254								
20P PCB-1221								
21P PCB-1232								
22P PCB-1248								
23P PCB-1260								
24P PCB-1016								
25P toxaphene								

NOTES: [a] All results are reported in μg/l unless otherwise noted. Where no value appears, the compound was not detected.
*-Compound coelutes with another compound on list. Peak area calculated as one compound.

bcc: T. Johnston
H. Rowland
DeClue/Lanzafame
D. Bailey
J. Bonner
G. Welch
T. Janeck

ST. JOE
LEAD COMPANY
Division of St. Joe Minerals Corporation
SMELTING DIVISION

R. E. PEPPERS
DIVISION MANAGER

August 24, 1982

Mr. Robert Zeman, P.E.
Chief, Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
St. Louis, Missouri 63119

Re: July Monitoring Report MO-281

Dear Bob:

Enclosed is the July data for the three monitoring stations - WW Plant Influent - After Reactor Clarifier - 001 Outfall. Table I total and dissolved metal data is included as with the second quarter report. The 002 pump condition report is included as Table II.

The 002 pump performed well all month, except for the 24th through the 27th. We pulled the pump with a cherry picker in place and cleaned plastic from the screen, replacing the pump immediately. The pump returned to unimpeded flow. It continues to operate at the writing of this letter.

Two problems in other operations of the plant affected plant performance on four sampling days late in the month. First, the WWTP lime silo malfunctioned and emptied the entire contents of the silo (5-8 tons) onto the ground and into the slurry mix room. The cleanup operation was extensive and problems with feeding continued for a few days after the cleanup was completed. The second problem centered on the startup of the acid plant. High strength acid began accumulating in the bottom of "A" exchanger from the first day of startup. It was bled to the acid plant lift station and resulted in markedly increased influent loadings of Pb, Zn, and Cd. The elevated acidity delivered to the treatment plant and the broken feed equipment, which caused bag lime feeding, resulted in four days of elevated zinc and cadmium measurements. The acid buildup problem was solved in late July and the drainage stopped in early August. A composite of the WWTP log and Acid Plant log are attached.

The observed flow at the weir from the flux pumps represents inflow into the old tile, as there was absolutely no discharge from the sump except during the period of July 24 to July 27 where some intermittent flow was

881 MAIN ST., HERCULANEUM, MO. 63048
TELEPHONE 314-479-5311

Mr. Robert Zeman, P.E.
Missouri Department of Natural Resources

August 24, 1982

recorded. There has been no discharge from the 002 monitoring location below the lake. The mean dissolved lead concentration when the four upset days are excluded is 0.13 mg/l (mean 0.16 mg/l - geometric mean - 0.13 mg/l for all days). The mean dissolved cadmium concentration when the four upset days are excluded is .07 mg/l (mean 0.35 mg/l geometric mean - 0.10 mg/l for all days). Finally, the mean dissolved zinc concentration when the four upset days are excluded is 0.23 mg/l (mean 2.6 mg/l - geometric mean - 0.36 mg/l for all days).

As you are aware, three sets of performance samples were collected on our outfall from August 9th to August 12th. Analysis of a split sample indicated that the effluent was in compliance with all metal permit requirements.

We will submit that data with our August report.

Enclosed are copies of our purchase order for the new Goyne pumps and the approved AFE on the overhead hoist system.

Very truly yours,

Daniel L. Vornberg
Environmental Manager

DLV/cds
Attachments
cc: R. E. Peppers

TABLE 1-A

ANALYSIS OF WTP INFLUENT, AFTER REACTOR CLARIFIER, AND OUTFALL 001 DISCHARGE TO THE RIVER

July 1982	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	20-21	21-22
TOTAL METALS IN WTP INFLUENT (Milligrams/Liter)																		
Pb	4.0	9.4	11.8	6.1	11.4	11.4	24.0	31.8	30.7	63.9	20.0	37.0	38.7	*	21.8	32.0	14.9	20.4
Cu	.20	1.84	.82	.56	1.5	.78	6.6	1.9	.98	6.3	2.6	2.6	1.7		1.6	1.9	1.1	1.5
Zn	2.5	6.3	7.8	8.4	13.8	10.0	9.9	9.1	15.3	22	17.0	16.9	14.6		33.5	33.7	65	65
Cd	.70	1.6	2.0	1.7	.68	.80	4.0	3.5	3.4	5.6	3.0	3.3	1.8		3.4	4.3	3.6	3.3
Na	140	166	140	129	138	110	188	130	115	114	100	97	102		105	93	112	99
SS	23.5	25.8	23.4	27.6	90	54	89.8	58.7	86.2	135.3	53.3	31.1	31.7		93.8	68.4	33.6	69.0
TDS	875	1050	1050	950	900	950	1000	900	950	950	950	900	900		900	1250	1350	1250
pH	8.5	7.5	8.2	8.5	9.1	8.2	8.3	7.5	7.5	7.2	7.3	7.2	7.4		7.6	5.5	6.3	5.5
Cond.	1375	1660	1560	1475	1400	1350	1460	1400	1400	1500	1400	1350	1350		1300	1875	2000	2000
$SO_4^=$																		
DISSOLVED METALS IN WTP INFLUENT (Milligrams/Liter)																		
Pb	.16	.43	.54	.23	.20	.42	.56	.38	0.6	.58	1.0	1.2	1.4		1.2	3.5	4.3	4.8
Cu	.01	.08	.07	.01	.03	.01	.08	.03	.02	.08	0.04	.04	.04		.09	.02	.19	0.01
Zn	.11	1.9	1.0	.36	.05	1.0	1.9	2.0	10.3	6.5	7.8	7.0	6.9		19.8	55.4	62	39
Cd	.30	1.0	1.2	.30	.04	.40	2.9	1.8	2.9	2.8	1.8	1.5	1.0		2.8	3.8	3.5	2.7
Na	132	154	146	123	139	106	194	137	118	116	105	97	97		106	100	115	101
SS																		
TDS																		
pH																		
Cond.																		
$SO_4^=$																		

*No Sample

July 1982	1-2	2-3	3-4	* 4-5	5-6	** 6-7	7-8	8-9	9-10	10-11	11-12	12-13	* 13-14	14-15	15-16	16-17	20-21	21-22
TOTAL METALS IN REACTOR CLARIFIER (Milligrams/Liter)																		
Pb	.11	.80	1.6		2.8	1.9	.59	2.4	.31	1.6	2.5	2.1		1.1	1.5	4.1	2.7	9.0
Cu	.01	.06	.14		.33	.19	.16	.27	.19	.07	.39	.26		.06	.06	.54	.14	.46
Zn	.11	.79	.85		2.2	1.9	.9	1.8	2.5	1.3	1.4	1.3		1.0	1.4	11.6	33	31.
Cd	.02	.20	.40		.55	.28	.44	.70	.46	.70	.37	.38		.33	0.9	2.0	2.1	1.9
Na	126	170	146		119	109	186	135	127	116	107	88		31	111	93	111	103
SS	4.5	11.7	8.1		40	13.8	21.4	3.1	27.4	10.6	7.2	2.7		12.8	13.0	23.2	22.8	35.1
TDS	875	1040	1040		900	900	950	900	950	950	900	900		850	900	1250	1350	1350
pH	9.4	7.6	8.4		8.1	7.9	8.0	7.9	8.2	7.7	8.2	7.6		8.3	7.6	6.9	6.3	6.9
Cond.	1330	1600	1360		1350	1360	1400	1390	1360	1475	1400	1375		1300	1250	1875	2000	2000
$SO_4^=$																		
DISSOLVED METALS AFTER REACTOR CLARIFIER (Milligrams/Liter)																		
Pb	.03	.33	.25		.32	.32	.25	.31	.27	.29	.26	.56		.25	.65	1.3	.70	.18
Cu	.01	.01	.02		.01	.01	.01	.03	.01	.01	.03	.03		.01	.01	.02	.01	.03
Zn	.02	.39	.30		.39	.50	.9	.47	.21	.73	.35	.77		0.8	0.8	9.8	28	10.
Cd	.01	.13	.20		.14	.10	.21	.30	.10	.60	.20	.33		.49	0.8	1.8	2.0	1.4
Na	121	164	144		117	109	185	141	124	113	113	89		116	111	100	119	100
SS																		
TDS																		
pH																		
Cond.																		
$SO_4^=$																		

*No Sample **Data was overlooked in preparing second quarter report.

July 1982	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	20-21	21-22
TOTAL METALS IN OUTFALL 001 DISCHARGE TO THE RIVER (Milligrams/Liter)																		
Pb	.06	.17	.07	.13	.12	.10	.09	.08	.01	.12	.18	.19	.42	.13	.33	.27	.31	1.1
Cu	<.01	.04	.02	.07	.01	.01	.01	.02	.02	.01	.09	.05	.10	.01	.01	.05	.02	.06
Zn	.03	.16	.17	.13	.10	.10	.6	.13	.29	.11	.08	.08	.13	1.0	0.1	7.8	38	16
Cd	.01	.12	.03	.03	.02	.04	.05	.03	.05	.13	.05	.07	.08	0.03	0.3	1.5	2.4	1.2
Na	120	134	146	130	117	110	182	103	121	118	113	90	82	107	116	97	118	100
SS	2.1	2.7	3.2	0.4	<2	<2	1	1.1	<2	4.4	1.0	1.3	1.5	4.4	1.6	0.5	1.4	8.3
TDS	850	1000	1040	950	980	900	950	900	950	950	900	900	850	850	900	1250	1350	1300
pH	8.7	7.8	8.2	8.2	8.0	7.7	7.1	7.9	7.9	7.6	7.7	7.6	7.7	7.3	7.5	6.9	6.9	7.1
Cond.	1350	1575	1560	1475	1340	1350	1310	1375	1350	1475	1400	1350	1275	1275	1250	1900	2000	2000
$SO_4^=$																		
DISSOLVED METALS IN OUTFALL 001 DISCHARGE TO THE RIVER (Milligrams/Liter)																		
Pb	.05	.08	.05	.08	.18	.13	.11	.07	.03	.08	.13	.18	.33	.13	.43	.18	.19	.18
Cu	<01	.02	.01	.01	.01	.01	.01	.02	.02	.01	.02	.03	.03	.01	.01	.01	.01	.01
Zn	.07	.15	.16	.10	.11	.10	.3	.12	.19	.15	.13	.12	.21	0.7	0.1	7.6	27	10
Cd	.02	.11	.03	.03	.02	.04	.03	.03	.03	.16	.06	.08	.10	.02	0.2	1.5	2.3	1.7
Na	113	128	138	132	118	110	184	138	119	117	120	89	81	103	114	101	123	106
SS																		
TDS																		
pH																		
Cond.																		
$SO_4^=$																		

TABLE 1-8

ANALYSIS OF WWTP INFLUENT, AFTER REACTOR CLARIFIER, AND OUTFALL 001 DISCHARGE TO THE RIVER

TOTAL METALS IN WWTP INFLUENT (Milligrams/Liter)			DISSOLVED METALS IN WWTP INFLUENT (Milligrams/Liter)															
July 1982	22-23	30-31																
Pb	45. / 2.7	8.4 / 1.3																
Cu	3.2 / 0.7	.61 / .04																
Zn	36.3 / 13.8	12.7 / 10.3																
Cd	4.0 / 3.0	.21 / .20																
Na	119 / 117	90 / 89																
SS	22.4	39.4																
TDS	1300	950																
pH	6.1	7.0																
Cond.	-	1400																
$SO_4^=$		680																

TOTAL METALS IN REACTOR CLARIFIER (Milligrams/Liter)			DISSOLVED METALS AFTER REACTOR CLARIFIER (Milligrams/Liter)															
July 1982	22-23	30-31																
Pb	1.0 / .02	3.7 / .47																
Cu	.40 / .02	.34 / .01																
Zn	11.9 / 4.0	10.4 / 4.8																
Cd	2.0 / 1.0	.20 / .16																
Na	117 / 117	92 / 91																
SS	4.9	35.9																
TDS	1300	950																
pH	6.9	7.7																
Cond.	-	1300																
$SO_4^=$		682																

TOTAL METALS IN OUTFALL 001 DISCHARGE TO THE RIVER (Milligrams/Liter)			DISSOLVED METALS IN OUTFALL 001 DISCHARGE TO THE RIVER (Milligrams/Liter)															
July 1982	22-23	30-31																
Pb	1.8 / .60	.15 / .20																
Cu	.02 / .02	.02 / .02																
Zn	3.3 / 3.6	1.6 / 1.7																
Cd	0.9 / 0.9	.13 / .13																
Na	123 / 119	93 / 93																
SS	<2	<2																
TDS	1275	950																
pH	7.3	7.2																
Cond.	-	1325																
$SO_4^=$		670																

TABLE 2

002 Flow Measurements and Flux Pump Condition Report

July 1982

Observation Date	Observed Flow at Weir, gpm	Mechanical Flowmeter Operating	Flux Pump Operable and Functioning/gpm		Flux Pump Off or Mal-functioning	Notes
07-01-82	4	X	X	450		
07-02-82	4	X	X	475		
07-03-82	4	X	X	410		
07-04-82	4	X	X	600+		
07-05-82	4	X	X	530		
07-06-82	4	X	X	530		Mississippi River backing up in 002 settling pond, very close to affecting weir.
07-07-82	4	X	X	435		Mississippi River backing up in 002 settling pond. Tried flushing pump, raised to 575 gpm.
07-08-82	4	X	X	575		
07-09-82	4	X	X	575		
07-10-82	4	X	X	575		
07-11-82	4	X	X	575		
07-12-82	4	X	X	475		
07-13-82	6	X	X	530		
07-14-82	4	X	X	410		
07-15-82	4	X	X	475		No discharge to river from 002 settling pond.
07-16-82	4	X	X	410		" " " " "
07-19-82	4	*	X	410		" " " " "
07-20-82	4	*	X	410		" " " " "
07-21-82	4	*	X	410		" " " " "
07-22-82	4	*	X	575+		" " " " "
07-23-82	4	X	X	575+		Mississippi River backing up into 002 pond.
07-24-82	...	X	X	?		

*Pen jumped off chart on 7-19-82, wasn't discovered until 7-23-82.

TABLE 2 (Continued)

002 Flow Measurements and Flux Pump Condition Report

July 1982

Observation Date	Observed Flow at Weir, gpm	Mechanical Flowmeter Operating	Flux Pump Operable and Functioning/gpm		Flux Pump Off or Mal-functioning	Notes
07-25-82		X	X	?		
07-26-82		X		205	X	Had work order written to check pump out.
07-27-82		X		150	X	Maint. cleaned wrong check valve. Maint. will try again.
07-28-82	4	X	X	575+		Pump seems to have recovered.
07-29-82	4	X	X	575+		Pump screen cleaned.
07-30-82	4	X	X	475		

INF	5.5	32P / 6.5	72.7 / 5.4	4.3 / 3.8
AFTER RC	6.9	4.1 / 1.3	11.6 / 9.8	2.0 / 1.8
[illegible]	6.9	.27 / .18	7.8 / 7.6	1.5 / 1.5

Time	Influent	After RC	WWTP Log	AP Log
9:00		9.2	Influent ph probe not working. Log says probe will be gone to 7-23-82	07:00 of 16th added 1 bag of lime
10:00		9.5		08:00 Drained acid out of A exchanger, closed valve, added 1 bag of lime.
11:00		9.1		
12:00		9.1		
13:00		9.1		
14:00		9.1		
15:00		9.1		
16:00		9.1		
17:00		8.8		
18:00				
[illegible]:00		8.8		
20:00		9.1		
21:00		9.1		
22:00		9.1		
23:00		9.0		
00:00		8.9		
01:00		8.9		
02:00		8.9		
03:00		8.9		
04:00		8.8		
05:00		9.3		
06:00		9.2		
[illegible]:00		9.0		
08:00		9.0		
09:00		8.8		
24hr				

nA.	4.3	14.9/4.3	65/62	3.6/3.8
After RC	6.5	2.7/2.0	33/28	2.1/2.0
[illegible]	6.6	2.7/.18	7.9/7.6	1.5/1.5

Time	Influent	After RC	WWTP Log	AP Log
09:00	4.0	8.0		06:10 Opened drain on A exchanger
10:00	4.2	7.5	Log indicated lime silo empty at 10:00	
11:00	4.2	7.5		06:55 Closed drain on A exch.
12:00	6.9	7.5		07:00 Opened demister drain
13:00	6.5	7.5		
14:00	6.5	7.5		
15:00	6.5	7.7	Log: Adding lime by hand thru sampling period	
16:00	6.8	7.8		
17:00	6.5	7.9		Started draining A exchanger
18:00				
[illegible]00	5.5	7.9		19:25 Added lime
20:00	6.5	8.4		
21:00	7.5	9.0		
22:00	7.5	9.0		Added 1 bag of Lime
23:00	7.4	9.0		
00:00	7.9	9.5		Added lime
01:00	7.9	9.5		
02:00	8.0	9.3		Added lime
03:00	7.6	9.2		3:05 Started draining A exchang 3:40 Shut off drain, drained entire time
04:00	7.6	9.2		4:45 added lime
05:00	3.8	8.5		
06:00	4.9	8.0		06:15 opened drain on A exchange 06:35 Closed drain on A exchang
[illegible]00	4.8	7.5		
08:00	5.0	7.5		
09:00	5.2	7.5		
24hr				

PURCHASE ORDER

ST. JOE
LEAD COMPANY
Division of St. Joe Minerals Corporation

881 MAIN ST., HERCULANEUM, MO. 63048

C. W. HORN,
PURCHASING AGENT
314-479-5311

Farrar Pump & Machinery Company 126070
1701 S. Big Bend Blvd.
St. Louis, MO 63117

ST. JOE PART NO. AND ALL BELOW MUST APPEAR ON ALL CORRESPONDENCE, INVOICES SHIPPING PAPERS AND PACKAGES.

Please enter our order subject to specifications and conditions hereon.

SHIP TO: ST. JOE LEAD COMPANY-
SMELTING DIVISION STOREROOM
HERCULANEUM, MO. 63048

PURCHASE ORDER NO.
B-72953-5
ORDER DATE
7-30-82

H 31060

TERMS	F.O.B.	SHIP VIA
Net 30 days	Ashland, PA	Best Method

ST. JOE PART NO.	QUANTITY—UNIT	DESCRIPTION	PRICE
	2 each	Goyne Model 5100, Size 5 x 6 x 15" Top Suction Type Vertical Pump in Goyne HC 500 construction. Pump to have 5C Bearing Housing, 5" discharge pipe, 15" HC 600 impeller passing 1¼" particles, two (2) submerged bearing housings with cutless rubber bearing, HC 600 casing ring, an overall length of 14'. Pump to be driven by a 40 H.P., two-speed, 1750/1160 RPM, 3-phase/60 hz/460 V, MAC type motor with 1-15 SF, thru a V-belt drive consisting of 9.0" OD 5V, 3-groove driver sheave, 15.0" OD 5V 3-groove driven sheave and a "power band" type belt. Unit to be complete with motor, mounted&enclosed type belt guard but less suction hood.	

(Continued on Page 2)

Inf	6.1	45 / 3.7	3.3 / 13.8	4.0 / 3.0
After RC	6.9	7.0 / 0.02	11.9 / 4.0	2.0 / 1.0
[illegible]	7.3	1.8 / .60	3.3 / 3.6	0.9 / 0.9

Time	Influent	After RC	WWTP Log	AP Log
09:00	7.0 ~~5.0~~	8.8 ~~8.1~~		
10:00	~~7.1~~			
11:00				
12:00			Put 8 tons of Lime on	
13:00			ground.	
14:00				
15:00				
16:00				
17:00				
18:00				
[illegible]:00				
20:00				
21:00				
22:00				
23:00	7.5	9.5		23:30 Added lime
00:00	7.3	9.3		
01:00	7.2	9.1		01:30 Added lime
02:00	6.5	9.5		
03:00	6.5	9.5		03:30 Added lime
04:00	6.5	9.4		04:00 started draining A exchanger 04:30 added lime
05:00	6.6	9.3		Closed drain from A exchanger, ou
06:00	4.8	9.0		little draining at this time
[illegible]:00				
08:00				08:30 Added two bags of lime
09:00	6.4	8.6	Lime system back on at 9:30	
24hr				

Inf	7.0	8.4 / 1.3	12.7 / 10.3	.21 / .20
After RC	7.7	3.7 / .47	10.4 / 4.8	.20 / .16
[illegible]	7.2	.15 / .20	1.6 / 1.7	.13 / .13

Time	Influent	After RC	WWTP Log	AP Log
09:00				07:10 draining A exchange
10:00				
11:00				
12:00				
13:00				
14:00				
15:00	5.8	9.0		
16:00	5.8	9.0		
17:00	5.3	9.0		
18:00	5.2	9.0		18:35 put 8 bags of lime in a
[illegible]:00	4.5	9.1	Called AP to add lime,	19:30 WWTP called said ph a little low
20:00	6.4	9.0	pH down to 3.8	Put 4 bags of lime + 2 caust
21:00	5.4	9.0		2 bags of lime
22:00	5.0	9.0		22:35 opened drain on A exchange
23:00	3.0	8.6		23:05 closed drain on A exchange
00:00	3.1	8.5		23:25 ~~[illegible]~~ added 1 bag of lime
01:00	4.0	8.5		
02:00	4.3	8.5		02:15 added 1 bag of lime
03:00	4.5	8.6		03:40 added 1 bag of lime
04:00	4.0	8.7		
05:00	4.2	8.9		
06:00	4.3	9.1		
[illegible]:00	4.0	9.6		
08:00	4.7	9.6		
09:00	3.9	9.5		
24hr				

PURCHASE ORDER

ST. JOE
LEAD COMPANY
Division of St. Joe Minerals Corporation

881 MAIN ST., HERCULANEUM, MO. 63048

C. W. HORN,
PURCHASING AGENT
314-479-5311

Farrar Pump & Machinery Company

Please enter our order subject to specifications and conditions hereon.

ST. JOE PART NO. AND ALL BELOW MUST APPEAR ON ALL CORRESPONDENCE, INVOICES SHIPPING PAPERS AND PACKAGES.

PURCHASE ORDER NO.
B-72953-5
ORDER DATE
7-30-82

SHIP TO: ST. JOE LEAD COMPANY
SMELTING DIVISION STOREROOM
HERCULANEUM, MO. 63048

(Page 2)

TERMS	F.O.B.	SHIP VIA

ST. JOE PART NO.	QUANTITY—UNIT	DESCRIPTION	PRICE
		Per your Mr. Jerry Jokerst's quotation of 7-15-82 and verbal amendment of 7-28-82 of $12,480.00 plus $983.00 for 2nd Submerged Bearing plus $269.00 for 1 foot length extension, less $391.00 reduction in motor price, toally $13,341 each.	
		Five sets of installation instructions, maintenance manuals, part lists and detail pump drawings required to complete order.	
		MISSOURI TAX APPLICABLE	
		DATE WANTED OCTOBER 8, 1982 OR SOONER	

SEND INVOICE IN TRIPLICATE AND ALL CORRESPONDENCE TO THE COMPANY AT HERCULANEUM, MO. 63048

ST. JOE LEAD COMPANY

BY C. R. Horn
AUTHORIZED SIGNATURE

EQUAL OPPORTUNITY EMPLOYER

CRH/sw

NOTICE: THIS ORDER AND SUBSEQUENT USE OF MATERIAL OR EQUIPMENT MUST NOT BE PUBLISHED OR ADVERTISED.

PURCHASE ORDER FILE

AND SUBSIDIARIES
AUTHORIZATION FOR EXPENDITURE

Date: 8/11/82

A.F.E. No. C5404-000-1

Revision? Yes [ ] No [X]

Title of Project: Replace Flux Room Roof & Add Service Hoist

Amount to be Authorized: $31,000

Division/Subsidiary/Corporate Office: St. Joe Lead Co.

Plant: Dross Plant Herculaneum

Amount Budgeted: $10,000

Description of Project:

Raise one bay of flux building roof using new columns, beams, etc. and sheeting, and install a monorail with two 3-ton chain hoists.

Project Class: Replacement Or Maintain Oper.

Economic Analysis (*)
Rate of Return _____ %
Payback _____ Year

Estimated Economic Life 10 Year

Estimated Completion: December Month 1982 Year

Estimated P.C.R. Submission: N/A Month _____ Year

Salvage Value of Replaced Equipment Plant, etc.: $ -0-

Purpose for Expenditure:

To raise roof sufficiently to permit change-out of sump pumps without removing roof sheeting and members.

Management Approval:

J E Rogers 8/11/82
Manager/Director Date

Chief Operating Executive Date

President, Chairman - St. Joe Min. Date

Financial Review -- Board Approval:

Vice President - St. Joe Min. Date

For Board of Directors of St. Joe Minerals Corporation Meeting Date

(*) Attach all pertinent supporting data

When budgeted this AFE was to provide for a trap door in the roof of the flux building to allow a crane to lift out one of the two in operating and one installed spare) flux building pumps when it needed repair.

Experience with the pumps has shown that the installed non-operating spare pump will silt in with the sediment that collects in the sump. Then, when the other pump fails the spare pump must be pulled out and cleaned before it can be used.

Our water discharge permit will not allow the resulting pump down time.

We now plan to install a mono rail and service hoist over the pumps to permit rapid installation of the spare pump when needed.

Since head room under the flux building roof is too low, we will have to raise one section of the roof. The roof and building columns will have to be strengthened or replaced to carry the hoist loads.

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: D. H. DeClue

August 31, 1982

From: J. M. Lanzafame

Subject: Report concerning sampling visit by the St. Louis Regional Office of the Missouri Department of Natural Resources (MDNR)

On the morning of August 9, 1982, Dan Vornberg received a call from Robert Zeman; Chief, Water Pollution Control; St. Louis Regional Office; Missouri Department of Natural Resources. Mr. Zeman informed Dan Vornberg that a water sampling team had already left the St. Louis office headed for the Herculaneum Smelter. The sampling team arrived, and introductions were made in Dan's office. After some conversation, I escorted the sampling team to 001 (D) and 003 (Acid Plant once through cooling water).

The MDNR, using ISCO automatic wastewater samplers, sampled from approximately 12:00 p.m. to 12:00 p.m. on August 9-10, 10-11, and 11-12, 1982. Grab samples were taken by MDNR at the Ranney Well on August 10 and 11, 1982. Table I is a presentation of the analysis of the split samples we received from the MDNR. Our analysis reflected a compliance with our effluent limitation for dissolved lead, cadmium, and zinc. On the August 10-11, 1982, sampling we showed a pH excursion of 9.7, and we were not in compliance with our pH effluent range of 6.0-9.0. At present, there are no effluent limitations for total metals.

John Davis, MDNR Environmental Specialist II, set up the equipment and collected the samples during the sampling period. During my conversations with John, I inquired as to the reason and purpose of the MDNR sampling at this time. He mentioned a letter that was received by the MDNR. Attachment I is the cover letter he sent to me after the sampling period ended. Attachment II is the letter that was received by the St. Louis Regional Office, MDNR. The letter labeled Attachment II is supposedly what precipitated our being sampled.

JML

attachments

JML/bb

TABLE I

ANALYSIS OF MDNR SPLIT SAMPLES OBTAINED DURING FIRST WEEK OF AUGUST, 1982

Date	Sampling Location					
8/9 - 8/10	001 "D"		003		Ranney Well	
Suspended Solids	2.0		2.4		0.9	
TDS	1000		500		500	
pH	7.3		---		7.3	
Conductivity	1450		775		775	
	Total	Filtrate	Total	Filtrate	Total	Filtrate
Pb	.16	.12	.07	.04	.06	.06
Cu	.03	.02	.02	.02	.02	.02
Zn	.10	.10	.02	.02	.03	.03
Cd	.03	.03	<.01	<.01	<.01	<.01
Na	83	83	45	48	43	48
SO_4 =	629		8.6		8.1	
8/10 - 8/11	001 "D"		003		Ranney Well	
Suspended Solids	<2		Not		<2	
TDS	900		Enough		450	
pH	9.7		Sample		7.6	
Conductivity	1400				800	
	Total	Filtrate	Total	Filtrate	Total	Filtrate
Pb	.34	.08	.03	.03	.02	.06
Cu	.02	.01	.01	.02	.01	.01
Zn	.1	.02	.01	.01	.01	.04
Cd	.02	.01	<.01	<.01	<.01	.01
Na	96	96	43	45	43	45
SO_4 =	645		192		--	
8/11 - 8/12	001 "D"		003		Ranney Well	
Suspended Solids	<2		<2		No sample taken by State	
TDS	800		850			
pH	8.1		8.1			
Conductivity	1100		750			
	Total	Filtrate	Total	Filtrate		
Pb	.05	.03	.02	.03		
Cu	.01	.02	.01	.01		
Zn	.1	.07	.02	.04		
Cd	.04	.03	.03	.03		
Na	89	84	42	41		
SO_4 =	471		206			

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

3.500 Jefferson County
St. Joe Lead Company

August 18, 1982

Mr. Jim M. Lanzafame
Environmental Department
St. Joe Lead Company
881 Main Street
Herculaneum, Missouri 63048

Dear Mr. Lanzafame:

Enclosed is a copy of the letter instructing the St. Louis Regional Office to initiate sampling at your plant as requested.

I was much impressed by the appearance of the process wastewater treatment effluent. Hopefully the metals content will be within your permit limitations and the pH variations are reduced by closer in-house monitoring.

Sincerely yours,

John W. Davis

John W. Davis
Environmental Specialist II

JWD/bkl

Christopher S. Bond Governor
Fred A. Lafser Director
St. Louis Regional Office

ATTACHMENT I

July 9, 1982

JUL 23 1982

SLRO

Dr. Ailan S. Abramson, Ph.D.
Director, Water Management Division
Environmental Protection Agency
Region VII
Kansas City, Missouri 64106

Re: Enforcement Activities, St. Joe Lead Co., Herculaneum

Dear Dr. ~~Abramson~~: ALLAN

The State of Missouri is closely following compliance efforts of the St. Joe Lead Company facility of Herculaneum. A meeting was held with St. Joe Lead Company on November 19, 1981.

St. Joe Lead Company at that time agreed to operate their facility to the best of their ability and to bring this facility into compliance during the period of January through March 1982, and continue compliance through June 1982, in order for the State of Missouri to not initiate immediate enforcement activities. This six month compliance period ended on June 30, 1982. The report for the first three months of this period shows continued violations. We feel that we must wait until the report is submitted covering the remaining three months period. We have asked St. Joe Lead Company for a response on their compliance status immediately after the end of this period.

The St. Louis Regional Office has been instructed to initiate a directed enforcement sampling effort during early July. The results of our own sampling efforts and St. Joe Lead Company's self-monitoring reports will be analyzed and appropriate action will be initiated by Missouri Department of Natural Resources.

You will be advised of our activities as they are carried out. If you have further questions in regard to this matter, please contact James F. Penfold or Charles R. Hartman of my staff.

Sincerely,

Robert J. Schreiber, Jr. P.E.
Director
Division of Environmental Quality

RJS/CRH/rb

cc: Treva Hearne
WPCP, Compliance/Review Section
WPCP, St. Louis Regional Office
WPCP, Permit Section
Dan Summers, Attorney General's Office

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

ST. JOE
LEAD COMPANY
Division of St. Joe Minerals Corporation
SMELTING DIVISION

R. E. PEPPERS
DIVISION MANAGER

September 3, 1982

Mr. Robert Zeman, P.E.
Chief, Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
St. Louis, Missouri 63119

Re: August Monitoring Report MO-281

Dear Bob:

Enclosed is the August data for the three monitoring stations: Wastewater Plant Influent, After Reactor Clarifier, 001 Outfall. Table I, Total and Dissolved Metal Data, is included as per the second quarter report. The 002 pump condition report is included as Table II.

The 002 pump performed well during the month of August, except for the incident that occurred on August 24th and 25th. Due to an unrelated construction project, the 002 pump level controls were raised approximately a foot above the existing concrete floor. The level controls were above the water level and no longer controlled the 002 pump. An attempt was made to have the problem corrected during the evening shift on August 24th. On Wednesday, August 25th, extensions were welded on the ends of the probes. The 002 pump was functioning properly by approximately 2:30 p.m., August 25th. According to the Stevens' gauge at the 002 Weir, water discharged to "Lake Ike", from about 9:00 a.m. on August 24th to about 2:30 p.m. on August 25th, at a rate of approximately 125 gpm.

As mentioned in the July Monitoring Report, three sets of performance samples were collected from our outfall between August 9th and August 12th. Table III is a presentation of the analysis of the split samples received from John Davis, MDNR Environmental Specialist II.

Very truly yours,

D. L. Vornberg
Environmental Manager

attachments

DLV/bb

cc: R. E. Peppers
D. H. DeClue

881 MAIN ST., HERCULANEUM, MO. 63048
TELEPHONE 314-479-5311

TABLE I

ANALYSIS OF WWTP INFLUENT, AFTER REACTOR CLARIFIER, AND OUTFALL 001 DISCHARGE TO THE RIVER

mg/l

Total Metals in WWTP Influent / Dissolved Metals in WWTP Influent

Aug. 1982	5-6	6-7	9-10	10-11	11-12	13-14	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	26-27	27-28	30-31	31-1*
Pb	19.3 / 9.7	10.6 / 2.6	8.1 / 1.1	10.1 / 1.2	9.8 / 0.6	8.2 / 0.7	16.0 / 1.3	9.6 / 1.1	14. / .70	11. / 0.5	15.6 / 1.8	23.1 / 4.1	42.1 / 5.4	33.2 / 2.3	1.6 / .04	1.9 / 1.0	22. / 2.3	
Cu	2.3 / .01	1.3 / .03	.91 / .02	1.0 / .03	0.7 / .05	.35 / .01	.61 / .07	.23 / .01	1.2 / .01	1.3 / .02	1.7 / .02	1.9 / 0.1	2.6 / .02	2.2 / .09	3.4 / .02	.09 / .03	1.1 / .01	
Zn	38.6 / 35.5	26.1 / 23.9	9.2 / 8.4	11.5 / 4.1	8.6 / .82	6.0 / 3.0	37.7 / 34.9	20. / 13.	19. / 9.3	17. / 6.9	38.5 / 34.3	60.1 / 35.9	53.0 / 41.9	59. / 54.	31.7 / 3.3	20.1 / 18.6	39. / 31.	
Cd	2.3 / 2.1	3.0 / 3.0	1.6 / 1.3	2.1 / 0.10	1.2 / .46	2.2 / 1.6	2.6 / 2.3	2.1 / 1.9	1.4 / .90	0.9 / 0.6	8.2 / 7.1	1.9 / 1.7	2.3 / 1.8	2.1 / 1.8	3.1 / 3.0	1.5 / 1.4	1.5 / 1.1	
Ni	104. / 99.	91. / 86.	87. / 89.	91. / 97.	87. / 88.	96. / 100.	106. / 106.	100. / 90.	80. / 80.	90. / 90.	90. / 90.	100. / 100	110. / 110.	136. / 144.	99.1 / 98.0	89. / 93.	87. / 89.	
Hi									.10 / .05	.12 / .06	.14 / .10	.11 / .05	.30 / .15	.24 / .16	.23 / .06	.08 / .08	.11 / .07	
SS	61.7	64	20.1	25.6	26.6	19.5	40.9	52	68.6	82.6	3.6	66	80	30	22	7	36	
TDS	1000	1000	1000	950	650	900	1050	1000	900	850	1000	1150	1200	1350	1000	950	1000	
pH	6.3	6.3	7.0	7.5	7.1	7.1	6.4	7.3	7.5	7.5	6.7	5.2	5.9	5.0	8.2	7.1	6.7	
Cond.	1050	1250	1450	1200	1300	1350	1500	1400	1350	1250	1350	1700	1800	1800	1300	1300	1350	
$SO_4^=$														*No Sample				

Total Metal in Reactor Clarifier Effluent / Dissolved Metals in Reactor Clarifier Effluent

Aug. 1982	5-6	6-7	9-10	10-11	11-12	13-14	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	26-27	27-28	30-31	31-1
Pb	2.5 / .87	1.8 / 0.35	2.1 / .25	1.6 / .11	0.4 / .01	1.7 / .30	*	*	2.1 / .25	2.4 / .2	2.8 / 0.3	0.5 / 0.1	4.8 / .15	11.3 / .30	.27 / .03	5.6 / .02	3.7 / .3	*
Cu	.17 / .01	.21 / .02	.16 / .01	.12 / .03	0.1 / .06	.16 / .01			.16 / .02	.08 / .01	0.1 / .01	0.6 / .03	.40 / .02	.91 / .06	.62 / .05	.02 / .01	.18 / * .01	
Zn	7.5 / .97	4.1 / 1.5	7.6 / .56	1.8 / .20	1.0 / 0.3	2.0 / 0.6			3.1 / .68	2.6 / 7.5	5.8 / 1.2	25.4 / 0.2	6.6 / .07	35. / <.01	3.7 / .21	.79 / .45	6.4 / 4.5	
Cd	.03 / .15	1.0 / 0.9	.39 / .14	.23 / <.01	0.20 / .09	.45 / .29			.28 / .10	.11 / .01	1.4 / 0.7	0.9 / .05	.67 / .09	1.2 / .13	.36 / .09	.85 / .24	.45 / .31	
Ni	103. / 94.	103. / 93.	88. / 90.	98. / 95.	89. / 94.	95. / 92.			70. / 70.	90. / 90.	80. / 80.	100. / 100	110. / 110	139. / 160	95.6 / 95.5	93. / 89.	81. / 81.	
Hi									.06 / <.04	.03 / .01	.04 / .02	.09 / .06	.06 / .03	.12 / .03	.04 / .02	.05 / .03	.05 / .03	
SS	10.8	31	3.1	23.7	7.8	13.9			28.6	30.8	8	34	25	17	6	<2	24	
TDS	1000	1000	1000	950	800	900			900	850	1000	1150	1200	1300	1000	1000	1000	
pH	8.0	7.5	8.0	9.2	8.6	7.1			7.9	8.3	7.4	8.7	8.9	8.6	8.2	7.3	7.5	
Cond.	1050	1250	1450	1350	1200	1350			1350	1150	1350	1700	1700	1800	1450	1450	1350	
$SO_4^=$														*No Sample				

Total Metals in Outfall 001 Discharge to the River / Dissolved Metals in Outfall 001 Discharge to the River

Aug. 1982	5-6	6-7	9-10	10-11	11-12	13-14	16-17	17-18	18-19	19-20	20-21	21-22	22-23	23-24	26-27	27-28	30-31	31-1
Pb	.29 / .06	0.45 / 0.29	.14 / .12	.34 / .08	.05 / .03	.17 / .16	.20 / .15	.16 / .07	.13 / .12	.11 / .11	0.2 / 0.2	.25 / .13	.17 / .10	.17 / .05	.02 / .02	<.01 / <.01	.22 / .20	.40 / .17
Cu	.03 / .01	.04 / .01	.03 / .02	.02 / .01	.01 / .02	.01 / .01	.03 / .02	.01 / .01	.02 / .01	.01 / .01	.01 / .01	.03 / .02	.02 / .01	.01 / .01	.04 / .06	.03 / .01	.02 / .01	<.01 / <.01
Zn	.32 / .10	0.7 / 0.3	.10 / .10	0.10 / 0.02	0.10 / .07	.11 / .11	1.7 / 1.4	.49 / .29	.16 / .12	0.1 / 0.1	.15 / .16	.45 / .11	.17 / .02	10. / <.01	.10 / .06	.50 / .50	.28 / .01	.09 / .09
Cd	.04 / .03	0.9 / 0.9	.03 / .03	.02 / .01	.04 / .03	.09 / .03	0.4 / 0.4	.34 / .18	.03 / .03	.03 / .03	.11 / .11	.12 / .11	.22 / .05	.27 / .17	.04 / .02	.40 / .38	.19 / .19	.05 / .05
Ni	96. / 97.	114. / 109	83. / 83.	96. / 96.	89. / 84.	95. / 96.	101. / 103.	100. / 100	70. / 70.	90. / 90.	80. / 80.	100. / 100.	110. / 110	144. / 148.	97.5 / 98.2	97. / 95.	80. / 80.	95. / 85.
Hi									.04 / <.04	.02 / .07	.03 / .03	.04 / .03	.04 / .04	.05 / .04	.03 / .03	.02 / .02	.05 / .04	.04 / .01
SS	8.3	4.8	2.0	<2	<2	0.4	<2	12	6	9.2	<2	6	<2	<2	<2	<2	<2	1.6
TDS	1000	1050	1000	900	800	900	1050	1000	900	850	1000	1150	1200	1300	1000	1000	1000	900
pH	8.7	7.2	7.3	9.7	8.1	7.0	7.3	7.8	7.5	7.2	7.4	8.2	8.8	8.5	8.6	7.3	6.7	7.3
Cond.	1050	1250	1450	1400	1100	1350	1500	1400	1350	1300	1350	1500	1750	1900	1350	1400	1350	1200
$SO_4^=$	700		629	645	471													

Table II

002 Flow Measurements and Flux Pump Condition Report

August 1982

Observation Date	Observed Flow at Weir, gpm	Mechanical Flowmeter Operating?	Flux Pump Operable and Functioning/gpm	Flux Pump Off or Malfunctioning	Notes
08-02-82	4	X	X 575		
08-03-82	4	X	X 575		
08-04-82	4	X	X -		
08-05-82	4	X	X -		
08-06-82	4	X	X 575		
08-09-82	4	X	X 530		
08-10-82	4	X	X 530		
08-11-82	4	X	X 530		
08-12-82	4	X	X 530		
08-13-82	4	X	X 485		
08-16-82	4	X	X 485		
08-17-82	4	X	X 450		
08-18-82	4	X	X 485		
08-19-82	4	X	X 485		
08-20-82	4	X	X 485		
08-21-82	4	X	X -		
08-22-82	4	X	X 485		
08-23-82	4	X	X 445		
08-24-82	4	X	X 445		24th. Checked pump in afternoon. Found level controls raised about 1'. Pump not working in automatic position. Notified T.Robart. T.Robart said he would have electrical troubleshooter check it out.
08-25-82	159	X	0	X	
08-26-82	4	X	X 445		25th. Checked pump at 8:30. Still not fixed. reported problem to Jess Green who said he would take care of it. Pump functioning normally about 2:30 p.m.
08-27-82	4	X	X 410		

002 Flow Measurements and Flux Pump Condition Report

August 1982

Observation Date	Observed Flow at Weir, gpm	Mechanical Flowmeter Operating	Flux Pump Operable and Functioning/gpm	Flux Pump Off or Mal-functioning	Notes
08-30-82	4	X	X 410		
08-31-82	4	X	X 410		

TABLE III

ANALYSIS OF MDNR SPLIT SAMPLES OBTAINED DURING FIRST WEEK OF AUGUST, 1982

Date	Sampling Location					
8/9 - 8/10	001 "D"		003		Ranney Well	
Suspended Solids	2.0		2.4		0.9	
TDS	1000		500		500	
pH	7.3		---		7.3	
Conductivity	1450		775		775	
	Total	Filtrate	Total	Filtrate	Total	Filtrate
Pb	.16	.12	.07	.04	.06	.06
Cu	.03	.02	.02	.02	.02	.02
Zn	.10	.10	.02	.02	.03	.03
Cd	.03	.03	<.01	<.01	<.01	<.01
Na	83	83	45	48	43	48
$SO_4^{=}$	629		8.6		8.1	
8/10 - 8/11	001 "D"		003		Ranney Well	
Suspended Solids	<2		Not		<2	
TDS	900		Enough		450	
pH	9.7		Sample		7.6	
Conductivity	1400				800	
	Total	Filtrate	Total	Filtrate	Total	Filtrate
Pb	.34	.08	.03	.03	.02	.06
Cu	.02	.01	.01	.02	.01	.01
Zn	.1	.02	.01	.01	.01	.04
Cd	.02	.01	<.01	<.01	<.01	.01
Na	96	96	43	45	43	45
$SO_4^{=}$	645		192		--	
8/11 - 8/12	001 "D"		003		Ranney Well	
Suspended Solids	<2		<2		No sample taken by State	
TDS	800		850			
pH	8.1		8.1			
Conductivity	1100		750			
	Total	Filtrate	Total	Filtrate		
Pb	.05	.03	.02	.03		
Cu	.01	.02	.01	.01		
Zn	.1	.07	.02	.04		
Cd	.04	.03	.03	.03		
Na	89	84	42	41		
$SO_4^{=}$	471		206			

ST. JOE
LEAD COMPANY
Division of St. Joe Minerals Corporation
SMELTING DIVISION

R. E. PEPPERS
DIVISION MANAGER

September 10, 1982

Mr. James R. Berlow
Sanitary Engineer
United States Environmental Protection Agency
Washington, D.C. 20460

Dear Jim:

Enclosed are several months of recent wastewater raw data from the Herculaneum Primary Lead Smelter. The 1982 data covers only the period of time when all wastewater from the smelter was collected and delivered to the Wastewater Treatment Plant. Twenty-four hour composite samples were collected, by ISCO samplers, at three sites in the water circuit. Influent water going into the plant (Table I), after reactor clarifier water (Table II), and the final effluent water (Table III) were collected. The data presented in these tables are for total metals. Dissolved metals were also measured, since our current permits are written that way.

In addition to the data tables, we have plotted lead, cadmium, zinc, and total suspended solids data, on lognormal probability paper, in order to extract the appropriate statistics.

After Reactor Clarifier (After Lime and Settle)

	One Day Maximum*	Long-Term Geometric Mean**	Ten-Day Average Maximum***	Thirty-Day Average Maximum****
Pb	12.2	1.58	3.72	2.35
Cd	3.1	.32	.78	.53
Zn	17.9	1.85	10.40	3.20
TSS	79.0	12.19	23.50	18.50

* 99 percent point of Lognormal Graph 1.
** 50 percent point of Lognormal Graph 1.
*** 99 percent point of Lognormal Graph 3.
**** 99 percent point of Lognormal Graph 5.

881 MAIN ST., HERCULANEUM, MO. 63048

Final Effluent Water (After Lime, Settle, and Filter)

	One Day Maximum*	Long-Term Geometric Mean**	Ten-Day Average Maximum***	Thirty-Day Average Maximum****
Pb	1.05	0.15	.37	.22
Cd	1.10	0.07	.88	.26
Zn	4.30	0.24	4.15	1.28
TSS	9.30	2.05	3.52	2.74

* 99 Percent point of Lognormal Graph 2.
** 50 percent point of Lognormal Graph 2.
*** 99 percent point of Lognormal Graph 4.
**** 99 percent point of Lognormal Graph 6.

The graphs were all drawn by first calculating the geometric mean and the geometric standard deviation. Then, these two pieces of data were used to plot the distribution of the raw data. The ten-day and thirty-day averages were compiled as moving averages, and then the geometric mean and geometric standard deviation of these moving averages were used to plot the distribution.

We also examined the ratio of total to dissolved metals for the three metals. The following ratios were determined, based on the summer 1982 data set:

Total Pb = 1.46 x dissolved Pb.
Total Cd = 1.00 x dissolved Cd.
Total Zn = 1.02 x dissolved Zn.

Based on these ratios, we were able to bring forward our dissolved data from 1980 and 1981, NPDES Permit Reports at Outfall 001 (After Lime, Settle, and Filter), for the long-term mean only.

Long-Term Mean (Geometric Mean) After Lime, Settle, and Filter

	1980	1981
Lead	.23	.15
Cadmium	.04	.03
Zinc	.25	.14

Graphs 7, 8, 9, and 10 show the effectiveness of our Wastewater Treatment Plant in removing total lead, total cadmium, total zinc, and total suspended solids, respectively.

From this evidence, it is our conclusion that the differences between your model Nonferrous Wastewater Treatment Plant and our Lead Smelting Wastewater Treatment Plant are significant. Hopefully, you will consider using lead smelter data for the lead smelting category.

We are still evaluating the flow data and storm water issues that we discussed, and we will make a submission on this matter in the near future.

Sincerely,

D. L. Vornberg
Environmental Manager

attachments

DLV/bb

TABLE

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
6/21-22/82	24 Hr. Composite			14.5	8.5	1.97	.18	1.5
6/22-23/82	"			No Sample				
6/23-24/82	"			No Sample				
6/24-25/82	"			No Sample				
6/25-26/82	"			No Sample				
6/26-27/82	"			No Sample				
6/27-28/82	"			No Sample				
6/28-29/82	"			6.3	7.1	.82	.09	.58
6/29-30/82	"			4.3	7.6	.84	.13	.59
6/30/82	"			7.3	8.0	.95	.10	.67
7/1-2/82	"			4.5	9.4	.11	.02	.11
7/2-3/82	"			11.7	7.6	.80	.20	.79
7/3-4/82	"			8.1	8.4	1.6	.40	.85
7/4-5/82	"			No Sample				
7/5-6/82	"			40.	8.1	2.8	.55	2.2
7/6-7/82	"			23.8	7.9	1.9	.28	1.9
7/7-8/82	"			21.4	8.0	.59	.44	.9
7/8-9/82	"			3.1	7.9	2.4	.70	1.8

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
7/9-10/82	24 Hr. Composite			27.4	8.2	.31	.46	2.5
7/10-11/82	"			10.6	7.7	1.6	.70	1.3
7/11-12/82	"			7.2	8.2	2.5	.37	1.4
7/12-13/82	"			2.7	7.6	2.4	.38	1.3
7/13-14/82	"			No Sample				
7/14-15/82	"			12.8	8.3	1.1	.53	1.0
7/15-16/82	"			13.0	7.6	1.5	.90	1.4
7/19-20/82	"			23.2	6.9	4.1	2.0	11.6
7/20-21/82	"			22.8	6.5	2.7	2.1	33.0
7/21-22/82	"			35.1	6.9	9.0	1.9	31.0
7/22-23/82	"			4.9	6.9	7.0	2.0	11.9
7/29/82				No Sample				
7/30-31/82	24 Hr. Composite			35.9	7.7	3.7	.2	10.4
8/5-6/82	"			10.8	8.0	2.5	.03	2.5
8/6-7/82	"			31.0	7.5	3.8	1.0	4.1
8/9-10/82	"			7.1	8.0	2.1	.39	2.6
8/10-11/82	"			23.7	9.2	1.8	.23	1.8
8/11-12/82	"			7.8	8.6	0.6	.20	1.0
8/13-14/82	"			13.9	7.1	1.7	.45	2.0
8/16-17/82				No Sample				

TABLE ( )

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
8/17-18/82	24 Hr. Composite			No Sample				
8/18-19/82	"			28.6	7.9	2.1	.28	3.1
8/19-20/82	"			30.8	8.5	2.4	.11	2.6
8/20-21/82	"			8.0	7.4	2.8	1.4	5.0
8/21-22/82	"			54.0	8.7	8.5	0.9	25.4
8/22-23/82	"			25.0	8.9	4.8	.67	6.6
8/23-24/82	"			17.0	8.6	11.3	1.2	35.0
8/26-27/82	"			6.0	8.2	0.27	.36	3.7
8/27-28/82	"			<2.0	7.3	5.6	.86	0.79
8/30-31/82	"			24.0	7.5	3.7	.45	4.4
8/31-9/1/82	"			No Sample				

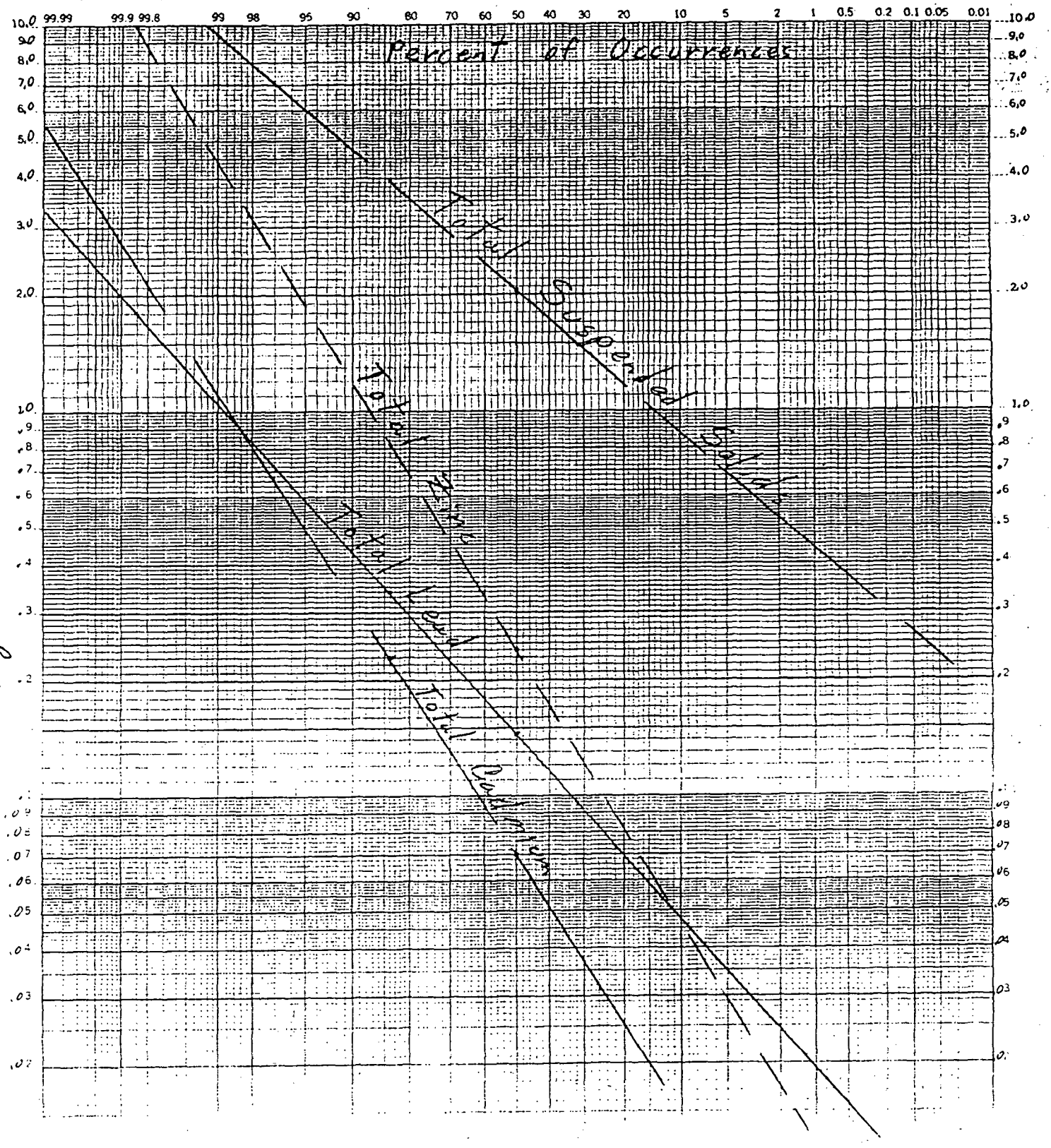


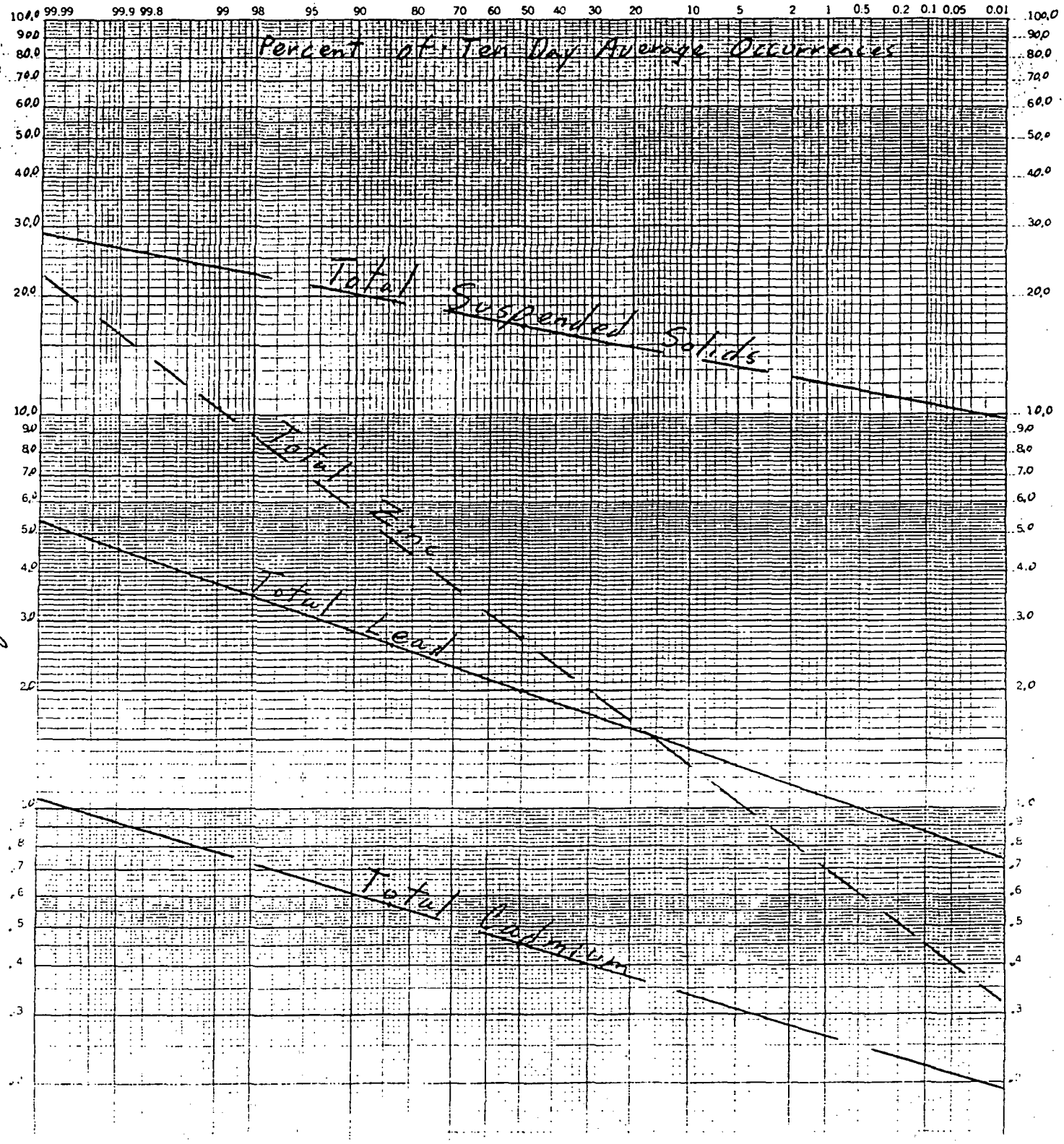
Fig 10

Final Effluent Water

001 Outfall

After Lime, Settle, and Filter

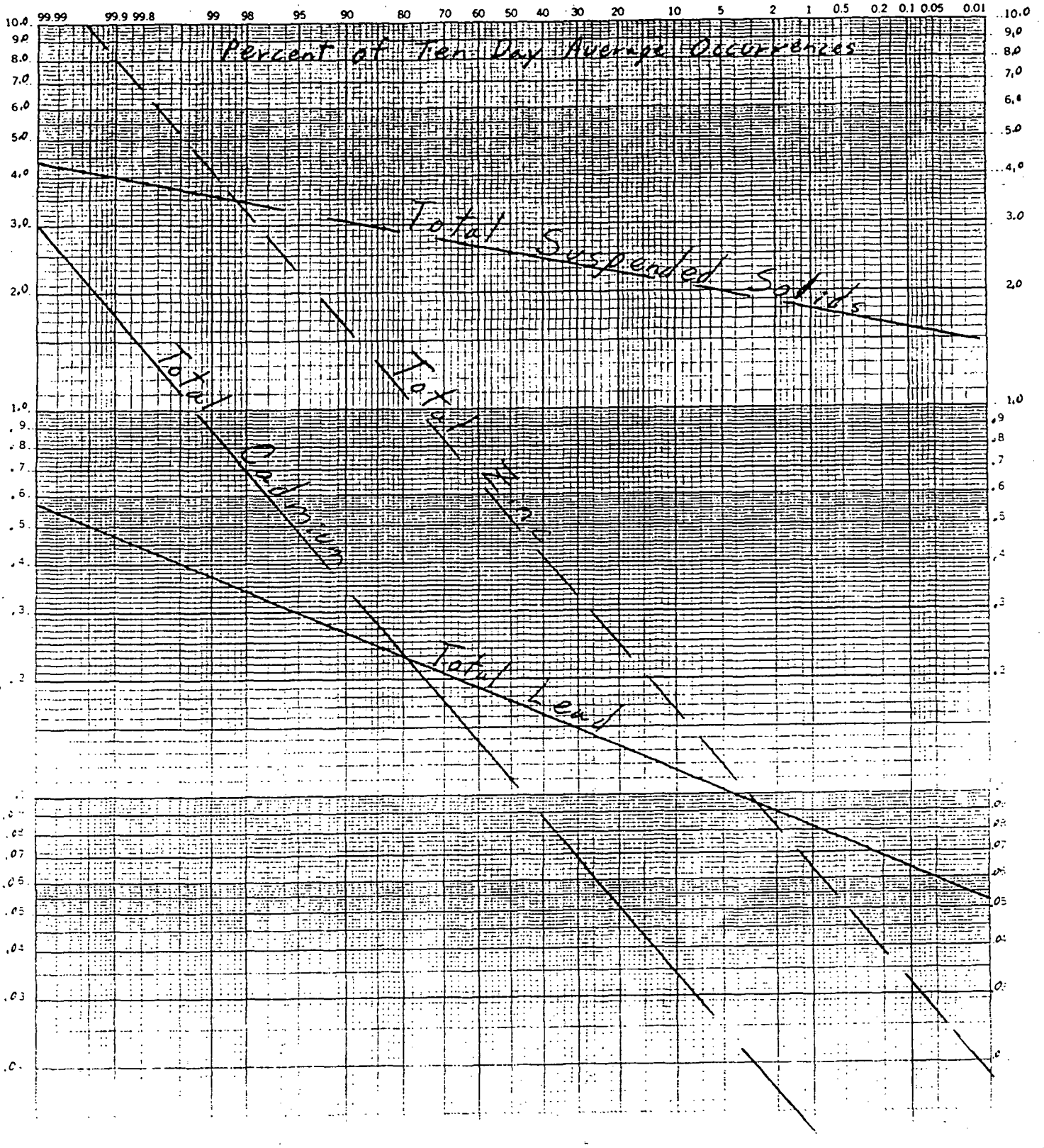
Graph 2



After Reactor Clarifier

After Lime and Settle

Graph 3

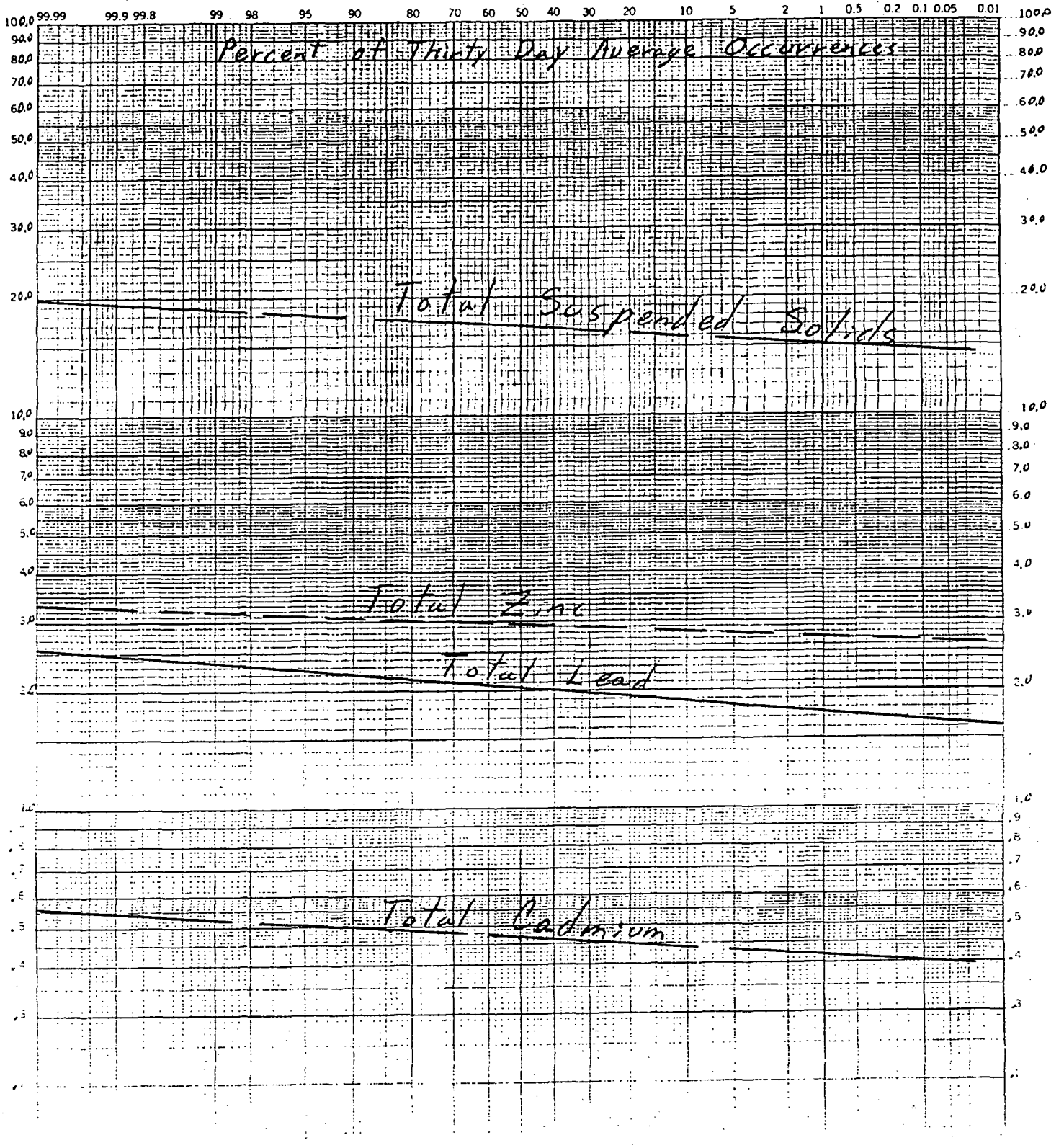


Final Effluent Water

001 Outfall

After Lime, Settle, and Filter

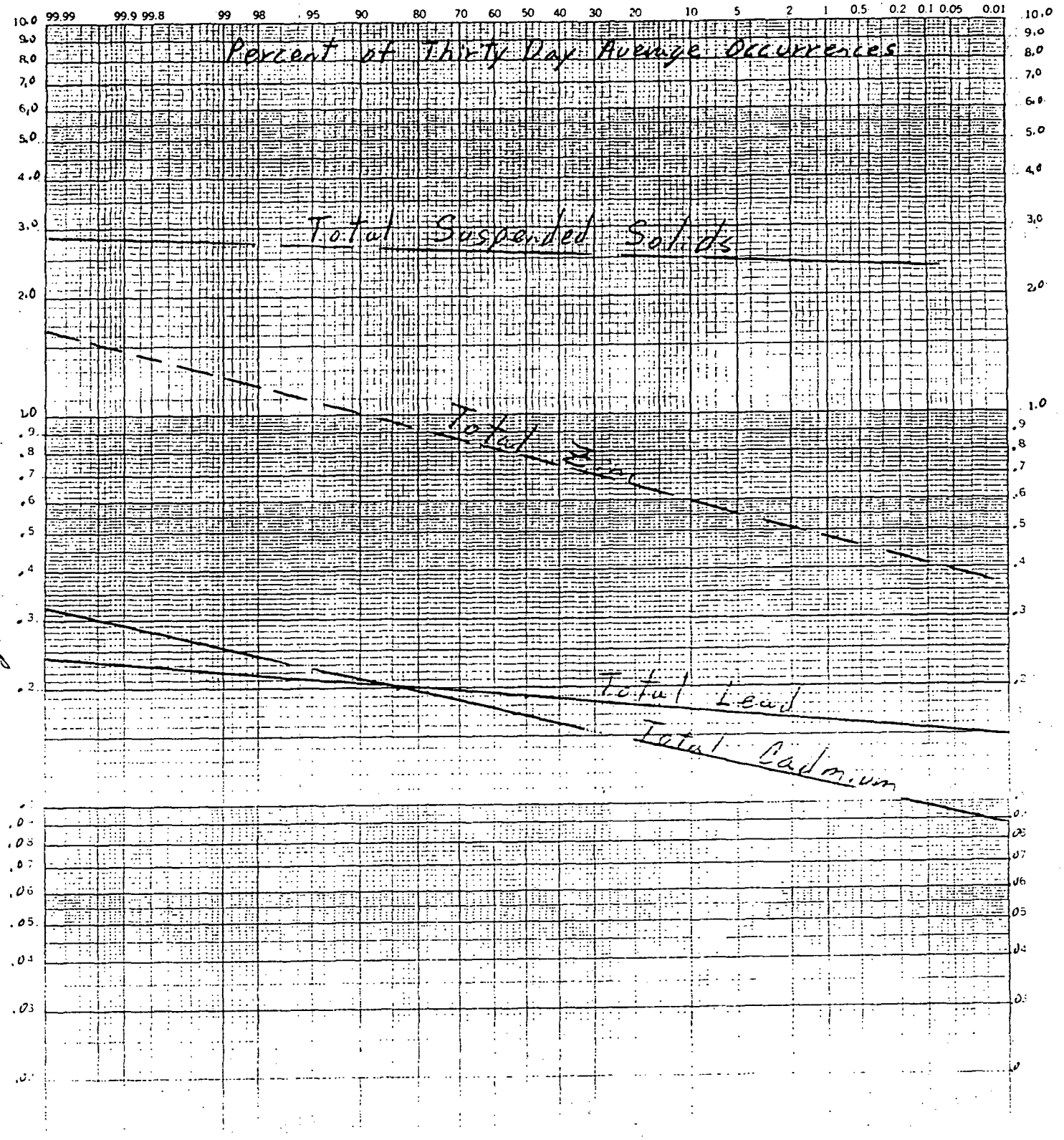
Graph 4



After Reactor Clarifier

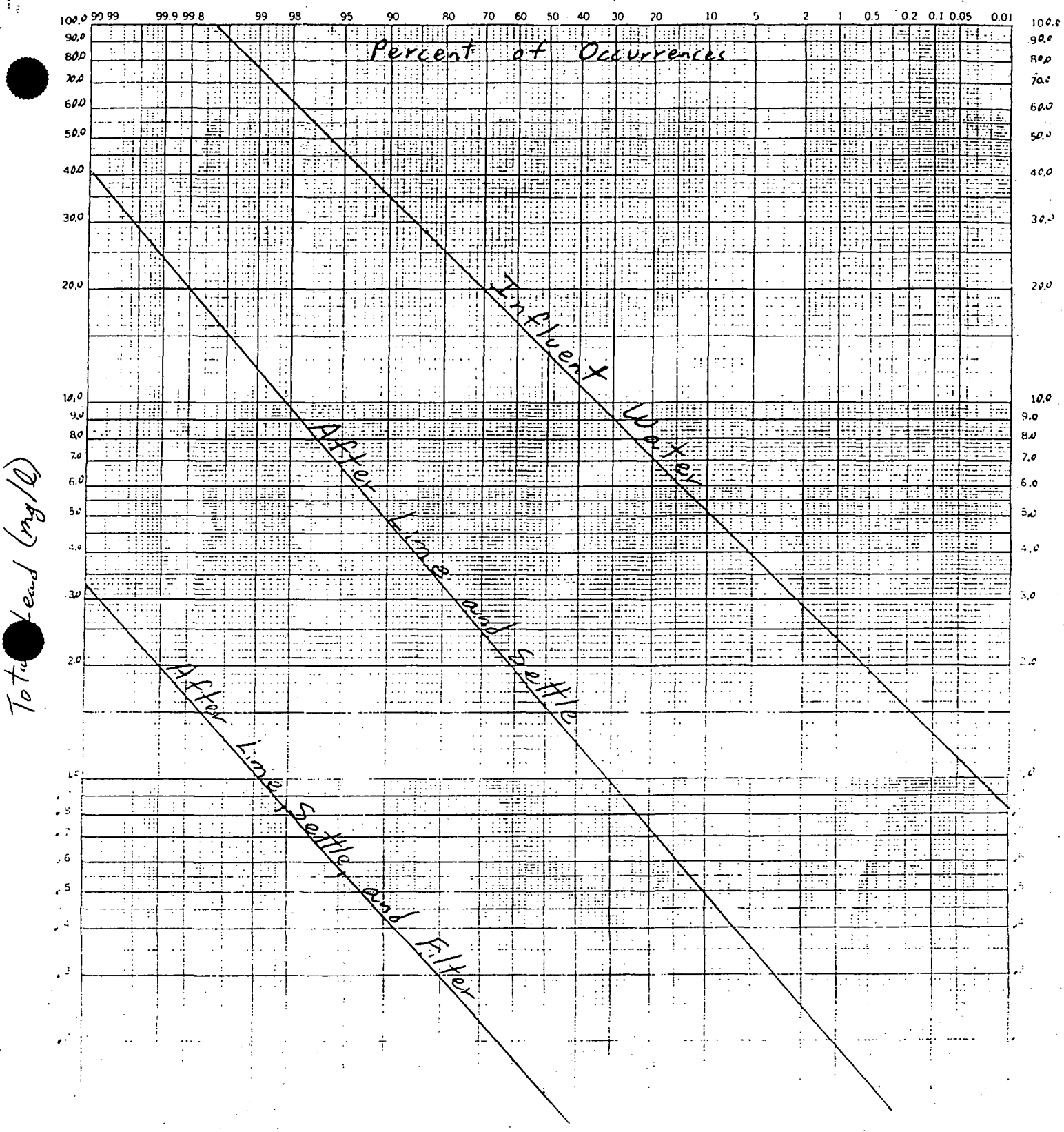
After Lime and Settle

Graph 5



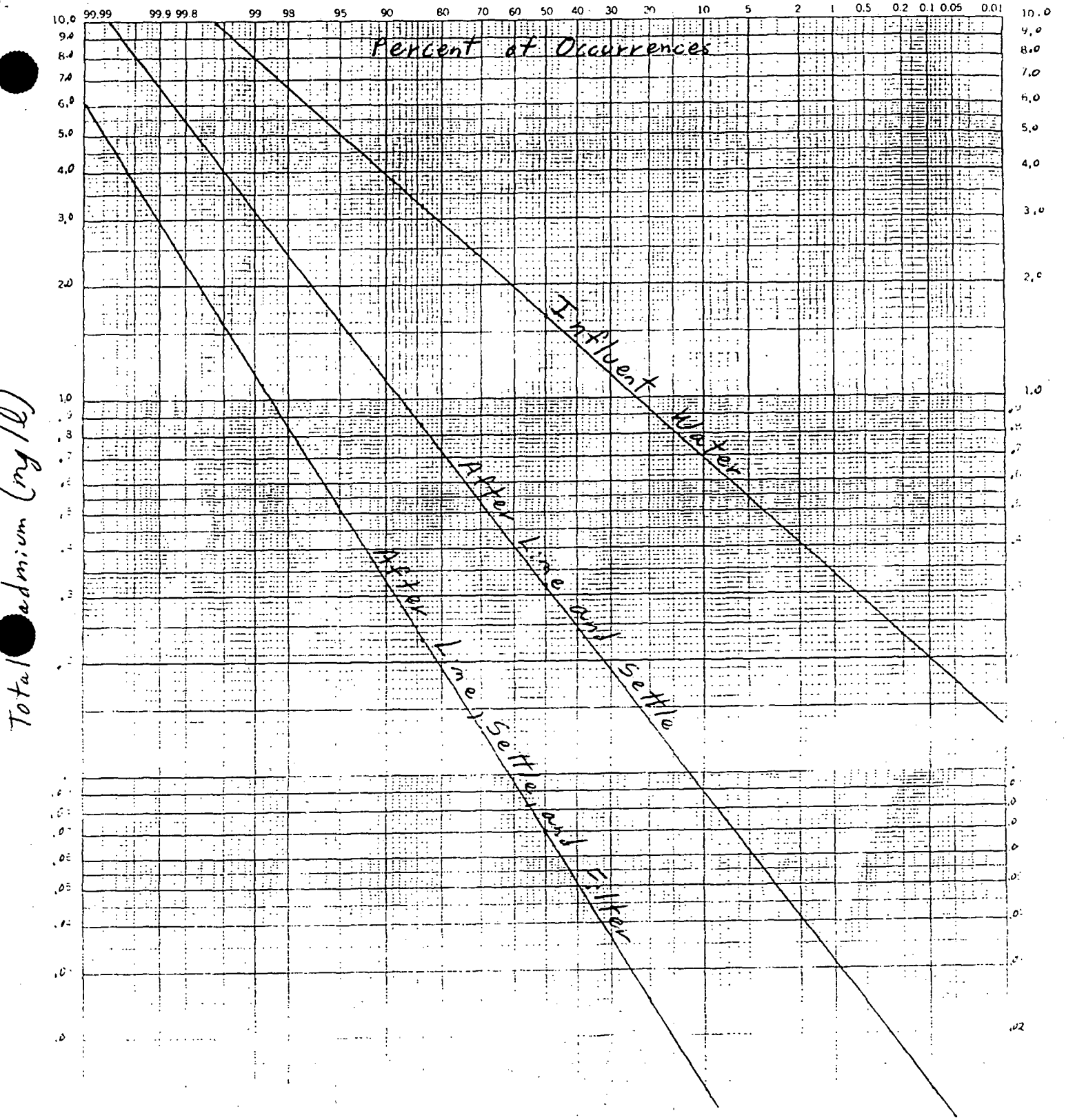
Final Effluent Water
001 Outfall
After Lime, Settle, and Filter

Graph 6



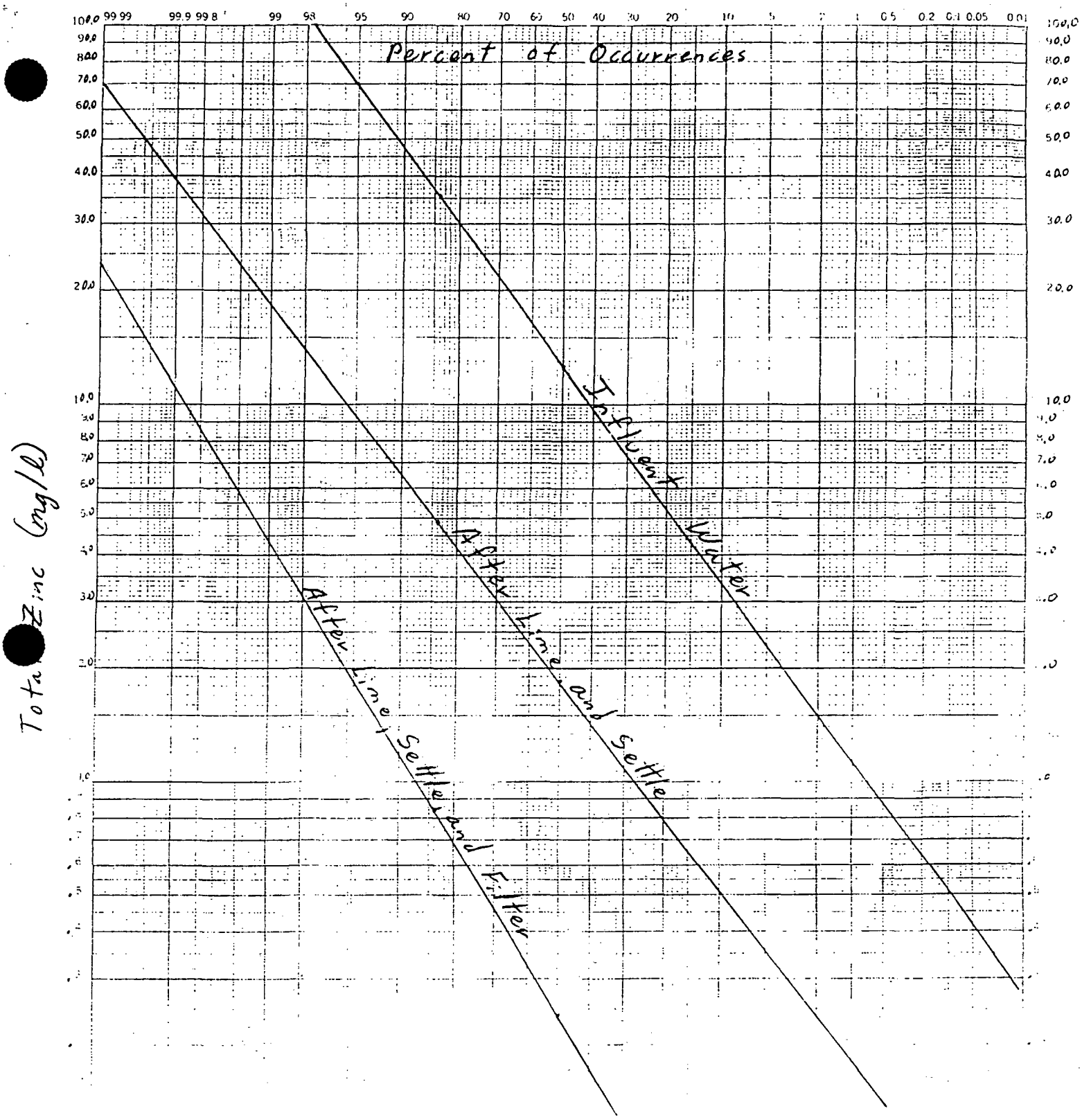
St. Joe Lead Smelter Waste Water Treatment Plant
with Respect to Lead

Graph 7



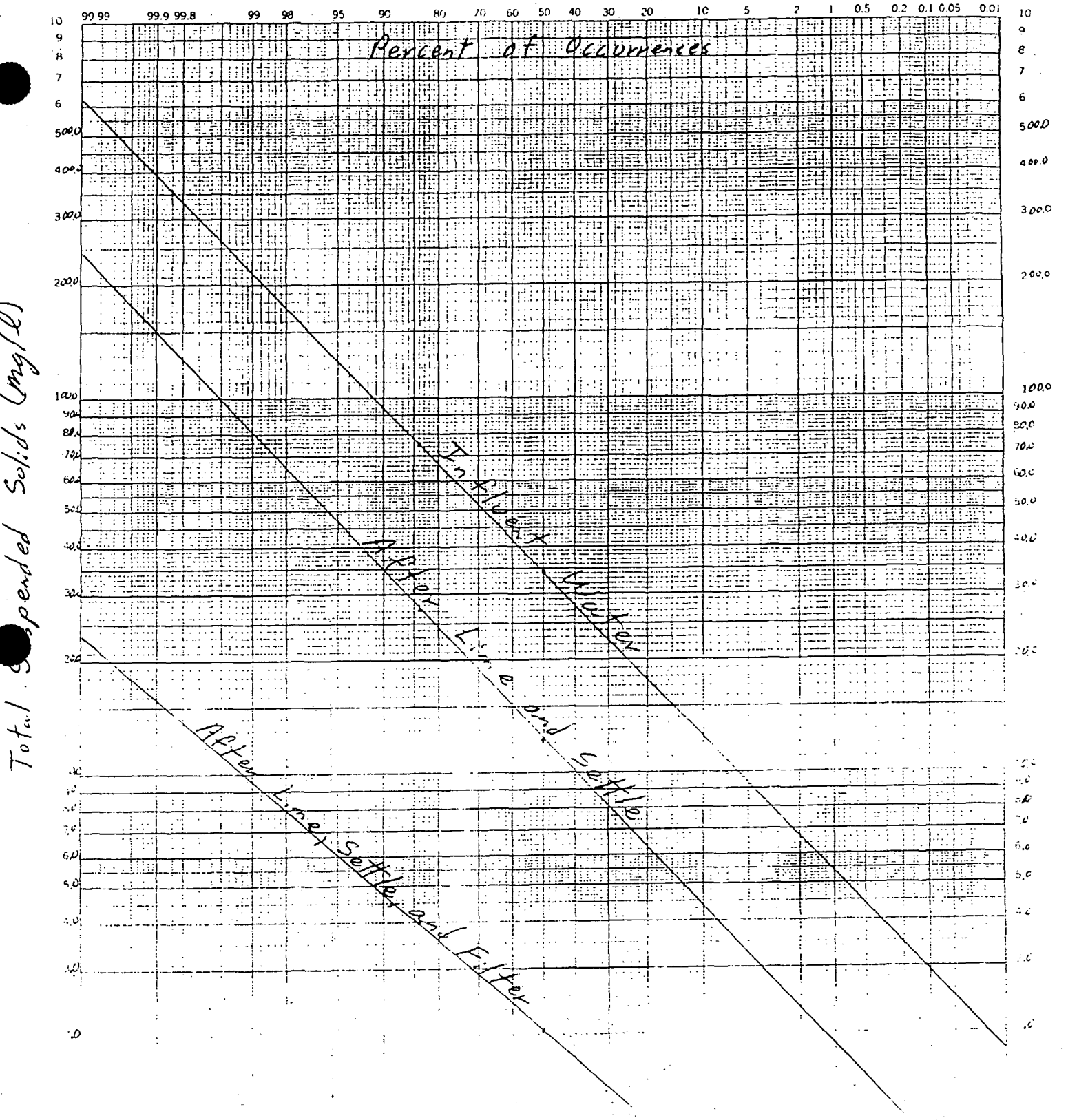
St. Joe Lead Smelter Waste Water Treatment Plant
with Respect to Cadmium

Graph 8



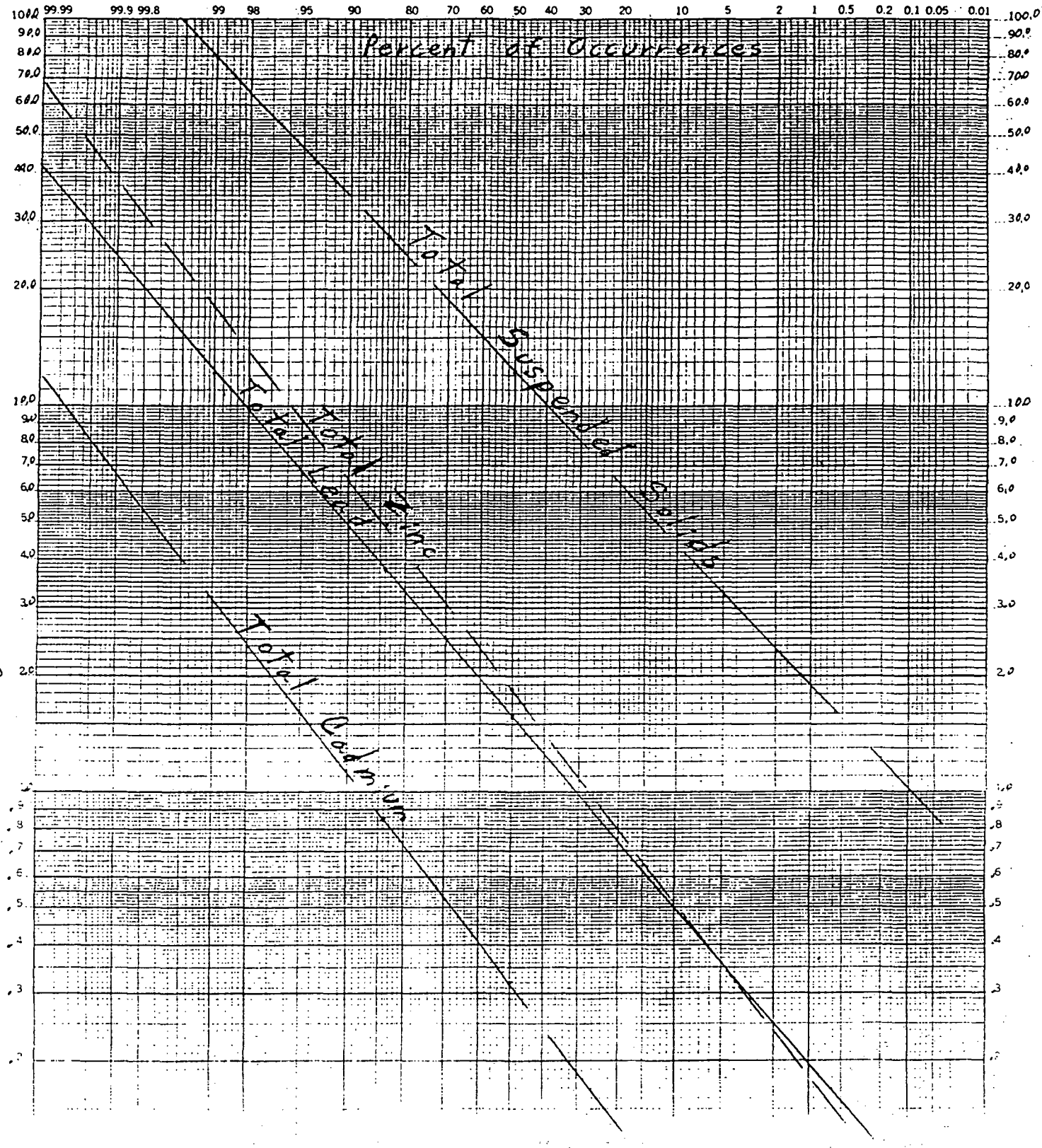
St. Joe Lead Smelter Waste Water Treatment Plant
with Respect to Zinc

Graph 9



St. Joe Lead Smelter Waste Water Treatment Plant
with Respect to Total Suspended Solids

Graph 10



After Reactor Clarifier

After Lime and Settle

Graph 1

TABLE I

PLANT INFLUENT INTO THE WATER TREATMENT PLANT

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
6/21-22/82	24 Hr. Composite			61.9	8.6	33.4	1.2	.1
6/22-23/82	"			17.8	7.8	10.6	.78	9.3
6/23-24/82	"			17.1	7.4	12.7	.77	14.8
6/24-25/82	"			11.3	8.1	8.3	1.0	13.5
6/25-26/82	"			5.1	7.7	4.9	.8	20.3
6/26-27/82	"			56.5	7.5	29.7	.74	15.1
6/27-28/82	"			29.6	7.4	13.3	.65	2.6
6/28-29/82	"			24.5	7.9	8.4	.86	7.3
6/29-30-82	"			20.1	8.1	10.2	1.60	8.0
6/30/82	"			26.5	8.4	6.5	.70	8.6
7/1-2/82	"			23.5	8.5	4.0	.70	2.5
7/2-3/82	"			25.8	7.5	9.4	1.8	6.3
7/3-4/82	"			23.4	8.2	11.8	2.0	7.8
7/4-5/82	"			27.6	8.5	6.1	1.7	8.4
7/5-6/82	"			90.0	9.1	11.4	.68	12.8
7/6-7/82	"			54.0	8.2	11.4	.80	10.0
7/7-8/82	"			89.8	8.3	24.0	4.0	9.9
7/8-9/82	"			58.7	7.5	31.8	3.3	9.1

TABLE I

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
7/9-10/82	24 Hr. Composite			86.2	7.5	30.7	3.4	15.3
7/10-11/82	"			135.3	7.2	63.9	5.6	22.0
7/11-12/82	"			53.3	7.3	20.0	3.0	17.0
7/12-13/82	"			51.1	7.2	27.0	2.3	16.9
7/13-14/82	"			51.7	7.4	28.7	1.8	14.6
7/14-15/82	"			No Sample				
7/15-16/82	"			93.8	7.6	21.8	3.4	23.5
7/19-20/82	"			68.4	5.5	32.0	4.3	72.7
7/20-21/82	"			33.4	4.3	14.9	3.6	65.0
7/21-22/82	"			49.0	5.5	20.4	3.3	65.0
7/22-23/82	"			22.4	6.1	45.0	4.0	36.3
7/29/82	"			No Sample				
7/30-31/82	24 Hr. Composite			39.4	7.0	8.4	.21	12.7
8/5-6/82	"			61.7	6.3	19.3	2.3	38.0
8/6-7/82	"			64.0	6.5	18.0	3.0	26.1
8/9-10/82	"			20.1	7.0	8.1	1.6	9.2
8/10-11/82	"			25.6	7.5	10.1	2.1	11.3
8/11-12/82	"			26.6	7.1	9.8	1.2	8.6
8/13-14/82	"			19.5	7.1	8.2	2.2	6.0

TABLE I

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
8/16-17/82	24 Hr. Composite			40.9	6.4	16.0	2.6	37.7
8/17-18/82	"			52.0	7.3	9.6	2.1	20.0
8/18-19/82	"			68.4	7.5	14.0	1.4	19.0
8/19-20/82	"			82.8	7.5	11.0	0.9	17.0
8/20-21/82	"			3.6	6.7	15.6	8.2	38.5
8/21-22/82	"			66.0	5.2	23.1	1.9	60.1
8/22-23/82	"			80.0	5.9	42.1	2.3	53.0
8/23-24/82	"			30.0	5.0	33.2	2.1	59.0
8/26-27/82	"			22.0	8.7	1.8	3.1	31.7
8/27-28/82	"			7.0	7.1	1.9	1.5	20.1
8/30-31/82	"			36.0	6.7	22.0	1.5	39.0
8/31-9/1/82	"			No Sample				

TABLE IA

PLANT INFLUENT INTO THE WATER TREATMENT PLANT

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite			236	7.4		40.0	2.5	30.0
9/2-3/82	"			9	6.2		10.8	2.7	33.7
9/3-4/82	"			---	---		39.0	5.0	21.2
9/7-8/82	"			100	7.1		24.1	1.9	34.6
9/9-10/82	"			55	6.2		24.0	1.6	26.9
9/10-11/82	"			70	7.3		18.3	0.9	20.6
9/13-14/82	"			30	7.4		20.1	1.2	25.8
9/14-15/82	"			30	7.3		26.6	3.6	25.1
9/15-16/82	"			41	7.2		66.2	5.7	53.7
9/17-18/82	"			50	7.0		33.1	2.8	32.1
9/18-19/82	"			9	7.5		16.8	1.6	15.7
9/19-20/82	"			84	7.1		20.6	1.4	14.7
9/20-21/82	"			60	7.3		18.0	1.7	11.0
9/21-22/82	"			269	7.0		47.0	3.4	36.0
9/22-23/82	"			136	7.4		22.0	32.0	15.0
9/27-28/82	"			40	7.5		23.8	3.8	26.1
9/28-29/82	"			85	7.5		20.1	3.6	17.0
9/30-10/1/82	"			50	7.7		22.5	3.4	16.3

TABLE IA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
10/8-9/82	24 Hr. Composite			39	6.7		21.7	1.5	64.8
10/11-12/82	"			192	7.1		40.0	1.8	39.0
10/20-21/82	"			100	7.4		24.2	3.7	57.9
11/2-3/82	"			200	6.8		31.0	3.7	39.0
11/9-10/82	"			142	7.3		24.0	2.1	26.0
11/16-17/82	"			19	6.6		29.6	0.3	10.7

TABLE II

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/1) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/1) TOTAL ZINC
6/21-22/82	24 Hr. Composite			14.5	8.5	8.7	1.97	.18	1.5
6/22-23/82	"			No Sample					
6/23-24/82	"			" "					
6/24-25/82	"			" "					
6/25-26/82	"			" "					
6/26-27/82	"			" "					
6/27-28/82	"			" "					
6/28-29/82	"			6.3	7.1	9.3	.82	.09	.58
6/29-30/82	"			4.3	7.6	9.1	.84	.13	.59
6/30/82	"			7.3	8.0	9.0	.95	.10	.67
7/1-2/82	"			4.5	9.4	9.8	.11	.02	.11
7/2-3/82	"			11.7	7.6	9.6	.80	.20	.79
7/3-4/82	"			8.1	8.4	9.0	1.6	.40	.85
7/4-5/82	"			No Sample					
7/5-6/82	"			40.	8.1	9.0	2.8	.55	2.2
7/6-7/82	"			23.8	7.9	9.1	1.9	.28	1.9
7/7-8/82	"			21.4	8.0	9.3	.59	.44	.9
7/8-9/82	"			3.1	7.9	9.3	2.4	.70	1.8

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
7/9-10/82	24 Hr. Composite			27.4	8.2	9.5	.31	.46	2.5
7/10-11/82	"			10.6	7.7	9.3	1.6	.70	1.3
7/11-12/82	"			7.2	8.2	9.4	2.5	.37	1.4
7/12-13/82	"			2.7	7.6	9.3	2.4	.38	1.3
7/13-14/82	"			No Sample					
7/14-15/82	"			12.8	8.3	9.1	1.1	.53	1.0
7/15-16/82	"			13.0	7.6	9.1	1.5	.90	1.4
7/19-20/82	"			23.2	6.9	8.6	4.1	2.0	11.6
7/20-21/82	"			22.8	6.5	8.3	2.7	2.1	33.0
7/21-22/82	"			35.1	6.9	8.7	9.0	1.9	31.0
7/22-23/82	"			4.9	6.9	---	7.0	2.0	11.9
7/29/82	"			No Sample					
7/30-31/82	"			35.9	7.7	8.9	3.7	.2	10.4
8/5-6/82	"			10.8	8.0	9.7	2.5	.03	2.5
8/6-7/82	"			31.0	7.5	9.9	3.8	1.0	4.1
8/9-10/82	"			7.1	8.0	9.7	2.1	.39	2.6
8/10-11/82	"			23.7	9.2	10.1	1.8	.23	1.8
8/11-12/82	"			7.8	8.6	10.0	0.6	.20	1.0
8/13-14/82	"			13.9	7.1	10.5	1.7	.45	2.0
8/16-17/82	"			No Sample					

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
8/17-18/82	24 Hr. Composite			No Sample					
8/18-19/82	"			28.6	7.9	9.6	2.1	.28	3.1
8/19-20/82	"			30.8	8.5	9.9	2.4	.11	2.6
8/20-21/82	"			8.0	7.4	9.8	2.8	1.4	5.0
8/21-22/82	"			54.0	8.7	9.6	8.5	0.9	25.4
8/22-23/82	"			25.0	8.9	10.0	4.8	.67	6.6
8/23-24/82	"			17.0	8.6	9.8	11.3	1.2	35.0
8/26-27/82	"			6.0	8.2	10.0	0.27	.36	3.7
8/27-28/82	"			< 2.0	7.3	9.5	5.6	.86	0.79
8/30-31/82	"			24.0	7.5	9.6	3.7	.45	4.4
8/31-9/1/82	"			No Sample					

TABLE 11A

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite			21	7.3	9.6	2.9	0.2	2.5
9/2-3/82	"			2	7.3	9.2	0.7	0.5	3.0
9/3-4/82	"			70	6.8	9.0	10.8	2.8	16.6
9/7-8/82	"			20	7.3	9.6	2.7	0.5	5.3
9/9-10/82	"			22	7.3	10.5	5.3	0.6	3.7
9/10-11/82	"			30	7.7	9.9	7.9	0.4	4.7
9/13-14/82	"			15	7.7	10.3	8.2	0.4	5.3
9/14-15/82	"			23	8.5	9.9	5.8	0.4	2.2
9/15-16/82	"			4	8.4	10.0	6.6	0.7	3.7
9/17-18/82	"			15	8.0	9.7	5.8	0.4	1.8
9/18-19/82	"			2	8.0	10.3	7.1	0.3	0.6
9/19-20/82	"			17	7.5	9.9	7.0	1.4	4.2
9/20-21/82	"			12	7.9	9.5	9.4	0.6	2.1
9/21-22/82	"			16	7.7	9.5	16.0	0.6	3.1
9/22-23/82	"			32	8.7	10.2	0.2	0.3	0.3
9/27-28/82	"			20	7.8	9.0	1.4	0.5	2.4
9/28-29/82	"			20	8.1	9.5	6.5	0.5	0.4
9/30-10/1/82	"			20	---	---	3.2	0.6	0.5

TABLE IIA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
10/8-9/82	24 Hr. Composite			3	8.5	9.1	4.3	0.23	1.9
10/11-12/82	"			2	---	---	5.6	0.25	3.0
10/20-21/82	"			7	8.4	8.9	2.3	0.37	3.5
11/2-3/82	"			--	---	---	---	----	---
11/9-10/82	"			--	---	---	---	----	---
11/16-17/82	"			--	---	---	---	----	---

TABLE

SUMMARY OF WATER DATA FROM JANUARY 1, 1982 THRU AUGUST 12, 1982

LOCATION	HEAVY METALS (MILLIGRAMS/LITER)						CALCULATION
	LEAD		CADMIUM		ZINC		
	TOTAL	DISSOLVED	TOTAL	DISSOLVED	TOTAL	DISSOLVED	
Ranney Well	0.04	0.06	0.01	0.01	0.02	0.035	Average
	0.02-0.06	---	---	---	0.01-0.03	0.03-0.04	Range
Outfall 001	0.26	0.15	0.11*	0.12*	0.37*	0.66*	Average
	0.01-1.8	0.03-0.6	0.01-2.4	0.01-2.3	0.06-28.0	0.01-27.0	Range
Outfall 003	0.03	0.035	0.14	0.14	0.016	0.034	Average
	0.01-0.07	0.01-0.07	0.01-0.03	0.01-0.03	0.01-0.02	0.01-0.06	Range

*Average does not include cadmium or zinc data from July 19, 1982 thru July 22, 1982.

TAB[illegible]

PLANT INFLUENT INTO THE WATER TREATMENT PLANT

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
6/21-22/82	24 Hr. Composite			61.9	8.6	33.4	1.2	.1
6/22-23/82	"			17.8	7.8	10.6	.78	9.3
6/23-24/82	"			17.1	7.4	12.7	.77	14.8
6/24-25/82	"			11.3	8.1	8.3	1.0	13.5
6/25-26/82	"			5.1	7.7	4.9	.8	20.3
6/26-27/82	"			56.5	7.5	29.7	.74	15.1
6/27-28/82	"			29.6	7.4	13.3	.65	2.6
6/28-29/82	"			24.5	7.9	8.4	.86	7.3
6/29-30-82	"			20.1	8.1	10.2	1.60	8.0
6/30/82	"			26.5	8.4	6.5	.70	8.6
7/1-2/82	"			23.5	8.5	4.0	.70	2.5
7/2-3/82	"			25.8	7.5	9.4	1.8	6.3
7/3-4/82	"			23.4	8.2	11.8	2.0	7.8
7/4-5/82	"			27.6	8.5	6.1	1.7	8.4
7/5-6/82	"			90.0	9.1	11.4	.68	12.8
7/6-7/82	"			54.0	8.2	11.4	.80	10.0
7/7-8/82	"			89.8	8.3	24.0	4.0	9.9
7/8-9/82	"			58.7	7.5	31.8	3.3	9.1

TABLE

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
7/9-10/82	24 Hr. Composite			86.2	7.5	30.7	3.4	15.3
7/10-11/82	"			135.3	7.2	63.9	5.6	22.0
7/11-12/82	"			53.3	7.3	20.0	3.0	17.0
7/12-13/82	"			51.1	7.2	27.0	2.3	16.9
7/13-14/82	"			51.7	7.4	28.7	1.8	14.6
7/14-15/82	"			No Sample				
7/15-16/82	"			93.8	7.6	21.8	3.4	23.5
7/19-20/82	"			68.4	5.5	32.0	4.3	72.7
7/20-21/82	"			33.4	4.3	14.9	3.6	65.0
7/21-22/82	"			49.0	5.5	20.4	3.3	65.0
7/22-23/82	"			22.4	6.1	45.0	4.0	36.3
7/29/82	"			No Sample				
7/30-31/82	24 Hr. Composite			39.4	7.0	8.4	.21	12.7
8/5-6/82	"			61.7	6.3	19.3	2.3	38.0
8/6-7/82	"			64.0	6.5	18.0	3.0	26.1
8/9-10/82	"			20.1	7.0	8.1	1.6	9.2
8/10-11/82	"			25.6	7.5	10.1	2.1	11.3
8/11-12/82	"			26.6	7.1	9.8	1.2	8.6
8/13-14/82	"			19.5	7.1	8.2	2.2	6.0

TABLE

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
8/16-17/82	24 Hr. Composite			40.9	6.4	16.0	2.6	37.7
8/17-18/82	"			52.0	7.3	9.6	2.1	20.0
8/18-19/82	"			68.4	7.5	14.0	1.4	19.0
8/19-20/82	"			82.8	7.5	11.0	0.9	17.0
8/20-21/82	"			3.6	6.7	15.6	8.2	38.5
8/21-22/82	"			66.0	5.2	23.1	1.9	60.1
8/22-23/82	"			80.0	5.9	42.1	2.3	53.0
8/23-24/82	"			30.0	5.0	33.2	2.1	59.0
8/26-27/82	"			22.0	8.7	1.8	3.1	31.7
8/27-28/82	"			7.0	7.1	1.9	1.5	20.1
8/30-31/82	"			36.0	6.7	22.0	1.5	39.0
8/31-9/1/82	"			No Sample				

TABLE II

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
6/21-22/82	24 Hr. Composite			14.5	8.5	8.7	1.97	.18	1.5
6/22-23/82	"			No Sample					
6/23-24/82	"			" "					
6/24-25/82	"			" "					
6/25-26/82	"			" "					
6/26-27/82	"			" "					
6/27-28/82	"			" "					
6/28-29/82	"			6.3	7.1	9.3	.82	.09	.58
6/29-30/82	"			4.3	7.6	9.1	.84	.13	.59
6/30/82	"			7.3	8.0	9.0	.95	.10	.67
7/1-2/82	"			4.5	9.4	9.8	.11	.02	.11
7/2-3/82	"			11.7	7.6	9.6	.80	.20	.79
7/3-4/82	"			8.1	8.4	9.0	1.6	.40	.85
7/4-5/82	"			No Sample					
7/5-6/82	"			40.	8.1	9.0	2.8	.55	2.2
7/6-7/82	"			23.8	7.9	9.1	1.9	.28	1.9
7/7-8/82	"			21.4	8.0	9.3	.59	.44	.9
7/8-9/82	"			3.1	7.9	9.3	2.4	.70	1.8

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
7/9-10/82	24 Hr. Composite			27.4	8.2	9.5	.31	.46	2.5
7/10-11/82	"			10.6	7.7	9.3	1.6	.70	1.3
7/11-12/82	"			7.2	8.2	9.4	2.5	.37	1.4
7/12-13/82	"			2.7	7.6	9.3	2.4	.38	1.3
7/13-14/82	"			No Sample					
7/14-15/82	"			12.8	8.3	9.1	1.1	.53	1.0
7/15-16/82	"			13.0	7.6	9.1	1.5	.90	1.4
7/19-20/82	"			23.2	6.9	8.6	4.1	2.0	11.6
7/20-21/82	"			22.8	6.5	8.3	2.7	2.1	33.0
7/21-22/82	"			35.1	6.9	8.7	9.0	1.9	31.0
7/22-23/82	"			4.9	6.9	---	7.0	2.0	11.9
7/29/82	"			No Sample					
7/30-31/82	"			35.9	7.7	8.9	3.7	.2	10.4
8/5-6/82	"			10.8	8.0	9.7	2.5	.03	2.5
8/6-7/82	"			31.0	7.5	9.9	3.8	1.0	4.1
8/9-10/82	"			7.1	8.0	9.7	2.1	.39	2.6
8/10-11/82	"			23.7	9.2	10.1	1.8	.23	1.8
8/11-12/82	"			7.8	8.6	10.0	0.6	.20	1.0
8/13-14/82	"			13.9	7.1	10.5	1.7	.45	2.0
8/16-17/82	"			No Sample					

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
8/17-18/82	24 Hr. Composite			No Sample					
8/18-19/82	"			28.6	7.9	9.6	2.1	.28	3.1
8/19-20/82	"			30.8	8.5	9.9	2.4	.11	2.6
8/20-21/82	"			8.0	7.4	9.8	2.8	1.4	5.0
8/21-22/82	"			54.0	8.7	9.6	8.5	0.9	25.4
8/22-23/82	"			25.0	8.9	10.0	4.8	.67	6.6
8/23-24/82	"			17.0	8.6	9.8	11.3	1.2	35.0
8/26-27/82	"			6.0	8.2	10.0	0.27	.36	3.7
8/27-28/82	"			< 2.0	7.3	9.5	5.6	.86	0.79
8/30-31/82	"			24.0	7.5	9.6	3.7	.45	4.4
8/31-9/1/82	"			No Sample					

TABLE

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
7/9-10/82	24 Hr. Composite			86.2	7.5	30.7	3.4	15.3
7/10-11/82	"			135.3	7.2	63.9	5.6	22.0
7/11-12/82	"			53.3	7.3	20.0	3.0	17.0
7/12-13/82	"			51.1	7.2	27.0	2.3	16.9
7/13-14/82	"			51.7	7.4	28.7	1.8	14.6
7/14-15/82	"			No Sample				
7/15-16/82	"			93.8	7.6	21.8	3.4	23.5
7/19-20/82	"			68.4	5.5	32.0	4.3	72.7
7/20-21/82	"			33.4	4.3	14.9	3.6	65.0
7/21-22/82	"			49.0	5.5	20.4	3.3	65.0
7/22-23/82	"			22.4	6.1	45.0	4.0	36.3
7/29/82	"			No Sample				
7/30-31/82	24 Hr. Composite			39.4	7.0	8.4	.21	12.7
8/5-6/82	"			61.7	6.3	19.3	2.3	38.0
8/6-7/82	"			64.0	6.5	18.0	3.0	26.1
8/9-10/82	"			20.1	7.0	8.1	1.6	9.2
8/10-11/82	"			25.6	7.5	10.1	2.1	11.3
8/11-12/82	"			26.6	7.1	9.8	1.2	8.6
8/13-14/82	"			19.5	7.1	8.2	2.2	6.0

TABLE

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
8/16-17/82	24 Hr. Composite			40.9	6.4	16.0	2.6	37.7
8/17-18/82	"			52.0	7.3	9.6	2.1	20.0
8/18-19/82	"			68.4	7.5	14.0	1.4	19.0
8/19-20/82	"			82.8	7.5	11.0	0.9	17.0
8/20-21/82	"			3.6	6.7	15.6	8.2	38.5
8/21-22/82	"			66.0	5.2	23.1	1.9	60.1
8/22-23/82	"			80.0	5.9	42.1	2.3	53.0
8/23-24/82	"			30.0	5.0	33.2	2.1	59.0
8/26-27/82	"			22.0	8.7	1.8	3.1	31.7
8/27-28/82	"			7.0	7.1	1.9	1.5	20.1
8/30-31/82	"			36.0	6.7	22.0	1.5	39.0
8/31-9/1/82	"			No Sample				

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
7/9-10/82	24 Hr. Composite			27.4	8.2	9.5	.31	.46	2.5
7/10-11/82	"			10.6	7.7	9.3	1.6	.70	1.3
7/11-12/82	"			7.2	8.2	9.4	2.5	.37	1.4
7/12-13/82	"			2.7	7.6	9.3	2.4	.38	1.3
7/13-14/82	"			No Sample					
7/14-15/82	"			12.8	8.3	9.1	1.1	.53	1.0
7/15-16/82	"			13.0	7.6	9.1	1.5	.90	1.4
7/19-20/82	"			23.2	6.9	8.6	4.1	2.0	11.6
7/20-21/82	"			22.8	6.5	8.3	2.7	2.1	33.0
7/21-22/82	"			35.1	6.9	8.7	9.0	1.9	31.0
7/22-23/82	"			4.9	6.9	---	7.0	2.0	11.9
7/29/82	"			No Sample					
7/30-31/82	"			35.9	7.7	8.9	3.7	.2	10.4
8/5-6/82	"			10.8	8.0	9.7	2.5	.03	2.5
8/6-7/82	"			31.0	7.5	9.9	3.8	1.0	4.1
8/9-10/82	"			7.1	8.0	9.7	2.1	.39	2.6
8/10-11/82	"			23.7	9.2	10.1	1.8	.23	1.8
8/11-12/82	"			7.8	8.6	10.0	0.6	.20	1.0
8/13-14/82	"			13.9	7.1	10.5	1.7	.45	2.0
8/16-17/82	"			No Sample					

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
8/17-18/82	24 Hr. Composite			No Sample					
8/18-19/82	"			28.6	7.9	9.6	2.1	.28	3.1
8/19-20/82	"			30.8	8.5	9.9	2.4	.11	2.6
8/20-21/82	"			8.0	7.4	9.8	2.8	1.4	5.0
8/21-22/82	"			54.0	8.7	9.6	8.5	0.9	25.4
8/22-23/82	"			25.0	8.9	10.0	4.8	.67	6.6
8/23-24/82	"			17.0	8.6	9.8	11.3	1.2	35.0
8/26-27/82	"			6.0	8.2	10.0	0.27	.36	3.7
8/27-28/82	"			< 2.0	7.3	9.5	5.6	.86	0.79
8/30-31/82	"			24.0	7.5	9.6	3.7	.45	4.4
8/31-9/1/82	"			No Sample					

TABLE IA

PLANT INFLUENT INTO THE WATER TREATMENT PLANT

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite			236	7.4		40.0	2.5	30.0
9/2-3/82	"			9	6.2		10.8	2.7	33.7
9/3-4/82	"			---	---		39.0	5.0	21.2
9/7-8/82	"			100	7.1		24.1	1.9	34.6
9/9-10/82	"			55	6.2		24.0	1.6	26.9
9/10-11/82	"			70	7.3		18.3	0.9	20.6
9/13-14/82	"			30	7.4		20.1	1.2	25.8
9/14-15/82	"			30	7.3		26.6	3.6	25.1
9/15-16/82	"			41	7.2		66.2	5.7	53.7
9/17-18/82	"			50	7.0		33.1	2.8	32.1
9/18-19/82	"			9	7.5		16.8	1.6	15.7
9/19-20/82	"			84	7.1		20.6	1.4	14.7
9/20-21/82	"			60	7.3		18.0	1.7	11.0
9/21-22/82	"			269	7.0		47.0	3.4	36.0
9/22-23/82	"			136	7.4		22.0	32.0	15.0
9/27-28/82	"			40	7.5		23.8	3.8	26.1
9/28-29/82	"			85	7.5		20.1	3.6	17.0
9/30-10/1/82	"			50	7.7		22.5	3.4	16.3

TABLE IA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
10/8-9/82	24 Hr. Composite			39	6.7		21.7	1.5	64.8
10/11-12/82	"			192	7.1		40.0	1.8	39.0
10/20-21/82	"			100	7.4		24.2	3.7	57.9
11/2-3/82	"			200	6.8		31.0	3.7	39.0
11/9-10/82	"			142	7.3		24.0	2.1	26.0
11/16-17/82	"			19	6.6		29.6	0.3	10.7

TABLE IIA

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite			21	7.3	9.6	2.9	0.2	2.5
9/2-3/82	"			2	7.3	9.2	0.7	0.5	3.0
9/3-4/82	"			70	6.8	9.0	10.8	2.8	16.6
9/7-8/82	"			20	7.3	9.6	2.7	0.5	5.3
9/9-10/82	"			22	7.3	10.5	5.3	0.6	3.7
9/10-11/82	"			30	7.7	9.9	7.9	0.4	4.7
9/13-14/82	"			15	7.7	10.3	8.2	0.4	5.3
9/14-15/82	"			23	8.5	9.9	5.8	0.4	2.2
9/15-16/82	"			4	8.4	10.0	6.6	0.7	3.7
9/17-18/82	"			15	8.0	9.7	5.8	0.4	1.8
9/18-19/82	"			2	8.0	10.3	7.1	0.3	0.6
9/19-20/82	"			17	7.5	9.9	7.0	1.4	4.2
9/20-21/82	"			12	7.9	9.5	9.4	0.6	2.1
9/21-22/82	"			16	7.7	9.5	16.0	0.6	3.1
9/22-23/82	"			32	8.7	10.2	0.2	0.3	0.3
9/27-28/82	"			20	7.8	9.0	1.4	0.5	2.4
9/28-29/82	"			20	8.1	9.5	6.5	0.5	0.4
9/30-10/1/82	"			20	---	---	3.2	0.6	0.5

PLANT DISCHARGE FROM WATER TREATMENT PLANT,

SAMPLING OUTFALL 001 (AFTER LIME, SETTLE, AND FILTER)

	Lead	Cadmium	Zinc		Lead	Cadmium	Zinc
1.	.01	.01	.02	37.	.19	.05	.14
2.	.04	.01	.04	38.	.19	.06	.15
3.	.05	.01	.04	39.	.19	.07	.15
4.	.05	.01	.05	40.	.19	.08	.15
5.	.06	.02	.05	41.	.19	.08	.15
6.	.07	.02	.05	42.	.19	.08	.15
7.	.07	.02	.06	43.	.20	.09	.16
8.	.08	.02	.06	44.	.20	.09	.16
9.	.08	.02	.08	45.	.20	.10	.16
10.	.09	.02	.08	46.	.20	.10	.17
11.	.10	.02	.08	47.	.20	.11	.17
12.	.10	.02	.08	48.	.20	.11	.18
13.	.10	.02	.08	49.	.21	.12	.19
14.	.10	.02	.08	50.	.22	.12	.23
15.	.10	.03	.09	51.	.23	.12	.23
16.	.11	.03	.09	52.	.25	.13	.29
17.	.11	.03	.09	53.	.27	.14	.32
18.	.11	.03	.09	54.	.29	.14	.34
19.	.12	.03	.10	55.	.31	.14	.35
20.	.12	.03	.10	56.	.32	.14	.40
21.	.12	.03	.10	57.	.33	.15	.45
22.	.13	.03	.10	58.	.34	.15	.49
23.	.13	.03	.10	59.	.34	.18	.60
24.	.13	.04	.10	60.	.37	.20	.68
25.	.15	.04	.10	61.	.37	.22	.69
26.	.16	.04	.10	62.	.40	.24	.70
27.	.16	.04	.10	63.	.40	.24	1.0
28.	.16	.04	.10	64.	.42	.34	1.6
29.	.17	.05	.11	65.	.44	.40	1.6
30.	.17	.05	.11	66.	.45	.90	1.7
31.	.17	.05	.11	67.	.55	.90	1.8
32.	.17	.05	.11	68.	.66	1.0	3.3
33.	.17	.05	.12	69.	.68	1.3	7.8
34.	.18	.05	.13	70.	1.1	1.5	12.5
35.	.18	.05	.13	71.	1.3	1.9	16.0
36.	.19	.05	.13	72.	1.8	2.4	28.0

TABLE I

WASTEWATER TREATMENT PLANT EFFLUENT

DATE	MILLIGRAMS/LITER LEAD	MILLIGRAMS/LITER SUSPENDED SOLIDS	UNITS pH
05/06/80	0.07	2	8.4
05/13/80	0.13	2	7.6
05/20/80	0.005	41	8.5
06/10/80	0.005	49*	8.6
06/17/80	0.05	5	8.0
06/25/80	0.05	32	8.9
07/01/80	0.03	7	8.3
07/08/80	0.01	4	8.6
07/22/80	0.07	7	8.0
08/05/80	0.86	10	6.3
08/19/80	0.06	0	7.4
09/02/80	0.10	8	10.0
09/09/80	0.22	0	10.2
09/16/80	0.25	1	10.3
09/30/80	0.25	5	8.5
10/07/80	0.03	0	9.6
10/14/80	0.25	6	9.3
10/21/80	0.05	3	9.4
10/[illegible]	0.08	7	8.7
11/04/80	1.8*	9	10.3
11/12/80	0.03	2	9.1
11/18/80	0.25	1	7.5
11/25/80	0.10	27	9.0
12/02/80	0.25	4	10.3
12/09/80	0.10	5	9.3
12/16/80	0.05	8	9.4
12/29/80	0.03	5	8.9
01/13/81	0.50	8	9.4
01/20/81	0.08	5	9.0
01/27/81	0.10	11	9.2
MEAN	0.14	8	8.9

* Value lies outside three standard deviations of the mean based on the whole data set.

TABLE

SUMMARY OF WATER DATA FROM JANUARY 1, 1982 THRU AUGUST 12, 1982

LOCATION	HEAVY METALS (MILLIGRAMS/LITER)						CALCULATION
	LEAD		CADMIUM		ZINC		
	TOTAL	DISSOLVED	TOTAL	DISSOLVED	TOTAL	DISSOLVED	
Ranney Well	0.04	0.06	0.01	0.01	0.02	0.035	Average
	0.02-0.06	---	---	---	0.01-0.03	0.03-0.04	Range
Outfall 001	0.26	0.15	0.11*	0.12*	0.37*	0.66*	Average
	0.01-1.8	0.03-0.6	0.01-2.4	0.01-2.3	0.06-28.0	0.01-27.0	Range
Outfall 003	0.03	0.035	0.14	0.14	0.016	0.034	Average
	0.01-0.07	0.01-0.07	0.01-0.03	0.01-0.03	0.01-0.02	0.01-0.06	Range

*Average does not include cadmium or zinc data from July 19, 1982 thru July 22, 1982.

TABLE

AVERAGE POUNDS PER DAY DISCHARGED TO THE MISSISSIPPI RIVER FROM OUTFALL 001

LOCATION	HEAVY METALS	LEAD	CADMIUM*	ZINC*
	Total	1.94	1.71	12.14
Outfall 001	Dissolved	1.12	1.79	13.11

*Analytical results slightly higher for dissolved heavy metals.

TABLE

WATER SAMPLING SUMMARY OF DATA (JANUARY 1, 1982 THRU AUGUST 12, 1982)

LOCATION	AVERAGE TEMPERATURE (°F)	FLOW (GALLONS PER MINUTE)	pH (UNITS)	CONDUCTIVITY (UMHOS)	CALCULATION
			7.63	450	Average
Mississippi River			7.2 - 8.2	450*	Range
			7.5	788	Average
Ranney Well			7.3 - 7.6	775 - 800	Range
	87	618	7.6	1460	Average
Outfall 001	71 - 118	8 - 900	1.8 - 9.7	1000 - 4250	Range
	74	1001	7.9	781	Average
Outfall 003	74*	969 - 1032	7.6 - 8.1	750 - 850	Range

*One result only.

TABLE [illegible]

PLANT DISCHARGE FROM WATER TREATMENT PLANT, SAMPLING OUTFALL 001, FOR MISSOURI DEPARTMENT OF NATURAL RESOURCES
(AFTER LIME, SETTLE, AND FILTER)

PLANT STATUS	DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS)	HEAVY METALS ANALYSIS (MILLIGRAMS/LITER) TOTAL LEAD	CADMIUM	ZINC
.P. Operated 4 Hrs. .P. Down	6/21-22/82	24 Hr. Composite			3.0	7.6	0.07	.05	.09
.P. Operating .P. Down	6/22-23/82	"			1.6	7.8	0.19	.08	.12
.P. Operated 4 Hrs. .P. DOWN	6/23-24/82	"		840	1.0	7.5	0.19	.12	.16
.P. Operated 17 Hrs. .P. Down	6/24-25/82	"		900	0.9	9.5	0.22	.04	.11
.P. Operating .P. Down	6/25-26/82	"		840	3.0	9.1	0.37	.03	.23
.P. Operating .P. Down	6/26-27/82	"		720	6.5	6.3	0.37	.02	.19
.P. Operating .P. Down	6/27-28/82	"		780	1.5	7.4	0.19	.02	.09
.P. Operated 12 Hrs. .P. Down	6/28-29/82	"		720	5.0	6.7	0.21	.01	.06
.P. Operated 16 Hrs. .P. Down	6/29-30/82	"		720	2.1	7.6	0.11	.02	.15
.P. Operating .P. Down	6/30/82	"	96	690	1.0	7.5	0.08	.02	.10
.P. Operated 18 Hrs. .P. Down	7/1-2/82	"		540	2.1	8.7	0.06	.02	.09
.P. Operating .P. Down	7/2-3/82	"		94	2.7	7.8	0.17	.12	.16
.P. Operating .P. Down	7/3-4/82	"		600	3.2	8.2	0.07	.03	.17
.P. Operated 19 Hrs. .P. Down	7/4-5/82	"		600	0.4	8.2	0.13	.03	.13
.P. Operating .P. Down	7/5-6/82	"			<2.0	8.0	0.12	.02	.10
.P. Operated 20 Hrs. .P. Recycle	7/6-7/82	"			<2.0	7.7	0.10	.04	.10
.P. Operated 18 Hrs. .P. Recycle	7/7-8/82	"		660	3.0	7.1	0.09	.05	.60
.P. Operating .P. Operated 14 Hrs.	7/8-9/82	"			1.1	7.9	0.08	.03	.15

TABLE IIIA

PLANT DISCHARGE FROM WATER TREATMENT PLANT, SAMPLING OUTFALL 001 (AFTER LIME, SETTLE, AND FILTER)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite		868	3.2	6.7		0.19	0.03	0.13
9/2-3/82	"		783	<2.0	7.3		0.04	0.04	0.18
9/3-4/82	"		760	8.0	6.8		0.68	1.90	12.50
9/7-8/82	"		823	10.0	7.4		0.17	0.18	0.35
9/9-10/82	"		872	5.0	7.3		0.20	0.14	0.08
9/10-11/82	"		792	10.0	7.6		0.20	0.08	0.08
9/13-14/82	"		807	5.0	7.6		0.20	0.09	0.11
9/14-15/82	"		781	<2.0	8.7		0.18	0.01	0.04
9/15-16/82	"		772	<2.0	7.4		0.12	0.02	0.02
9/17-18/82	"		840	4.0	7.6		0.10	0.05	0.06
9/18-19/82	"		903	<2.0	7.9		0.05	0.03	0.04
9/19-20/82	"		931	<2.0	7.4		0.44	1.00	1.80
9/20-21/82	"		776	<1.0	7.4		0.34	0.34	0.40
9/21-22/82	"		771	<2.0	7.4		0.23	0.14	0.10
9/22-23/82	"		723	<2.0	7.9		0.11	0.05	0.05
9/27-28/82	"		719	----	---		----	----	----
9/28-29/82	"		737	2.0	7.9		0.19	0.14	0.05
9/30-10/1/82	"		715	5.0	8.3		0.16	0.14	0.08

TABLE IIIA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
10/8-9/82	24 Hr. Composite		757	<2.0	7.5		0.66	0.02	0.34
10/11-12/82	"		908	<2.0	9.0		1.30	0.01	0.10
10/20-21/82	"		664	2.0	8.0		0.19	0.15	0.16
11/2-3/82	"		616	4.0	7.4		0.10	0.05	0.08
11/9-10/82	"		628	2.0	9.0		0.17	0.05	0.05
11/16-17/82	"		666	<2.0	7.4		0.40	0.10	0.68

CONFIDENTIAL INFORMATION

ST. JOE LEAD COMPANY — LEAD SMELTING DIVISION — HERCCULANEUM, MISSOURI

RECORD TYPE	DATE DAY	TIME HOUR	WIND SPEED (M/SS) AVG	WIND SPEED (M/SS) STD	LEVEL 1 DIRECT (DEG) AVG	LEVEL 1 DIRECT (DEG) STD	TEMP (C) AVG	LEVEL 2 SPEED AVG	LEVEL 2 SPEED STD	LEVEL 2 DIRECT (DEEG) AVG	LEVEL 2 DIRECT (DEEG) STD	TEMP (C) AVG	SO2-1 (PPM) AVG	SO2-2 (PPM) AVG	SO2-3 (PPM) AVG	SO2-4 (PPM) AVG
MI	000	16:00	6.4	1.9	2833.	14.	+ .0	4.0	1.9	290.	28.	+ 10.3	.02	.03	.01	.00
HR	000	16:00	6.4	1.5	283.	14.	+ .0	4.0	1.9	290.	28.	+ 10.3	.02	.03	.01	.00
MI	000	17:00	6.7	1.2	287.	7.	- .1	3.9	1.4	293.	19.	+ 9.4	.02	.04	.02	.00
HR	000	17:00	6.7	1.2	287.	7.	- .1	3.9	1.4	293.	19.	+ 9.4	.02	.04	.02	.00
MI	000	18:00	5.1	.9	294.	8.	- .4	2.7	.9	300.	19.	+ 8.0	.02	.03	.02	.01
HR	000	18:00	5.1	.9	294.	8.	- .4	2.7	.9	300.	119.	+ 8.0	.02	.03	.02	.01
3HR	000	18:00	6.0	1.6	288.	10.	- .2	3.5	1.6	295.	22.	+ 9.1	.02	.03	.02	.00
MI	000	19:00	4.5	.8	297.	9.	- .3	2.5	.8	301.	20.	+ 7.7	.02	.03	.00	.00
HR	000	19:00	4.5	.8	297.	9.	- .3	2.5	.8	301.	20.	+ 7.7	.02	.03	.00	.00
MI	000	20:00	5.6	1.2	151.	167.	- .1	3.8	1.6	350.	105.	+ 5.8	.02	.03	.01	.00
HR	000	20:00	5.6	1.2	151.	167.	- .1	3.8	1.6	350.	105.	+ 5.8	.02	.03	.01	.00
MI	000	21:00	7.2	1.33	179.	235.	- .1	4.6	1.2	12.	24.	+ 3.7	.02	.03	.02	.00
HR	000	21:00	7.2	1.3	179.	235.	- .1	4.6	1.2	12.	24.	+ 3.7	.02	.03	.02	.00
3HR	000	21:00	5.8	1.8	209.	203.	- .2	3.6	1.7	341.	90.	+ 5.7	.02	.03	.01	.00
MI	000	22:00	6.0	2.1	316.	21.	- .1	3.9	1.7	350.	19.	+ 3.6	.02	.03	.03	.01
HR	000	22:00	6.0	2.1	316.	21.	- .1	3.9	1.7	350.	19.	+ 3.6	.02	.03	.03	.01
MI	000	23:00	4.0	.9	324.	24.	- .1	2.6	.9	334.	18.	+ 3.3	.02	.04	.03	.01
HR	000	23:00	4.0	.9	324.	24.	- .11	2.6	.9	3344.	18.	+ 3.3	.02	.04	.03	.01
MI	001	24:00	3.4	.99	2661.	150.	- .1	2.1	.7	350.	48.	+ 2.9	.02	.04	.03	.01
HR	001	24:00	3.4	.9	261.	150.	.1	2.1	.7	350.	48.	+ 2.9	.02	.04	.03	.01
3HR	001	24:00	4.5	2.0	300.	100.	.1	2.9	1.4	344.	30.	+ 3.3	.02	.04	.03	.01
DA	001	24:00	5.4	2.1	265.	195.	.1	3.33	1.6	328.	71.	+ 6.0	.02	.03	.02	.00
MI	001	01:00	3.9	1.0	315.	20.	.0	2.5	.8	351.	18.	+ 2.3	.02	.04	.03	.01
HR	001	01:00	3.9	1.0	315.	20.	- .0	2.5	.8	351.	18.	+ 2.3	.02	.04	.03	.01
MI	001	02:00	4.7	.9	320.	20.	.0	3.0	1.0	332.	21.	+ 2.2	.02	.03	.03	.01
HR	001	02:00	4.7	.9	320.	20.	- .00	3.0	1.0	332.	21.	+ 2.2	.02	.03	.03	.01
MI	001	03:00	4.1	1.0	313.	21.	.0	2.5	1.0	323.	20.	+ 1.8	.02	.03	.03	.01
HR	001	03:00	4.1	1.0	313.	21.	- .0	2.5	1.0	323.	20.	+ 1.8	.002	.03	.03	.01
3HR	001	03:00	4.2	1.0	316.	140.	- .0	2.7	1.0	335.	25.	+ 2.1	.02	.03	.03	.01
MI	001	04:00	6.0	1.7	303.	115.	- .0	3.6	1.5	310.	25.	+ 1.2	.02	.02	.02	.01
HR	001	04:00	6.0	1.7	303.	15.	.0	3.6	1.5	310.	25.	+ 1.2	.02	.02	.02	.01
MI	001	05:00	4.8	1.5	308.	11.	- .0	3.0	1.3	316.	22.	+ 1.0	.02	.02	.03	.01
HR	001	05:00	4.8	1.5	308.	11.	.0	3.0	1.3	316.	22.	+ 1.0	.02	.02	.03	.01
MI	001	06:00	3.2	.8	309.	16.	- .0	1.9	.8	315.	27.	+ 1.0	.02	.03	.03	.01
HR	001	06:00	3.2	.8	309.	16.	.0	1.99	.8	315.	27.	+ 1.0	.02	.03	.03	.01
3HR	001	06:00	4.6	2.1	307.	13.	.0	2.8	1.5	313.	24.	+ 1.0	.02	.02	.03	.01
MI	001	07:00	2.7	.4	272.	7.	- .1	1.5	.4	274.	13.	+ 1.1	.02	.03	.03	.01
HR	001	07:00	2.7	.4	272.	7.	- .1	11.5	.4	274.	13.	+ 1.1	.02	.03	.03	.01

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ST. JOE LEEAD COMPANY — LEAD SMELTING DIVISION — HERCULANEEUN, MISSOURI

RECORD TYPE	DDATE DAY	TIME HOUR	WIND SPPEED AVG	WIND (M/S) STD	LEVEL 1 DIRECT AVG	LEVEL 1 (DEG) STD	TEMP (C) AVG	WIND SPEED AAVG	WIND (M/S) STD	LEVEL 2 DIRECT AVG	LEVEL 2 (DEG) STD	TEMP (C) AVG	SO2-1 (PPM) AVG	SO2-2 (PPMM) AVG	SO2-3 (PPM) AVG	SO2-4 (PPM) AVG
HR	366	08:00	6.0	.8	279.	5.	- .4	3.3	1.0	287.	15.	+ 2.1	.01	.04	.00	.01
MI	366	09:00	7.3	1.3	276.	7.	- .0	4.8	1.6	2822.	16.	+ 2.6	.01	.04	.00	.01
HR	366	09:00	7.3	1.3	276.	7.	- .0	4.8	1.6	282.	16.	+ 2.6	.01	.04	.00	.01
3HR	366	09:00	66.4	1.2	277.	3.	- .4	3.88	1.44	283.	13.	+ 2.4	.01	.04	.00	.01
MI	366	10:00	6.1	1.1	277.	7.	+ .0	4.1	1.5	283.	17.	+ 3.8	.02	.03	.04	.00
HR	366	10:00	6.1	1.1	277.	7.	+ .0	4.1	1.5	283.	17.	+ 3.8	.02	.03	.04	.00
MI	366	11:00	5.7	1.2	277.	9.	+ .1	4.0	1.7	283.	20.	+ 5.5	.15	.00	.00	.01
HR	366	11:00	5.7	1.2	277.	9.	+ .1	4.0	1.7	283.	20.	+ 5.5	.15	.00	.00	.01
MI	366	12:00	6.3	1.6	277.	10.	+ .2	4.3	1.9	282.	25.	+ 7.2	.25	.08	.11	.10
HR	366	12:00	6.33	1.6	277.	10.	+ .2	4.3	1.9	282.	25.	+ 7.2	.25	.08	.11	.10
3HR	366	12:00	6.0	1.3	277.	8.	+ .1	4.1	1.77	282.	20.	+ 5.5	.12	.01	.05	.04
MI	366	13:00	6.6	1.2	278.	10.	+ .3	4.5	1.6	284.	22.	+ 8.8	.03	.03	.01	.00
HR	366	13:00	6.6	1.2	278.	10.	+ .3	4.5	1.6	284.	22.	+ 8.8	.03	.03	.01	.00
MI	366	14:00	6.4	1.4	278.	11.	+ .3	4.5	1.8	282.	23.	+ 10.0	.02	.03	.01	.00
HR	366	14:00	6.4	1.4	278.	11.	+ .3	4.5	1.8	282.	23.	+ 10.0	.02	.03	.01	.00
MI	366	15:00	5.9	1.8	285.	11.	+ .1	3.8	1.7	290.	25.	+ 10.1	.02	.03	.02	.00
HR	366	15:00	5.9	1.8	285.	11.	+ .1	3.8	1.7	290.	25.	+ 10.1	.02	.03	.02	.00
3HR	366	15:00	6.3	1.5	281.	10.	+ .2	4.3	1.8	285.	23.	+ 9.6	.03	.03	.01	.00
~~MI~~	~~000~~	~~15:15~~	~~5.0~~	~~.4~~	~~287.~~	~~18.~~	~~+ .1~~	~~1.5~~	~~.0~~	~~290.~~	~~7.~~	~~+ 10.4~~	~~.03~~	~~.00~~	~~.05~~	~~.01~~
MI	000	15:15	6.2	.0	279.	.	+ .1	2.0	.0	276.	.	+ 10.4	.07	.08	.02	.04
~~MI~~	~~000~~	~~15:16~~	~~7.2~~	~~.0~~	~~280.~~	~~.~~	~~+ .2~~	~~4.0~~	~~.0~~	~~284.~~	~~.~~	~~+ 10.4~~	~~.07~~	~~.07~~	~~.03~~	~~.05~~

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: Duane DeClue

November 2, 1982

From: James M. Lanzafame

Subject: Report of Biweekly Inspection of Plant Water Circuit Components

On November 1, 1982, Dan Vornberg, Duane DeClue, and I made a plant water inspection tour. Our first and probably most important stop was the flux building pump. At 9:15 a.m., the pump was functioning in a proper manner with a rate of approximately 530 gpm.

Prior to meeting Dan and Duane, I had checked the Steven's flow meter at Outfall 002 weir. The Steven's strip chart indicated that there had been a discharge from Outfall 002 during the period from 4:00 p.m. Sunday to 8:00 a.m. Monday. Later Monday afternoon, John Bonner explained to me that one of the switches controlling the 0-500 gpm circuit of the pump had been turned off. The 500-1000 gpm circuit was dependent on the 0-500 gpm circuit being in the "On" position. He also informed me that this interdependence of circuits has been corrected. The pump will now operate either in the 0-500 or 500-1000 gpm range independent of the other circuit.

We then inspected our Outfalls 001, 002, and 003 to the river. Outfalls 002 and 003 were functioning in a normal manner. It was noted that several possible problems exist within close proximity to Outfall 001. They are as follows:

1. West of Outfall 001, there appears to be matte stored on concrete without proper drainage.
2. East of Outfall 001, there is some material that seems to have originated from the dross furnace rebuild, contaminated bricks and dross furnace slag.
3. East southeast of Outfall 001, there is a large pile of Outfall 002 lake mud waiting for recycle, without proper drainage.
4. East of Outfall 001 are three electrical transformers. They are located very near Outfall 001 and the Mississippi River.
5. Several "oil" drums were observed to the south of Outfall 001.

All of the above items contribute to a negative appearance.

Outfalls A and B were not discharging. Dan questioned the absence of the lime rock in the first two chambers of the sump located east of the refinery parking lot. Tom Johnston does not feel that lime rock in this area is a high-priority item.

The acid plant lime pit seemed to be fully operational. We will have to become more familiar with the pumping systems before evaluating this area.

Nos. 2 and 3 baghouse washing pit was overflowing to the industrial drain rather than being pumped to the sinter plant thickener circuit.

The old sinter plant thickener had a rather large flow of plant water to the overflow. We couldn't see any apparent need for this extra water flow. Dan said that he would try to find out the reason(s) for this flow.

The automatic valve from the Ranney Well was operating normally.

The make-up valve from the acid plant was closed while we were at the cold water pond.

On our way to the wastewater treatment plant, we inspected the T-valve that splits the flow to the river or to the cold water pond. Recent work at the valve showed that the line going to the cold water pond had been sealed.

Everything seemed to be functioning properly at the wastewater treatment plant (WWTP).

Attachment I is the form used for plant water inspections.

James M. Langstone
Environmental Technician

JML/bb

cc: D. L. Vornberg

ATTACHME[illegible]
PLANT WATER INS[illegible]TION, NOVEMBER 1, 1982

OCATION	TIME	SATISFACTORILY	UNSATISFACTORILY	REPAIR CONTACT	GENERAL COMMENTS
cid Plant Lime Pit		X			
utfalls A and B		X			
o 2&3 Baghouse ash Water Pit		X			
efinery Pump		X			
lux Building Pump		530 gpm X			
ross Plant Sanitary Pump		X			
verflow Standpipe		X			
ooling Tower			X		Down
last Furnace Pump Sta.		X			
old Water Pond Valve From WWTP		?	?		Valve has been modified to make delivery of water to pond impossible.
General WWTP Conditions, Lime Silo, RC, ETC		X			
Outfall 001		X			Has some minor appearance problems; transforme dross furnace debris, barrels, matte on undrai ed storage pad.
Outfall 002	9:40	1" 6 gpm			
Outfall 003	9:41	7½" 365 gpm			
					High flow of plant water through old sinter plant thickener. Why?

ST. JOE LEAD COMPANY
WASTE WATER TREATMENT PLANT
6 Inch Parshall Flume Capacity

12/13/78
A E S

FLOW (Gal./Min.)	HEAD (Inch)
100	2.94 = 2 29/32
200	4.55 = 4 17/32
300	5.88 = 5 7/8
400	7.06 = 8 1/16
500	8.13 = 8 1/8
600	9.13 = 9 1/8
700	10.1 = 10 1/16
800	10.09 = 10 15/16
850	11.4 = 11 3/8

1.300 Herculaneum
St. Joe Lead Company

MO-0000281

November 12, 1982

Mr. Daniel L. Vornberg
Environmental Manager
St. Joe Lead Company
881 Main Street
Herculaneum, Missouri 63048

Dear Mr. Vornberg:

Enclosed are copies of reports on compliance monitoring of the effluent discharges from outfalls 001 and 003 at the St. Joe Lead Company Herculaneum Smelter. Sampling was performed and analyses initiated by Missouri Department of Natural Resources personnel August 9 through August 12, 1982. Also enclosed are reports on analyses of two grab samples of the raw water supply from the plant's Ranney well collected on August 10 and August 11.

I believe the results are self explanatory. If you have any questions, please contact me.

Sincerely,

Bob Zeman

Bob Zeman, P.E.
Chief, Water Enforcement and Permits
St. Louis Regional Office

BZ/jk

cc Central Office, Compliance Section
Central Office, Permit Section

MISSOURI DEPARTMENT OF NATURAL RESOURCES
8460 Watson Road St. Louis, Missouri 63119 (314) 849-1313

Christopher S. Bond Governor
Fred A. Lafser Director
St. Louis Regional Office

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

SAMPLE NO. 82-9505

Reported to Don Maddox, Regional Administrator *Date* 10-21-82

Affiliation St. Louis Regional Office

Sample Description Outfall #001 of St. Joe Lead Co. Effluent from process treatment plant. 24 hr. comp.

Collected By John Davis *Date* 8-10-82

Affiliation St. Louis Regional Office

Remarks

PARAMETERS	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	690	mg/l	
pH	6.9	units	field
Sp. Conductance	790	umho/cm 25 °C	field
N. F. Residue	<1	mg/l	*
Cadmium, Diss.	30	ug/l	
Cadmium, Total	30	ug/l	
Copper, Diss.	6	ug/l	
Copper, Total	< 5	ug/l	
Iron, Diss.	< 20	ug/l	
Iron, Total	70	ug/l	
Lead, Diss.	42	ug/l	
Lead, Total	100	ug/l	
Zinc, Diss.	60	ug/l	
Zinc, Total	100	ug/l	
Sodium, Diss.	100	mg/l	
Sodium, Total	110	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

SAMPLE NO. 82-9504

Reported to Don Maddox, Regional Administrator *Date* 11-1-82

Affiliation St. Louis Regional Office

Sample Description Outfall #003 of St. Joe Lead Co., Herculaneum, Missouri - Non-contact H_2O

Collected By John W. Davis *Date* 8-10-82

Affiliation St. Louis Regional Office

Remarks 24 hour composite

PARAMETERS	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	180	mg/l	
pH	7.2	units	field
Sp. Conductance	540	umho/cm 25°C	field
N. F. Residue	3	mg/l	*
Cadmium, Diss.	<2	ug/l	
Cadmium, Total	2	ug/l	
Copper, Diss.	<5	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	< 20	ug/l	
Iron, Total	1500	ug/l	
Lead, Diss.	10	ug/l	
Lead, Total	20	ug/l	
Zinc, Diss.	< 10	ug/l	
Zinc, Total	10	ug/l	
Sodium, Diss.	42	mg/l	
Sodium, Total	43	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

REPORT OF SAMPLE ANALYSIS

SAMPLE NO. 82-9506

Reported to Don Maddox, Regional Administrator Date 10-21-82

Affiliation St. Louis Regional Office

Sample Description Incoming water from well serving St. Joe Lead
Grab sample

Collected By John Davis Date 8-10-82

Affiliation St. Louis Regional Office

Remarks

PARAMETERS	RESULTS	UNITS	REMARKS
Sulfate	183	mg/l	
pH	7.0	units	field
Sp. Conductance	510	umho/cm 25°C	field
Temperature	21	°C	field
N. F. Residue	3	mg/l	*
Cadmium, Diss.	<2	ug/l	
Cadmium, Total	<2	ug/l	
Copper, Diss.	<5	ug/l	
Copper, Total	11	ug/l	
Iron, Diss.	1800	ug/l	
Iron, Total	2300	ug/l	
Lead, Diss.	<5	ug/l	
Lead, Total	8	ug/l	
Zinc, Diss.	<10	ug/l	
Zinc, Total	10	ug/l	
Sodium, Diss.	42	mg/l	
Sodium, Total	43	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

MISSOURI DEPARTMENT OF NATURAL RESOURCES
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LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

SAMPLE NO. 82-9509

Reported to Don Maddox, Regional Administrator *Date* 10-21-82

Affiliation St. Louis Regional Office

Sample Description Outfall 001 St. Joe Lead Process wastewater plant effluent - 24 hr. comp.

Collected By John Davis *Date* 8-11-82

Affiliation St. Louis Regional Office

Remarks

PARAMETERS	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	590	mg/l	
pH	9.7	units	field
Sp. Conductance	1500	umho/cm 25 °C	field
N. F. Residue	<1	mg/l	*
Cadmium, Diss.	4	ug/l	
Cadmium, Total	20	ug/l	
Copper, Diss.	5	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	<20	ug/l	
Iron, Total	40	ug/l	
Lead, Diss.	160	ug/l	
Lead, Total	380	ug/l	
Zinc, Diss.	<10	ug/l	
Zinc, Total	100	ug/l	
Sodium, Diss.	96	mg/l	
Sodium, Total	98	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 1368 2010 Missouri Blvd. Jefferson City, Missouri 65102 (314) 751-3241

LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

SAMPLE NO. 82-9507

Reported to Don Maddox, Regional Administrator *Date* 10-21-82

Affiliation St. Louis Regional Office

Sample Description Outfall #003, St. Joe Lead Co. Non-contact cooling water discharge - 24 hr. comp.

Collected By John Davis *Date* 8-11-82

Affiliation St. Louis Regional Office

Remarks

PARAMETERS	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	189	mg/l	
pH	6.8	units	field
Sp. Conductance	460	umho/cm 25 °C	field
N. F. Residue	2	mg/l	*
Cadmium, Diss.	<2	ug/l	
Cadmium, Total	<2	ug/l	
Copper, Diss.	<5	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	<20	ug/l	
Iron, Total	1000	ug/l	
Lead, Diss.	<5	ug/l	
Lead, Total	<5	ug/l	
Zinc, Diss.	<10	ug/l	
Zinc, Total	10	ug/l	
Sodium, Diss.	43	mg/l	
Sodium, Total	43	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

RECEIVED
OCT 15 1982

SAMPLE NO. 82-9508

Reported to Don Maddox, Regional Administrator Date S L R O 10-12-82

Affiliation St. Louis Regional Office

Sample Description Plant intake of well water - grab

Collected by John Davis Date 8-11-82

Affiliation St. Louis Regional Office

Remarks

PARAMETER	RESULTS	UNITS	REMARKS
Sulfate	183	mg/l	
pH	7.2	units	field
Sp. Conductance	680	umho/cm 25°C	field
Temperature	22	°C	field
N. F. Residue	3	mg/l	*
Cadmium, Diss.	<2	ug/l	
Cadmium, Total	<2	ug/l	
Copper, Diss.	<5	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	1900	ug/l	
Iron, Total	2300	ug/l	
Lead, Diss.	10	ug/l	
Lead, Total	6	ug/l	
Zinc, Diss.	<10	ug/l	
Zinc, Total	10	ug/l	
Sodium, Diss.	42	mg/l	
Sodium, Total	43	mg/l	

* Exceeded holding time/Log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

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LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

RECEIVED
OCT 15 1982
SLRO

SAMPLE NO. 82-9511

Reported to Don Maddox, Regional Administrator *Date* 10-12-82

Affiliation St. Louis Regional Office

Sample Description Outfall #001, St. Joe Lead, effluent from process pit

Collected by John Davis *Date* 8-12-82

Affiliation St. Louis Regional Office

Remarks 24-hour composite Plant well intake not pumping

PARAMETER	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	550	mg/l	
pH	8.9	units	comp. (field)
pH	8.5	units	grab (field)
Sp. Conductance	1200	umho/cm 25°C	(field)
Temperature	42.5	°C	grab (field)
N. F. Residue	<1	mg/l	*
Cadmium, Diss.	10	ug/l	
Cadmium, Total	12	ug/l	
Copper, Diss.	6	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	<20	ug/l	
Iron, Total	40	ug/l	
Lead, Diss.	28	ug/l	
Lead, Total	57	ug/l	
Zinc, Diss.	30	ug/l	
Zinc, Total	60	ug/l	
Sodium, Diss.	88	mg/l	
Sodium, Total	88	mg/l	

* Exceeded holding time/log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

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LABORATORY SERVICES PROGRAM
REPORT OF SAMPLE ANALYSIS

OCT 15 1982

SLRO

SAMPLE NO. 82-9510

Reported to Don Maddox, Regional Administrator *Date* 10-12-82

Affiliation St. Louis Regional Office

Sample Description Outfall #003 St. Joe Lead Non-contact cooling discharge

Collected by John Davis *Date* 8-12-82

Affiliation St. Louis Regional Office

Remarks 24-hour composite

PARAMETER	*RESULTS*	*UNITS*	*REMARKS*
Sulfate	183	mg/l	
pH	7.2	units	comp. (field)
pH	7.4	units	grab (field)
Sp. Conductance	800	umho/cm 25°C	Comp. (field)
Temperature	22.4	°C	grab (field)
N. F. Residue	<1	mg/l	*
Cadmium, Diss.	<2	ug/l	
Cadmium, Total	<2	ug/l	
Copper, Diss.	<5	ug/l	
Copper, Total	<5	ug/l	
Iron, Diss.	<20	ug/l	
Iron, Total	490	ug/l	
Lead, Diss.	<5	ug/l	
Lead, Total	<5	ug/l	
Zinc, Diss.	<10	ug/l	
Zinc, Total	10	ug/l	
Sodium, Diss.	41	mg/l	
Sodium, Total	42	mg/l	

* Exceeded holding time/log error

The analysis of this sample was performed in accordance with procedures as outlined in the latest edition of Standard Methods for the Examination of Water and Wastewater, EPA Manual of Methods for Chemical Analysis of Water and Wastes, and/or Annual Book of ASTM Standards.

James H. Long

James H. Long, Director
Laboratory Services Program
Division of Environmental Quality

JHL/sk

cc: Jim Penfold, WPCP

TABLE I

WASTEWATER TREATMENT PLANT EFFLUENT

DATE	MILLIGRAMS/LITER LEAD	MILLIGRAMS/LITER SUSPENDED SOLIDS	UNITS pH
05/06/80	0.07	2	8.4
05/13/80	0.13	2	7.6
05/20/80	0.005	41	8.5
06/10/80	0.005	49*	8.6
06/17/80	0.05	5	8.0
06/25/80	0.05	32	8.9
07/01/80	0.03	7	8.3
07/08/80	0.01	4	8.6
07/22/80	0.07	7	8.0
08/05/80	0.86	10	6.3
08/19/80	0.06	0	7.4
09/02/80	0.10	8	10.0
09/09/80	0.22	0	10.2
09/16/80	0.25	1	10.3
09/30/80	0.25	5	8.5
10/07/80	0.03	0	9.6
10/14/80	0.25	6	9.3
10/21/80	0.05	3	9.4
10/28/80	0.08	7	8.7
11/04/80	1.8*	9	10.3
11/12/80	0.03	2	9.1
11/18/80	0.25	1	7.5
11/25/80	0.10	27	9.0
12/02/80	0.25	4	10.3
12/09/80	0.10	5	9.3
12/16/80	0.05	8	9.4
12/29/80	0.03	5	8.9
01/13/81	0.50	8	9.4
01/20/81	0.08	5	9.0
01/27/81	0.10	11	9.2
MEAN	0.14	8	8.9

* Value lies outside three standard deviations of the mean based on the whole data set.

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: Duane DeClue

November 15, 1982

From: James M. Lanzafame

Subject: Report of Biweekly Inspection of Plant Water Circuit Components

On November 15, 1982, I made my biweekly plant water inspection. I will cover only the points that are in need of attention. Attachment 1 is an expanded check list of the areas covered.

The Dross Furnace sanitary lift pump is not operating. I reported this condition to the Maintenance Department two weeks ago. Some work has been done on the pump; however, it is still not functioning.

The drainage ditch that used to carry the flows from "A" and "B" contained a considerable amount of oil, although "A" and "B" pipes were absolutely dry. It was noted, however, that the city's stormwater pipe was flowing into the drainage ditch during my inspection. The pump located at the southeast corner of the Strip Mill Parking Lot is functioning properly.

At the time I made my observation, we were discharging a very small amount of water from 002 to the river. There will probably be an increase in the amount of discharge with the arrival of decreasing temperatures (losing evaporation effect).

The spare flux building pump still has not been moved to the Flux Building. The idea of a complete spare pump to be stored in the Flux Pump Building with the overhead crane was a central argument, with the state, concerning our cut-off of 002's flow. It would not help our credibility if the pump was not in the Flux Pump Building on the morning of November 18, 1982, the day of the USEPA and MoDNR tour.

James M. Lanzafame
Environmental Technician

JML/bb

Attachment

cc: D. L. Vornberg

ATTACHMENT 1

PLANT WATER IN[illegible]TION, 11/15/82

LOCATION	TIME	SATISFACTORILY	UNSATISFACTORILY	REPAIR CONTACT	GENERAL COMMENTS
Acid Plant Lime Pit	9:51	X			
Outfalls A and B	9:04	X			"A"and "B" pipe interiors absolutely dry. Waterflow coming from city's stormwater pipe. Oil present in drainage ditch.
No 2&3 Baghouse Wash Water Pit	9:53	X			
Refinery Pump	10:19	X			
Flux Building Pump	10:25	X 475 gpm			Opened control valve a little (from between ½ & 3/4 to 3/4 setting). Spare flux pump still not in Flux Pump Building.
Dross Plant Sanitary Pump	10:30		X	B.F. Ofc.	Reported pump in unsatisfactory condition two wks ago. Broken again or never repaired?
Overflow Standpipe	10:23	X			
Cooling Tower	10:25		X		Still out of service.
Blast Furnace Pump Sta.		X			
Cold Water Pond Valve from WWTP	10:32	X			Has been capped off thus preventing any discharge of WWTP treated water to Cold Water Pond.
General WWTP Conditions, Lime Silo, RC, ETC	10:06	X			
Outfall 001	9:16	X			
Outfall 002	9:37		X		Flow dripping over top of wooden board (have lost evaporation effect due to cooler temps).
Outfall 003	9:28	X			
Inter Plant Thickener	9:40	X			

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: Duane DeClue

December 1, 1982

From: James M. Lanzafame

Subject: Report of Biweekly Inspection of Plant Water Circuit

The plant water circuit inspection was made on November 30, 1982. I will only cover the areas that are in need of attention.

The Vanton pump at the Acid Plant lime pit was not operating the day of the inspection. I talked with Dan Krueger about this problem. Dan indicated that this was indeed a problem area, so much so, that perhaps what is needed is a new pump.

The Dross Plant sanitary pump is either still out of service or has been repaired and is now down again. I will start a daily check to see which of the above is the case.

The Waste Water Treatment Plant has been operating about two weeks without the use of the forebay pH monitoring system. The instrument shop is waiting for repair parts. The Waste Water Treatment Plant is also without a functioning portable pH meter. The portable pH meter could not be standardized. Mark Stites said he would talk to Monte McCue about this situation on December 1, 1982.

We are still experiencing a slight discharge at Outfall 002 (approximately 6 gpm or less).

Attachment I is an expanded check list of the areas covered.

James M. Lanzafame
Environmental Technician

JML/bb

Attachment

cc: D. L. Vornberg

ATTACHMENT I

PLANT WATER INSPECTION, 11/30/82

LOCATION	TIME	SATISFACTORILY	UNSATISFACTORILY	REPAIR CONTACT	GENERAL COMMENTS
Acid Plant Lime Pit	11:02		X		Vanton pump in need of repair.
Outfalls A and B	11:09	X			Absolutely dry.
No 2&3 Baghouse Wash Water Pit	11:16	X			
Refinery Pump	11:19	X			
Flux Building Pump	11:27	X			540 gpm rate
Dross Plant Sanitary Pump	11:23		X		Still not operating.
Overflow Standpipe	11:28	X			
Blast Furnace Cooling Tower	11:28		X		Still out of service.
Blast Furnace Pump Sta.	11:30	X			
Cold Water Pond Valve From WWTP	11:30	X			
General WWTP Conditions, Lime Silo, RC, ETC	9:30		X		Influent pH monitor down.
Outfall 001	8:48	X			
Outfall 002	9:15		X		Discharging 6 gpm or less.
Outfall 003	8:52	X			No discharge.

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: D. L. Vornberg November 19, 1982

From: James M. Lanzafame/D. H. DeClue

Subject: Comparison of MDNR's Results with St. Joe's Laboratory Results

From August 9 through 12, 1982, compliance monitoring was performed at Outfalls 001 and 003 discharges to the Mississippi River, and grab samples were obtained from the intake line from the Ranney Well, by John Davis, St. Louis Regional Office, MDNR. We received split samples, whenever practical, from the state's composites. The top half of Tables I, II, and III are presentations of the state's and our laboratory's results. The state's analyses were originally presented in micrograms/liter. I converted these analyses from micrograms/liter to milligrams/liter.

The lower half of Tables I, II, and III are presentations of the percent difference between the state's results and our laboratory's results. Due to the differences in analytical equipment and, possibly, analytical procedures, conclusions are difficult. However, an examination of the results show that we were considerably higher than the state's results.

JML/DHD/bb

Attachments

cc. G. D. Haines

TABLE I

Comparison of MDNR and St. Joe Results on August 10, 1982

Milligrams/Liter	Outfall 001 MDNR	Outfall 001 St. Joe	Outfall 003 MDNR	Outfall 003 St. Joe	Ranney Well MDNR	Ranney Well St. Joe
pH	6.9	7.3	7.2		7.0	7.3
Conductivity	790	1450	540	775	510	775
Pb	0.10 / 0.042	0.16 / 0.12	0.020 / 0.010	0.07 / 0.04	0.008 / <0.005	0.06 / 0.06
Cu	<0.005 / 0.006	0.03 / 0.02	<0.005 / <0.005	0.02 / 0.02	0.011 / <0.005	0.02 / 0.02
Zn	0.100 / 0.060	0.10 / 0.10	0.010 / <0.010	0.02 / 0.02	0.010 / <0.010	0.03 / 0.03
Cd	0.030 / 0.030	0.03 / 0.03	0.002 / <0.002	<0.01 / <0.01	<0.002 / <0.002	<0.01 / <0.01
Na	110 / 100	83 / 83	43 / 42	45 / 48	43 / 42	43 / 48
SO_4	690	629	180	8.6	183	8.1

Total Difference / Dissolved Difference	Percent Difference Between MDNR's & St. Joe's Results		
pH	+6%		+4%
Conductivity	+43%	+44%	+52%
Pb	+60% / +186%	+250% / +300%	+650% / +1124%
Cu	+512% / +233%	+308% / +308%	+82% / +308%
Zn	0% / +67%	+100% / +122%	+200% / +233%
Cd	0% / 0%	+350% / +374%	+374% / +374%
Na	-25% / -17%	+5% / +14%	0% / +14%
SO_4	-9%	-95%	-96%

Example: MDNR Total Pb Result 0.100 St. Joe Total Pb Result 0.16

$$\frac{0.16 - 0.100}{0.100} \times 100 = +60\%$$

St. Joe total Pb result was 60% higher than MDNR total Pb result.

TABLE II

Comparison of MDNR and St. Joe Results on August 11, 1982

Milligrams/Liter	Outfall 001 MDNR	Outfall 001 St. Joe	Outfall 003 MDNR	Outfall 003 St. Joe	Ranney Well MDNR	Ranney Well St. Joe
pH	9.7	9.7	6.8		7.2	7.6
Conductivity	1500	1400	460		680	800
Pb	0.380 / 0.160	0.34 / 0.08	<0.005 / <0.005	0.03 / 0.03	0.006 / 0.010	0.02 / 0.06
Cu	<0.005 / 0.005	0.02 / 0.01	<0.005 / <0.005	0.01 / 0.02	<0.005 / <0.005	0.01 / 0.01
Zn	0.100 / <0.010	0.10 / 0.02	0.010 / <0.010	0.01 / 0.01	0.010 / <0.010	0.01 / 0.04
Cd	0.020 / 0.004	0.02 / 0.01	<0.002 / <0.002	<0.01 / <0.01	<0.002 / <0.002	<0.01 / 0.01
Na	98 / 96	96 / 96	43 / 43	43 / 45	43 / 42	43 / 45
SO_4	590	645	189	192	183	

Total Difference / Dissolved Difference	Percent Difference Between MDNR's & St. Joe's Results		
pH	0%		+6%
Conductivity	-7%		+18%
Pb	-11% / -50%	+512% / +512%	+233% / +500%
Cu	+308% / +100%	+104% / +308%	+104% / +104%
Zn	0% / +122%	0% / +11%	0% / +344%
Cd	0% / +150%	+374% / +374%	+374% / +426%
Na	-2% / 0%	0% / +5%	0% / +7%
SO_4	+9%	+2%	

Example: MDNR's Total Pb Result 0.380 St. Joe's Total Pb Result 0.34

$$\frac{0.34 - 0.380}{0.380} \times 100 = -11\%$$

St. Joe's total Pb result was 11% lower than the MDNR's total Pb result.

TABLE III

Comparison of MDNR and St. Joe Results on August 12, 1982

Milligrams/Liter	Outfall 001 MDNR	Outfall 001 St. Joe	Outfall 003 MDNR	Outfall 003 St. Joe
pH	8.9	8.1	7.2	8.1
Conductivity	1200	1100	800	750
Pb	0.057 / 0.028	0.05 / 0.03	<0.005 / <0.005	0.02 / 0.03
Cu	<0.005 / 0.006	0.01 / 0.02	<0.005 / <0.005	0.01 / 0.01
Zn	0.060 / 0.030	0.10 / 0.07	0.010 / <0.010	0.02 / 0.04
Cd	0.012 / 0.010	0.04 / 0.03	<0.002 / <0.002	0.03 / 0.03
Na	88 / 88	89 / 84	42 / 41	42 / 41
SO_4	550	471	183	206

Total Difference / Dissolved Difference	Percent Difference Between MDNR's & St. Joe's Results	
pH	-8%	+13%
Conductivity	-33%	-6%
Pb	-12% / +7%	+308% / +512%
Cu	+104% / +233%	+104% / +104%
Zn	+67% / +133%	+100% / +344%
Cd	+233% / +200%	+1479% / +1479%
Na	+1% / -5%	0% / 0%
SO_4	-15%	+13%

Example: MDNR's Total Pb Result 0.057 St. Joe's Total Pb Result 0.05

$$\frac{0.05 - 0.057}{0.057} \times 100 = -12\%$$

St. Joe's total Pb result was 12% lower than the MDNR's total Pb result.

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: D. H. DeClue

December 15, 1982

From: G. L. Walker

Subject: Update of Wastewater Analysis

In September, 1982, a report covering several months of wastewater raw data was sent to James R. Berlow, USEPA. Since that time, additional data have been generated. The new raw data (September, 1982, through November, 1982) are presented in Tables IA, IIA, and IIIA. Table IA presents the Water Treatment Plant's influent water analysis. Table IIA presents an analysis of the water after lime and settle. Table IIIA presents an analysis of the water after lime, settle, and filter.

Table II, from the original document sent to Mr. Berlow, has been included with this information. This table has been expanded to include the average 24-hour pH. This average was determined by averaging the hourly field operation pH's.

Environmental Technician

GLW/bb

cc: D. L. Vornberg

TABLE II

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
6/21-22/82	24 Hr. Composite			14.5	8.5	8.7	1.97	.18	1.5
6/22-23/82	"			No Sample					
6/23-24/82	"			" "					
6/24-25/82	"			" "					
6/25-26/82	"			" "					
6/26-27/82	"			" "					
6/27-28/82	"			" "					
6/28-29/82	"			6.3	7.1	9.3	.82	.09	.58
6/29-30/82	"			4.3	7.6	9.1	.84	.13	.59
6/30/82	"			7.3	8.0	9.0	.95	.10	.67
7/1-2/82	"			4.5	9.4	9.8	.11	.02	.11
7/2-3/82	"			11.7	7.6	9.6	.80	.20	.79
7/3-4/82	"			8.1	8.4	9.0	1.6	.40	.85
7/4-5/82	"			No Sample					
7/5-6/82	"			40.	8.1	9.0	2.8	.55	2.2
7/6-7/82	"			23.8	7.9	9.1	1.9	.28	1.9
7/7-8/82	"			21.4	8.0	9.3	.59	.44	.9
7/8-9/82	"			3.1	7.9	9.3	2.4	.70	1.8

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
7/9-10/82	24 Hr. Composite			27.4	8.2	9.5	.31	.46	2.5
7/10-11/82	"			10.6	7.7	9.3	1.6	.70	1.3
7/11-12/82	"			7.2	8.2	9.4	2.5	.37	1.4
7/12-13/82	"			2.7	7.6	9.3	2.4	.38	1.3
7/13-14/82	"			No Sample					
7/14-15/82	"			12.8	8.3	9.1	1.1	.53	1.0
7/15-16/82	"			13.0	7.6	9.1	1.5	.90	1.4
7/19-20/82	"			23.2	6.9	8.6	4.1	2.0	11.6
7/20-21/82	"			22.8	6.5	8.3	2.7	2.1	33.0
7/21-22/82	"			35.1	6.9	8.7	9.0	1.9	31.0
7/22-23/82	"			4.9	6.9	---	7.0	2.0	11.9
7/29/82	"			No Sample					
7/30-31/82	"			35.9	7.7	8.9	3.7	.2	10.4
8/5-6/82	"			10.8	8.0	9.7	2.5	.03	2.5
8/6-7/82	"			31.0	7.5	9.9	3.8	1.0	4.1
8/9-10/82	"			7.1	8.0	9.7	2.1	.39	2.6
8/10-11/82	"			23.7	9.2	10.1	1.8	.23	1.8
8/11-12/82	"			7.8	8.6	10.0	0.6	.20	1.0
8/13-14/82	"			13.9	7.1	10.5	1.7	.45	2.0
8/16-17/82	"			No Sample					

TABLE II

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/1) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/1) TOTAL ZINC
8/17-18/82	24 Hr. Composite			No Sample					
8/18-19/82	"			28.6	7.9	9.6	2.1	.28	3.1
8/19-20/82	"			30.8	8.5	9.9	2.4	.11	2.6
8/20-21/82	"			8.0	7.4	9.8	2.8	1.4	5.0
8/21-22/82	"			54.0	8.7	9.6	8.5	0.9	25.4
8/22-23/82	"			25.0	8.9	10.0	4.8	.67	6.6
8/23-24/82	"			17.0	8.6	9.8	11.3	1.2	35.0
8/26-27/82	"			6.0	8.2	10.0	0.27	.36	3.7
8/27-28/82	"			< 2.0	7.3	9.5	5.6	.86	0.79
8/30-31/82	"			24.0	7.5	9.6	3.7	.45	4.4
8/31-9/1/82	"			No Sample					

TABLE IA

PLANT INFLUENT INTO THE WATER TREATMENT PLANT

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/l) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/l) TOTAL ZINC
9/1-2/82	24 Hr. Composite			236	7.4		40.0	2.5	30.0
9/2-3/82	"			9	6.2		10.8	2.7	33.7
9/3-4/82	"			---	---		39.0	5.0	21.2
9/7-8/82	"			100	7.1		24.1	1.9	34.6
9/9-10/82	"			55	6.2		24.0	1.6	26.9
9/10-11/82	"			70	7.3		18.3	0.9	20.6
9/13-14/82	"			30	7.4		20.1	1.2	25.8
9/14-15/82	"			30	7.3		26.6	3.6	25.1
9/15-16/82	"			41	7.2		66.2	5.7	53.7
9/17-18/82	"			50	7.0		33.1	2.8	32.1
9/18-19/82	"			9	7.5		16.8	1.6	15.7
9/19-20/82	"			84	7.1		20.6	1.4	14.7
9/20-21/82	"			60	7.3		18.0	1.7	11.0
9/21-22/82	"			269	7.0		47.0	3.4	36.0
9/22-23/82	"			136	7.4		22.0	32.0	15.0
9/27-28/82	"			40	7.5		23.8	3.8	26.1
9/28-29/82	"			85	7.5		20.1	3.6	17.0
9/30-10/1/82	"			50	7.7		22.5	3.4	16.3

TABLE 1A

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS(mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/1) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/1) TOTAL ZINC
10/8-9/82	24 Hr. Composite			39	6.7		21.7	1.5	64.8
10/11-12/82	"			192	7.1		40.0	1.8	39.0
10/20-21/82	"			100	7.4		24.2	3.7	57.9
11/2-3/82	"			200	6.8		31.0	3.7	39.0
11/9-10/82	"			142	7.3		24.0	2.1	26.0
11/16-17/82	"			19	6.6		29.6	0.3	10.7

TABLE IIA

PLANT WATER AFTER THE REACTOR CLARIFIER IN THE WATER TREATMENT PLANT (AFTER LIME AND SETTLE)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/l)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/l) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite			21	7.3	9.6	2.9	0.2	2.5
9/2-3/82	"			2	7.3	9.2	0.7	0.5	3.0
9/3-4/82	"			70	6.8	9.0	10.8	2.8	16.6
9/7-8/82	"			20	7.3	9.6	2.7	0.5	5.3
9/9-10/82	"			22	7.3	10.5	5.3	0.6	3.7
9/10-11/82	"			30	7.7	9.9	7.9	0.4	4.7
9/13-14/82	"			15	7.7	10.3	8.2	0.4	5.3
9/14-15/82	"			23	8.5	9.9	5.8	0.4	2.2
9/15-16/82	"			4	8.4	10.0	6.6	0.7	3.7
9/17-18/82	"			15	8.0	9.7	5.8	0.4	1.8
9/18-19/82	"			2	8.0	10.3	7.1	0.3	0.6
9/19-20/82	"			17	7.5	9.9	7.0	1.4	4.2
9/20-21/82	"			12	7.9	9.5	9.4	0.6	2.1
9/21-22/82	"			16	7.7	9.5	16.0	0.6	3.1
9/22-23/82	"			32	8.7	10.2	0.2	0.3	0.3
9/27-28/82	"			20	7.8	9.0	1.4	0.5	2.4
9/28-29/82	"			20	8.1	9.5	6.5	0.5	0.4
9/30-10/1/82	"			20	---	---	3.2	0.6	0.5

TABLE IIA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/1) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/1) TOTAL ZINC
10/8-9/82	24 Hr. Composite			3	8.5	9.1	4.3	0.23	1.9
10/11-12/82	"			2	---	---	5.6	0.25	3.0
10/20-21/82	"			7	8.4	8.9	2.3	0.37	3.5
11/2-3/82	"			--	---	---	---	----	---
11/9-10/82	"			--	---	---	---	----	---
11/16-17/82	"			--	---	---	---	----	---

TABLE 111A

PLANT DISCHARGE FROM WATER TREATMENT PLANT, SAMPLING OUTFALL 001 (AFTER LIME, SETTLE, AND FILTER)

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	TOTAL CADMIUM	TOTAL ZINC
9/1-2/82	24 Hr. Composite		868	3.2	6.7		0.19	0.03	0.13
9/2-3/82	"		783	<2.0	7.3		0.04	0.04	0.18
9/3-4/82	"		760	8.0	6.8		0.68	1.90	12.50
9/7-8/82	"		823	10.0	7.4		0.17	0.18	0.35
9/9-10/82	"		872	5.0	7.3		0.20	0.14	0.08
9/10-11/82	"		792	10.0	7.6		0.20	0.08	0.08
9/13-14/82	"		807	5.0	7.6		0.20	0.09	0.11
9/14-15/82	"		781	<2.0	8.7		0.18	0.01	0.04
9/15-16/82	"		772	<2.0	7.4		0.12	0.02	0.02
9/17-18/82	"		840	4.0	7.6		0.10	0.05	0.06
9/18-19/82	"		903	<2.0	7.9		0.05	0.03	0.04
9/19-20/82	"		931	<2.0	7.4		0.44	1.00	1.80
9/20-21/82	"		776	<1.0	7.4		0.34	0.34	0.40
9/21-22/82	"		771	<2.0	7.4		0.23	0.14	0.10
9/22-23/82	"		723	<2.0	7.9		0.11	0.05	0.05
9/27-28/82	"		719	----	---		----	----	----
9/28-29/82	"		737	2.0	7.9		0.19	0.14	0.05
9/30-10/1/82	"		715	5.0	8.3		0.16	0.14	0.08

TABLE IIIA

DATE	HOW SAMPLED	TEMP. (°F)	FLOW (GPM)	TOTAL SUSPENDED SOLIDS (mg/1)	pH (UNITS) 24 HR. COMPOSITE	pH (UNITS) AVERAGE FROM HOURLY FIELD OPERATIONS	HEAVY METALS ANALYSIS (mg/1) TOTAL LEAD	HEAVY METALS ANALYSIS (mg/1) TOTAL CADMIUM	HEAVY METALS ANALYSIS (mg/1) TOTAL ZINC
10/8-9/82	24 Hr. Composite		757	<2.0	7.5		0.66	0.02	0.34
10/11-12/82	"		908	<2.0	9.0		1.30	0.01	0.10
10/20-21/82	"		664	2.0	8.0		0.19	0.15	0.16
11/2-3/82	"		616	4.0	7.4		0.10	0.05	0.08
11/9-10/82	"		628	2.0	9.0		0.17	0.05	0.05
11/16-17/82	"		666	<2.0	7.4		0.40	0.10	0.68

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: Duane DeClue January 6, 1983

From: James M. Lanzafame

Subject: Report of Biweekly Inspection of Plant Water Circuit

The plant water circuit inspection was performed on January 5, 1983. This report will only cover the areas that are in need of attention. Attachment I is an expanded check list of the areas covered.

I spoke to Dan Krueger concerning the Vanton pump. He informed me that replacement of this pump is doubtful during the present fiscal year. Dan also said that he would have a Work Order processed to inspect the loose cuppling guard in the pump pit.

The flux pump is continuing to blow fuses. The electrical department has not been able to correct this problem. At present, I report the problem to John Bonner, who, in turn, calls the electricians. I will talk with John Bonner to see if, perhaps, we can expedite this procedure.

The wastewater treatment plant continues to be without an influent pH system (approximately six weeks). I spoke with Gary Gerstenschlager about the delay in the repair. He told me that, as of yet, the instrument repair person has been unable to determine the problem with the system. He did not give me a tentative completion date.

The next point to be covered is our Discharge Point 001. The wastewater treatment plant was not operating during my inspection. I checked the overflow pipe north of the dewater bin pump station. The wastewater treatment plant effluent pipe that empties into the stand pipe was not flowing. The discharge at Outfall 001 was approximately 10 gpm. My question is, do we have a similar infiltration problem in the 001 discharge pipe as we believe we have at 002? Also, from time to time, the proposition of zero discharge plant operations has been proposed. We need to consider this possible "infiltration" at 001 in our future discussions of zero discharge.

Outfall 002's discharge has varied during December with the rising and falling of the Mississippi River. Perhaps, what we are talking about, in this case, is the water table. The discharge ranged from 6 to 22 gpm. Preliminary work has been initiated at the flux building to permit access for the television inspection of the 002 discharge pipe to Lake Ike.

James M. Lanzafame
Environmental Technician

JML/bb

Attachment

cc: D. Vornberg

ATTACHMENT
PLANT WATER INSP[illegible]ON, 01/05/83

CATION	TIME	SATISFACTORILY	UNSATISFACTORILY	REPAIR CONTACT	GENERAL COMMENTS
id Plant Lime Pit	8:43		X		Vanton pump & electric mixer not operating. One of the pumps inside shelter has loose cuppler safety guard rubbing against cuppler.
tfalls A and B	8:34	X			
2&3 Baghouse sh Water Pit	8:49	X			
finery Pump	9:10	X			
ux Building Pump	8:53		X	John Bonner	Not operating in either auto or manual. Bill Hartsell replaced fuses. Pump back on at 9:18 a.m.
oss Plant Sanitary Pump	8:55		X		Pump has not operated since last inspection.
erflow Standpipe	9:02	X			
oling Tower	9:02		X		Down for engineering and construction modification and/or repair.
last Furnace Pump Sta.	9:02	X			
old Water Pond Valve rom WWTP	9:02	X			
eneral WWTP Conditions, ime Silo, RC, ETC	9:02		X		WWTP down. Repairs being made at Dewatering Bin pump station. Influent pH system out.
utfall 001	10:29		X		Checked on flow from WWTP at stand pipe. None coming from WWTP pipe. Flow at 001 Weir was 10 gpm.
utfall 002	10:31	X			Flow at Weir was 13 gpm.
utfall 003	10:35	X			No discharge.
inter Plant Thickener	8:51	X			

cc: TWJohnston
HLRowland
Henke/Gordon
McCue/FitzSimmons
Krueger/EAllen
MStites

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: D. L. Vornberg Dated: November 10, 1983

From: J. M. Lanzafame

Subject: October Monthly WWTP Effluent and Flux Pump Condition Report

---

The October arithmetic averages for lead, zinc, cadmium and total suspended solids are presented below. The average is based on 24-hour time composite samples; e.g., 100 ml every hour for 24 hours.

	Average (mg/l)	Present Effluent Goals (mg/l)
Lead	$\bar{x}$ = 0.13	0.20
Zinc	$\bar{x}$ = 0.02	1.0
Cadmium	$\bar{x}$ = 0.11	0.4
Total Suspended Solids	$\bar{x}$ = <2	50

Tables I and II present detailed WWTP influent and effluent data for October. Table III represents the grab samples obtained at 001 during October.

The continued efforts of the water treatment plant and acid plant have again enabled us to meet our "present effluent goals". Hopefully, this spirit of cooperation and concern will continue to develop especially in light of the recent events (e.g., EPA's suit).

The flux pump experienced several periods of down time during the month of October (see Table IV for more detail). The main problem seemed to be the pump screen becoming clogged with various types of materials (leaves, ear plugs, mud, small pieces of coke, etc.). These episodes seemed to coincide with rainfall events. Generally, the pump was cleaned and back in service within a few hours. These pump outages contributed to less than ~1% of the combined normal plant discharge (001 discharge plus 002 infiltration discharge).

James M. Lanzafame
Environmental Officer

JML/cds
11/18/83

Attachments

TABLE I - 4th Quarter

Total Metals in WWTP Influent (milligrams/liter) / Dissolved Metals in WWTP Influent (milligrams/liter)																		
Oct.	19-20	26-27																
Pb	42.1 / 2.6	175 / .33																
Cu	3.1 / <.005	21.8 / .014																
Zn	79.8 / 68.7	189. / 5.0																
Cd	3.6 / 3.0	14.0 / 1.7																
Na	183 / 165	157 / 212																
Ni	.39 / .23	1.5 / .039																
SS	120	1372																
TDS	1350	1430																
pH	5.8	7.7																
Cond.	1800	1900																
$SO_4^=$																		

TABLE II - 4th Quart[illegible]983

Total Metals in Outfall 001 Discharge (milligrams/liter)

Dissolved Metals in Outfall 001 Discharge (milligrams/liter)

	Oct. 19-20	Oct. 26-27																
Pb	.16 / .11	.75 / .14																
Cu	<.005 / <.005	.031 / .026																
Zn	.053 / .013	.082 / .031																
Cd	.25 / .21	<.001 / .018																
Na	156 / 170	254 / [illegible]																
Ni	<.005 / .007	[illegible] / [illegible]																
SS	<1	3																
TDS	1200	1350																
pH	6.9	8.7																
Cond.	1650	[illegible]																
$SO_4^=$		856																

TABLE III

ANALYSIS P. P. M. FORM 632-0-12

Date	Sample Point	Sampled By	Time	Temp. °F	Flow GPM	Miss. River Stage Feet	pH	pH to 4.5	pH to 8.2	Conductance	SOLIDS Dissolved	SOLIDS Suspended	Heavy Metals	Pb	Cu	Ni	Cd	Zn	Mn	Na	Fe	SO_2	SO_3	SO_4
10/26-27/83	001(D)	ISCO 2100	24-hr composite	123	472		8.7			1400	1430	3	TOTAL / DISSOLVED	.25 / .14	.031 / .006	<.003 / <.005	<.001 / .018	.082 / .031		254 / 249				856
	002(C)																							
10/6-7/83	003	ISCO 2100	24-hr composite	94	1117		7.6			800	550	<1	TOTAL / DISSOLVED	<.05 / <.05	<.005 / <.006	<.005 / .011	.008 / .002	.019 / <.001		48 / 64				227

October 1983	Sample Point 001 (D) Temp °F	pH	Cond	GPM	Sample Point 002 (C) Temp °F	pH	Cond	GPM	Sample Point 003 Temp °F	pH	Cond	GPM
3	98	7.6	1500	13		Dripping			78	7.3	800	1117
4	114	7.0	1700	544					100	7.1	900	898
5	108	7.3	1500	51					70	7.3	700	2
6	108	6.9	1700	159					94	7.2	800	1117
7	112	7.0	1500	72					98	7.2	700	1004
10	96	8.8	1300	96		Dripping			84	7.0	800	1004
11	91	8.5	1100	708	Rain event			3 *	74	7.5	700	6
12	92	9.2	1100	623	Rain Event			5 *	94	7.2	700	1117
13	116	9.1	1300	544		Dripping			68	7.2	600	6
14	114	9.0	1700	544	Cleaned pump screen			9*	96	7.4	800	1004
17	122	9.0	1500	290	Clock Stopped			?	92	7.1	800	360
18	128	8.6	1800	544	Clock Stopped			?	68	7.4	700	6
19	104	8.7	1300	472	Pen off chart			?	92	7.4	800	1004
20	94	8.8	1000	1117	Pen off chart			?	67	7.7	700	2
21	124	8.1	2200	544	Pump screen clogged			42*	66	7.6	700	1004
24	124	7.7	1800	290	Dripping				88	7.3	800	1117
25	126	8.9	1800	405	Dripping				88	7.5	700	1117
26	123	8.7	1900	472	Dripping				75	7.3	700	898
27	112	9.8	2100	800	Dripping				68	7.8	700	290
28	118	8.2	1900	193	Dripping				68	7.4	600	1117
31	98	7.7	1500	22	Dripping				95	7.3	700	1807

These data are based on grab samples

* Flow represents average flow from Lake Ike for the 24-hour period 00:00-00:00 (midnight to midnight).

TABLE

002 FLOW MEASUREMENTS AND FLUX PUMP CONDITION REPORT

Oct. 1983

Observation Date	Observed* Flow at Weir, GPM	Discharge** to River from Lake	Mechanical Flowmeter Operating	Flux Pump Operable and Functioning/GPM		Flux Pump Off or Malfunctioning	Notes
10-03-83	2	2					
10-04-83	2	2	X	X	375		
10-05-83		2	X	X			
10-06-83		2	X	X			
10-07-83	2	2	X	X			
10-08-83	2	2	X	X			
10-09-83	2	2	X	X			
10-10-83	2	2	X	X			
10-11-83	2	2	X	X			
10-12-83		7	X	?	?	?	10-12 Checked pump 8:15 p.m. Pump
10-13-83		2	X	X	340		discharging 340 gpm in high cycle (1000
10-14-83	2	7	X	X	340		gpm). "Backflushed" pump several times.
10-15-83	2	2	X	X			Capacity increased to 375 gpm in low
10-16-83	2	2	X	X			cycle (500 gpm). Pump cycling.
10-17-83	2	22	X	X	340		10-14 Pump screen was cleaned. No
10-18-83	190	91	X	Operable by 1:17pm	500		improvement in capacity.
10-19-83			Pen Off Chart	X			10-18 Pump out for service. Replaced
10-20-83			Pen Off Chart	X	500		pump with spare. Rain storm on evening
10-21-83	290	42	X	?	?	?	of 10-17-83.
10-22-83	5	5	X	X			10-21 "Backflushed" pump. Capacity
10-23-83	7	7	X	X			returned to "normal" 400 gpm.
10-24-83	7	7	X	X	410		
10-25-83	7	7	X	X	410		
10-26-83		6	X	X			
10-27-83		8	X	X	375		

*note: Observed flow is recorded based on a single day shift observation.

**note: Discharge to river is based on analysis of Steven's guage flow charts at 002 weir. It is assumed that flow past weir is flow out of "lake" averaged over 24 hours.

TABLE IV Contd.

002 FLOW MEASUREMENTS AND FLUX PUMP CONDITION REPORT

Oct. 1983

Observation Date	Observed* Flow at Weir, GPM	Discharge** to River from Lake	Mechanical Flowmeter Operating	Flux Pump Operable and Functioning/GPM		Flux Pump Off or Malfunctioning	Notes
10-28-83	4	4	X	X	375		
10-29-83		3	X				
10-30-83		8	X				Rainfall
10-31-83	2	2	X	X	375		

*note: Observed flow is recorded based on a single day shift observation.

**note: Discharge to river is based on analysis of Steven's guage flow charts at 002 weir. It is assumed that flow past weir is flow out of "lake" averaged over 24 hours.

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

To: All Water Treatment Operators Dated: November 16, 1983

From: Jim Lanzafame

Subject: Water Treatment Operations

In the past few weeks we have been attempting a trial test of sludge recirculation. Some of you may already have formed your ideas as to whether sludge recirculation is beneficial or not. We are attempting to attach some real numbers to the operations of the water treatment plant with and without sludge recirculation.

I was asked to develop some operational guidelines to be used in the future during sludge recirculation and non-recirculation. The attached pages (Attachment I and II) are the current operational guidelines. I would like to see these guidelines implemented.

I will be reviewing the log-book when I pick up my samples. Your help in these tests in the coming weeks will be greatly appreciated.

Jim Lanzafame
Environmental Officer

JML/cds

Attachments

ATTACHMENT I

SLUDGE RECIRCULATION

1) 100% recycle of settled sludge to the lime mix tank.

2) A minimum of sludge wasting to the thickener.

3) If operator determines it is necessary to waste sludge to thickener (for example, high solids carry over from clarifier to SVG filters causing excessive backwash, excessive torque on RC rake, etc.) by all means waste the sludge and record the reason, the time wasting started, and the time wasting stopped.

4) If clarifier is exceptionally good looking or bad looking, record the conditions at that instant (for example):

   8:35 Clarifier very clear
   sludge blanket well defined, about 4 ft. down
   pumping from cold pond
   Forebay temp. 92°F
   Clarifier temp. 105°F

Follow the above guidelines but also make use of your operating experience.

ATTACHMENT II

NON-RECIRCULATION

1) Try not to waste the sludge that has been built up during recirculation.

2) Again, make use of your operating judgement. If the torque on the rake has raised to let's say 50% for argument's sake, I would have to agree that some sludge should be wasted to the thickener. Again, record the reason, time started, and time stopped in the log book.

3) Make notes of the WWTP conditions during episodes of very good or very bad clarifier conditions, for example:

   Time Forebay temp
         Clarifier temp
         Clarifier Condition
         What pumps are running: dewater, make-up or cycling, etc.

Form #182

ST. JOE MINERALS CORPORATION
LEAD SMELTING DIVISION

REQUEST FOR SPECIAL ANALYSIS

Requested by: Jim Langalame Dept.: Envir Date: 11 Jan 84

Sample Description

Sulfide treated WWTP, filtered
results in mg/L

SAMPLE NO.	As	Zn	Cd	Pb	Ni	Fe	Mg	Ca	Cu	Na
After RC + Sulfide	<.05	.046	<.003	<.05	<.005	.035	10	207	.017	139
After RC	<.05	.266	.006	.77	<.005	.006	11	231	.015	133
Before RC + Sulfide	.06	.210	.018	<.05	.031	.004	30	147	.011	116
Before RC	.05	2.54	1.48	.39	.067	<.003	34	173	<.008	123

Analysis done by: [illegible] Date Completed: 12 Jan 84

Total Time: 7 ~~DR~~ TCA Hours: 4 Wet Lab Hours: 3

Chief Chemist

Form #182

ST. JOE MINERALS CORPORATION
LEAD SMELTING DIVISION

REQUEST FOR SPECIAL ANALYSIS

Requested by: Jim Lanzafame Dept.: ENV Date: 2-22-84

Sample Description

WWTP Total metals in mg/l
sulfide

SAMPLE NO.

	As	Zn	Cd	Pb	Ni	Fe	Mg	Ca	Cu	Na
Influent (Total)	.15	14.0	1.88	23	.213	6.42	35.	165	1.43	124
After SVG (Total)	<.05	.016	.015	<.05	<.005	.005	—	154	.007	119
After RC (Total)	<.05	1.37	.232	2.9	.016	.820	—	161	.166	118

Analysis don by: RT Date Completed: 2-22-84

Total Time: 4 DR Hours: 2 Wet Lab Hours: 2

Chief Chemist

Form #182

ST. JOE MINERALS CORPORATION
LEAD SMELTING DIVISION

REQUEST FOR SPECIAL ANALYSIS

Requested by: Jim Lanzatame Dept.: ENV Date: 2-24-84

Sample Description

WWTP Total metals in mg/l
Sulfide — ran after weekend

SAMPLE NO.

	As	Zn	Cd	Pb	Ni	Fe	Mg	Ca	Cu	Na
Intluent	<.05	18.2	2.00	61	.201	21.8	28	169	2.92	81
After SVG	.06	.058	.022	.19	<.005	.011	24	158	.030	84
After RC	<.05	1.56	.234	3.4	.012	1.01	24	167	.485	81

Analysis don by: RT Date Completed: 2-28-84

Total Time: 4 DR Hours: 2 Wet Lab Hours: 2

Chief Chemist

Form #182

ST. JOE MINERALS CORPORATION
LEAD SMELTING DIVISION

REQUEST FOR SPECIAL ANALYSIS

Requested by: Jim Lanzafame Dept.: Env Date: 24 Feb 84

Sample Description

Sulfide addition WWTP Total elements in mg/L

SAMPLE NO.	As	Zn	Cd	Pb	Ni	Fe	Mg	Ca	Cu	Na
After SVg Tot	<.05	.053	.020	.15	<.005	.016	22	148	.02	77
ARC total	<.05	1.38	.230	3.0	.011	.79	22	162	.157	77
Influent	.11	15.0	1.94	45	.140	13.4	27	160	1.51	73

Analysis done by: R.T. Date Completed: 27 Feb 84

Total Time: 5 ~~DR~~ IOP Hours: 2 Wet Lab Hours: 3

Chief Chemist

BLACK & VEATCH
CONSULTING ENGINEERS
TEL. (314) 532-7940

ST. LOUIS
1415 ELBRIDGE PAYNE ROAD
CHESTERFIELD, MISSOURI 63017

B&V Project 12709
B&V File B
February 24, 1986

Mr. Dan Vornberg
St. Joe Lead Company
881 Main Street
Herculaneum, MO 63048

Re: Sanitary Sewer Evaluation

Dear Mr. Vornberg:

Pursuant to authorization for the above noted sewer evaluation, we have completed the field surveys and provide the following summary of that investigation for your consideration:

1. Elevations were field checked for the tops and flowlines (F.L.) of seven manholes (Nos. 5B - 11) and compared to record information noted on the "as-constructed" drawings. This comparison showed:

   M.H. #11 - No change
   M.H. #10 - No change
   M.H. # 9 - F.L. 0.06' higher
   M.H. # 8 - No change
   M.H. # 7 - F.L. 0.13' lower
   M.H. # 6 - F.L. 0.16' higher
   M.H. # 5 - F.L. 0.03' lower

2. We then attempted to visually check sewer alignments between manholes 9 & 8, 8 & 7, and 7 & 6 by "lamping" each line with a high intensity light. None of these three lines permitted passage of the light beam.

3. We also smoke tested the same three reaches as noted under item 2. These tests showed the following conditions:

   M.H. #9 to M.H. #8 - The time delay of smoke escaping from M.H. #8 is indicative of either some blockage or possibly some vertical misalignment that traps sewage and prevents a normal air flow through the pipe. Such vertical misalignment could create a low point that holds liquid and flows only under siphon conditions.

   M.H. #8 to M.H. #7 - While the smoke time delay was less than the preceding reach, it nevertheless is quite slow and indicative of some problem.

   M.H. #7 to M.H. #6 - This reach of the sewer displayed the most extreme blockage of the smoke testing. Here again, this is indicative of some problem.

4. Summation:

The testing described in the preceding was established to provide a low cost method of evaluating the condition of the sewer line, particularly the three reaches between M.H. #9 and M.H. #6. Based on the field measurements and tests, the following conditions may have occurred:

(a) Elevations - The incidence of some manholes being higher and some lower may reflect a displacement due to high overburden loads in combination with compressive soils indigenious to an aluvial area such as the slag pile site.

(b) Visual Check - The restriction of light through the sewer could be indicative of three possible problems, vertical misalignment, horizontal misalignment, or an obstruction in the line.

(c) Smoke Testing - The delays in smoke passage through the line lends credence to the suspected problems related to the inability to complete a visual check on any of the three reaches.

In total these three tests indicate that some unobserved problems exist in the three lines. Due to the age of the lines, the heavy overburden and soil type in the area, the sewers will in all likelihood continue to experience more severe problems.

At this point in the evaluation, we have expended approximately $1,500 of the $2,200 budgeted for this work. We could utilize the remaining amount to perform additional smoke tests during a period of low flow when sewage flow can be blocked, say 3 a.m. or 4 a.m. in the morning, or apply that amount to TV inspection of the three lines. TV inspection will cost approximately $1,200 to $1,500 if normal conditions for such work prevails. Normal conditions meaning, cleaning and TV equipment can be pulled through the lines without restriction due to joint misalignment or "sags" that retain sewage.

A copy of the field measurements is enclosed. If you have any questions regarding this material, please feel free to call.

Yours very truly,

BLACK & VEATCH

Stanley Dolecki

Stanley Dolecki, P.E.

cms
Enclosure

BLACK & VEATCH
CONSULTING ENGINEERS
KANSAS CITY

SUBJECT: ST. JOE LEAD COMPANY

WORK: Survey, lamping & smoking of 12" sanitary sewer (#12709)

DATE 11/8 19 85 REVISED ____ 19__ BY ____
SET UP BY EFS COMPUTED BY ____
COMPUTED BY EFS CHECKED BY ____
CHECKED BY ____ APP'D FOR TYPING BY ____
NO. 1 OF 1

IN THIS SPACE DO NOT WRITE

FORM NO. 13-10-87

Sewer Reach	Surveyed Conditions	Visual Conditions	Lamping of Lines	Smoke Testing	Other
M.H. #11 - M.H. #10	M.H. #11 Plans FL / Surveyed FL / Ground 388.23 / 388.24 / 395.44		N/A	N/A	Bolted lid @ M.H. #11 Will need to open for FL
M.H. #10 - M.H. #9	M.H. #10 Plans FL / Surveyed FL / Ground 387.74 / 387.74 / 401.41		N/A	N/A	
M.H. #9 - M.H. #8	M.H. #9 Plans FL / Surveyed FL / Ground 386.60 / 386.66 / 399.31		Lamping was done from M.H. #8 w/ no visible light @ M.H. #9	Blower was shut off after 5 min. w/ no visible smoke. Smoke started billowing out of M.H. 8, w/o use of blower, after 10-12 min.	A 2nd smoke bomb was ignited @ M.H. 9, w/o the use of the blower. No smoke was visible after 13 mins. @ M.H. 8. Blower was turned on for 5 mins. w/ still no smoke.
M.H. #8 - M.H. #7	M.H. #8 Plans FL / Surveyed FL / Ground 385.52 / 385.52 / 392.87		Lamping was done @ M.H. #7 w/ D-beam on stick as well as manually. No signs of light @ M.H. #8 either way.	Smoke began rising from M.H. #7 after 3 mins. from smoke bomb ignition. Smoke continued to billow out of this M.H. for about 5 mins.	Toxic meter alarmed @ M.H. #7 after smoking line between 7 & 8. Meter continued to go off after numerous attempts to blow out M.H.
M.H. #7 - M.H. #6	M.H. #7 Plans FL / Surveyed FL / Ground 384.50 / 384.37 / 391.11	Velocity of flow @ M.H. #7 at least 3 times as fast as at M.H. #8.	Lamping was done from M.H. #7 w/ no visible light @ M.H. #6	No visible smoke after 15 mins. from bomb ignition & continuous blower operation @ M.H. #6. Another bomb was ignited w/ the same thing happening after 10 mins.	
M.H. #6 - M.H. #5B	M.H. #6 Plans FL / Surveyed FL / Ground 383.45 / 383.61 / 390.54		N/A	N/A	
	M.H. #5B Plans FL / Surveyed FL / Ground 382.63 / 382.60 / 389.90				Bolted lid @ M.H. #5B Will need to open for FL

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

April 23, 1986

Mr. Robert Zeman
Chief Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
Saint Louis, Missouri 63119

Re: Frist Quarter 1986 NPDES Report, MO-0000281

Dear Bob:

Enclosed you will find the routine quarterly report for the frist quarter of 1986.

Problems arose with the flux building pump which controls the outfall 002 discharge during February and March. Mechanical pump problems were carried over into the new year from a rushed rebuild of the spare flux pump. Also, it became necessary to chemically rehabilate the discharge line from the flux pump itself. Salt loadings within the plant had critically reduced the carrying capacity of the flux pump discharge line.

The warmer temperatures of late March necessitated the start-up of the outfall 003 once through cooling water flow.

Sincerely,

Daniel L. Vornberg
Environmental Manager

bcc: R. E. Peppers
J. M. Lanzafame

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

January 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fac. Temp	Analytical Method		
1	001		No Data																1
2		09:30	JML	GRAB		292	0.420	10.0											2
3		10:00	JML	GRAB		408	0.588	10.2											3
4		16:00	SEC	GRAB		408	0.588	9.2											4
5		16:30	SEC	GRAB		475	0.684	9.1											5
6		13:00	JML	GRAB		441	0.635	9.7											6
7		10:00	JML	GRAB		408	0.588	8.0											7
8		13:00	JML	GRAB		669	0.963	9.0											8
9		10:00	JML	GRAB		587	0.845	10.2											9
10		09:00	JML	GRAB		587	0.845	9.9											10
11		17:00	SEC	GRAB		475	0.684	9.0											11
12		17:00	SEC	GRAB		548	0.789	9.2											12
13		08:00	GLW	GRAB		408	0.588	9.1											13
14		08:00	JML	GRAB		160	0.023	9.8											14
15		09:00	JML	GRAB		713	1.027	9.0											15
16		09:00	JML	GRAB		548	0.789	9.1											16
17		09:00	JML	GRAB		759	1.093	8.5											17
18		18:00	SEC	GRAB		713	1.027	9.3											18
19		17:00	SEC	GRAB		199	0.287	9.4											19
20		09:00	JML	GRAB		511	0.736	9.0											20
21		24-HR	ISCO	COMP	2/14/86	408	0.588	10.0	<0.249	1.639	0.387	7.62	<0.075	<49.8	4469		ICP		21
22		11:00	JML	GRAB		713	1.027	10.8											22
23		24-HR	ISCO	COMP	2/14/86	511	0.736	10.1	<0.312	2.889	1.073	5.99	<0.094	<62.4	5422		ICP		23
24		10:00	JML	GRAB		713	1.027	9.2											24
25		16:00	SEC	GRAB		713	1.027	9.5											25
26		15:30	SEC	GRAB		587	0.845	9.1											26
27		08:30	JML	GRAB		548	0.789	8.0											27
28		08:30	JML	GRAB		408	0.588	8.1											28
29		08:30	JML	GRAB		292	0.420	8.5											29
30		08:00	JML	GRAB		750	1.080	9.1											30
31		10:00	GLW	GRAB		292	0.420	8.5											31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

February 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, Gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fan. Temp	Analytical Method		
1	001	15:00	SEC	GRAB		588	0.847	9.5											1
2		16:30	SEC			588	0.847	9.6											2
3		08:30	JML			1125	1.620	9.3											3
4		08:00	CY			800	1.152	9.0											4
5		08:00	CY			800	1.152	10.6											5
6		08:00	CY			800	1.152	9.3											6
7		08:00	CY			750	1.080	9.0											7
8		15:00	SEC			408	0.587	9.0											8
9		15:30	SEC			713	1.027	9.3											9
10		08:00	DW			750	1.080	8.5											10
11		16:00	JML			475	0.684	8.0											11
12		16:00	JML			475	0.684	8.3											12
13		15:00	GLW			627	0.903	8.2											13
14		14:00	GLW			548	0.789	8.2											14
15		18:00	SEC			408	0.587	9.1											15
16		17:00	SEC			713	1.027	9.0											16
17		08:00	JRP			750	1.080	9.4											17
18		08:00	JRP			700	1.008	9.0											18
19		15:30	GLW	GRAB		292	0.420	9.9											19
20		24-HR	ISCO	COMP		548	0.789	9.5	<0.335	0.113	0.047	0.522	0.100	<66.9	5707		ICP		20
21		09:00	JML	GRAB		587	0.845	9.3											21
22		15:30	SEC	GRAB		475	0.684	9.2											22
23		15:30	SEC			548	0.789	9.5											23
24		08:00	JML			13	0.019	9.4											24
25		08:30	JML			627	0.903	9.2											25
26		08:30	JML			548	0.789	7.5											26
27		08:30	JML			475	0.684	7.3											27
28	001	08:30	JML	GRAB		408	0.588	10.6											28
29																			29
30																			30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

March 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Ram. Temp	Analytical Method		
1	001	17:00	MV	GRAB		408		10.5											1
2		16:00	KD			548		9.7											2
3		08:30	JML			408		9.3											3
4		10:30	JML			290		10.8											4
5		16:30	JML			347		11.0											5
6		08:00	GLW			243		9.5											6
7		08:00	DW			500		9.1											7
8		15:00	MK			627		9.5											8
9		17:00	JM			408		9.7											9
10		08:00	DW			600		10.2											10
11		08:00	DW			650		10.7											11
12		08:00	DW			600		7.0											12
13		08:00	JML			160		8.6											13
14		08:00	DH			600		9.9											14
15		18:00	MW			548		9.5											15
16		18:00	KD			408		9.1											16
17		08:30	JML			441		9.4											17
18		14:30	JML			292		10.2											18
19		08:30	JML			347		10.6											19
20		08:30	JML			347		11.0											20
21		08:30	JML			408		8.4											21
22		15:00	RC			126		9.0											22
23		15:30	JM	GRAB		243		9.3											23
24		24-HR	ISCO	COMP	3-26-86	408		10.2	<0.249	0.164	0.025	0.80	<0.075	*	4233		ICP		24
25		08:30	JML			408		10.5											25
26		09:00	JML			608		10.4											26
27		14:00	JML			408		8.0											27
28		08:00	AH			800		9.5											28
29		16:00	MW			408		10.1											29
30		16:00	WB			905		9.2											30
31	001	09:00	JML			713		7.6											31

* Insufficient sample to run analysis.

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

January 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Sam. Temp	Analy-tical Method		
1	002'		NO DATA																1
2	"		UNMEASURABEL																2
3	"																		3
4	"																		4
5	"																		5
6	"																		6
7	"																		7
8	"																		8
9	"																		9
10	"																		10
11	"																		11
12	"																		12
13	"																		13
14	"																		14
15	"																		15
16	"																		16
17	"																		17
18	"																		18
19	"																		19
20	"																		20
21	"																		21
22	"																		22
23	"																		23
24	"																		24
25	"																		25
26	"																		26
27	"																		27
28	"																		28
29	"																		29
30	"																		30
31	"		UNMEASURABLE																31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

February 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Surface pds	Fin. Temp	Analytical Method		
1	002																		1
2																			2
3		08:30	JML			524	0.775	10.5											3
4																			4
5																			5
6																			6
7																			7
8		15:00	SEC			35	0.050												8
9		15:30	SEC			72	0.104												9
10																			10
11																			11
12																			12
13		15:00	CLW			22	0.032												13
14		16:00	CLW			126	0.181												14
15		18:00	SEC			35	0.050												15
16		17:00	SEC			126	0.181												16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28	002																		28
29																			29
30																			30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

March 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Amb. Temp	Analytical Method		
1	002		Unmeasurable																1
2	↑			"															2
3				"															3
4				"															4
5				"															5
6																			6
7																			7
8		15:00	MK	GRAB		126													8
9		12:00	JM	GRAB		97													9
10																			10
11																			11
12																			12
13		08:00	JML	GRAB		52													13
14																			14
15																			15
16																			16
17			Unmeasurable																17
18				"															18
19				"															19
20																			20
21																			21
22																			22
23																			23
24				"															24
25				"															25
26				"															26
27				"															27
28																			28
29																			29
30																			30
31	↓ 002			"															31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

January 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, Epm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fam. Temp	Analytical Method		
1	003		NO DISCHARGE																1
2	"																		2
3	"																		3
4	"																		4
5	"																		5
6	"																		6
7	"																		7
8	"																		8
9	"																		9
10	"																		10
11	"																		11
12	"																		12
13	"																		13
14	"																		14
15	"																		15
16	"																		16
17	"																		17
18	"																		18
19	"																		19
20	"																		20
21	"																		21
22	"																		22
23	"																		23
24	"																		24
25	"																		25
26	"																		26
27	"																		27
28	"																		28
29	"																		29
30	"		NO DISCHARGE																30
31	"																		31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

February 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fan. Temp	Analytical Method		
1	003		NO DISCHARGE																1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14																			14
15																			15
16																			16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28	003		NO DISCHARGE																28
29																			29
30																			30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

March 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, Gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Ean. Temp	Analytical Method		
1	003																		1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14																			14
15																			15
16																			16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30																			30
31	003	09:00	JNL	GRAB	3-14-86	1125	1.620	7.7	<0.687	0.134	<0.027	<0.687	0.206		2651	60	ICP		31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Sam. Temp	Analy-tical Method		
1-21-86	Influent	24-HR	ISCO	COMP	2-14-86				0.673	59.8	14.1	198	22.5	473	4887		ICP		1
1-23-86	Influent	24-HR	ISCO	COMP	2-14-86				2.60	92.3	39.2	323	38.2	749	6202		ICP		2
2-20-86	Influent	24-HR	ISCO	COMP	2-26-86				0.602	77.6	22.0	266	6.65	1050	6664		ICP		3
3-20-86	Influent	24-HR	ISCO	COMP	3-26-86				5.83	93.7	47.5	465	134				ICP		4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14																			14
15																			15
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27																			27
28																			28
29																			29
30																			30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

DATE	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, ppm	Total Zn, ppm	Total Cd, ppm	Total Pb, ppm	Total Cu, ppm	SS, ppm	Sulfate ppm	Fan. Temp	Analytical Method		
3/31/86	Rainey	09:00	JML	GRAB	4-14-86				<0.050	0.010	<0.002	<0.050	<0.015		161		ICP		1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14																			14
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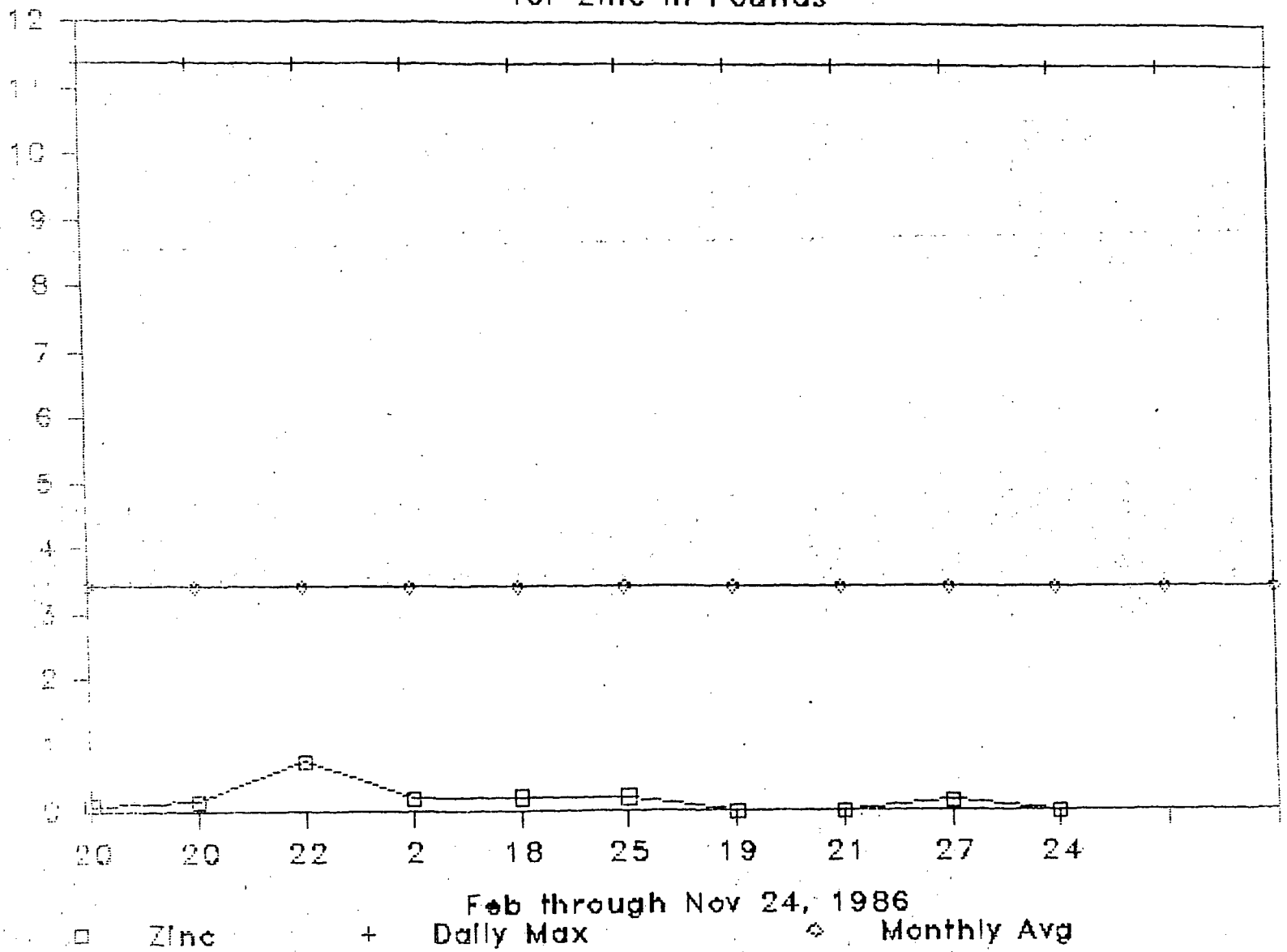
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30																			30
31																			31

date	day	lead	cadmium	zinc
20-Feb-86	20	0.522	0.047	0.113
20-Mar-86	20	0.8	0.025	0.164
22-Apr-86	22	1.03	0.337	0.747
02-May-86	2	1.06	0.022	0.21
18-Jun-86	18	0.384	0.248	0.218
25-Jul-86	25	0.537	0.129	0.218
19-Aug-86	19	0.238	0.004	0.004
21-Aug-86	21	0.211	0.004	0.004
27-Sep-86	27	0.227	0.038	0.168
24-Oct-86	24	0.077	0.004	0.002

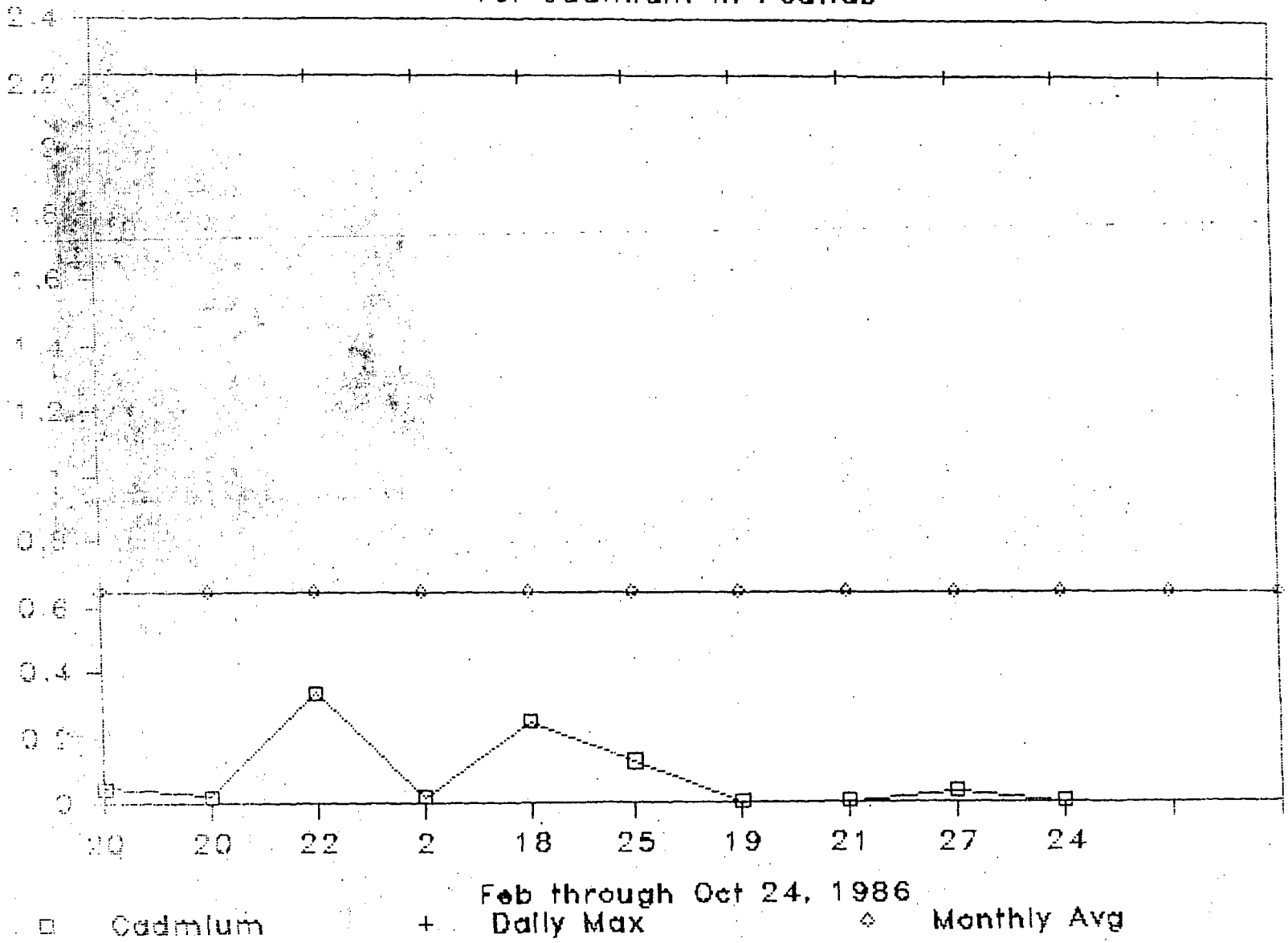
WWTP PERFORMANCE

for Zinc in Pounds



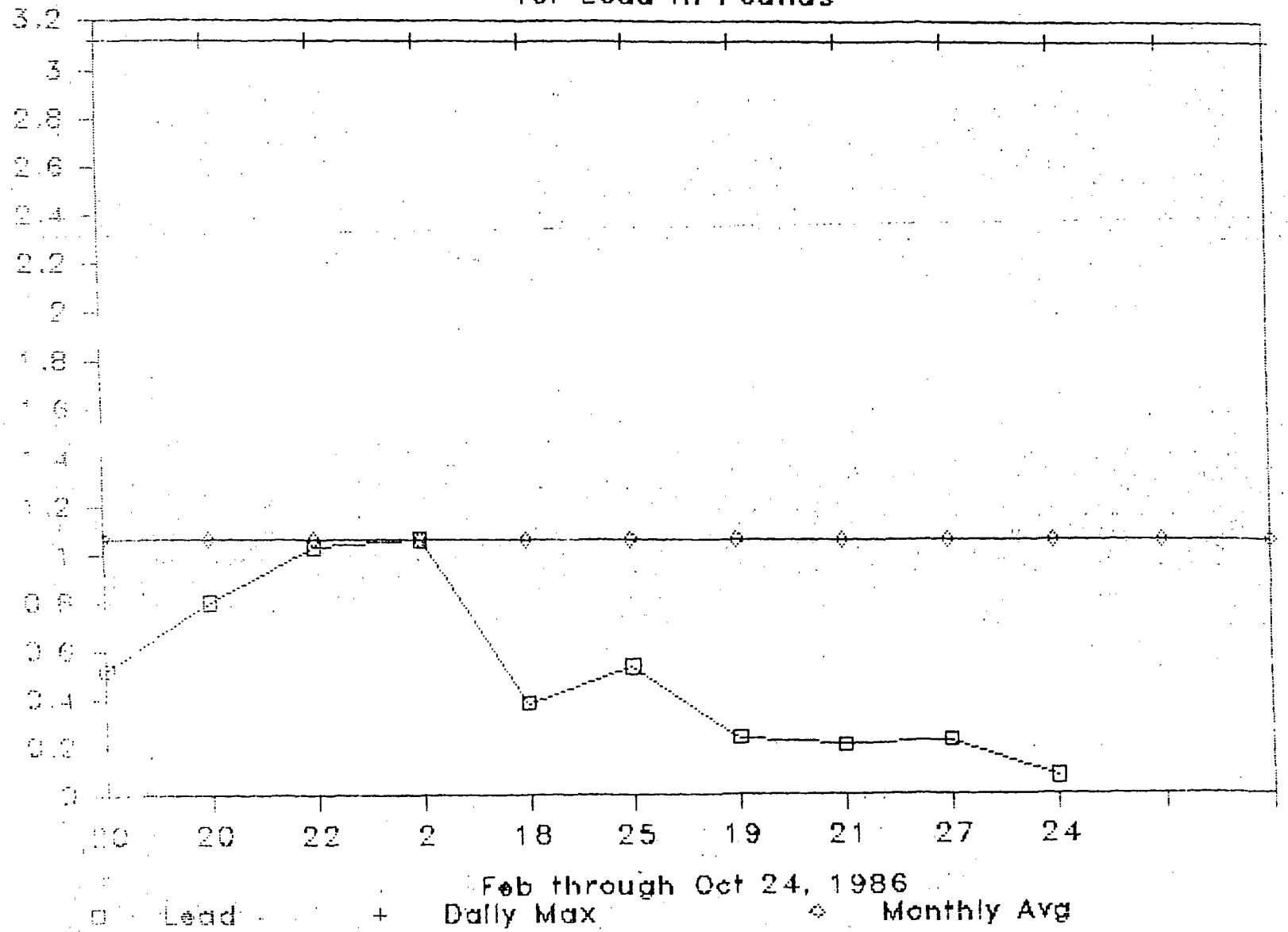
WWTP PERFORMANCE

for Cadmium In Pounds



WWTP PERFORMANCE

for Lead In Pounds



ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

July 28, 1986

Mr. Robert Zeman
Chief Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
Saint Louis, Missouri 63119

Re: Second Quarter 1986 NPDES Report, MO-0000281

Dear Bob:

Enclosed you will find the routine quarterly report for the second quarter of 1986.

Some discharges at the 001 outfall were experienced due to problems with the flux building sump pump. Several efforts to increase the availability of the flux pump have been undertaken: scheduled replacement of the flux pump for overhaul, scheduled maintenance cleaning of the sump, and the addition of a spare pump shaft to our store house parts inventory.

The outfall 003 discharge was temporarily stopped during the quarter.

Based upon the data available for review, St. Joe believes that it is in compliance with its interim operating limits for lead and cadmium and final limits for the other metals. The interim operating limits of our permit are:

	Daily Max.	Monthly Average
Lead Total, pounds	11.14	2.45
Cadmium Total, pounds	8.2[illegible]	1.25

The interim operating limits are a result of the agreed upon treatability concentration limits contained in the stipulation order covering our appeal number 119.

system at the our wastewater treatment plant during the July shutdown. The final hook-up and shakedown of the unit should occur during the third quarter of 1986.

Sincerely,

Daniel L. Vornberg
Environmental Manager

cc: J. E. FitzSimmoms
J. M. Lanzafame

ST JOE LEAD COMPANY, HERCULANEUM, MO.

April 1986	Form Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, Gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fam. Temp	Analytical Method		
1	001	10:30	JML	GRAB		713	1.027	9.5											1
2		08:30	JML			22	0.032	7.6											2
3		09:00	JML			22	0.032	7.6											3
4		09:00	JML			0	0	7.8											4
5		15:30	DW			800	1.152	9.6											5
6		15:30	DW			800	1.152	7.8											6
7		09:00	JML			627	0.902	8.5											7
8		09:00	GLW			713	1.027	8.9											8
9		09:00	JML			713	1.027	9.3											9
10		09:00	JML			347	0.500	10.3											10
11		15:00	MK			243	0.350	9.4											11
12		07:00	MK			243	0.350	9.5											12
13		07:00	JRP			292	0.420	9.0											13
14		09:00	JML			347	0.500	9.2											14
15		08:00	JRP			292	0.420	8.9											15
16		15:00	MK			292	0.420	9.2											16
17		08:00	JRP			800	1.152	9.6											17
18		15:00	CY			800	1.152	7.9											18
19		07:00	MK			292	0.420	9.3											19
20		07:00	MK			243	0.350	9.2											20
21		09:00	MK	GRAB		243	0.350	9.0											21
22		24-HR	ISCO	COMP	4/24/86	600	0.864	9.5	<0.366	0.747	0.337	1.03	<0.110	<73	4490		ICP		22
23		07:00	MK	GRAB		600	0.864	10.0											23
24		15:30	JML			548	0.789	9.5											24
25		07:00	CY			548	0.789	9.9											25
26		07:00	CY			548	0.789	9.8											26
27		07:00	CY			548	0.789	9.4											27
28		07:00	CY			347	0.500	10.7											28
29		07:00	CY			408	0.588	8.1											29
30	003	08:00	CY	GRAB		548	0.789	9.7											30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

May 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Fan. Temp	Analy-tical Method		
1	001	07:00	CY	GRAB		347	0.500	9.4											1
2		16:00	JML	COMP	5/22/86	292	0.420	8.9	<0.089	0.210	0.022	1.06	<0.014	<36	2678		ICP		2
3		08:00	DW	GRAB		475	0.684	9.0											3
4		08:00	DW			548	0.789	9.5											4
5		08:00	DW			548	0.789	9.5											5
6		08:00	DW			292	0.420	11.3											6
7		08:00	DW			292	0.420	10.0											7
8		15:00	MK			408	0.588	9.1											8
9		08:00	DH			408	0.588	8.8											9
10		08:00	JRP			347	0.500	9.6											10
11		08:00	JRP			408	0.588	8.6											11
12		08:00	JRP			408	0.588	8.9											12
13		08:00	JRP			377	0.543	9.0											13
14		08:00	JRP			243	0.350	7.9											14
15		08:00	JRP			408	0.588	8.0											15
16		08:00	MK			347	0.500	9.0											16
17		08:00	MK			408	0.588	8.9											17
18		08:00	MK			408	0.588	9.1											18
19		08:00	MK			408	0.588	9.0											19
20		08:00	MK			408	0.588	9.0											20
21		08:00	MK			408	0.588	9.1											21
22		08:00	MK			292	0.420	8.9											22
23		15:00	DW			627	0.903	8.8											23
24		08:00	CY			243	0.350	9.2											24
25		08:00	CY			408	0.588	9.5											25
26		08:00	CY			408	0.588	10.0											26
27		08:00	CY			243	0.350	9.4											27
28		08:00	CY			408	0.588	10.0											28
29		08:00	CY			408	0.588	9.4											29
30		15:00	JRP			408	0.588	8.5											30
31	001	15:00	JRP	GRAB		0	0	-											31

ST JOE LEAD COMPANY, HERCULANEUM, MO.

June 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, Gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Pan. Temp	Analytical Method		
1	001	15:00	JRP	GRAB		408	0.588	9.6											1
2		15:00	JRP			408	0.588	9.0											2
3		15:00	JRP			408	0.588	9.0											3
4		15:00	CY			475	0.684	10.2											4
5		08:00	DH			408	0.588	8.4											5
6		10:00	JRP			408	0.588	9.1											6
7		07:00	JRP			408	0.588	8.7											7
8		07:00	JRP			408	0.588	8.9											8
9		07:00	JRP			408	0.588	9.0											9
10		11:30	JRP			347	0.500	9.6											10
11		07:00	JRP			475	0.684	9.2											11
12		07:00	JRP			475	0.684	9.2											12
13		07:00	MK			347	0.500	9.0											13
14		07:00	MK			408	0.588	9.1											14
15		07:00	MK			408	0.588	9.2											15
16		07:00	MK			408	0.588	9.1											16
17		07:00	MK			408	0.588	9.0											17
18		07:00	DNR		6/25/86	408	0.588	9.1	<0.249	0.218	0.248	0.384	<0.020	<50	2197		ICP		18
19		07:00	MK			408	0.588	9.1											19
20		07:00	CY			475	0.684	9.3											20
21		07:00	CY			408	0.588	9.4											21
22		07:00	CY			408	0.588	9.0											22
23		07:00	CY			408	0.588	8.7											23
24		07:00	CY			475	0.684	9.3											24
25		07:00	CY			475	0.684	8.9											25
26		07:00	CY			408	0.588	8.8											26
27		07:00	DW			548	0.789	9.0											27
28		07:00	DW			408	0.588	8.9											28
29		07:00	DW	GRAB		800	1.152	8.9											29
30	001		NO	DISCHARGE															30
31																			31

ST JOE LEAD COMPANY, HERCULANEUM, MO.

April 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Sam. Temp	Analytical Method		
1	002		Unmeasurable																1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8			Unmeasurable																8
9			Flooded																9
10			Unmeasurable																10
11																			11
12																			12
13																			13
14																			14
15																			15
16																			16
17																			17
18																			18
19																			19
20			Unmeasurable																20
21		09:00	JML	GRAB		44	0.063												21
22		09:00	JML	GRAB		44	0.063												22
23			Unmeasurable																23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30	002		Unmeasurable																30
31																			31

ST JOE LEAD COMPANY, HERCULANEUM, MO.

May 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Surface pds	Fan. Temp	Analytical Method		
1	002		Unmeasurable																1
2																			2
3																			3
4																			4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14			Unmeasurable																14
15		00:00	JML			96													15
16			Unmeasurable																16
17																			17
18			Unmeasurable																18
19			Flooded																19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30																			30
31	002		Flooded																31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

June 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Sulfate pds	Sam. Temp	Analytical Method		
1	002		Flooded																1
2																			2
3																			3
4																			4
5			Flooded																5
6		08:30	JML		GRAB	199													6
7			Unmeasurable																7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14			Unmeasurable																14
15		15:30	BC		GRAB	.905													15
16																			16
17																			17
18																			18
19																			19
20																			20
21		15:30	DO		GRAB	199													21
22		15:30	BG		GRAB	72													22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30																			30
31	002		Unmeasurable																31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

April 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Surface pds	Rec. Temp	Analytical Method		
1	003	10:30	JML	GRAB		1246	1.794									54			1
2		08:30	JML			1125	1.620									60			2
3		09:00	JML			1125	1.620									60			3
4		09:00	JML			1125	1.620									60			4
5		15:30	BG			1125	1.620									60			5
6		15:30	MK			1011	1.456									60			6
7		09:00	JML			1125	1.620									60			7
8		09:00	GLW			1125	1.620									60			8
9		09:00	JML	GRAB		13	0.018	7.8	<0.008	<0.001	<0.001	<0.008	<0.001	---	31	54	ICP		9
10			NO DISCHARGE																10
11																			11
12																			12
13																			13
14																			14
15																			15
16																			16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30	003		NO DISCHARGE																30
31																			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

May 1986	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Surface pds	Pan. Temp	Analytical Method		
1	001	09:00	JML	GRAB		905	1.303									64			1
2																67			2
3		16:00	RG	GRAB		1654	2.382									89			3
4		17:00	RA			1125	1.620									75			4
5		08:30	JML			1125	1.620	7.3								84			5
6		08:30	JML			1125	1.620	7.3								60			6
7		15:00	JML			1125	1.620									60			7
8		16:00	JML			1011	1.456									85			8
9		15:30	JML			905	1.303									68			9
10		16:00	KD			1125	1.620									70			10
11		15:30	KD			1125	1.620									72			11
12		15:30	JML			1125	1.620									84			12
13		08:30	JML			1125	1.620									87			13
14		08:30	JML			1125	1.620									84			14
15		08:30	JML			905	1.303									73			15
16		08:30	JML			1125	1.620	7.7								81			16
17		15:00	RG			1125	1.620									84			17
18		16:00	WB			1011	1.456									70			18
19		08:30	JML			1125	1.620	7.7								68			19
20			FLOODED													72			20
21																84			21
22																82			22
23																78			23
24																83			24
25																79			25
26																70			26
27																70			27
28																70			28
29																68			29
30			FLOODED													70			30
31	003	16:00	MK			1125	1.620									70			31

ST. JOE LEAD COMPANY, HERCULANEUM, MO.

June 1989	Point Number	Time of Day	Sampled By	Sample Type	Date of Analysis	Flow, gpm	Flow, MGD	pH	Total As, pds	Total Zn, pds	Total Cd, pds	Total Pb, pds	Total Cu, pds	SS, pds	Surface pds	Sam. Temp	Analytical Method		
1	001	17:00	JML	GRAB		1125	1.620									72			1
2		08:00	JML			1125	1.620									64			2
3		15:00	JML			160	0.230		<0.097	0.009	< 0.002	0.098	<0.008	---	281	64			3
4		08:30	JML			1160	0.230									64			4
5			NO DISCHARGE																5
6																			6
7																			7
8																			8
9																			9
10																			10
11																			11
12																			12
13																			13
14																			14
15																			15
16																			16
17																			17
18																			18
19																			19
20																			20
21																			21
22																			22
23																			23
24																			24
25																			25
26																			26
27																			27
28																			28
29																			29
30	003		NO DISCHARGE																30
31																			31

ST. JOE LEAD COMPANY
Smelting Division
Herculaneum, Missouri 63048

October 28, 1986

Mr. Robert Zeman
Chief Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
Saint Louis, Missouri 63119

Re: Third Quarter 1986 NPDES Report, MO-0000281

Dear Bob:

Enclosed you will find the routine quarterly report for the third quarter of 1986.

St. Joe has recently installed a new pH lime addition system at the waste water treatment plant. The unit is undergoing shakedown and St. Joe is gaining experience in its operation. The automatic unit should provide increased consistent pH control.

St. Joe in its continuing efforts to improve the reliability and capabitlity of the flux building storm water sump pump station is about to embark on a major replacement of one of the system's primary components. Earlier this year St. Joe entered into a contract with a contractor specializing in the descaling of process water lines. While this effort was somewaht productive, it was not entirely satisfactory. Therefore, St. Joe is currrently planning to replace the entire length of the pump's discharge line (approximately 350 feet of 10" cast iron pipe).

The outfall 003 discharge was not restarted until the last week of September. The last week of September also saw the river waters rise and overflow the 003 sampling point.

Sincerely,

Daniel L. Vornberg
Environmental Manager

RI DEPARTMENT OF NATURAL RESOURCES
ON OF ENVIRONMENTAL QUALITY
MO[illegible]ING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

ST. JOE LEAD COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLOUR CORPORATION, IRVINE, CALIFORINA

UMBER: 3.500 JEFFERSON, POINTS 001, 002, AND 003

TY NAME: LEAD SMELTING DIVISION, HERCULANEUM, MISSOURI 63048

COVERING PERIOD: 1 JULY 30 SEPTEMBER 1986

	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PPM	TOTAL Zn, PPM	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PPM	SUSPENDED SOLIDS, PP	SULFATE, PPM
1	01-Jul-86	WWTP down during smelter trunaround													
1	02-Jul-86	WWTP down during smelter trunaround													
1	03-Jul-86	WWTP down during smelter trunaround													
1	04-Jul-86	WWTP down during smelter trunaround													
1	05-Jul-86	WWTP down during smelter trunaround													
1	06-Jul-86	WWTP down during smelter trunaround													
1	07-Jul-86	WWTP down during smelter trunaround													
1	08-Jul-86	WWTP down during smelter trunaround													
1	09-Jul-86	WWTP down during smelter trunaround													
1	10-Jul-86	WWTP down during smelter trunaround													
1	[illegible]ul-86	WWTP down during smelter trunaround													
1	[illegible]ul-86	WWTP down during smelter trunaround													
1	13-Jul-86	WWTP down during smelter trunaround													
1	14-Jul-86	WWTP down during smelter trunaround													
1	15-Jul-86	0000	600	WTP											
1	16-Jul-86	0000	650	WTP											
1	17-Jul-86	0000	635	WTP											
1	18-Jul-86	0000	665	WTP											
1	19-Jul-86	0000	687	WTP											
1	20-Jul-86	0000	675	WTP											
1	21-Jul-86	0000	658	WTP											
1	22-Jul-86	0000	700	WTP											
1	23-Jul-86	0000	666	WTP											
1	24-Jul-86	0000	652	WTP											
1	25-Jul-86	0000	700	WTP											
1	26-Jul-86	0000	462	ISCO	9		COMP	07-29-86	0.0675	0.0386	0.0229	0.0953	0.007		
1	27-Jul-86	0000	800	WTP											
1	28-Jul-86	0000	800	WTP											
1	29-Jul-86	0000	422	EX											
1	30-Jul-86	0000	480	EX											
1	31-Jul-86	0000	372	EX											
1	01-Aug-86	0000	440	EX											
1	02-Aug-86	0000	447	EX											
1	03-Aug-86	0000	413	EX											
1	04-Aug-86	0000	430	EX											
1	05-Aug-86	0000	482	EX											
1	[illegible]ug-86	0000	436	EX											
1	07-Aug-86	0000	400	EX											
1	08-Aug-86	0000	446	EX											

1	09-Aug-86	0000	424 EX							
1	10-Aug-86	0000	431 EX							
1	11-Aug-86	0000	330 EX							
1	12-Aug-86	0000	302 EX							
1	13-Aug-86	0000	318 EX							
1	14-Aug-86	0000	336 EX							
1	15-Aug-86	0000	371 EX							
1	16-Aug-86	0000	373 EX							
1	17-Aug-86	0000	388 EX							
1	18-Aug-86	0000	479 EX							
1	19-Aug-86	0000	367 EX							
1	20-Aug-86	0000	416 EX		COMP	08-28-86	0.0864	0.001	0.001	0.051	0.007
1	21-Aug-86	0000	360 EX							
1	22-Aug-86	0000	352 EX		COMP	08-28-86	0.05	0.001	0.001	0.048	0.007
1	23-Aug-86	0000	350 EX							
1	24-Aug-86	0000	343 EX							
1	25-Aug-86	0000	342 EX							
1	26-Aug-86	0000	383 EX							
1	27-Aug-86	0000	359 EX	10.5						
1	28-Aug-86	0000	190 EX							
1	29-Aug-86	0000	333 EX							
1	30-Aug-86	0000	304 EX							
1	31-Aug-86	0000	316 EX							
1	01-Sep-86	0000	277 EX							
1	02-Sep-86	0000	290 EX							
1	03-Sep-86	0000	288 EX							
1	04-Sep-86	0000	293 EX							
1	05-Sep-86	0000	270 EX							
1	06-Sep-86	0000	269 EX							
1	07-Sep-86	0000	190 EX							
1	08-Sep-86	0000	219 EX							
1	09-Sep-86	0000	275 EX							
1	10-Sep-86	0000	261 EX							
1	11-Sep-86	0000	239 EX							
1	12-Sep-86	0000	158 EX							
1	13-Sep-86	0000	320 EX							
1	14-Sep-86	0000	224 EX							
1	15-Sep-86	0000	318 EX							
1	16-Sep-86	0000	227 EX							
1	17-Sep-86	0000	250 EX	10.3						
1	18-Sep-86	0000	147 EX							
1	19-Sep-86	0000	236 EX							
1	20-Sep-86	0000	193 EX							
1	21-Sep-86	0000	236 EX							
1	22-Sep-86	0000	248 EX							
1	23-Sep-86	0000	190 EX							
1	24-Sep-86	0000	246 EX							
1	25-Sep-86	0000	250 EX							
1	26-Sep-86	0000	210 EX							
1	27-Sep-86	0000	224 EX							
1	28-Sep-86	0000	216 EX		COMP	17-Oct-86	0.05	0.0225	0.0138	0.0829	0.007
1	29-Sep-86	0000	203 EX							
1	30-Sep-86	0000	215 EX							

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: ST. JOE LEAD COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLOUR CORPORATION, IRVINE, CALIFORINA

FILE NUMBER: 3.500 JEFFERSON, POINTS 001, 002, AND 003

FACILITY NAME: LEAD SMELTING DIVISION, HERCULANEUM, MISSOURI 63048

REPORT COVERING PERIOD: 1 JULY 30 SEPTEMBER 1986

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PPM	TOTAL Zn, PPM	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PPM	SUSPENDEI SOLIDS,PI
2	01-Jul-86													
2	02-Jul-86	Unmeasureable												
2	03-Jul-86	Unmeasureable												
2	04-Jul-86	Unmeasureable												
2	05-Jul-86	Unmeasureable												
2	06-Jul-86	Unmeasureable												
2	07-Jul-86	Unmeasureable												
2	08-Jul-86	Unmeasureable												
2	09-Jul-86	Unmeasureable												
2	10-Jul-86	Unmeasureable												
2	11-Jul-86	Unmeasureable												
2	12-Jul-86	Unmeasureable												
2	13-Jul-86	Unmeasureable												
2	14-Jul-86		FLOODED											
2	15-Jul-86		FLOODED											
2	16-Jul-86		FLOODED											
2	17-Jul-86		FLOODED											
2	18-Jul-86		FLOODED											
2	19-Jul-86		FLOODED											
2	20-Jul-86	Unmeasureable												
2	21-Jul-86	Unmeasureable												
2	22-Jul-86	Unmeasureable												
2	23-Jul-86	Unmeasureable												
2	24-Jul-86	Unmeasureable												
2	25-Jul-86	Unmeasureable												
2	26-Jul-86	Unmeasureable												
2	27-Jul-86	Unmeasureable												
2	28-Jul-86	Unmeasureable												
2	29-Jul-86	Unmeasureable												
2	30-Jul-86	Unmeasureable												
2	31-Jul-86	Unmeasureable												
2	01-Aug-86	Unmeasureable												
2	02-Aug-86	Unmeasureable												
2	03-Aug-86	Unmeasureable												
2	04-Aug-86	Unmeasureable												
2	05-Aug-86	Unmeasureable												
2	06-Aug-86	Unmeasureable												
2	07-Aug-86	0000		31 ST										
2	08-Aug-86	0000		41 SG										

2	09-Aug-86	0000	97	ST
2	10-Aug-86	0000	243	SG
2	11-Aug-86	0000	180	SG
2	12-Aug-86	0000	169	SG
2	13-Aug-86	0000	150	SG
2	14-Aug-86	Unmeasureable		
2	15-Aug-86	Unmeasureable		
2	16-Aug-86	Unmeasureable		
2	17-Aug-86	Unmeasureable		
2	18-Aug-86	Unmeasureable		
2	19-Aug-86	Unmeasureable		
2	20-Aug-86	Unmeasureable		
2	21-Aug-86	Unmeasureable		
2	22-Aug-86	Unmeasureable		
2	23-Aug-86	Unmeasureable		
2	24-Aug-86	Unmeasureable		
2	25-Aug-86	0000	140	SG
2	26-Aug-86	0000	123	SG
2	27-Aug-86	0000	33	SG
2	28-Aug-86	Unmeasureable		
2	29-Aug-86	Unmeasureable		
2	30-Aug-86	Unmeasureable		
2	31-Aug-86	Unmeasureable		
2	01-Sep-86	Unmeasureable		
2	02-Sep-86	Unmeasureable		
2	03-Sep-86	Unmeasureable		
2	04-Sep-86	Unmeasureable		
2	05-Sep-86	Unmeasureable		
2	06-Sep-86	Unmeasureable		
2	07-Sep-86	Unmeasureable		
2	08-Sep-86	Unmeasureable		
2	09-Sep-86	Unmeasureable		
2	10-Sep-86	Unmeasureable		
2	11-Sep-86	Unmeasureable		
2	12-Sep-86	Unmeasureable		
2	13-Sep-86	Unmeasureable		
2	14-Sep-86	Unmeasureable		
2	15-Sep-86	Unmeasureable		
2	16-Sep-86	Unmeasureable		
2	17-Sep-86	Unmeasureable		
2	18-Sep-86	1530	206	JML
2	19-Sep-86	Unmeasureable		
2	20-Sep-86	Unmeasureable		
2	21-Sep-86	Unmeasureable		
2	22-Sep-86	Unmeasureable		
2	23-Sep-86	Unmeasureable		
2	24-Sep-86	Unmeasureable		
2	25-Sep-86	Unmeasureable		
2	26-Sep-86	Unmeasureable		
2	27-Sep-86	FLOODED		
2	28-Sep-86	FLOODED		
2	29-Sep-86	FLOODED		
2	30-Sep-86	FLOODED		

ISSOURI DEPARTMENT OF NATURAL RESOURCES
I[illegible] OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

WNER: ST. JOE LEAD COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLOUR CORPORATION, IRVINE, CALIFORINA

ILE NUMBER: 3.500 JEFFERSON, POINTS 001, 002, AND 003

ACILITY NAME: LEAD SMELTING DIVISION, HERCULANEUM, MISSOURI 63048

EPORT COVERING PERIOD: 1 JULY 30 SEPTEMBER 1986

OINT UMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PPM	TOTAL Zn, PPM	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PPM	SUSPENDED SOLIDS, PP	SULFA PPM
3	01-Jul-86	Acid plant on turnaround													
3	02-Jul-86	Acid plant on turnaround													
3	03-Jul-86	Acid plant on turnaround													
3	04-Jul-86	Acid plant on turnaround													
3	05-Jul-86	Acid plant on turnaround													
3	06-Jul-86	Acid plant on turnaround													
3	07-Jul-86	Acid plant on turnaround													
3	08-Jul-86	Acid plant on turnaround													
3	09-Jul-86	Acid plant on turnaround													
3	10-Jul-86	Acid plant on turnaround													
3	11-Jul-86	Acid plant on turnaround													
3	12-Jul-86	Acid plant on turnaround													
3	13-Jul-86	Acid plant on turnaround													
3	14-Jul-86	Acid plant on turnaround													
3	15-Jul-86	Acid plant on turnaround													
3	16-Jul-86	Acid plant on turnaround													
3	17-Jul-86	Acid plant on turnaround													
3	18-Jul-86	Acid plant on turnaround													
3	19-Jul-86	Acid plant on turnaround													
3	20-Jul-86	Acid plant on turnaround													
3	21-Jul-86	Acid plant on turnaround													
3	22-Jul-86	Acid plant on turnaround													
3	23-Jul-86	Acid plant on turnaround													
3	24-Jul-86	Acid plant on turnaround													
3	25-Jul-86	Acid plant on turnaround													
3	26-Jul-86	Acid plant on turnaround													
3	27-Jul-86	Acid plant on turnaround													
3	28-Jul-86	Acid plant on turnaround													
3	29-Jul-86	Acid plant on turnaround													
3	30-Jul-86	Acid plant on turnaround													
3	31-Jul-86	Acid plant on turnaround													
3	01-Aug-86	Acid plant on turnaround													
3	02-Aug-86	Acid plant on turnaround													
3	03-Aug-86	Acid plant on turnaround													
3	04-Aug-86	Acid plant on turnaround													
3	05-Aug-86	Acid plant on turnaround													
3	06-Aug-86	Acid plant on turnaround													
3	07-Aug-86	Acid plant on turnaround													
3	08-Aug-86	Acid plant on turnaround													

3	09-Aug-86	Acid plant on turnaround									
3	10-Aug-86	Acid plant on turnaround									
3	11-Aug-86	Acid plant on turnaround									
3	12-Aug-86	Acid plant on turnaround									
3	13-Aug-86	Acid plant on turnaround									
3	14-Aug-86	Acid plant on turnaround									
3	15-Aug-86	Acid plant on turnaround									
3	16-Aug-86	Acid plant on turnaround									
3	17-Aug-86	Acid plant on turnaround									
3	18-Aug-86	Acid plant on turnaround									
3	19-Aug-86	Acid plant on turnaround									
3	20-Aug-86	Acid plant on turnaround									
3	21-Aug-86	Acid plant on turnaround									
3	22-Aug-86	Acid plant on turnaround									
3	23-Aug-86	Acid plant on turnaround									
3	24-Aug-86	Acid plant on turnaround									
3	25-Aug-86	Acid plant on turnaround									
3	26-Aug-86	Acid plant on turnaround									
3	27-Aug-86	Acid plant on turnaround									
3	28-Aug-86	Acid plant on turnaround									
3	29-Aug-86	Acid plant on turnaround									
3	30-Aug-86	Acid plant on turnaround									
3	31-Aug-86	Acid plant on turnaround									
3	01-Sep-86	Acid plant on turnaround									
3	02-Sep-86	Acid plant on turnaround									
3	03-Sep-86	Acid plant on turnaround									
3	04-Sep-86	Acid plant on turnaround									
3	05-Sep-86	Acid plant on turnaround									
3	06-Sep-86	Acid plant on turnaround									
3	07-Sep-86	Acid plant on turnaround									
3	08-Sep-86	Acid plant on turnaround									
3	09-Sep-86	Acid plant on turnaround									
3	10-Sep-86	Acid plant on turnaround									
3	11-Sep-86	Acid plant on turnaround									
3	12-Sep-86	Acid plant on turnaround									
3	13-Sep-86	Acid plant on turnaround									
3	14-Sep-86	Acid plant on turnaround									
3	15-Sep-86	Acid plant on turnaround									
3	16-Sep-86	Acid plant on turnaround									
3	17-Sep-86	Acid plant on turnaround									
3	18-Sep-86	Acid plant on turnaround									
3	19-Sep-86	Acid plant on turnaround									
3	20-Sep-86	Acid plant on turnaround									
3	21-Sep-86	Acid plant on turnaround									
3	22-Sep-86	Acid plant on turnaround									
3	23-Sep-86	Acid plant on turnaround									
3	24-Sep-86	Acid plant on turnaround									
3	25-Sep-86	Acid plant on turnaround									
3	26-Sep-86	FLOODED									
3	27-Sep-86	FLOODED	7.3		GRAB	17-Oct-86	0.05	0.00314	0.001	0.05	0.007
3	28-Sep-86	FLOODED									
3	29-Sep-86	FLOODED		68							
3	30-Sep-86	FLOODED	7.3	68							

DOE RUN COMPANY
Herculaneum Division
Herculaneum, Missouri 63048

November 11, 1986

Mr. Robert Zeman
Chief Water Pollution Control
St. Louis Regional Office
Missouri Department of Natural Resources
8460 Watson Road
Saint Louis, Missouri 63119

Re: Addendum to the Third Quarter 1986 NPDES Report, MO-0000281

Dear Bob:

Please add the tss and sulfate data contained in the enclosed attachment to your files.

Also, Judith Kalna, Engineering Aide, from your office has requested that we report lead and cadmium in milligrams per liter and all other metals are to be reported in pounds. Judith's request is in response to her interpretation of the stipulation order covering our appeal number 119.

It is our understanding that the concentrations contained in the stipulation order covering our appeal number 119 are treatablility concentration limits. Based on these treatability concentration limits our interim allowable discharge limits are:

	Daily Max	Monthly Average
Total Lead, pounds	11.14	2.45
Total Cadmium, pounds	8.92	3.25

Sincerely,

Daniel L. Vornberg
Environmental Manager

cc: J. M. Lanzafame

Addedum to the Third Quarter

1986 NPDES Report, MO-0000281

Station Number	Date	Total As, pounds	Total Zn, pounds	Total Cd, mg/l	Total Pb, mg/l	Total Cu, pounds	TSS, pounds	Sulfate, pounds
001	07/26/86	0.38	0.218	0.0229	0.0953	0.039	<56	3091
001	08/09/86	0.387	0.004	0.001	0.051	0.031	<45	2245
001	08/21/86	<0.220	0.004	0.001	0.048	0.031	<44	1872
001	09/27/86	<0.136	0.061	0.0138	0.0829	0.019	<27	1592

THE DOE RUN COMPANY
Herculaneum Smelting Division
Herculaneum, Missouri 63048

January 27, 1987

Mr. James A. Burris, P.E.
Missouri Department of Natural Resources
Division of Environmental Quality
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Fourth Quarter 1986 NPDES Report, MO-0000281

Dear Jim:

Enclosed you will find the routine quarterly report for the fourth quarter of 1986.

During the quarter the discharge line of one of the wastewater collection systems became clogged to the point where replacement was deemed the only option. The collection pipe was part of the system used to intercept water going to Outfall 002. Replacement of the pipe was completed during mid-December. The collection capacity was greatly increased due to this maintenance item.

There were no discharges from outfall 003 during the quarter. The outfall 003 is the discharge for non-contact cooling water from our acid plant. The discharge is seasonal based on heat loadings of the acid plant cooling tower.

It is our understanding that the concentrations contained in the stipulation order covering our appeal number 119 are treatability concentration limits. Based on these treatability concentration limits our interim allowable discharge limits are:

	Daily Max	Monthly Average
Total Lead, pounds	11.14	2.45
Total Cadmium, pounds	8.92	3.25

Sincerely,

Daniel L. Vornberg
Environmental Manager

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3.510 JEFFERSON, POINT: 1
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63030
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Oct-86	0000	157	EX											
1	02-Oct-86	0000	157	EX											
1	03-Oct-86	0000	229	EX											
1	04-Oct-86	0000	216	EX											
1	05-Oct-86	0000	160	EX											
1	06-Oct-86	0000	155	EX											
1	07-Oct-86	0000	164	EX											
1	08-Oct-86	0000	161	EX											
1	09-Oct-86	0000	137	EX											
1	10-Oct-86	0000	145	EX											
1	11-Oct-86	0000	133	EX											
1	12-Oct-86	0000	150	EX											
1	13-Oct-86	0000	131	EX											
1	14-Oct-86	0000	84	EX											
1	15-Oct-86	0000	138	EX											
1	16-Oct-86	0000	161	EX											
1	17-Oct-86	0000	154	EX											
1	18-Oct-86	0000	146	EX											
1	19-Oct-86	0000	159	EX											
1	20-Oct-86	0000	146	EX											
1	21-Oct-86	0000	152	EX											
1	22-Oct-86	0000	158	EX											
1	23-Oct-86	0000	171	EX											
1	24-Oct-86	0000	181	EX			GRAB	30-OCT-86	0.111	0.062	0.002	0.035	0.009	22	1286
1	25-Oct-86	0000	171	EX											
1	26-Oct-86	0000	163	EX											
1	27-Oct-86	0000	122	EX											
1	28-Oct-86	0000	118	EX	7.65										
1	[illegible]	[illegible]	155	EX											
1	[illegible]	[illegible]	[illegible]	[illegible]											
1	[illegible]	[illegible]	130	EX											

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3.500 JEFFERSON POINT: 1
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Nov-86	0000	118	EX											
1	02-Nov-86	0000	215	EX											
1	03-Nov-86	0000	118	EX											
1	04-Nov-86	0000	132	EX											
1	05-Nov-86	0000	215	EX											
1	06-Nov-86	0000	160	EX											
1	07-Nov-86	0000	283	EX											
1	08-Nov-86	0000	297	EX											
1	09-Nov-86	0000	278	EX											
1	10-Nov-86	0000	241	EX											
1	11-Nov-86	0000	297	EX											
1	12-Nov-86		NO DATA												
1	13-Nov-86		NO DATA												
1	14-Nov-86	1530	408	JML		9.7									
1	15-Nov-86	0000	126	WTP											
1	16-Nov-86	0000	408	WTP											
1	17-Nov-86	0000	524	WTP											
1	18-Nov-86	0000	475	WTP			COMP	26-NOV-86	0.290	0.754	0.01	0.134	0.429	58	2685
1	19-Nov-86	0000	511	WTP											
1	20-Nov-86	0000	475	WTP			COMP	26-NOV-86	0.290	4.989	0.114	0.191	0.023	50	4939
1	21-Nov-86	0000	408	WTP											
1	22-Nov-86	0000	408	WTP											
1	23-Nov-86	0000	408	WTP											
1	24-Nov-86	0000	475	WTP											
1	25-Nov-86	0000	475	WTP											
1	26-Nov-86	0000	475	WTP											
1	27-Nov-86	0000	441	WTP											
1	28-Nov-86	0000	441	WTP											
1	29-Nov-86	[illegible]	441	WTP											
1	[illegible]		[illegible]	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3.560 JEFFERSON, POINT: 1
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME HR MIN	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Dec-86	0000		408 WTP											
1	02-Dec-86	[illegible]		408 WTP											
1	03-Dec-86	[illegible]		377 WTP											
1	04-Dec-86	[illegible]		408 WTP											
1	05-Dec-86	[illegible]		377 WTP											
1	06-Dec-86	0000		408 WTP											
1	07-Dec-86	0000		408 WTP											
1	08-Dec-86	[illegible]		347 WTP											
1	09-Dec-86	[illegible]		408 WTP											
1	10-Dec-86	[illegible]		319 WTP											
1	11-Dec-86	0000		408 WTP											
1	12-Dec-86	[illegible]		357 WTP											
1	13-Dec-86	[illegible]		388 WTP											
1	14-Dec-86	[illegible]		340 WTP											
1	15-Dec-86	[illegible]		331 WTP											
1	16-Dec-86	[illegible]		398 WTP											
1	17-Dec-86	[illegible]		357 WTP											
1	18-Dec-86	[illegible]		369 WTP											
1	19-Dec-86	[illegible]		369 WTP											
1	20-Dec-86	[illegible]		408 WTP											
1	21-Dec-86	[illegible]		369 WTP											
1	22-Dec-86	[illegible]		408 WTP											
1	23-Dec-86	[illegible]		388 WTP			COMP	07-JAN-87	0.026	0.199	0.051	0.2	0.142	47	3340
1	24-Dec-86	0000		408 JNL											
1	25-Dec-86	0000		408 WTP											
1	26-Dec-86	0000		369 WTP											
1	27-Dec-86	0000		408 WTP											
1	28-Dec-86	[illegible]		408 WTP											
1	29-Dec-86	[illegible]		292 WTP											
1	30-Dec-86	[illegible]		[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42	[illegible]
1	31-Dec-86	[illegible]		212 WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0004281
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3.500 JEFFERSON; POINT: 2
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Oct-86		FLOODED												
2	02-Oct-86		FLOODED												
2	03-Oct-86		FLOODED												
2	04-Oct-86		FLOODED												
2	05-Oct-86		FLOODED												
2	06-Oct-86		FLOODED												
2	07-Oct-86		FLOODED												
2	08-Oct-86		FLOODED												
2	09-Oct-86		FLOODED												
2	10-Oct-86		FLOODED												
2	11-Oct-86		FLOODED												
2	12-Oct-86		FLOODED												
2	13-Oct-86		FLOODED												
2	14-Oct-86		FLOODED												
2	15-Oct-86		FLOODED												
2	16-Oct-86		FLOODED												
2	17-Oct-86		FLOODED												
2	18-Oct-86		FLOODED												
2	19-Oct-86		FLOODED												
2	20-Oct-86		FLOODED												
2	21-Oct-86		FLOODED												
2	22-Oct-86		FLOODED												
2	23-Oct-86		FLOODED												
2	24-Oct-86		FLOODED												
2	25-Oct-86		FLOODED												
2	26-Oct-86		FLOODED												
2	27-Oct-86		FLOODED												
2	28-Oct-86		FLOODED												
[illegible]	[illegible]		[illegible]												
[illegible]	[illegible]		[illegible]												
[illegible]	[illegible]		[illegible]												

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLOOD CONVERSION, IRVINE, CALIFORNIA

FILE NUMBER: 3.500 JEFFERSON, POINT: 2
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL PB, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Nov-86		FLOODED												
2	02-Nov-86		FLOODED												
2	03-Nov-86		FLOODED												
2	04-Nov-86		FLOODED												
2	05-Nov-86		FLOODED												
2	06-Nov-86		FLOODED												
2	07-Nov-86	0830	UNMEASUREABLE												
2	08-Nov-86		UNMEASUREABLE												
2	09-Nov-86		UNMEASUREABLE												
2	10-Nov-86		UNMEASUREABLE												
2	11-Nov-86		UNMEASUREABLE												
2	12-Nov-86		NO DATA												
2	13-Nov-86		NO DATA												
2	14-Nov-86		NO DATA												
2	15-Nov-86	1[illegible]	12	JV											
2	16-Nov-86	15[illegible]	25	JV											
2	17-Nov-86		4	JML		10	GRAB	3[illegible]-DEC-86	0.[illegible]	0.791	0.72	2.4	0.111	85	98
2	18-Nov-86		24	JML											
2	19-Nov-86		24	JML			GRAB	26-NOV-86	0.056	1.800	2.71	9.34	0.275	3	116
2	20-Nov-86	[illegible]	8	JML			GRAB	26-NOV-86	0.028	0.084	0.239	0.472	0.059	1	24
2	21-Nov-86		24	JML			GRAB	26-NOV-86	0.039	0.291	0.193	3.43	0.266	3	174
2	22-Nov-86	1[illegible]	97	ST		8.7	GRAB	30-DEC-86	0.104	5.093	2.3	3.2	0.592	50	351
2	23-Nov-86	1[illegible]	126	JB		9.3	GRAB	30-DEC-86	0.215	6.000	2.7	3.9	1.252	369	505
2	24-Nov-86	1[illegible]	44	JML		8.2	GRAB	30-DEC-86	0.064	0.526	0.45	1.5	0.156	19	113
2	25-Nov-86	150[illegible]	67	JML											
2	26-Nov-86	16[illegible]	44	JML		8.5	GRAB	30-DEC-86	0.086	0.698	0.4	2	0.045	19	119
2	27-Nov-86	[illegible]	72	ET		9.6	GRAB	30-DEC-86	0.229	1.055	0.29	2.1	0.059	28	178
2	28-Nov-86	[illegible]	56	ET		8.6	GRAB	30-DEC-86	0.076	1.143	0.45	2.7	0.089	17	150
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	GRAB	[illegible]	[illegible]	[illegible]	[illegible]	1.1	[illegible]	11	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000281
PART OF FLORIS FORMATION, IRVINE, CALIFORNIA

FILE NUMBER: 3,500 JEFFERSON, POINT: 2
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Dec-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS LBS/DAY	TOTAL AS PPM	TOTAL Zn LBS/DAY	TOTAL Zn PPM	TOTAL CD LBS/DAY	TOTAL CD PPM	TOTAL Pb LBS/DAY	TOTAL Pb PPM	TOTAL Cu LBS/DAY	TOTAL Cu PPM	SUSPENDED SOLIDS LBS/DAY	SUSPENDED SOLIDS PPM	SULFATE LBS/DAY	SULFATE PPM
2	01-Dec-86	[illegible]	5.[illegible]	[illegible]	8.5		GRAB	30-DEC-86	0.[illegible]3	3.048	2.7	8.4	0.203		36		245	
2	02-Dec-86	1145	175	GLW	7.[illegible]		GRAB	30-DEC-86	0.[illegible]4	7.302	2.4	6	0.286		83		713	
2	03-Dec-86	[illegible]	6[illegible]	GLW	8.2		GRAB	30-DEC-86	0.[illegible]9	1.882	1.5	2.8	0.147		33		238	
2	04-Dec-86	[illegible]	FLOODED	GLW													0	
2	05-Dec-86		FLOODED	GLW														
2	06-Dec-86	[illegible]	16[illegible]	ST														
2	07-Dec-86	[illegible]	160	ST														
2	08-Dec-86	1530	6[illegible]	JML	7.6		GRAB	30-DEC-86	0.[illegible]	0.704	0.28	0.74	0.025		11		142	
2	09-Dec-86	1530	6[illegible]	JML	8.5		GRAB	30-DEC-86	0.[illegible]8	1.053	0.31	4	0.278		55		211	
2	10-Dec-86	[illegible]	6[illegible]	JML	7.6		GRAB	30-DEC-86	0.[illegible]	1.053	0.58	3.4	0.136		21		169	
2	11-Dec-86	[illegible]	100	JML	7.4		GRAB	30-DEC-86	0.[illegible]	7.937	0.69	17	1.184		69		381	
2	12-Dec-86	[illegible]	6[illegible]	JML	7.3		GRAB	30-DEC-86	0.[illegible]	1.554	1.2	2.8	0.031		21		185	
2	13-Dec-86	1530	67	JV	7.5		GRAB	30-DEC-86	0.[illegible]5	1.309	0.68	1.6	0.031		11		203	
2	14-Dec-86	1530	6[illegible]	ST	7.8		GRAB	30-DEC-86	0.[illegible]1	1.634	0.87	2.3	0.017		15		208	
2	15-Dec-86	[illegible]	548	JML	8.4		GRAB	30-DEC-86	0.[illegible]5	36.801	1.6	20	30.110		696		2375	
2	16-Dec-86	[illegible]	139	JML	9.6		GRAB	30-DEC-86	0.[illegible]4	7.937	1.8	19	1.746		341		543	
2	17-Dec-86	[illegible]	130	JML	7.9		GRAB	30-DEC-86	0.[illegible]	3.810	0.94	5.2	0.175		35		405	
2	18-Dec-86	[illegible]	130	JML	7.9		GRAB	30-DEC-86	0.[illegible]	3.810	0.88	6.5	0.270		76		440	
2	19-Dec-86	[illegible]	139	JML	8.6		GRAB	30-DEC-86	0.[illegible]	19.794	0.67	23	1.905		127		465	
2	20-Dec-86	[illegible]	139	ST	7.9		GRAB	30-DEC-86	0.[illegible]	3.492	1.1	2.[illegible]	0.094		19		417	
2	21-Dec-86	[illegible]	97	JML	8.3		GRAB	30-DEC-86	0.[illegible]	2.250	0.56	3.3	0.509		44		293	
2	22-Dec-86		UNMEASUREABLE															
2	23-Dec-86		UNMEASUREABLE															
2	24-Dec-86		UNMEASUREABLE															
2	25-Dec-86		NO DATA															
2	26-Dec-86		NO DATA															
2	27-Dec-86	1530	206	ST														
2	28-Dec-86	[illegible]	72	ST														
[illegible]	[illegible]		[illegible]															
[illegible]	[illegible]		[illegible]															
2	31-Dec-86		UNMEASUREABLE															

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0004281
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3,500 JEFFERSON, POINT: 3
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL PB, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Oct-86		NO DISCHARGE												
3	02-Oct-86		NO DISCHARGE												
3	03-Oct-86		NO DISCHARGE												
3	04-Oct-86		NO DISCHARGE												
3	05-Oct-86		NO DISCHARGE												
3	06-Oct-86		NO DISCHARGE												
3	07-Oct-86		NO DISCHARGE												
3	08-Oct-86		NO DISCHARGE												
3	09-Oct-86		NO DISCHARGE												
3	10-Oct-86		NO DISCHARGE												
3	11-Oct-86		NO DISCHARGE												
3	12-Oct-86		NO DISCHARGE												
3	13-Oct-86		NO DISCHARGE												
3	14-Oct-86		NO DISCHARGE												
3	15-Oct-86		NO DISCHARGE												
3	16-Oct-86		NO DISCHARGE												
3	17-Oct-86		NO DISCHARGE												
3	18-Oct-86		NO DISCHARGE												
3	19-Oct-86		NO DISCHARGE												
3	20-Oct-86		NO DISCHARGE												
3	21-Oct-86		NO DISCHARGE												
3	22-Oct-86		NO DISCHARGE												
3	23-Oct-86		NO DISCHARGE												
3	24-Oct-86		NO DISCHARGE												
3	25-Oct-86		NO DISCHARGE												
3	26-Oct-86		NO DISCHARGE												
3	27-Oct-86		NO DISCHARGE												
3	28-Oct-86		NO DISCHARGE												
3	29-Oct-86		NO DISCHARGE												
3	[illegible]		NO DISCHARGE												
3	[illegible]		NO DISCHARGE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0004081
PART OF FLORA CORPORATION, IRVINE, KENTUCKY

FILE NUMBER: 3.500 DISCHARGE POINT: 3
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF SAMPLING	SAMPLED BY	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Nov-86		NO DISCHARGE										
3	02-Nov-86		NO DISCHARGE										
3	03-Nov-86		NO DISCHARGE										
3	04-Nov-86		NO DISCHARGE										
3	05-Nov-86		NO DISCHARGE										
3	06-Nov-86		NO DISCHARGE										
3	07-Nov-86		NO DISCHARGE										
3	08-Nov-86		NO DISCHARGE										
3	09-Nov-86		NO DISCHARGE										
3	10-Nov-86		NO DISCHARGE										
3	11-Nov-86		NO DISCHARGE										
3	12-Nov-86		NO DISCHARGE										
3	13-Nov-86		NO DISCHARGE										
3	14-Nov-86		NO DISCHARGE										
3	15-Nov-86		NO DISCHARGE										
3	16-Nov-86		NO DISCHARGE										
3	17-Nov-86		NO DISCHARGE										
3	18-Nov-86		NO DISCHARGE										
3	19-Nov-86		NO DISCHARGE										
3	20-Nov-86		NO DISCHARGE										
3	21-Nov-86		NO DISCHARGE										
3	22-Nov-86		NO DISCHARGE										
3	23-Nov-86		NO DISCHARGE										
3	24-Nov-86		NO DISCHARGE										
3	25-Nov-86		NO DISCHARGE										
3	26-Nov-86		NO DISCHARGE										
3	27-Nov-86		NO DISCHARGE										
3	28-Nov-86		NO DISCHARGE										
3	29-Nov-86		NO DISCHARGE										

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGERS

OWNER: THE DOE RUN COMPANY, CLAYTON, MISSOURI PERMIT NO: MO-0000731
PART OF FLUOR CORPORATION, IRVINE, CALIFORNIA

FILE NUMBER: 3.500 JEFFERSON, POINT: 3
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-86 THROUGH 31-Dec-86

POINT NUMBER	SAMPLING DATE	TIME OF DAY	FLOW GPM	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PPM	TOTAL Pb, PPM	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Dec-86		NO DISCHARGE												
3	02-Dec-86		NO DISCHARGE												
3	03-Dec-86		NO DISCHARGE												
3	04-Dec-86		NO DISCHARGE												
3	05-Dec-86		NO DISCHARGE												
3	06-Dec-86		NO DISCHARGE												
3	07-Dec-86		NO DISCHARGE												
3	08-Dec-86		NO DISCHARGE												
3	09-Dec-86		NO DISCHARGE												
3	10-Dec-86		NO DISCHARGE												
3	11-Dec-86		NO DISCHARGE												
3	12-Dec-86		NO DISCHARGE												
3	13-Dec-86		NO DISCHARGE												
3	14-Dec-86		NO DISCHARGE												
3	15-Dec-86		NO DISCHARGE												
3	16-Dec-86		NO DISCHARGE												
3	17-Dec-86		NO DISCHARGE												
3	18-Dec-86		NO DISCHARGE												
3	19-Dec-86		NO DISCHARGE												
3	20-Dec-86		NO DISCHARGE												
3	21-Dec-86		NO DISCHARGE												
3	22-Dec-86		NO DISCHARGE												
3	23-Dec-86		NO DISCHARGE												
3	24-Dec-86		NO DISCHARGE												
3	25-Dec-86		NO DISCHARGE												
3	26-Dec-86		NO DISCHARGE												
3	27-Dec-86		NO DISCHARGE												
3	28-Dec-86		NO DISCHARGE												
3	29-Dec-86		NO DISCHARGE												
3	30-Dec-86		NO DISCHARGE												
3	31-Dec-86		NO DISCHARGE												

002 - Dis

Actual	AS	Zn	Cd	Pb	Cu	S
Avg			1.809	16.324		
As Ins Permit						
Max	0	0	3	11	1	2
Avg	OK	OK	Over .65	Over 3.12	OK	OK
Interim Permit						
Max			1	3		
Avg			OK	Over 2.45		

n=17

00 — Nov

Actual	AS	Zn	Cd	Pb	Cu	SS
No #s						
Avg	.120	1.627	.787	1.785	.052	
As IS Permit						
Mo #	0	0	2	2	0	1
Avg	OK	OK	Over .65	Over 1.06	OK	OK
Interim Permit						
Mo #			0	0		
Avg			OK	OK		

file

THE DOE RUN COMPANY
Herculaneum Smelting Division
Herculaneum, Missouri 63048

April 24, 1987

Mr. James A. Burris, P.E.
Missouri Department of Natural Resources
Division of Environmental Quality
948 Lester Street
Poplar Bluff, Missouri 63901

Re: First Quarter 1987 NPDES Report, MO-0000281

Dear Jim:

Enclosed you will find the routine quarterly report for the first quarter of 1987.

There were no discharges from outfall 003 during the quarter. The outfall 003 is a discharge for non-contact cooling water from our acid plant. The discharge is seasonal based on heat loadings of the acid plant cooling tower.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Officer

cc: Dan Vornberg

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jan-87	0000	0.476	WTP											
1	02-Jan-87	0000	0.544	WTP											
1	03-Jan-87	0000	0.504	WTP											
1	04-Jan-87	0000	0.558	WTP											
1	05-Jan-87	0000	0.588	WTP											
1	06-Jan-87	0000	0.543	WTP											
1	07-Jan-87	0000	0.588	WTP											
1	08-Jan-87	0000	0.558	WTP											
1	09-Jan-87	0000	0.588	WTP											
1	10-Jan-87	0000	0.558	WTP											
1	11-Jan-87	0000	0.558	WTP											
1	12-Jan-87	0000	0.588	WTP											
1	13-Jan-87	0000	0.558	ISCO			COMP	16-Jan-87	0.107	1.048	0.196	0.712	0.033	46.562	3398.990
1	14-Jan-87	0000	0.687	WTP											
1	15-Jan-87	0000	0.588	WTP											
1	16-Jan-87	0000	0.559	WTP											
1	17-Jan-87	0000	0.542	WTP											
1	18-Jan-87	0000	0.471	WTP											
1	19-Jan-87	0000	0.503	WTP											
1	20-Jan-87	0000	0.564	WTP											
1	21-Jan-87	0000	0.625	WTP											
1	22-Jan-87	0000	0.596	WTP											
1	23-Jan-87	0000	0.684	WTP											
1	24-Jan-87	0000	0.652	WTP											
1	25-Jan-87	0000	0.652	WTP											
1	26-Jan-87	0000	0.684	WTP											
1	27-Jan-87	0000	0.62	WTP											
1	28-Jan-87	0000	0.517	WTP											
1	29-Jan-87	0000	0.669	JML		9.7									
1	30-Jan-87	0000	0.684	WTP											
1	31-Jan-87	0000	0.652	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Feb-87	0000	0.62	WTP											
1	02-Feb-87	0000	0.636	WTP											
1	03-Feb-87	0000	0.652	WTP											
1	04-Feb-87	0000	0.652	WTP											
1	05-Feb-87	0000	0.655	WTP											
1	06-Feb-87	0000	0.684	WTP											
1	07-Feb-87	0000	0.62	WTP											
1	08-Feb-87	0000	0.535	WTP											
1	09-Feb-87	0000	0.535	WTP											
1	10-Feb-87	0000	0.532	WTP											
1	11-Feb-87	0000	0.558	WTP											
1	12-Feb-87	0000	0.564	WTP											
1	13-Feb-87	0000	0.635	WTP											
1	14-Feb-87	0000	0.62	WTP											
1	15-Feb-87	0000	0.719	WTP											
1	16-Feb-87	0000	0.62	WTP											
1	17-Feb-87	0000	0.558	WTP											
1	18-Feb-87	0000	0.558	WTP											
1	19-Feb-87	0000	0.558	WTP											
1	20-Feb-87	0000	0.655	WTP											
1	21-Feb-87	0000	0.652	WTP											
1	22-Feb-87	0000	0.652	WTP											
1	23-Feb-87	0000	0.652	WTP		8.1									
1	24-Feb-87	0000	0.72	ISCO			COMP	27-Feb-87	0.354	0.210	0.114	0.745	0.060	60.079	306.405
1	25-Feb-87	0000	0.588	WTP											
1	26-Feb-87	0000	0.554	WTP											
1	27-Feb-87	0000	0.532	WTP											
1	28-Feb-87	0000	0.447	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Mar-87	0000	0.499	WTP											
1	02-Mar-87	0000	0.368	WTP											
1	03-Mar-87	0000	0.452	WTP											
1	04-Mar-87	0000	0.552	WTP											
1	05-Mar-87	0000	0.554	WTP											
1	06-Mar-87	0000	0.503	WTP											
1	07-Mar-87	0000	0.62	WTP											
1	08-Mar-87	0000	0	WTP											
1	09-Mar-87	0000	0.544	WTP											
1	10-Mar-87	0000	0.53	WTP											
1	11-Mar-87	0000	0.53	WTP											
1	12-Mar-87	0000	0.558	WTP											
1	13-Mar-87	0000	0.453	WTP											
1	14-Mar-87	0000	0.599	WTP											
1	15-Mar-87	0000	0.636	WTP											
1	16-Mar-87	0000	0.473	WTP											
1	17-Mar-87	0000	0.593	WTP											
1	18-Mar-87	0000	0.669	ISCO			COMP	22-Mar-87	0.128	0.793	0.374	0.910	0.045	55.824	4019.309
1	19-Mar-87	0000	0.737	WTP											
1	20-Mar-87	0000	0.588	WTP											
1	21-Mar-87	0000	0.725	WTP											
1	22-Mar-87	0000	0.792	WTP											
1	23-Mar-87	0000	0.655	WTP											
1	24-Mar-87	0000	0.737	WTP											
1	25-Mar-87	0000	0.799	WTP											
1	26-Mar-87	0000	0.799	WTP											
1	27-Mar-87	0000	0.588	WTP											
1	28-Mar-87	0000	0.544	WTP											
1	29-Mar-87	0000	0.62	WTP											
1	30-Mar-87	0000	0.684	WTP											
1	31-Mar-87	0000	0.789	GLW	7.9										

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jan-87		UNMEASUREABLE												
2	02-Jan-87		UNMEASUREABLE												
2	03-Jan-87		UNMEASUREABLE												
2	04-Jan-87		UNMEASUREABLE												
2	05-Jan-87		UNMEASUREABLE												
2	06-Jan-87		UNMEASUREABLE												
2	07-Jan-87		UNMEASUREABLE												
2	08-Jan-87		UNMEASUREABLE												
2	09-Jan-87		UNMEASUREABLE												
2	10-Jan-87		UNMEASUREABLE												
2	11-Jan-87		UNMEASUREABLE												
2	12-Jan-87		UNMEASUREABLE												
2	13-Jan-87		UNMEASUREABLE												
2	14-Jan-87		UNMEASUREABLE												
2	15-Jan-87		UNMEASUREABLE												
2	16-Jan-87		UNMEASUREABLE												
2	17-Jan-87		UNMEASUREABLE												
2	18-Jan-87		UNMEASUREABLE												
2	19-Jan-87		UNMEASUREABLE												
2	20-Jan-87		UNMEASUREABLE												
2	21-Jan-87		UNMEASUREABLE												
2	22-Jan-87		UNMEASUREABLE												
2	23-Jan-87	1400	0.096	JML			GRAB	22-Mar-87	0.211	0.424	0.207	0.841	0.031	80.907	436.577
2	24-Jan-87	1600	0.063	MK -- NO DATA											
2	25-Jan-87	1500	0.096	MK	11.1		GRAB	22-Mar-87	1.826	3.541	1.146	2.163	0.602	145.793	424.561
2	26-Jan-87		UNMEASUREABLE												
2	27-Jan-87	0900	0.187	JML			GRAB	22-Mar-87	0.406	2.840	1.300	9.472	0.830	57.735	405.703
2	28-Jan-87		UNMEASUREABLE												
2	29-Jan-87		UNMEASUREABLE												
2	30-Jan-87		UNMEASUREABLE												
2	31-Jan-87	1500	0.096	MK			GRAB	22-Mar-87	0.083	0.244	0.010	0.192	0.084	8.011	809.870

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Feb-87	1500	0.5	MK -- NO DATA											
2	02-Feb-87		UNMEASUREABLE												
2	03-Feb-87		UNMEASUREABLE												
2	04-Feb-87	1000	0.018	JML			GRAB	22-Mar-87	0.013	0.404	0.089	0.496	0.149	10.514	142.388
2	05-Feb-87		UNMEASUREABLE												
2	06-Feb-87		UNMEASUREABLE												
2	07-Feb-87		UNMEASUREABLE												
2	08-Feb-87		UNMEASUREABLE												
2	09-Feb-87		UNMEASUREABLE												
2	10-Feb-87	0900	0.096	JML			GRAB	22-Mar-87	0.251	2.684	0.661	6.144	0.379	36.048	422.158
2	11-Feb-87		UNMEASUREABLE												
2	12-Feb-87		UNMEASUREABLE												
2	13-Feb-87		UNMEASUREABLE												
2	14-Feb-87		UNMEASUREABLE												
2	15-Feb-87		UNMEASUREABLE												
2	16-Feb-87		DISCHARGE -- NO DATA												
2	17-Feb-87		DISCHARGE -- NO DATA												
2	18-Feb-87		UNMEASUREABLE												
2	19-Feb-87		UNMEASUREABLE												
2	20-Feb-87		UNMEASUREABLE												
2	21-Feb-87		UNMEASUREABLE												
2	22-Feb-87		UNMEASUREABLE												
2	23-Feb-87		UNMEASUREABLE												
2	24-Feb-87		UNMEASUREABLE												
2	25-Feb-87		UNMEASUREABLE												
2	26-Feb-87		UNMEASUREABLE												
2	27-Feb-87		DISCHARGE -- NO DATA												
2	28-Feb-87		DISCHARGE -- NO DATA												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Mar-87		DISCHARGE -- NO DATA												
2	02-Mar-87	1345	0.297	GLW	9.5	SAMPLE LOST									
2	03-Mar-87		NO DATA												
2	04-Mar-87		NO DATA												
2	05-Mar-87		NO DATA												
2	06-Mar-87		UNMEASUREABLE												
2	07-Mar-87		UNMEASUREABLE												
2	08-Mar-87		UNMEASUREABLE												
2	09-Mar-87		UNMEASUREABLE												
2	10-Mar-87		UNMEASUREABLE												
2	11-Mar-87		UNMEASUREABLE												
2	12-Mar-87		UNMEASUREABLE												
2	13-Mar-87		UNMEASUREABLE												
2	14-Mar-87		UNMEASUREABLE												
2	15-Mar-87		UNMEASUREABLE												
2	16-Mar-87		UNMEASUREABLE												
2	17-Mar-87		UNMEASUREABLE												
2	18-Mar-87		UNMEASUREABLE												
2	19-Mar-87		UNMEASUREABLE												
2	20-Mar-87		UNMEASUREABLE												
2	21-Mar-87		DISCHARGE -- NO DATA												
2	22-Mar-87		DISCHARGE -- NO DATA												
2	23-Mar-87		DISCHARGE -- NO DATA												
2	24-Mar-87		UNMEASUREABLE												
2	25-Mar-87		UNMEASUREABLE												
2	26-Mar-87		UNMEASUREABLE												
2	27-Mar-87		UNMEASUREABLE												
2	28-Mar-87		UNMEASUREABLE												
2	29-Mar-87		UNMEASUREABLE												
2	30-Mar-87		UNMEASUREABLE												
2	31-Mar-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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REPORT COVERING PERIOD: 01-Jan-87 THROUGH 31-Mar-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jan-87		NO DISCHARGE												
3	02-Jan-87		NO DISCHARGE												
3	03-Jan-87		NO DISCHARGE												
3	04-Jan-87		NO DISCHARGE												
3	05-Jan-87		NO DISCHARGE												
3	06-Jan-87		NO DISCHARGE												
3	07-Jan-87		NO DISCHARGE												
3	08-Jan-87		NO DISCHARGE												
3	09-Jan-87		NO DISCHARGE												
3	10-Jan-87		NO DISCHARGE												
3	11-Jan-87		NO DISCHARGE												
3	12-Jan-87		NO DISCHARGE												
3	13-Jan-87		NO DISCHARGE												
3	14-Jan-87		NO DISCHARGE												
3	15-Jan-87		NO DISCHARGE												
3	16-Jan-87		NO DISCHARGE												
3	17-Jan-87		NO DISCHARGE												
3	18-Jan-87		NO DISCHARGE												
3	19-Jan-87		NO DISCHARGE												
3	20-Jan-87		NO DISCHARGE												
3	21-Jan-87		NO DISCHARGE												
3	22-Jan-87		NO DISCHARGE												
3	23-Jan-87		NO DISCHARGE												
3	24-Jan-87		NO DISCHARGE												
3	25-Jan-87		NO DISCHARGE												
3	26-Jan-87		NO DISCHARGE												
3	27-Jan-87		NO DISCHARGE												
3	28-Jan-87		NO DISCHARGE												
3	29-Jan-87		NO DISCHARGE												
3	30-Jan-87		NO DISCHARGE												
3	31-Jan-87		NO DISCHARGE												

MISSOURI DEPART[illegible] OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Feb-87		NO DISCHARGE												
3	02-Feb-87		NO DISCHARGE												
3	03-Feb-87		NO DISCHARGE												
3	04-Feb-87		NO DISCHARGE												
3	05-Feb-87		NO DISCHARGE												
3	06-Feb-87		NO DISCHARGE												
3	07-Feb-87		NO DISCHARGE												
3	08-Feb-87		NO DISCHARGE												
3	09-Feb-87		NO DISCHARGE												
3	10-Feb-87		NO DISCHARGE												
3	11-Feb-87		NO DISCHARGE												
3	12-Feb-87		NO DISCHARGE												
3	13-Feb-87		NO DISCHARGE												
3	14-Feb-87		NO DISCHARGE												
3	15-Feb-87		NO DISCHARGE												
3	16-Feb-87		NO DISCHARGE												
3	17-Feb-87		NO DISCHARGE												
3	18-Feb-87		NO DISCHARGE												
3	19-Feb-87		NO DISCHARGE												
3	20-Feb-87		NO DISCHARGE												
3	21-Feb-87		NO DISCHARGE												
3	22-Feb-87		NO DISCHARGE												
3	23-Feb-87		NO DISCHARGE												
3	24-Feb-87		NO DISCHARGE												
3	25-Feb-87		NO DISCHARGE												
3	26-Feb-87		NO DISCHARGE												
3	27-Feb-87		NO DISCHARGE												
3	28-Feb-87		NO DISCHARGE												

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OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Mar-87		NO DISCHARGE												
3	02-Mar-87		NO DISCHARGE												
3	03-Mar-87		NO DISCHARGE												
3	04-Mar-87		NO DISCHARGE												
3	05-Mar-87		NO DISCHARGE												
3	06-Mar-87		NO DISCHARGE												
3	07-Mar-87		NO DISCHARGE												
3	08-Mar-87		NO DISCHARGE												
3	09-Mar-87		NO DISCHARGE												
3	10-Mar-87		NO DISCHARGE												
3	11-Mar-87		NO DISCHARGE												
3	12-Mar-87		NO DISCHARGE												
3	13-Mar-87		NO DISCHARGE												
3	14-Mar-87		NO DISCHARGE												
3	15-Mar-87		NO DISCHARGE												
3	16-Mar-87		NO DISCHARGE												
3	17-Mar-87		NO DISCHARGE												
3	18-Mar-87		NO DISCHARGE												
3	19-Mar-87		NO DISCHARGE												
3	20-Mar-87		NO DISCHARGE												
3	21-Mar-87		NO DISCHARGE												
3	22-Mar-87		NO DISCHARGE												
3	23-Mar-87		NO DISCHARGE												
3	24-Mar-87		NO DISCHARGE												
3	25-Mar-87		NO DISCHARGE												
3	26-Mar-87		NO DISCHARGE												
3	27-Mar-87		NO DISCHARGE												
3	28-Mar-87		NO DISCHARGE												
3	29-Mar-87		NO DISCHARGE												
3	30-Mar-87		NO DISCHARGE												
3	31-Mar-87		NO DISCHARGE												

THE DOE RUN COMPANY
Herculaneum Smelting Division
Herculaneum, Missouri 63048

July 28, 1987

Mr. James A. Burris, P.E.
Missouri Department of Natural Resources
Division of Environmental Quality
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Second Quarter 1987 NPDES Report, MO-0000281

Dear Jim:

Enclosed you will find the routine quarterly report for the first quarter of 1987.

The flowmeter at the outfall 002 sampling station had experienced some operational problems during the quarter but have been largely resolved to date. In addition, The Doe Run Company is in the process of installing an automatic sampler at 002 which would be liquid level activated rather than the present manual sampling method.

Discharges from our outfall 003 were intermitent during the quarter. The outfall 003 is a discharge for non-contact cooling water from our acid plant. The discharge is based on the heat loadings of the acid plant cooling tower.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Officer

cc: Dan Vornberg

ATTACHMENT

OUTFALL NUMBER	DATE OF SAMPLE	DATE OF ANALYSIS	pH	As, PPM	Zn, PPM	Cd, PPM	Pb, PPM	Cu, PPM	TSS PPM	SULFATE PPM
002	04-06-87	07-23-87	8.5	0.11	0.44	0.05	0.37	0.04	0.18	1127
002	06-24-87	07-23-87	7.6	0.08	0.4	0.15	0.5	0.05	19	795
002	06-25-87	07-23-87	8.9	0.19	2.96	0.52	19	3	144	319

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PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Apr-87	0000	0.789	WTP											
1	02-Apr-87	0000	0.789	WTP											
1	03-Apr-87	0000	0.754	WTP											
1	04-Apr-87	0000	0.719	WTP											
1	05-Apr-87	0000	0.755	WTP											
1	06-Apr-87	0000	0.737	WTP											
1	07-Apr-87	0000	0.001	WTP											
1	08-Apr-87	0000	0.001	WTP											
1	09-Apr-87	0000	0.841	WTP											
1	10-Apr-87	0000	0.684	WTP											
1	11-Apr-87	0000	0.754	WTP											
1	12-Apr-87	0000	0.789	WTP											
1	13-Apr-87	0000	0.754	WTP											
1	14-Apr-87	0000	0.757	WTP											
1	15-Apr-87	0000	0.689	WTP											
1	16-Apr-87	0000	0.684	WTP											
1	17-Apr-87	0000	0.719	WTP											
1	18-Apr-87	0000	0.754	WTP											
1	19-Apr-87	0000	0.719	WTP											
1	20-Apr-87	0000	0.452	WTP											
1	21-Apr-87	0000	0.453	WTP											
1	22-Apr-87	0000	0.792	WTP											
1	23-Apr-87	0000	0.906	WTP			COMP	05-07-87	0.174	0.892	0.832	2.170	0.060		
1	24-Apr-87	0000	0.757	WTP											
1	25-Apr-87	0000	0.792	WTP											
1	26-Apr-87	0000	0.945	WTP											
1	27-Apr-87	0000	0.605	WTP											
1	28-Apr-87	0000	0.906	WTP			COMP	05-07-87	0.174	1.376	1.089	3.175	0.060		
1	29-Apr-87	0000	0.356	WTP		8.7									
1	30-Apr-87	0000	0.284	WTP			COMP	7-23-87	<0.118	0.166	0.166	<0.237	<0.024	30.807	1985.890

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PERMIT NO. MO-0000281
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OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-May-87	0000	0.465	WTP											
1	02-May-87	0000	0.315	WTP											
1	03-May-87	0000	0.343	WTP											
1	04-May-87	0000	0.634	WTP											
1	05-May-87	0000	0.441	WTP		8.3									
1	06-May-87	0000	0.492	WTP			COMP	7-23-87	<0.205	0.082	0.205	<0.411	<0.041	32.843	2611.049
1	07-May-87	0000	0.609	WTP											
1	08-May-87	0000	0.212	MS											
1	09-May-87	0000	0.589	WTP											
1	10-May-87	0000	0.586	WTP											
1	11-May-87	0000	0.643	WTP											
1	12-May-87	0000	0.421	WTP											
1	13-May-87	0000	0.525	WTP											
1	14-May-87	0000	0.343	WTP											
1	15-May-87	0000	0.939	WTP											
1	16-May-87	0000	0.273	WTP											
1	17-May-87	0000	0.15	WTP											
1	18-May-87	0000	0.001	WTP											
1	19-May-87	0000	0.453	WTP											
1	20-May-87	0000	0.225	WTP											
1	21-May-87	0000	0.29	WTP											
1	22-May-87	0000	0.504	WTP											
1	23-May-87	0000	0.2	WTP											
1	24-May-87	0000	0.199	WTP											
1	25-May-87	0000	0.322	WTP											
1	26-May-87	0000	0.34	WTP											
1	27-May-87	0000	0.376	WTP											
1	28-May-87	0000	0.248	WTP											
1	29-May-87	0000	0.346	WTP											
1	30-May-87	0000	0.261	WTP											
1	31-May-87	0000	0.432	WTP											

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OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jun-87	0000	0.001	WTP											
1	02-Jun-87	0000	0.001	WTP											
1	03-Jun-87	0000	0.001	WTP											
1	04-Jun-87	0000	0.249	WTP											
1	05-Jun-87	0000	0.001	WTP											
1	06-Jun-87	0000	0.805	WTP											
1	07-Jun-87	0000	0.749	WTP											
1	08-Jun-87	0000	0.263	WTP											
1	09-Jun-87	0000	0.001	WTP											
1	10-Jun-87	0000	0.001	WTP											
1	11-Jun-87	0000	0.166	WTP											
1	12-Jun-87	0000	0.001	WTP											
1	13-Jun-87	0000	0.553	WTP											
1	14-Jun-87	0000	0.504	WTP											
1	15-Jun-87	0000	0.689	WTP											
1	16-Jun-87	0000	0.718	WTP	7.8		GRAB	7-23-87	<0.300	0.959	0.419	1.678	0.060	23.965	4948.771
1	17-Jun-87	0000	0.643	WTP											
1	18-Jun-87	0000	0.864	WTP											
1	19-Jun-87	0000	0.323	WTP											
1	20-Jun-87	0000	1.102	WTP											
1	21-Jun-87	0000	0.505	WTP											
1	22-Jun-87	0000	0.731	WTP											
1	23-Jun-87	0000	0.489	WTP			COMP	7-23-87	<0.204	0.082	<0.204	2.326	0.041	4.080	
1	24-Jun-87	0000	0.599	WTP											
1	25-Jun-87	0000	0.664	WTP											
1	26-Jun-87	0000	0.733	WTP											
1	27-Jun-87	0000	0.469	WTP											
1	28-Jun-87	0000	0.758	WTP											
1	29-Jun-87	0000	0.694	WTP											
1	30-Jun-87	0000	0.359	WTP											

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OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Apr-87		UNMEASUREABLE												
2	02-Apr-87		UNMEASUREABLE												
2	03-Apr-87		DISCHARGE -- NO DATA												
2	04-Apr-87		DISCHARGE -- NO DATA												
2	05-Apr-87		DISCHARGE -- NO DATA												
2	06-Apr-87		DISCHARGE BUT NO FLOW DATA, SEE ATTACHMENT FOR ANALYSIS												
2	07-Apr-87		NO DATA												
2	08-Apr-87		NO DATA												
2	09-Apr-87		UNMEASUREABLE												
2	10-Apr-87		UNMEASUREABLE												
2	11-Apr-87		UNMEASUREABLE												
2	12-Apr-87		UNMEASUREABLE												
2	13-Apr-87		UNMEASUREABLE												
2	14-Apr-87		UNMEASUREABLE												
2	15-Apr-87		UNMEASUREABLE												
2	16-Apr-87		UNMEASUREABLE												
2	17-Apr-87		UNMEASUREABLE												
2	18-Apr-87		UNMEASUREABLE												
2	19-Apr-87		UNMEASUREABLE												
2	20-Apr-87		UNMEASUREABLE												
2	21-Apr-87		UNMEASUREABLE												
2	22-Apr-87		UNMEASUREABLE												
2	23-Apr-87		UNMEASUREABLE												
2	24-Apr-87		UNMEASUREABLE												
2	25-Apr-87		UNMEASUREABLE												
2	26-Apr-87		UNMEASUREABLE												
2	27-Apr-87		UNMEASUREABLE												
2	28-Apr-87		UNMEASUREABLE												
2	29-Apr-87		UNMEASUREABLE												
2	30-Apr-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-May-87		UNMEASUREABLE												
2	02-May-87		UNMEASUREABLE												
2	03-May-87		UNMEASUREABLE												
2	04-May-87		UNMEASUREABLE												
2	05-May-87		UNMEASUREABLE												
2	06-May-87		UNMEASUREABLE												
2	07-May-87		UNMEASUREABLE												
2	08-May-87		UNMEASUREABLE												
2	09-May-87		UNMEASUREABLE												
2	10-May-87		UNMEASUREABLE												
2	11-May-87		UNMEASUREABLE												
2	12-May-87		UNMEASUREABLE												
2	13-May-87		UNMEASUREABLE												
2	14-May-87		UNMEASUREABLE												
2	15-May-87		UNMEASUREABLE												
2	16-May-87		UNMEASUREABLE												
2	17-May-87		UNMEASUREABLE												
2	18-May-87		UNMEASUREABLE												
2	19-May-87		UNMEASUREABLE												
2	20-May-87		UNMEASUREABLE												
2	21-May-87		UNMEASUREABLE												
2	22-May-87	1130	0.004	MK		8.5	GRAB	07-23-87	< 0.002	0.037	0.023	0.014	0.001	1.001	9.980
2	23-May-87		UNMEASUREABLE												
2	24-May-87		UNMEASUREABLE												
2	25-May-87		UNMEASUREABLE												
2	26-May-87		UNMEASUREABLE												
2	27-May-87		UNMEASUREABLE												
2	28-May-87		UNMEASUREABLE												
2	29-May-87		UNMEASUREABLE												
2	30-May-87		UNMEASUREABLE												
2	31-May-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jun-87		UNMEASUREABLE												
2	02-Jun-87		UNMEASUREABLE												
2	03-Jun-87	1330	0.19	JML	9.4		GRAB	7-23-87	<0.079	0.190	0.111	0.650	0.111	115.736	611.975
2	04-Jun-87		UNMEASUREABLE												
2	05-Jun-87		UNMEASUREABLE												
2	06-Jun-87		UNMEASUREABLE												
2	07-Jun-87		UNMEASUREABLE												
2	08-Jun-87		UNMEASUREABLE												
2	09-Jun-87		UNMEASUREABLE												
2	10-Jun-87		UNMEASUREABLE												
2	11-Jun-87		UNMEASUREABLE												
2	12-Jun-87		UNMEASUREABLE												
2	13-Jun-87		UNMEASUREABLE												
2	14-Jun-87		UNMEASUREABLE												
2	15-Jun-87		UNMEASUREABLE												
2	16-Jun-87	0730	0.025	MS	10		GRAB	7-23-87	0.015	0.670	0.417	2.921	0.250	20.026	119.116
2	17-Jun-87	0730	0.2	MS	8.1		GRAB	7-23-87	0.083	3.104	2.336	7.677	0.200	48.397	772.687
2	18-Jun-87	0700	0.234	MS	8.4		GRAB	7-23-87	<0.098	2.460	1.523	2.734	0.098	62.483	716.597
2	19-Jun-87	0730	0.024	MS	11.6		GRAB	7-23-87	0.070	0.467	0.094	2.804	0.160	28.037	126.167
2	20-Jun-87		UNMEASUREABLE												
2	21-Jun-87		UNMEASUREABLE												
2	22-Jun-87		UNMEASUREABLE												
2	23-Jun-87		UNMEASUREABLE												
2	24-Jun-87		DISCHARGE BUT NO FLOW DATA, SEE ATTACHMENT FOR ANALYSIS												
2	25-Jun-87		DISCHARGE BUT NO FLOW DATA, SEE ATTACHMENT FOR ANALYSIS												
2	26-Jun-87		UNMEASUREABLE												
2	27-Jun-87		UNMEASUREABLE												
2	28-Jun-87		UNMEASUREABLE												
2	29-Jun-87		UNMEASUREABLE												
2	30-Jun-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
MPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL PB, PDS	TOTAL CU, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Apr-87		NO DISCHARGE												
3	02-Apr-87		NO DISCHARGE												
3	03-Apr-87		NO DISCHARGE												
3	04-Apr-87		NO DISCHARGE												
3	05-Apr-87		NO DISCHARGE												
3	06-Apr-87		NO DISCHARGE												
3	07-Apr-87		NO DISCHARGE												
3	08-Apr-87		NO DISCHARGE												
3	09-Apr-87		NO DISCHARGE												
3	10-Apr-87		NO DISCHARGE												
3	11-Apr-87		NO DISCHARGE												
3	12-Apr-87		NO DISCHARGE												
3	13-Apr-87		NO DISCHARGE												
3	14-Apr-87		NO DISCHARGE												
3	15-Apr-87		NO DISCHARGE												
3	16-Apr-87		NO DISCHARGE												
3	17-Apr-87		NO DISCHARGE												
3	18-Apr-87		NO DISCHARGE												
3	19-Apr-87		NO DISCHARGE												
3	20-Apr-87		NO DISCHARGE												
3	21-Apr-87		NO DISCHARGE												
3	22-Apr-87		NO DISCHARGE												
3	23-Apr-87		NO DISCHARGE												
3	24-Apr-87	0900	0.588	JML	7.4	64	GRAB	07-23-87	<0.245	<0.049	<0.245	<0.491	<0.049	215.885	673.354
3	25-Apr-87		NO DISCHARGE												
3	26-Apr-87		NO DISCHARGE												
3	27-Apr-87		NO DISCHARGE												
3	28-Apr-87		NO DISCHARGE												
3	29-Apr-87	1530	0.003	JML		65									
3	30-Apr-87	1130	0.5	JML	7.4										

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-May-87		NO DISCHARGE												
3	02-May-87		NO DISCHARGE												
3	03-May-87	0730	0.35	MS											
3	04-May-87	1530	0.086	MS											
3	05-May-87		NO DISCHARGE												
3	06-May-87		NO DISCHARGE												
3	07-May-87		NO DISCHARGE												
3	08-May-87		NO DISCHARGE												
3	09-May-87	0730	1.303	JP											
3	10-May-87		NO DISCHARGE												
3	11-May-87	0730	0.019	MS											
3	12-May-87		NO DISCHARGE												
3	13-May-87		NO DISCHARGE												
3	14-May-87		NO DISCHARGE												
3	15-May-87		NO DISCHARGE												
3	16-May-87		NO DISCHARGE												
3	17-May-87		NO DISCHARGE												
3	18-May-87		NO DISCHARGE												
3	19-May-87		NO DISCHARGE												
3	20-May-87		NO DISCHARGE												
3	21-May-87		NO DISCHARGE												
3	22-May-87		NO DISCHARGE												
3	23-May-87		NO DISCHARGE												
3	24-May-87		NO DISCHARGE												
3	25-May-87		NO DISCHARGE												
3	26-May-87		NO DISCHARGE												
3	27-May-87		NO DISCHARGE												
3	28-May-87		NO DISCHARGE												
3	29-May-87		NO DISCHARGE												
3	30-May-87		NO DISCHARGE												
3	31-May-87		NO DISCHARGE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-87 THROUGH ERR
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jun-87		NO DISCHARGE												
3	02-Jun-87		NO DISCHARGE												
3	03-Jun-87		NO DISCHARGE												
3	04-Jun-87		NO DISCHARGE												
3	05-Jun-87		NO DISCHARGE												
3	06-Jun-87		NO DISCHARGE												
3	07-Jun-87		NO DISCHARGE												
3	08-Jun-87		NO DISCHARGE												
3	09-Jun-87		NO DISCHARGE												
3	10-Jun-87		NO DISCHARGE												
3	11-Jun-87		NO DISCHARGE												
3	12-Jun-87		NO DISCHARGE												
3	13-Jun-87	0730	1.16	MS											
3	14-Jun-87	0730	1.456	MS											
3	15-Jun-87	1500	0.35	JML	7.4		GRAB	7-23-87	<0.146	<0.029	<0.146	<0.292	<0.029	14.603	490.648
3	16-Jun-87	0730	1.027	MS	7.9	77									
3	17-Jun-87	0730	1.303	MS		74									
3	18-Jun-87	0700	1.303	MS		70									
3	19-Jun-87	0730	0.05	MS		66									
3	20-Jun-87		NO DISCHARGE												
3	21-Jun-87		NO DISCHARGE												
3	22-Jun-87		NO DISCHARGE												
3	23-Jun-87		NO DISCHARGE												
3	24-Jun-87		NO DISCHARGE												
3	25-Jun-87		NO DISCHARGE												
3	26-Jun-87		NO DISCHARGE												
3	27-Jun-87		NO DISCHARGE												
3	28-Jun-87	0730	1.027	CEY											
3	29-Jun-87	0730	1.027	MS	7.8	73									
3	30-Jun-87	0730	1.027	MS	7.8										

THE DOE RUN COMPANY
Herculaneum Smelting Division
Herculaneum, Missouri 63048

October 26, 1987

Mr. James A. Burris, P.E.
Missouri Department of Natural Resources
Division of Environmental Quality
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Third Quarter 1987 NPDES Report, MO-0000281

Dear Jim:

Enclosed you will find the routine quarterly report for the first quarter of 1987.

Some discharges occured at outfall 002 due to a pump failure. At the present time the lift station is operating properly. Different approaches to controlling discharges during pump outages are being evaluated.

As a side note, during the third quarter we discovered a major leak in one of our potable water supply lines. As a result of having replaced this supply line not only have we reduced our potable water useage, but as a side benefit we have reduced the flow to the flux building sump and wwtp by approximately 100 gpm. Therefore, we should be able to manage about a 100 gpm more stormwater flow during rain events.

Outfall 003 was largely non-existent during the third quarter. Outfall 003 serves the non-contact cooling water in the acid plant. Our sinter plant was down for major repairs from approximately August 6th through September 24th. The acid plant did not run during this period and thus no non-contact cooling discharge ,outfall 003 discharge, was required.

Sincerely,

James M. Langefame

James M. Langefame
Environmental Officer

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
UTFALL NUMBER 1

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jul-87	0000	0.953	WTP											
1	02-Jul-87	0000	0.545	WTP											
1	03-Jul-87	0000	0.523	WTP											
1	04-Jul-87	0000	0.401	WTP											
1	05-Jul-87	0000	0.292	WTP											
1	06-Jul-87	0000	0.54	WTP											
1	07-Jul-87	0000	0.548	WTP											
1	08-Jul-87	0000	0.189	WTP											
1	09-Jul-87	0000	0.757	WTP											
1	10-Jul-87	0000	0.769	WTP											
1	11-Jul-87	0000	0.651	WTP											
1	12-Jul-87	0000	0.535	WTP											
1	13-Jul-87	0000	0.578	WTP											
1	14-Jul-87	0000	0.566	WTP											
1	15-Jul-87	0000	0.438	WTP											
1	16-Jul-87	0000	0.77	WTP											
1	17-Jul-87	0000	0.674	WTP											
1	18-Jul-87	0000	0.7	WTP											
1	19-Jul-87	0000	0.69	WTP											
1	20-Jul-87	0000	0.67	WTP											
1	21-Jul-87	0000	0.708	WTP											
1	22-Jul-87	0000	0	WTP											
1	23-Jul-87	0000	0.079	WTP											
1	24-Jul-87	0000	0	WTP											
1	25-Jul-87	0000	0	WTP											
1	26-Jul-87	0000	0.617	WTP											
1	27-Jul-87	0000	0.617	WTP											
1	28-Jul-87	0000	0.267	WTP	8.4		COMP	08-05-87	0.022	0.022	0.011	0.668	0.022	2.228	1670.957
1	29-Jul-87	0000	0.27	WTP											
1	30-Jul-87	0000	0.194	WTP											
1	31-Jul-87	000	0.454	WTP											

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
UTFALL NUMBER 1

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Aug-87	0000	0.639	WTP											
1	02-Aug-87	0000	0.524	WTP											
1	03-Aug-87	0000	0.482	WTP											
1	04-Aug-87	0000	0.193	WTP											
1	05-Aug-87	0000	0.238	WTP											
1	06-Aug-87	0000	0.349	WTP											
1	07-Aug-87	0000	0.409	WTP											
1	08-Aug-87	0000	0.467	WTP											
1	09-Aug-87	0000	0.377	WTP											
1	10-Aug-87	0000	0.401	WTP											
1	11-Aug-87	0000	0.475	WTP											
1	12-Aug-87	0000	0.455	WTP											
1	13-Aug-87	0000	0.455	WTP											
1	14-Aug-87	0000	0.45	WTP											
1	15-Aug-87	0000	0.092	WTP											
1	16-Aug-87	0000	0.006	WTP											
1	17-Aug-87	0000	0	WTP											
1	18-Aug-87	0000	0	WTP											
1	19-Aug-87	0000	0.193	WTP											
1	20-Aug-87	0000	0.405	WTP											
1	21-Aug-87	0000	0	WTP											
1	22-Aug-87	0000	0	WTP											
1	23-Aug-87	0000	0	WTP											
1	24-Aug-87	0000	0.202	WTP											
1	25-Aug-87	0000	0.438	WTP											
1	26-Aug-87	0000	0.479	WTP											
1	27-Aug-87	0000	0.481	WTP		9.3									
1	28-Aug-87	0000	0.408	WTP											
1	29-Aug-87	0000	0.239	WTP											
1	30-Aug-87	0000	0.239	WTP											
1	31-Aug-87	[illegible]	[illegible]	WTP			COMP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
AME: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-97
UTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Sep-87	0000	0.365	WTP											
1	02-Sep-87	0000	0.46	WTP											
1	03-Sep-87	0000	0.485	WTP											
1	04-Sep-87	0000	0.428	WTP											
1	05-Sep-87	0000	0.544	WTP											
1	06-Sep-87	0000	0.439	WTP											
1	07-Sep-87	0000	0.419	WTP											
1	08-Sep-87	0000	0.43	WTP											
1	09-Sep-87	0000	0.1	WTP											
1	10-Sep-87	0000	0.31	WTP											
1	11-Sep-87	0000	0.39	WTP											
1	12-Sep-87	0000	0.397	WTP											
1	13-Sep-87	0000	0.363	WTP											
1	14-Sep-87	0000	0.11	WTP											
1	15-Sep-87	0000	0.485	WTP											
1	16-Sep-87	0000	0.477	WTP											
1	17-Sep-87	0000	0.371	WTP											
1	18-Sep-87	0000	0.3314	WTP											
1	19-Sep-87	0000	0.377	WTP											
1	20-Sep-87	0000	0.246	WTP											
1	21-Sep-87	0000	0.249	WTP											
1	22-Sep-87	0000	0.414	WTP											
1	23-Sep-87	0000	0.471	WTP			COMP	10-07-87	0.086	0.008	0.094	0.098	0.031	39.302	998.269
1	24-Sep-87	0000	0.51	WTP											
1	25-Sep-87	0000	0.51	WTP											
1	26-Sep-87	0000	0.489	WTP											
1	27-Sep-87	0000	0.471	WTP											
1	28-Sep-87	0000	0.529	WTP		9.8									
1	29-Sep-87	0000	0.511	WTP											
1	30-Sep-87	0000	0.365	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jul-87		UNMEASUREABLE												
2	02-Jul-87		UNMEASUREABLE												
2	03-Jul-87		UNMEASUREABLE												
2	04-Jul-87		UNMEASUREABLE												
2	05-Jul-87		UNMEASUREABLE												
2	06-Jul-87		UNMEASUREABLE												
2	07-Jul-87		UNMEASUREABLE												
2	08-Jul-87		UNMEASUREABLE												
2	09-Jul-87		UNMEASUREABLE												
2	10-Jul-87		UNMEASUREABLE												
2	11-Jul-87		UNMEASUREABLE												
2	12-Jul-87		UNMEASUREABLE												
2	13-Jul-87		UNMEASUREABLE												
2	14-Jul-87		UNMEASUREABLE												
2	15-Jul-87		UNMEASUREABLE												
2	16-Jul-87		UNMEASUREABLE												
2	17-Jul-87		UNMEASUREABLE												
2	18-Jul-87		UNMEASUREABLE												
2	19-Jul-87		UNMEASUREABLE												
2	20-Jul-87		UNMEASUREABLE												
2	21-Jul-87		UNMEASUREABLE												
2	22-Jul-87		UNMEASUREABLE												
2	23-Jul-87		UNMEASUREABLE												
2	24-Jul-87		UNMEASUREABLE												
2	25-Jul-87		UNMEASUREABLE												
2	26-Jul-87		UNMEASUREABLE												
2	27-Jul-87		UNMEASUREABLE												
2	28-Jul-87		UNMEASUREABLE												
2	29-Jul-87		UNMEASUREABLE												
2	30-Jul-87		UNMEASUREABLE												
2	31-Jul-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DMRS MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM 0, MISSOURI 63018
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Aug-87		UNMEASUREABLE												
2	02-Aug-87		UNMEASUREABLE												
2	03-Aug-87		UNMEASUREABLE												
2	04-Aug-87		UNMEASUREABLE												
2	05-Aug-87		UNMEASUREABLE												
2	06-Aug-87		UNMEASUREABLE												
2	07-Aug-87		UNMEASUREABLE												
2	08-Aug-87		UNMEASUREABLE												
2	09-Aug-87		UNMEASUREABLE												
2	10-Aug-87		UNMEASUREABLE												
2	11-Aug-87		UNMEASUREABLE												
2	12-Aug-87		UNMEASUREABLE												
2	13-Aug-87		UNMEASUREABLE												
2	14-Aug-87		UNMEASUREABLE												
2	15-Aug-87		UNMEASUREABLE												
2	16-Aug-87		UNMEASUREABLE												
2	17-Aug-87	0730	0.126	DWH	9.5		GRAB	09-01-87	0.193	6.481	0.854	30.291	0.911	287.029	181.890
2	18-Aug-87	0700	0.116	DWH	8.2		GRAB	09-01-87	0.106	14.258	0.998	60.351	0.898	160.679	360.076
2	19-Aug-87	0700	0.104	DWH	9.6		GRAB	09-01-87	0.541	40.787	2.127	135.379	20.914	1689.632	490.314
2	20-Aug-87	0730	0.089	DW	8.2		GRAB	09-01-87	0.035	2.414	0.309	8.748	0.472	23.765	108.427
2	21-Aug-87	0800	0.144	DW	8		GRAB	09-01-87	0.076	1.413	0.602	4.804	0.183	16.822	395.322
2	22-Aug-87		UNMEASUREABLE												
2	23-Aug-87		UNMEASUREABLE												
2	24-Aug-87	0730	0.013	MS	9.8		GRAB	09-01-87	0.020	0.022	0.002	0.158	0.003		
2	25-Aug-87		UNMEASUREABLE												
2	26-Aug-87	1815	0.046	SW			GRAB	09-01-87	0.159	18.080	1.742	104.178	5.988		
2	27-Aug-87		UNMEASUREABLE												
2	28-Aug-87		UNMEASUREABLE												
2	29-Aug-87		UNMEASUREABLE												
2	30-Aug-87		UNMEASUREABLE												
2	31-Aug-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Sep-87		UNMEASUREABLE												
2	02-Sep-87		UNMEASUREABLE												
2	03-Sep-87		UNMEASUREABLE												
2	04-Sep-87		UNMEASUREABLE												
2	05-Sep-87		UNMEASUREABLE												
2	06-Sep-87		UNMEASUREABLE												
2	07-Sep-87		UNMEASUREABLE												
2	08-Sep-87		UNMEASUREABLE												
2	09-Sep-87		UNMEASUREABLE												
2	10-Sep-87		UNMEASUREABLE												
2	11-Sep-87		UNMEASUREABLE												
2	12-Sep-87		UNMEASUREABLE												
2	13-Sep-87		UNMEASUREABLE												
2	14-Sep-87		UNMEASUREABLE												
2	15-Sep-87		UNMEASUREABLE												
2	16-Sep-87		UNMEASUREABLE												
2	17-Sep-87		UNMEASUREABLE												
2	18-Sep-87		UNMEASUREABLE												
2	19-Sep-87		UNMEASUREABLE												
2	20-Sep-87		UNMEASUREABLE												
2	21-Sep-87		UNMEASUREABLE												
2	22-Sep-87	0720	0.038	RWS	9.7		GRAB	10-07-87	0.070	0.224	0.017	0.434	0.014	3.171	75.783
2	23-Sep-87	1015	0.079	DW	9.8		GRAB	10-07-87	0.057	0.012	0.001	0.020	0.007	5.592	390.908
2	24-Sep-87		UNMEASUREABLE												
2	25-Sep-87		UNMEASUREABLE												
2	26-Sep-87		UNMEASUREABLE												
2	27-Sep-87		UNMEASUREABLE												
2	28-Sep-87		UNMEASUREABLE												
2	29-Sep-87		UNMEASUREABLE												
2	30-Sep-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000231
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63046
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jul-87		NO DISCHARGE												
3	02-Jul-87		NO DISCHARGE												
3	03-Jul-87		NO DISCHARGE												
3	04-Jul-87		NO DISCHARGE												
3	05-Jul-87		NO DISCHARGE												
3	06-Jul-87		NO DISCHARGE												
3	07-Jul-87	0730	2.392	JP											
3	08-Jul-87		NO DISCHARGE												
3	09-Jul-87		NO DISCHARGE												
3	10-Jul-87		NO DISCHARGE												
3	11-Jul-87	0800	1.528	MK											
3	12-Jul-87	0730	1.456	MK											
3	13-Jul-87	1500	1.16	JML	7.4	77									
3	14-Jul-87	1000	1.303	MK											
3	15-Jul-87	0730	1.303	MK											
3	16-Jul-87		NO DISCHARGE												
3	17-Jul-87		NO DISCHARGE												
3	18-Jul-87	0800	0.009	DWH											
3	19-Jul-87		NO DATA												
3	20-Jul-87	0700	1.794	DWH											
3	21-Jul-87	0930	0.009	DWH											
3	22-Jul-87		NO DISCHARGE												
3	23-Jul-87	0800	0.032	DWH											
3	24-Jul-87		NO DISCHARGE												
3	25-Jul-87		NO DISCHARGE												
3	26-Jul-87		NO DISCHARGE												
3	27-Jul-87		NO DISCHARGE												
3	28-Jul-87		NO DISCHARGE												
3	29-Jul-87		NO DISCHARGE												
3	30-Jul-87		NO DISCHARGE												
3	31-Jul-87		NO DISCHARGE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Aug-87		NO DISCHARGE												
3	02-Aug-87		NO DISCHARGE												
3	03-Aug-87		NO DISCHARGE												
3	04-Aug-87		NO DISCHARGE												
3	05-Aug-87		NO DISCHARGE												
3	06-Aug-87		NO DISCHARGE												
3	07-Aug-87		NO DISCHARGE												
3	08-Aug-87		NO DISCHARGE												
3	09-Aug-87		NO DISCHARGE												
3	10-Aug-87		NO DISCHARGE												
3	11-Aug-87		NO DISCHARGE												
3	12-Aug-87		NO DISCHARGE												
3	13-Aug-87		NO DISCHARGE												
3	14-Aug-87		NO DISCHARGE												
3	15-Aug-87		NO DISCHARGE												
3	16-Aug-87		NO DISCHARGE												
3	17-Aug-87		NO DISCHARGE												
3	18-Aug-87		NO DISCHARGE												
3	19-Aug-87		NO DISCHARGE												
3	20-Aug-87		NO DISCHARGE												
3	21-Aug-87		NO DISCHARGE												
3	22-Aug-87		NO DISCHARGE												
3	23-Aug-87		NO DISCHARGE												
3	24-Aug-87		NO DISCHARGE												
3	25-Aug-87		NO DISCHARGE												
3	26-Aug-87		NO DISCHARGE												
3	27-Aug-87		NO DISCHARGE												
3	28-Aug-87		NO DISCHARGE												
3	29-Aug-87		NO DISCHARGE												
3	30-Aug-87		NO DISCHARGE												
3	31-Aug-87		NO DISCHARGE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jul-87 THROUGH 30-Sep-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Sep-87		NO DISCHARGE												
3	02-Sep-87		NO DISCHARGE												
3	03-Sep-87		NO DISCHARGE												
3	04-Sep-87		NO DISCHARGE												
3	05-Sep-87		NO DISCHARGE												
3	06-Sep-87		NO DISCHARGE												
3	07-Sep-87		NO DISCHARGE												
3	08-Sep-87		NO DISCHARGE												
3	09-Sep-87		NO DISCHARGE												
3	10-Sep-87		NO DISCHARGE												
3	11-Sep-87		NO DISCHARGE												
3	12-Sep-87		NO DISCHARGE												
3	13-Sep-87		NO DISCHARGE												
3	14-Sep-87		NO DISCHARGE												
3	15-Sep-87		NO DISCHARGE												
3	16-Sep-87		NO DISCHARGE												
3	17-Sep-87		NO DISCHARGE												
3	18-Sep-87		NO DISCHARGE												
3	19-Sep-87		NO DISCHARGE												
3	20-Sep-87		NO DISCHARGE												
3	21-Sep-87		NO DISCHARGE												
3	22-Sep-87		NO DISCHARGE												
3	23-Sep-87		NO DISCHARGE												
3	24-Sep-87		NO DISCHARGE												
3	25-Sep-87		NO DISCHARGE												
3	26-Sep-87		NO DISCHARGE												
3	27-Sep-87		NO DISCHARGE												
3	28-Sep-87		NO DISCHARGE												
3	29-Sep-87		NO DISCHARGE												
3	30-Sep-87		NO DISCHARGE												

THE DOE RUN COMPANY
Herculaneum Smelting Division
881 Main Street
Herculaneum, Missouri 63048

January 21, 1988

Mr. James A. Burris, P.E.
Missouri Department of Natural Resources
Division of Environmental Quality
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Fourth Quarter 1987 NPDES Report, MO-0000281

Dear Jim:

Enclosed you will find the routine quarterly report for the fourth quarter of 1987.

Major structural renovation of one of our water treatment plant's multi media filters was initiated during the fourth quarter. Completion of this project will help insure the continued quality of the water produced at our water treatment plant.

A discharge occurred at outfall 002 during December when it became necessary to change pumps due to reduced pump capacity. Use of a temporary pump during the maintenance operation significantly helped reduce the discharge to a minimum. At the present time the lift station is operating properly.

Outfall 003 was operated intermittently during the fourth quarter due to a mechanicl problem in the acid plant's cooling tower. We would expect to return to closed loop operation within the first quarter of 1988 dependent on ambient temperatures present at the time repairs are completed.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Officer

cc: Dan Wurnberg

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON. POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF SAM	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Oct-87	0000	0.409	WTP											
1	02-Oct-87	0000	0.26	WTP											
1	03-Oct-87	0000	0.216	WTP											
1	04-Oct-87	0000	0.372	WTP											
1	05-Oct-87	0000	0.388	WTP											
1	06-Oct-87	0000	0.426	WTP											
1	07-Oct-87	0000	0.325	WTP											
1	08-Oct-87	0000	0.717	WTP											
1	09-Oct-87	0000	0.973	WTP											
1	10-Oct-87	0000	0.422	WTP											
1	11-Oct-87	0000	0.277	WTP											
1	12-Oct-87	0000	0.269	WTP											
1	13-Oct-87	0000	0.338	WTP											
1	14-Oct-87	0000	0.442	WTP											
1	15-Oct-87	0000	0.278	WTP											
1	16-Oct-87	0000	0.253	WTP											
1	17-Oct-87	0000	0.21	ISCO			COMP	10-26-87	0.040	0.026	0.002	0.107	0.012		
1	18-Oct-87	0000	0.213	WTP											
1	19-Oct-87	0000	0.119	WTP											
1	20-Oct-87	0000	0.2	WTP											
1	21-Oct-87	0000	0.153	WTP											
1	22-Oct-87	0000	0	WTP											
1	23-Oct-87	0000	0.2	WTP											
1	24-Oct-87	0000	0.328	WTP											
1	25-Oct-87	0000	0.3	WTP											
1	26-Oct-87	0000	0.316	WTP											
1	27-Oct-87	0000	0.298	WTP											
1	28-Oct-87	0000	0.285	WTP											
1	29-Oct-87	0000	0.449	WTP	8.9										
1	30-Oct-87	0000	0.412	WTP											
1	31-Oct-87	[illegible]	[illegible]	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
SITE NUMBER: 3.500 JEFFERSON, FOINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Nov-87	0000	0.42	WTP											
1	02-Nov-87	0000	0.43	WTP											
1	03-Nov-87	0000	0.092	WTP											
1	04-Nov-87	0000	0.056	WTP											
1	05-Nov-87	0000	0.112	WTP											
1	06-Nov-87	0000	0.281	WTP											
1	07-Nov-87	0000	0.252	WTP											
1	08-Nov-87	0000	0.159	WTP											
1	09-Nov-87	0000	0.525	WTP											
1	10-Nov-87	0000	0.135	WTP											
1	11-Nov-87	0000	0.254	WTP											
1	12-Nov-87	0000	0.202	WTP											
1	13-Nov-87	0000	0.81	WTP											
1	14-Nov-87	0000	0.404	WTP											
1	15-Nov-87	0000	0.347	WTP											
1	16-Nov-87	0000	0.147	WTP											
1	17-Nov-87	0000	0.147	WTP											
1	18-Nov-87	0000	0.148	WTP											
1	19-Nov-87	0000	0.254	WTP											
1	20-Nov-87	0000	0.21	WTP											
1	21-Nov-87	0000	0.16	WTP											
1	22-Nov-87	0000	0.117	WTP											
1	23-Nov-87	0000	0.21	WTP											
1	24-Nov-87	0000	0.214	WTP											
1	25-Nov-87	0000	0.23	WTP											
1	26-Nov-87	0000	0.109	WTP											
1	27-Nov-87	0000	0.083	ISCO	9.9		COMP	12-07-87	0.016	0.076	0.003	0.215	0.008		548.525
1	28-Nov-87	0000	0.195	WTP											
1	29-Nov-87	0000	0.316	WTP											
1	30-Nov-87	0000	0.185	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000291
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Dec-87	0000	0.12	WTP											
1	02-Dec-87	0000	0.282	WTP											
1	03-Dec-87	0000	0.407	WTP											
1	04-Dec-87	0000	1.289	WTP											
1	05-Dec-87	0000	0.021	WTP											
1	06-Dec-87	0000	0.259	WTP											
1	07-Dec-87	0000	0.409	WTP											
1	08-Dec-87	0000	0.154	WTP											
1	09-Dec-87	0000	0.331	WTP											
1	10-Dec-87	0000	0.403	WTP											
1	11-Dec-87	0000	0.233	WTP											
1	12-Dec-87	0000	0.124	WTP											
1	13-Dec-87	0000	0.081	WTP											
1	14-Dec-87	0000	0.09	WTP											
1	15-Dec-87	0000	0.172	WTP											
1	16-Dec-87	0000	0.339	WTP											
1	17-Dec-87	0000	0.704	WTP											
1	18-Dec-87	0000	0.56	WTP											
1	19-Dec-87	0000	1.05	WTP											
1	20-Dec-87	0000	1.277	WTP											
1	21-Dec-87	0000	1.311	WTP											
1	22-Dec-87	0000	0.588	ISCO	9.8		COMP	01-07-88	0.245	0.329	0.027	1.806	0.064		
1	23-Dec-87	0000	0.774	WTP											
1	24-Dec-87	0000	0.425	WTP											
1	25-Dec-87	0000	0.562	WTP											
1	26-Dec-87	0000	0.476	WTP											
1	27-Dec-87	0000	0.16	WTP											
1	28-Dec-87	0000	0.277	WTP											
1	29-Dec-87	0000	0.255	WTP											
1	30-Dec-87	0000	0.326	WTP											
1	31-Dec-87		.138	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
MONTHLY MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Oct-87		UNMEASUREABLE												
2	02-Oct-87		UNMEASUREABLE												
2	03-Oct-87		UNMEASUREABLE												
2	04-Oct-87		UNMEASUREABLE												
2	05-Oct-87		UNMEASUREABLE												
2	06-Oct-87		UNMEASUREABLE												
2	07-Oct-87		UNMEASUREABLE												
2	08-Oct-87		UNMEASUREABLE												
2	09-Oct-87		UNMEASUREABLE												
2	10-Oct-87		UNMEASUREABLE												
2	11-Oct-87		UNMEASUREABLE												
2	12-Oct-87		UNMEASUREABLE												
2	13-Oct-87		UNMEASUREABLE												
2	14-Oct-87		UNMEASUREABLE												
2	15-Oct-87		UNMEASUREABLE												
2	16-Oct-87		UNMEASUREABLE												
2	17-Oct-87		UNMEASUREABLE												
2	18-Oct-87		UNMEASUREABLE												
2	19-Oct-87		UNMEASUREABLE												
2	20-Oct-87		UNMEASUREABLE												
2	21-Oct-87		UNMEASUREABLE												
2	22-Oct-87		UNMEASUREABLE												
2	23-Oct-87		UNMEASUREABLE												
2	24-Oct-87		UNMEASUREABLE												
2	25-Oct-87		UNMEASUREABLE												
2	26-Oct-87		UNMEASUREABLE												
2	27-Oct-87		UNMEASUREABLE												
2	28-Oct-87		UNMEASUREABLE												
2	29-Oct-87		UNMEASUREABLE												
2	30-Oct-87		UNMEASUREABLE												
2	31-Oct-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY. HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	DAY	TIME OF FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS. PDS	TOTAL Zn. PDS	TOTAL CD, PDS	TOTAL PB, PDS	TOTAL CU. PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Nov-87		UNMEASUREABLE												
2	02-Nov-87		UNMEASUREABLE												
2	03-Nov-87		UNMEASUREABLE												
2	04-Nov-87		UNMEASUREABLE												
2	05-Nov-87		UNMEASUREABLE												
2	06-Nov-87		UNMEASUREABLE												
2	07-Nov-87		UNMEASUREABLE												
2	08-Nov-87		UNMEASUREABLE												
2	09-Nov-87		UNMEASUREABLE												
2	10-Nov-87		UNMEASUREABLE												
2	11-Nov-87		UNMEASUREABLE												
2	12-Nov-87		UNMEASUREABLE												
2	13-Nov-87		UNMEASUREABLE												
2	14-Nov-87		UNMEASUREABLE												
2	15-Nov-87		UNMEASUREABLE												
2	16-Nov-87		UNMEASUREABLE												
2	17-Nov-87		UNMEASUREABLE												
2	18-Nov-87		UNMEASUREABLE												
2	19-Nov-87		UNMEASUREABLE												
2	20-Nov-87		UNMEASUREABLE												
2	21-Nov-87		UNMEASUREABLE												
2	22-Nov-87		UNMEASUREABLE												
2	23-Nov-87		UNMEASUREABLE												
2	24-Nov-87		UNMEASUREABLE												
2	25-Nov-87		UNMEASUREABLE												
2	26-Nov-87		UNMEASUREABLE												
2	27-Nov-87		UNMEASUREABLE												
2	28-Nov-87		UNMEASUREABLE												
2	29-Nov-87		UNMEASUREABLE												
2	30-Nov-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
TOTAL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, TDS	TOTAL Zn, TDS	TOTAL CD, TDS	TOTAL Pb, TDS	TOTAL Cu, TDS	SUSPENDED SOLIDS, TDS	SULFATE, TDS
2	01-Dec-87		UNMEASUREABLE												
2	02-Dec-87		UNMEASUREABLE												
2	03-Dec-87		UNMEASUREABLE												
2	04-Dec-87		UNMEASUREABLE												
2	05-Dec-87		UNMEASUREABLE												
2	06-Dec-87		UNMEASUREABLE												
2	07-Dec-87		UNMEASUREABLE												
2	08-Dec-87		UNMEASUREABLE												
2	09-Dec-87		UNMEASUREABLE												
2	10-Dec-87		UNMEASUREABLE												
2	11-Dec-87		UNMEASUREABLE												
2	12-Dec-87		UNMEASUREABLE												
2	13-Dec-87		UNMEASUREABLE												
2	14-Dec-87		UNMEASUREABLE												
2	15-Dec-87		UNMEASUREABLE												
2	16-Dec-87		UNMEASUREABLE												
2	17-Dec-87		UNMEASUREABLE												
2	18-Dec-87		UNMEASUREABLE												
2	19-Dec-87		UNMEASUREABLE												
2	20-Dec-87		UNMEASUREABLE												
2	21-Dec-87		UNMEASUREABLE												
2	22-Dec-87		0.0014	JP	9.4		GRAB	01-07-88	0.001	0.009	0.002	0.018	0.001		
2	23-Dec-87		UNMEASUREABLE												
2	24-Dec-87		UNMEASUREABLE												
2	25-Dec-87		UNMEASUREABLE												
2	26-Dec-87		UNMEASUREABLE												
2	27-Dec-87		UNMEASUREABLE												
2	28-Dec-87		UNMEASUREABLE												
2	29-Dec-87		UNMEASUREABLE												
2	30-Dec-87		UNMEASUREABLE												
2	31-Dec-87		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.300 JEFFERSON, POINT:
FACILITY NAME: THE EOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Oct-87		NO DISCHARGE												
3	02-Oct-87		NO DISCHARGE												
3	03-Oct-87		NO DISCHARGE												
3	04-Oct-87		NO DISCHARGE												
3	05-Oct-87		NO DISCHARGE												
3	06-Oct-87		NO DISCHARGE												
3	07-Oct-87		NO DISCHARGE												
3	08-Oct-87		NO DISCHARGE												
3	09-Oct-87		NO DISCHARGE												
3	10-Oct-87		NO DISCHARGE												
3	11-Oct-87		NO DISCHARGE												
3	12-Oct-87		NO DISCHARGE												
3	13-Oct-87		NO DISCHARGE												
3	14-Oct-87		NO DISCHARGE												
3	15-Oct-87		NO DISCHARGE												
3	16-Oct-87		NO DISCHARGE												
3	17-Oct-87		NO DISCHARGE												
3	18-Oct-87		NO DISCHARGE												
3	19-Oct-87		NO DISCHARGE												
3	20-Oct-87		NO DISCHARGE												
3	21-Oct-87		NO DISCHARGE												
3	22-Oct-87		NO DISCHARGE												
3	23-Oct-87		NO DISCHARGE												
3	24-Oct-87		NO DISCHARGE												
3	25-Oct-87		NO DISCHARGE												
3	26-Oct-87		NO DISCHARGE												
3	27-Oct-87		NO DISCHARGE												
3	28-Oct-87		NO DISCHARGE												
3	29-Oct-87		NO DISCHARGE												
3	30-Oct-87		NO DISCHARGE												
3	31-Oct-87		NO DISCHARGE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Nov-87		NO DISCHARGE												
3	02-Nov-87		NO DISCHARGE												
3	03-Nov-87		NO DISCHARGE												
3	04-Nov-87		NO DISCHARGE												
3	05-Nov-87		NO DISCHARGE												
3	06-Nov-87		NO DISCHARGE												
3	07-Nov-87		NO DISCHARGE												
3	08-Nov-87		NO DISCHARGE												
3	09-Nov-87		NO DISCHARGE												
3	10-Nov-87		NO DISCHARGE												
3	11-Nov-87		NO DISCHARGE												
3	12-Nov-87		NO DISCHARGE												
3	13-Nov-87		NO DISCHARGE												
3	14-Nov-87		NO DISCHARGE												
3	15-Nov-87		NO DISCHARGE												
3	16-Nov-87		NO DISCHARGE												
3	17-Nov-87		NO DISCHARGE												
3	18-Nov-87		NO DISCHARGE												
3	19-Nov-87		NO DISCHARGE												
3	20-Nov-87		NO DISCHARGE												
3	21-Nov-87		NO DISCHARGE												
3	22-Nov-87		NO DISCHARGE												
3	23-Nov-87		NO DISCHARGE												
3	24-Nov-87		NO DISCHARGE												
3	25-Nov-87		NO DISCHARGE												
3	26-Nov-87		NO DISCHARGE												
3	27-Nov-87		NO DISCHARGE												
3	28-Nov-87		NO DISCHARGE												
3	29-Nov-87	1100	1.303 MG												
3	30-Nov-87		NO DISCHARGE												

...AL DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
...S MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
...: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
...E NUMBER: 3.506 JEFFERSON, MISSOURI
...ITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-87 THROUGH 31-Dec-87
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Dec-87		NO DISCHARGE												
3	02-Dec-87		NO DISCHARGE												
3	03-Dec-87		NO DISCHARGE												
3	04-Dec-87		NO DISCHARGE												
3	05-Dec-87	0830	1.303	DWH											
3	06-Dec-87	0845	1.303	DWH											
3	07-Dec-87		NO DISCHARGE												
3	08-Dec-87	0940	1.512	DWH		69	GRAB	01-07-88	0.366	0.025	0.013	0.290	0.161		
3	09-Dec-87	0730	0.599	MS	7.8	91									
3	10-Dec-87	0800	1.25	DWH		62									
3	11-Dec-87	0800	1.23	DWH		75									
3	12-Dec-87	0800	1.25	DWH		88									
3	13-Dec-87	0800	0.739	CEY		89									
3	14-Dec-87	0800	1.161	MS		84									
3	15-Dec-87		NO DISCHARGE												
3	16-Dec-87		NO DISCHARGE												
3	17-Dec-87		NO DISCHARGE												
3	18-Dec-87		NO DISCHARGE												
3	19-Dec-87		NO DISCHARGE												
3	20-Dec-87		NO DISCHARGE												
3	21-Dec-87		NO DISCHARGE												
3	22-Dec-87		NO DISCHARGE												
3	23-Dec-87		NO DISCHARGE												
3	24-Dec-87		NO DISCHARGE												
3	25-Dec-87		NO DISCHARGE												
3	26-Dec-87		NO DISCHARGE												
3	27-Dec-87		NO DISCHARGE												
3	28-Dec-87		NO DISCHARGE												
3	29-Dec-87		NO DISCHARGE												
3	30-Dec-87	0800	1.303	MK											
3	31-Dec-87	[illegible]	1.303	MS	7.6	51									

THE DOE RUN COMPANY

LEAD SMELTING DIVISION

HERCULANEUM, MISSOURI

HEAVY METALS IN WWTP WATER SAMPLES

18-JUL-88 ANALYST = MARILYN PRG = HGWWTP88.PRG

	Pb	Cu	As
7/15 001 3:30 PM SUSPENDED METALS	0.144	< 0.008 ND	< 0.05
	Zn	Cd	
	0.007	0.002	
	Pb	Cu	As
7/15 001 3:30 PM DISSOLVED METALS	< 0.023 ND	< 0.008 ND	< 0.05
	Zn	Cd	
	0.143	0.002	

Heavy metals reported in ppm

FYI

SEPTEMBER '89 001 "QUICKIES"

WTP GOALS FOR LEAD IN POUNDS = 0.35/SHIFT OR 1.06/DAY

DAY	LOC	SFT	pH	PPM	GPM	LBS SHIFT	SFT DIFF	LBS DAY	DAY DIFF	SAMP ID
1	001	D	9.1	0.540	292	0.632	0.278	0.865	(0.199)	CM
1	001	E	9.5	0.120	292	0.140	(0.213)			DW
1	001	N	9.2	0.080	292	0.094	(0.260)			RS
2	001	D	9.3	0.280	292	0.327	(0.026)	0.614	(0.446)	MK
2	001	E	9.3	0.150	292	0.175	(0.178)			DW
2	001	N	9.2	0.140	198	0.111	(0.242)			RS
3	001	D	9.0	0.120	292	0.140	(0.213)	0.374	(0.686)	MK
3	001	E	9.1	0.100	292	0.117	(0.236)			DW
3	001	N	9.2	0.100	292	0.117	(0.236)			RS
4	001	D	9.0	0.080	292	0.094	(0.260)	0.284	(0.776)	MK
4	001	E	9.0	0.100	242	0.097	(0.256)			DW
4	001	N	9.2	0.080	292	0.094	(0.260)			RS
5	001	D	9.2	0.120	292	0.211	(0.319)	0.507	(0.553)	MK
5	001	N	9.3	0.090	548	0.296	(0.234)			JP
6	001	D	9.1	0.060	408	0.147	(0.206)	0.539	(0.521)	MK
6	001	E	9.3	0.080	408	0.131	(0.223)			DW
6	001	N	9.4	0.160	408	0.261	(0.092)			JP
7	001	D	9.4	0.050	292	0.058	(0.295)	0.308	(0.752)	MK
7	001	E	9.3	0.070	242	0.068	(0.285)			RS
7	001	N	9.4	0.050	905	0.181	(0.172)			JP
8	001	D	9.4	0.070	242	0.068	(0.285)	0.225	(0.570)	DW
8	001	E	9.3	0.090	242	0.087	(0.266)			JP
8	001	N	9.5	0.140	126	0.071	(0.283)			RS
9	001	D	9.6	0.120	292	0.140	(0.213)	0.488	(0.574)	DW
9	001	E	9.2	0.120	347	0.167	(0.187)			JP
9	001	N	9.0	0.130	347	0.181	(0.172)			RS
10	001	D	9.7	0.080	408	0.098	(0.251)	0.380	(0.700)	DW
10	001	E	9.3	0.090	408	0.147	(0.206)			JP
10	001	N	9.2	0.070	408	0.114	(0.239)			RS
11	001	D	9.5	0.060	126	0.030	(0.323)	0.116	(0.944)	DW
11	001	E	9.4	0.050	126	0.025	(0.328)			RS
11	001	N	9.2	0.120	126	0.061	(0.293)			JP
12	001	D	9.7	0.070	408	0.114	(0.239)	0.276	(0.784)	DW
12	001	E	9.3	0.070	408	0.114	(0.239)			RS
12	001	N	9.2	0.060	195	0.048	(0.306)			MK
13	001	D	9.6	0.080	242	0.078	(0.276)	0.204	(0.856)	DW
13	001	E	9.2	0.080	198	0.063	(0.290)			RS
13	001	N	9.1	0.080	198	0.063	(0.290)			MK
14	001	D	9.7	0.060	548	0.132	(0.222)	0.333	(0.727)	DW
14	001	E	9.3	0.070	548	0.154	(0.200)			JP
14	001	N	9.3	0.060	198	0.048	(0.306)			MK
15	001	D	9.2	0.050	242	0.047	(0.316)	0.211	(0.893)	DW
15	001	E	9.0	[illegible]	198	[illegible]	[illegible]			JP
15	001	N	[illegible]	[illegible]	198	[illegible]	[illegible]			MK
16	001	D	9.1	0.080	408	0.131	(0.223)	0.226	(0.870)	RS
16	001	E	9.3	0.070	198	0.056	(0.298)			JP
16	001	N	9.1	0.050	198	0.040	(0.314)			MK
17	001	D	9.2	0.080	198	0.063	(0.290)	0.174	(0.936)	RS
17	001	E	9.0	0.080	198	0.063	(0.290)			JP

17	001	N	9.0	0.060	178	0.045	(0.308)			MK
18	001	D	9.0	0.070	236	0.066	(0.287)	0.199	(0.861)	RS
18	001	E	9.0	0.050	234	0.048	(0.305)			JP
18	001	N	9.0	0.060	236	0.057	(0.297)			MK
19	001	D	9.0	0.050	242	0.048	(0.305)	0.145	(0.915)	RS
19	001	E	9.2	0.050	242	0.048	(0.305)			JP
19	001	N	9.1	0.050	242	0.048	(0.305)			DW
20	001	D	9.1	0.050	242	0.048	(0.305)	0.155	(0.905)	RS
20	001	E	9.1	0.050	242	0.048	(0.305)			JP
20	001	N	9.4	0.060	242	0.058	(0.295)			DW
21	001	D	9.0	0.050	242	0.048	(0.305)	0.145	(0.915)	RS
21	001	E	9.0	0.050	242	0.048	(0.305)			MK
21	001	N	9.1	0.050	242	0.048	(0.305)			DW
22	001	D	9.1	0.070	242	0.068	(0.285)	0.204	(0.856)	DH
22	001	E	9.1	0.070	242	0.068	(0.285)			MK
22	001	N	9.2	0.070	242	0.068	(0.285)			DW
23	001	D	9.1	0.090	242	0.087	(0.266)	0.184	(0.876)	JP
23	001	E	9.2	0.050	242	0.048	(0.305)			MK
23	001	N	9.1	0.050	242	0.048	(0.305)			DW
24	001	D	9.0	0.050	242	0.073	(0.457)	0.145	(0.915)	JP
24	001	N	9.4	0.050	242	0.073	(0.457)			DW

TOTAL "SHIFT" SAMPLES TAKEN	*70*	
IN SPEC	*69*	*99%*
OUT OF SPEC	*1*	*1%*

TOTAL "DAILY" SAMPLES TAKEN	*24*	
IN SPEC	*24*	*100%*
OUT OF SPEC	*0*	*0%*

A NEGETIVE NUMBER INDICATES AN IN SPEC SAMPLE

Month	Monthly Pb Std / Significant Exceedance Level	Actual Monthly Value	Daily Pb Std / Significant Exceedance Level	Actual Daily Value	Monthly Zn Std / Significant Exceedance Value	Actual Monthly Value	All Other Parameters Monthly & Daily	Exceedance Monthly	Significant Exceedance Monthly	Exceedance Daily	Significant Exceedance Daily
Jan '88	1.06/1.27	2.26	3.12/3.74	3.53	3.42/4.10	0.13	OK		Pb	Pb	
Feb '88		5.19		5.19		4.63	OK		Pb Zn		Pb
Mar '88		0.67		0.67		0.08	OK				
Apr '88		No reportable Value		No reportable Value		0.20	OK				
May '88		2.02		2.72		0.27	OK		Pb		
Jun '88		1.01		1.66		0.49	OK				

THE
DOE RUN
COMPANY
SMELTING DIVISION

J. E. FITZSIMMONS
DIVISION MANAGER

April 27, 1989

Mr. Gary Gaines, P. E.
Missouri Department of Natural Resources
Poplar Bluff Regional Office
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Monitoring Data Report 1st Quarter of 1989

Dear Gary,

Enclosed you will find the monitoring data report for the first quarter of 1989. If you have any questions, please feel free to call me.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Superintendent

881 MAIN ST., HERCULANEUM, MO 63048
TELEPHONE 314-479-5311

SSOURI DEPARTMENT OF NATURAL RESOURCES --- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
NER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
RMIT NO. MO-0000281
LE NUMBER: 3.300 JEFFERSON COUNTY
CILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
FALL NUMBER

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jan-89	0000	0.4075	WTP											
1	02-Jan-89	0000	0.4873	WTP											
1	03-Jan-89	0000	0.3272	WTP											
1	04-Jan-89	0000	0.3527	WTP											
1	05-Jan-89	0000	0.4946	WTP	8.9		GRAB	01/20/89	0.206	0.099	0.008	0.557	0.033		
1	06-Jan-89	0000	0.5454	WTP										45.594	3574.535
1	07-Jan-89	0000	0.515	WTP											
1	08-Jan-89	0000	0.4868	WTP											
1	09-Jan-89	0000	0.3713	WTP											
1	10-Jan-89	0000	0.4513	WTP											
1	11-Jan-89	0000	0.511	WTP											
1	12-Jan-89	0000	0.5381	WTP											
1	13-Jan-89	0000	0.3384	WTP											
1	14-Jan-89	0000	0.4139	WTP											
1	15-Jan-89	0000	0.705	WTP			GRAB	0120/89	0.294	0.153	0.012	0.688	0.047		
1	16-Jan-89	0000	0.4628	WTP											
1	17-Jan-89	0000	0.5647	WTP											
1	18-Jan-89	0000	0.4301	WTP											
1	19-Jan-89	0000	0.5556	WTP											
1	20-Jan-89	0000	0.4212	WTP											
1	21-Jan-89	0000	0.5942	WTP											
1	22-Jan-89	0000	0.6827	WTP											
1	23-Jan-89	0000	0.543	WTP											
1	24-Jan-89	0000	0.5845	WTP											
1	25-Jan-89	0000	0.7085	WTP											
1	26-Jan-89	0000	0.525	WTP											
1	27-Jan-89	0000	0.4367	WTP											
1	28-Jan-89	0000	0.5906	WTP											
1	29-Jan-89	0000	0.597	WTP											
1	30-Jan-89	0000	0.6801	WTP											
1	31-Jan-89	0000	0.504	WTP											

SSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
ER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
RMIT NO. MO-0000281
LE NUMBER: 3.500 JEFFERSON; POINT:
CILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
FALL NUMBER 1

FALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW (MGD)	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Feb-89	0000	0.2575	WTP											
1	02-Feb-89	0000	0.4615	WTP											
1	03-Feb-89	0000	0.5006	WTP											
1	04-Feb-89	0000	0.2569	WTP											
1	05-Feb-89	0000	0.3678	WTP											
1	06-Feb-89	0000	0.3669	WTP											
1	07-Feb-89	0000	0.5231	WTP											
1	08-Feb-89	0000	0.4361	WTP											
1	09-Feb-89	0000	0.4007	WTP											
1	10-Feb-89	0000	0.4165	WTP											
1	11-Feb-89	0000	0.4385	WTP											
1	12-Feb-89	0000	0.3062	WTP											
1	13-Feb-89	0000	0.501	WTP											
1	14-Feb-89	0000	0.5977	WTP											
1	15-Feb-89	0000	0.4715	WTP											
1	16-Feb-89	0000	0.5063	WTP											
1	17-Feb-89	0000	0.5394	WTP											
1	18-Feb-89	0000	0.5101	WTP											
1	19-Feb-89	0000	0.5377	WTP											
1	20-Feb-89	0000	0.4599	WTP											
1	21-Feb-89	0000	0.4602	WTP			GRAB	03/03/89	0.192	0.054	0.088	0.718	0.031	38.401	3763.271
1	22-Feb-89	0000	0.4477	WTP		9.2									
1	23-Feb-89	0000	0.3621	WTP											
1	24-Feb-89	0000	0.3104	WTP											
1	25-Feb-89	0000	0.44	WTP											
1	26-Feb-89	0000	0.416	WTP											
1	27-Feb-89	0000	0.406	WTP											
1	28-Feb-89	0000	0.4385	WTP											

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
'GES MONITORING REPORT FOR NON MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
'ERMIT NO. MO-0000281
'LE NUMBER: 3.500 JEFFERSON, POINT:
-CILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
JTFALL NUMBER 1

ITFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Mar-89	0000	0.3424	WTP											
1	02-Mar-89	0000	0.4498	WTP											
1	03-Mar-89	0000	0.4555	WTP											
1	04-Mar-89	0000	0.4063	WTP											
1	05-Mar-89	0000	0.3531	WTP											
1	06-Mar-89	0000	0.2848	WTP											
1	07-Mar-89	0000	0.3246	WTP											
1	08-Mar-89	0000	0.365	WTP											
1	09-Mar-89	0000	0.2061	WTP			COMP	03/10/89	0.086	0.076	0.053	0.287	0.014	17.198	1454.927
1	10-Mar-89	0000	0.4572	WTP											
1	11-Mar-89	0000	0.5651	WTP											
1	12-Mar-89	0000	0.5324	WTP											
1	13-Mar-89	0000	0.5592	WTP											
1	14-Mar-89	0000	0.5955	WTP											
1	15-Mar-89	0000	0.5003	WTP											
1	16-Mar-89	0000	0.5666	WTP											
1	17-Mar-89	0000	0.6713	WTP											
1	18-Mar-89	0000	0.467	WTP											
1	19-Mar-89	0000	0.4016	WTP											
1	20-Mar-89	0000	0.616	WTP											
1	21-Mar-89	0000	0.6161	WTP											
1	22-Mar-89	0000	0.645	WTP											
1	23-Mar-89	0000	0.695	WTP											
1	24-Mar-89	0000	0.791	WTP											
1	25-Mar-89	0000	0.8275	WTP											
1	26-Mar-89	0000	0.8505	WTP											
1	27-Mar-89	0000	0.7767	WTP											
1	28-Mar-89	0000	0.7416	WTP		9.1									
1	29-Mar-89	0000	0.6759	WTP											
1	30-Mar-89	0000	[illegible]	WTP											
1	31-Mar-89	0000	[illegible]	WTP											

EOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
NER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
MIT NO. MO-0000281
LE NUMBER: 3.500 JEFFERSON, POINT:
ILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
FALL NUMBER 2

FALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jan-89		UNMEASUREABLE												
2	02-Jan-89		UNMEASUREABLE												
2	03-Jan-89		UNMEASUREABLE												
2	04-Jan-89		UNMEASUREABLE												
2	05-Jan-89	0145	0.00144	MK	7.9		GRAB	01/20/89	0.001	0.130	0.025	0.167	0.005	0.120	7.294
2	06-Jan-89		UNMEASUREABLE												
2	07-Jan-89		UNMEASUREABLE												
2	08-Jan-89		UNMEASUREABLE												
2	09-Jan-89		UNMEASUREABLE												
2	10-Jan-89		UNMEASUREABLE												
2	11-Jan-89		UNMEASUREABLE												
2	12-Jan-89		UNMEASUREABLE												
2	13-Jan-89		UNMEASUREABLE												
2	14-Jan-89		UNMEASUREABLE												
2	15-Jan-89		UNMEASUREABLE												
2	16-Jan-89		UNMEASUREABLE												
2	17-Jan-89		UNMEASUREABLE												
2	18-Jan-89		UNMEASUREABLE												
2	19-Jan-89		UNMEASUREABLE												
2	20-Jan-89		UNMEASUREABLE												
2	21-Jan-89		UNMEASUREABLE												
2	22-Jan-89		UNMEASUREABLE												
2	23-Jan-89		UNMEASUREABLE												
2	24-Jan-89		UNMEASUREABLE												
2	25-Jan-89		UNMEASUREABLE												
2	26-Jan-89		UNMEASUREABLE												
2	27-Jan-89		UNMEASUREABLE												
2	28-Jan-89		UNMEASUREABLE												
2	29-Jan-89		UNMEASUREABLE												
2	30-Jan-89		UNMEASUREABLE												
2	31-Jan-89		UNMEASUREABLE												

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
NER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
RMIT NO. MO-0000261
LE NUMBER: 3.500 JEFFERSON, POINT:
CILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
TFALL NUMBER 2

TFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Feb-89		UNMEASUREABLE												
2	02-Feb-89		UNMEASUREABLE												
2	03-Feb-89		UNMEASUREABLE												
2	04-Feb-89		UNMEASUREABLE												
2	05-Feb-89		UNMEASUREABLE												
2	06-Feb-89		UNMEASUREABLE												
2	07-Feb-89		UNMEASUREABLE												
2	08-Feb-89		UNMEASUREABLE												
2	09-Feb-89		UNMEASUREABLE												
2	10-Feb-89		UNMEASUREABLE												
2	11-Feb-89		UNMEASUREABLE												
2	12-Feb-89		UNMEASUREABLE												
2	13-Feb-89		UNMEASUREABLE												
2	14-Feb-89		UNMEASUREABLE												
2	15-Feb-89		UNMEASUREABLE												
2	16-Feb-89		UNMEASUREABLE												
2	17-Feb-89		UNMEASUREABLE												
2	18-Feb-89		UNMEASUREABLE												
2	19-Feb-89		UNMEASUREABLE												
2	20-Feb-89		UNMEASUREABLE												
2	21-Feb-89		UNMEASUREABLE												
2	22-Feb-89		UNMEASUREABLE												
2	23-Feb-89		UNMEASUREABLE												
2	24-Feb-89		UNMEASUREABLE												
2	25-Feb-89		UNMEASUREABLE												
2	26-Feb-89		UNMEASUREABLE												
2	27-Feb-89		UNMEASUREABLE												
2	28-Feb-89		UNMEASUREABLE												

'ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
UTFALL NUMBER 2

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Mar-89		UNMEASUREABLE												
2	02-Mar-89		UNMEASUREABLE												
2	03-Mar-89		UNMEASUREABLE												
2	04-Mar-89		UNMEASUREABLE												
2	05-Mar-89		UNMEASUREABLE												
2	06-Mar-89		UNMEASUREABLE												
2	07-Mar-89		UNMEASUREABLE												
2	08-Mar-89		UNMEASUREABLE												
2	09-Mar-89		UNMEASUREABLE												
2	10-Mar-89		UNMEASUREABLE												
2	11-Mar-89		UNMEASUREABLE												
2	12-Mar-89		UNMEASUREABLE												
2	13-Mar-89		UNMEASUREABLE												
2	14-Mar-89		UNMEASUREABLE												
2	15-Mar-89		UNMEASUREABLE												
2	16-Mar-89		UNMEASUREABLE												
2	17-Mar-89		UNMEASUREABLE												
2	18-Mar-89		UNMEASUREABLE												
2	19-Mar-89		UNMEASUREABLE												
2	20-Mar-89		UNMEASUREABLE												
2	21-Mar-89		UNMEASUREABLE												
2	22-Mar-89		UNMEASUREABLE												
2	23-Mar-89		UNMEASUREABLE												
2	24-Mar-89		UNMEASUREABLE												
2	25-Mar-89		UNMEASUREABLE												
2	26-Mar-89		UNMEASUREABLE												
2	27-Mar-89		UNMEASUREABLE												
2	28-Mar-89		UNMEASUREABLE												
2	29-Mar-89		UNMEASUREABLE												
2	30-Mar-89		UNMEASUREABLE												
2	31-Mar-89		UNMEASUREABLE												

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUN, MISSOURI 63048
EPORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
UTFALL NUMBER 3

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jan-89		NO DISCHARGE												
3	02-Jan-89		NO DISCHARGE												
3	03-Jan-89		NO DISCHARGE												
3	04-Jan-89		NO DISCHARGE												
3	05-Jan-89		NO DISCHARGE												
3	06-Jan-89		NO DISCHARGE												
3	07-Jan-89		NO DISCHARGE												
3	08-Jan-89		NO DISCHARGE												
3	09-Jan-89		NO DISCHARGE												
3	10-Jan-89		NO DISCHARGE												
3	11-Jan-89		NO DISCHARGE												
3	12-Jan-89		NO DISCHARGE												
3	13-Jan-89		NO DISCHARGE												
3	14-Jan-89		NO DISCHARGE												
3	15-Jan-89		NO DISCHARGE												
3	16-Jan-89		NO DISCHARGE												
3	17-Jan-89		NO DISCHARGE												
3	18-Jan-89		NO DISCHARGE												
3	19-Jan-89		NO DISCHARGE												
3	20-Jan-89		NO DISCHARGE												
3	21-Jan-89		NO DISCHARGE												
3	22-Jan-89		NO DISCHARGE												
3	23-Jan-89		NO DISCHARGE												
3	24-Jan-89		NO DISCHARGE												
3	25-Jan-89		NO DISCHARGE												
3	26-Jan-89		NO DISCHARGE												
3	27-Jan-89		NO DISCHARGE												
3	28-Jan-89		NO DISCHARGE												
3	29-Jan-89		NO DISCHARGE												
3	30-Jan-89		NO DISCHARGE												
3	31-Jan-89		NO DISCHARGE												

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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ERMIT NO. MO-0000281
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EPORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
UTFALL NUMBER 3

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Feb-89		NO DISCHARGE												
3	02-Feb-89		NO DISCHARGE												
3	03-Feb-89		NO DISCHARGE												
3	04-Feb-89		NO DISCHARGE												
3	05-Feb-89		NO DISCHARGE												
3	06-Feb-89		NO DISCHARGE												
3	07-Feb-89		NO DISCHARGE												
3	08-Feb-89		NO DISCHARGE												
3	09-Feb-89		NO DISCHARGE												
3	10-Feb-89		NO DISCHARGE												
3	11-Feb-89		NO DISCHARGE												
3	12-Feb-89		NO DISCHARGE												
3	13-Feb-89		NO DISCHARGE												
3	14-Feb-89		NO DISCHARGE												
3	15-Feb-89		NO DISCHARGE												
3	16-Feb-89		NO DISCHARGE												
3	17-Feb-89		NO DISCHARGE												
3	18-Feb-89		NO DISCHARGE												
3	19-Feb-89		NO DISCHARGE												
3	20-Feb-89		NO DISCHARGE												
3	21-Feb-89		NO DISCHARGE												
3	22-Feb-89		NO DISCHARGE												
3	23-Feb-89		NO DISCHARGE												
3	24-Feb-89		NO DISCHARGE												
3	25-Feb-89		NO DISCHARGE												
3	26-Feb-89		NO DISCHARGE												
3	27-Feb-89		NO DISCHARGE												
3	28-Feb-89		NO DISCHARGE												

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
NER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
MIT NO. MO-0000281
LE NUMBER: 3.500 JEFFERSON, POINT:
CILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: 01-Jan-89 THROUGH 31-Mar-89
TFALL NUMBER 3

TFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Mar-89		NO DISCHARGE												
3	02-Mar-89		NO DISCHARGE												
3	03-Mar-89		NO DISCHARGE												
3	04-Mar-89		NO DISCHARGE												
3	05-Mar-89		NO DISCHARGE												
3	06-Mar-89		NO DISCHARGE												
3	07-Mar-89		NO DISCHARGE												
3	08-Mar-89		NO DISCHARGE												
3	09-Mar-89		NO DISCHARGE												
3	10-Mar-89		NO DISCHARGE												
3	11-Mar-89		NO DISCHARGE												
3	12-Mar-89		NO DISCHARGE												
3	13-Mar-89		NO DISCHARGE												
3	14-Mar-89		NO DISCHARGE												
3	15-Mar-89		NO DISCHARGE												
3	16-Mar-89		NO DISCHARGE												
3	17-Mar-89		NO DISCHARGE												
3	18-Mar-89		NO DISCHARGE												
3	19-Mar-89		NO DISCHARGE												
3	20-Mar-89		NO DISCHARGE												
3	21-Mar-89		NO DISCHARGE												
3	22-Mar-89		NO DISCHARGE												
3	23-Mar-89		NO DISCHARGE												
3	24-Mar-89		NO DISCHARGE												
3	25-Mar-89		NO DISCHARGE												
3	26-Mar-89		NO DISCHARGE												
3	27-Mar-89		NO DISCHARGE												
3	28-Mar-89	0730	1.027	DW	8.6		GRAB	04/24/89	0.428	0.223	0.026	0.677	0.069	128.545	1565.386
3	29-Mar-89		0.0069	DW		69									
3	30-Mar-89		1.62	DW		69									
3	31-Mar-89		1.62	FWE		65									

NPDES file

THE DOE RUN COMPANY
Smelting Division
881 Main Street
Herculaneum, Missouri 63048

July 27, 1989

Mr. Gary Gaines, P. E.
Missouri Department of Natural Resources
Poplar Bluff Regional Office
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Monitoring Data Report 2nd Quarter of 1989

Dear Gary,

Enclosed you will find the monitoring data report for the second quarter of 1989.

If you have any questions, please feel free to call us.

Sincerely,

Daniel Vornberg
Environmental Manager

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
PDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
WNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
ERMIT NO. MO-0000281
ILE NUMBER: 3.500 JEFFERSON, POINT:
ACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
EPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
UTFALL NUMBER 1

UTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Apr-89	0000	0.5803	WTP											
1	02-Apr-89	0000	0.613	WTP											
1	03-Apr-89	0000	0.6493	WTP											
1	04-Apr-89	0000	0.6703	WTP											
1	05-Apr-89	0000	0.6162	WTP											
1	06-Apr-89	0000	0.4687	WTP											
1	07-Apr-89	0000	0.6469	WTP											
1	08-Apr-89	0000	0.6163	WTP											
1	09-Apr-89	0000	0.5466	WTP											
1	10-Apr-89	0000	0.5549	WTP											
1	11-Apr-89	0000	0.5609	WTP											
1	12-Apr-89	0000	0.6622	WTP											
1	13-Apr-89	0000	0.6503	WTP											
1	14-Apr-89	0000	0.6791	WTP											
1	15-Apr-89	0000	0.703	WTP											
1	16-Apr-89	0000	0.6601	WTP											
1	17-Apr-89	0000	0.8026	WTP											
1	18-Apr-89	0000	0.6005	WTP											
1	19-Apr-89	0000	0.6456	WTP											
1	20-Apr-89	0000	0.628	WTP											
1	21-Apr-89	0000	0.7066	WTP											
1	22-Apr-89	0000	0.7538	WTP											
1	23-Apr-89	0000	0.747	WTP											
1	24-Apr-89	0000	0.8044	WTP											
1	25-Apr-89	0000	0.8495	WTP											
1	26-Apr-89	0000	0.6222	WTP											
1	27-Apr-89	0000	0.3601	WTP											
1	28-Apr-89	0000	0.3038	WTP											
1	29-Apr-89	0000	0.3302	WTP	9.2		GRAB	05/04/89	<0.138	0.085	0.076	0.265	<0.022	60.617	3521.282
1	30-Apr-89	0000	0.2674	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE BOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-May-89	0000	0.2173	WTP											
1	02-May-89	0000	0.2226	WTP											
1	03-May-89	0000	0.2974	WTP											
1	04-May-89	0000	0.1016	WTP											
1	05-May-89	0000	0.1371	WTP											
1	06-May-89	0000	0.2049	WTP											
1	07-May-89	0000	0.2581	WTP											
1	08-May-89	0000	0.2559	WTP											
1	09-May-89	0000	0.4624	WTP											
1	10-May-89	0000	0.3809	WTP											
1	11-May-89	0000	0.3261	WTP											
1	12-May-89	0000	0.3434	WTP											
1	13-May-89	0000	0.3897	WTP											
1	14-May-89	0000	0.4022	WTP											
1	15-May-89	0000	0.3858	WTP	9.1										
1	16-May-89	0000	0.394	WTP											
1	17-May-89	0000	0.365	WTP											
1	18-May-89	0000	0.396	WTP											
1	19-May-89	0000	0.408	WTP											
1	20-May-89	0000	0.402	WTP											
1	21-May-89	0000	0.385	WTP											
1	22-May-89	0000	0.47	WTP											
1	23-May-89	0000	0.3782	WTP											
1	24-May-89	0000	0.4292	WTP											
1	25-May-89	0000	0.5706	WTP											
1	26-May-89	0000	0.6108	WTP											
1	27-May-89	0000	0.6375	WTP			GRAB	06/12/89	<0.266	0.181	0.048	0.553	<0.043	<53.195	5888.716
1	28-May-89	0000	0.3952	WTP											
1	29-May-89	0000	0.6295	WTP											
1	30-May-89	0000	0.659	WTP			GRAB	06/12/89	<0.275	0.247	0.110	1.193	<0.044	<54.989	4987.031
1	31-May-89	0000	0.372	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jun-89	0000	0.5378	WTP											
1	02-Jun-89	0000	1.0194	WTP											
1	03-Jun-89	0000	0.7922	WTP											
1	04-Jun-89	0000	0.6779	WTP											
1	05-Jun-89	0000	0.6831	WTP											
1	06-Jun-89	0000	0.6576	WTP											
1	07-Jun-89	0000	0.526	WTP											
1	08-Jun-89	0000	0.6908	WTP											
1	09-Jun-89	0000	0.6812	WTP											
1	10-Jun-89	0000	0.4713	WTP			GRAB	06/22/89	<0.197	32.091	1.180	4.365	<0.031		
1	11-Jun-89	0000	0.4207	WTP			GRAB	06/22/89	<0.176	65.997	2.907	5.371	<0.028		
1	12-Jun-89	0000	0.4955	WTP											
1	13-Jun-89	0000	0.3768	WTP											
1	14-Jun-89	0000	0.301	WTP		9.2	GRAB	06/22/89	<0.126	0.090	0.013	0.462	<0.020	<25.117	2840.678
1	15-Jun-89	0000	0.4769	WTP											
1	16-Jun-89	0000	0.5667	WTP											
1	17-Jun-89	0000	0.5743	WTP											
1	18-Jun-89	0000	0.6408	WTP											
1	19-Jun-89	0000	0.671	WTP											
1	20-Jun-89	0000	0.6372	WTP											
1	21-Jun-89	0000	0.6999	WTP											
1	22-Jun-89	0000	0.5273	WTP											
1	23-Jun-89	0000	0.3719	WTP											
1	24-Jun-89	0000	0.5678	WTP											
1	25-Jun-89	0000	0.5714	WTP											
1	26-Jun-89	0000	0.65	WTP											
1	27-Jun-89	0000	0.7278	WTP											
1	28-Jun-89	0000	0.726	WTP											
1	29-Jun-89	0000	0.4885	WTP											
1	30-Jun-89	0000	0.249	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE JOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Apr-89		UNMEASUREABLE												
2	02-Apr-89		UNMEASUREABLE												
2	03-Apr-89		UNMEASUREABLE												
2	04-Apr-89		UNMEASUREABLE												
2	05-Apr-89		UNMEASUREABLE												
2	06-Apr-89		UNMEASUREABLE												
2	07-Apr-89		UNMEASUREABLE												
2	08-Apr-89		UNMEASUREABLE												
2	09-Apr-89		UNMEASUREABLE												
2	10-Apr-89		UNMEASUREABLE												
2	11-Apr-89		UNMEASUREABLE												
2	12-Apr-89		UNMEASUREABLE												
2	13-Apr-89		UNMEASUREABLE												
2	14-Apr-89		UNMEASUREABLE												
2	15-Apr-89		UNMEASUREABLE												
2	16-Apr-89		UNMEASUREABLE												
2	17-Apr-89		UNMEASUREABLE												
2	18-Apr-89		UNMEASUREABLE												
2	19-Apr-89		UNMEASUREABLE												
2	20-Apr-89		UNMEASUREABLE												
2	21-Apr-89		UNMEASUREABLE												
2	22-Apr-89		UNMEASUREABLE												
2	23-Apr-89		UNMEASUREABLE												
2	24-Apr-89		UNMEASUREABLE												
2	25-Apr-89		UNMEASUREABLE												
2	26-Apr-89		UNMEASUREABLE												
2	27-Apr-89		UNMEASUREABLE												
2	28-Apr-89		UNMEASUREABLE												
2	29-Apr-89		UNMEASUREABLE												
2	30-Apr-89		UNMEASUREABLE												

ISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
DES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
NER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
RMIT NO. MO-0000281
LE NUMBER: 3.500 JEFFERSON, [illegible]
CILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
PORT COVERING PERIOD: [illegible] THROUGH 30-Jun-89
TFALL NUMBER

TFALL NUMBER	SAMPLING DATE	TIME OF DAY	[illegible]	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-May-89		UNMEASUREABLE												
2	02-May-89		UNMEASUREABLE												
2	03-May-89		UNMEASUREABLE												
2	04-May-89		UNMEASUREABLE												
2	05-May-89		UNMEASUREABLE												
2	06-May-89		UNMEASUREABLE												
2	07-May-89		UNMEASUREABLE												
2	08-May-89		UNMEASUREABLE												
2	09-May-89		UNMEASUREABLE												
2	10-May-89		UNMEASUREABLE												
2	11-May-89		UNMEASUREABLE												
2	12-May-89		UNMEASUREABLE												
2	13-May-89		UNMEASUREABLE												
2	14-May-89		UNMEASUREABLE												
2	15-May-89		UNMEASUREABLE												
2	16-May-89		UNMEASUREABLE												
2	17-May-89		UNMEASUREABLE												
2	18-May-89		UNMEASUREABLE												
2	19-May-89		UNMEASUREABLE												
2	20-May-89		UNMEASUREABLE												
2	21-May-89		UNMEASUREABLE												
2	22-May-89		UNMEASUREABLE												
2	23-May-89		UNMEASUREABLE												
2	24-May-89		UNMEASUREABLE												
2	25-May-89		UNMEASUREABLE												
2	26-May-89		UNMEASUREABLE												
2	27-May-89		UNMEASUREABLE												
2	28-May-89		UNMEASUREABLE												
2	29-May-89		UNMEASUREABLE												
2	30-May-89		[illegible]		7.5		GRAB	06/1[illegible]/89	0.019	0.100	0.099	0.306	0.025	2.203	[illegible]
2	31-May-89		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jun-89		UNMEASUREABLE												
2	02-Jun-89		UNMEASUREABLE												
2	03-Jun-89		UNMEASUREABLE												
2	04-Jun-89		UNMEASUREABLE												
2	05-Jun-89		UNMEASUREABLE												
2	06-Jun-89		UNMEASUREABLE												
2	07-Jun-89		UNMEASUREABLE												
2	08-Jun-89		UNMEASUREABLE												
2	09-Jun-89		UNMEASUREABLE												
2	10-Jun-89		UNMEASUREABLE												
2	11-Jun-89		UNMEASUREABLE												
2	12-Jun-89		UNMEASUREABLE												
2	13-Jun-89		UNMEASUREABLE												
2	14-Jun-89		UNMEASUREABLE												
2	15-Jun-89		UNMEASUREABLE												
2	16-Jun-89		UNMEASUREABLE												
2	17-Jun-89		UNMEASUREABLE												
2	18-Jun-89		UNMEASUREABLE												
2	19-Jun-89		UNMEASUREABLE												
2	20-Jun-89		UNMEASUREABLE												
2	21-Jun-89		UNMEASUREABLE												
2	22-Jun-89		UNMEASUREABLE												
2	23-Jun-89		UNMEASUREABLE												
2	24-Jun-89		UNMEASUREABLE												
2	25-Jun-89		UNMEASUREABLE												
2	26-Jun-89		UNMEASUREABLE												
2	27-Jun-89		UNMEASUREABLE												
2	28-Jun-89		UNMEASUREABLE												
2	29-Jun-89		UNMEASUREABLE												
2	30-Jun-89		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Apr-89		1.098	RWS		69									
3	02-Apr-89		1.62	RWS		68									
3	03-Apr-89		1.62	RWS		68									
3	04-Apr-89		0.0033	RWS	8.1	69									
3	05-Apr-89		1.62	RWS		72									
3	06-Apr-89		1.62	JP		68									
3	07-Apr-89		1.62	MK		69									
3	08-Apr-89		1.98	JP		64									
3	09-Apr-89		1.98	JP		65									
3	10-Apr-89		1.62	JP		65									
3	11-Apr-89		1.62	JP		68									
3	12-Apr-89		1.62	PW		69									
3	13-Apr-89		1.62	MK	7.9	69									
3	14-Apr-89		1.62	DW		68									
3	15-Apr-89		1.62	MK		67									
3	16-Apr-89		1.62	MK		60									
3	17-Apr-89		1.62	MK		68									
3	18-Apr-89		1.62	MK		66									
3	19-Apr-89		1.62	MK	8.2	69									
3	20-Apr-89		1.62	MK		67	GRAB	04/12/89	<0.676	<0.108	<0.027	0.378	<0.108	<135.179	1811.393
3	21-Apr-89		1.62	MB		69									
3	22-Apr-89		1.62	DW		63									
3	23-Apr-89		1.62	DW		77									
3	24-Apr-89		1.98	DW		70									
3	25-Apr-89		1.98	DW		73									
3	26-Apr-89		2.38	DW	8	67									
3	27-Apr-89		2.829	DW		69									
3	28-Apr-89		1.98	TC		68									
3	29-Apr-89		1.62	DK		70									
3	30-Apr-89		1.62	TC		69									

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-May-89		1.027	TC		68									
3	02-May-89		1.027	TC	7.2	65									
3	03-May-89		1.98	RWS		66									
3	04-May-89		1.98	RWS		68									
3	05-May-89		1.98	DK		72									
3	06-May-89		1.98	JP		66									
3	07-May-89		1.98	JP		69									
3	08-May-89		1.98	JP		70									
3	09-May-89		1.98	JP		68									
3	10-May-89		1.98	JP		72									
3	11-May-89		1.98	JP	7.8	67	GRAB	05/11/89	<0.826	<0.132	<0.033	0.363	0.132	<165.218	1883.488
3	12-May-89		2.38	JP		68									
3	13-May-89		2.38	MK		66									
3	14-May-89		1.98	MK		69									
3	15-May-89		1.98	MK		66									
3	16-May-89		1.98	MK		69									
3	17-May-89		0.0187	MK		68									
3	18-May-89		1.98	MK		76									
3	19-May-89		1.98	MB		80									
3	20-May-89		2.38	DW	8.1	80									
3	21-May-89		1.98	DW		80									
3	22-May-89		2.38	DW	8.1	71									
3	23-May-89		2.38	DK		75									
3	24-May-89		1.98	RWS		81									
3	25-May-89		2.38	RWS		78									
3	26-May-89		1.98	RWS		77									
3	27-May-89		1.98	RWS		76									
3	28-May-89		1.98	RWS		78									
3	29-May-89		2.83	RWS		79									
3	30-May-89		2.83	RWS	8.2	84									
3	31-May-89		2.83	RWS		85									

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUN, MISSOURI 63048
REPORT COVERING PERIOD: 01-Apr-89 THROUGH 30-Jun-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jun-89		2.38	MS		77									
3	02-Jun-89		2.38			84									
3	03-Jun-89		1.98	JP		81	GRAB	06/22/89	<0.026	0.132	<0.033	0.578	<0.132	<165.218	2230.446
3	04-Jun-89		1.98	JP		81									
3	05-Jun-89		1.98	JP		84									
3	06-Jun-89		1.98	JP		80									
3	07-Jun-89		1.98	JP	7.2	72									
3	08-Jun-89		1.98	JP		81									
3	09-Jun-89		1.98	MK		78									
3	10-Jun-89		1.98	MK		75									
3	11-Jun-89		1.98	MK		72									
3	12-Jun-89		1.98	MK	7.4	80									
3	13-Jun-89		2.412	MK		77									
3	14-Jun-89		1.98	MK		80									
3	15-Jun-89		0.0288	MK		72									
3	16-Jun-89		2.412	DW		76									
3	17-Jun-89		2.412	DW		80									
3	18-Jun-89		2.412	DW		79									
3	19-Jun-89		0.036	DW		81									
3	20-Jun-89		2.412	DW	7.2	83									
3	21-Jun-89		0	DW		84									
3	22-Jun-89		2.412	DW		83									
3	23-Jun-89		1.98	TC		81									
3	24-Jun-89		1.98	RWS		80									
3	25-Jun-89		1.98	RWS		83									
3	26-Jun-89		1.98	RWS		82									
3	27-Jun-89		1.98	RWS		78									
3	28-Jun-89		1.98	RWS	7.5	80									
3	29-Jun-89		1.98	RWS		78									
3	30-Jun-89		1.98	DH		77									

THE
DOE RUN
COMPANY
SMELTING DIVISION

J. E. FitzSimmons
GENERAL MANAGER

October 27, 1989

Mr. Gary Gaines, P. E.
Missouri Department of Natural Resources
Poplar Bluff Regional Office
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Monitoring Data Report 3rd Quarter of 1989

Dear Gary,

Enclosed you will find the monitoring data report for the third quarter of 1989.

The third quarter of 1989 saw a culmination of recent efforts to improve the consistent operation of our water treatment plant. Based on information obtained from vendors and a site visit to a similar water treatment plant, experimentation with a polymer was initiated during July. Initial results were encouraging and testing continued using another manufacturer's polymer. The second polymer proved more effective than the first, and has allowed us to improve greatly improve our water quality and consistency.

In order to provide faster feedback to operations, a shorten analytical method was developed to provide qualitative feedback of the performance of the water treatment process. The average of this qualitative feedback for the third quarter was .59 pounds of lead per day. As more experience with the polymer was acquired, greater efficiencies were experienced during the latter part of the quarter.

A few pH excursions were observed during the quarter due to problems associated with our neutralization system at the acid plant. We feel that these problems have been addressed

881 MAIN ST., HERCULANEUM, MO 63048
TELEPHONE 314-479-5311

and should not be a problem in the future.

If you have any questions, please feel free to call us.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Superintendent

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Jul-89 THROUGH 30-Sep-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Jul-89	0000	0.2929	WTP											
1	02-Jul-89	0000	0.2847	WTP											
1	03-Jul-89	0000	0.2545	WTP											
1	04-Jul-89	0000	0.3317	WTP											
1	05-Jul-89	0000	0.3224	WTP											
1	06-Jul-89	0000	0.3304	WTP											
1	07-Jul-89	0000	0.2116	WTP											
1	08-Jul-89	0000	0.3374	WTP											
1	09-Jul-89	0000	0.341	WTP											
1	10-Jul-89	0000	0.3822	WTP											
1	11-Jul-89	0000	0.6259	WTP											
1	12-Jul-89	0000	0.2239	WTP											
1	13-Jul-89	0000	0.3366	WTP											
1	14-Jul-89	0000	0.323	WTP											
1	15-Jul-89	0000	0.282	WTP											
1	16-Jul-89	0000	0.275	WTP											
1	17-Jul-89	0000	0.263	WTP											
1	18-Jul-89	0000	0.2612	WTP											
1	19-Jul-89	0000	0.2394	WTP											
1	20-Jul-89	0000	0.2058	WTP											
1	21-Jul-89	0000	0.2596	WTP											
1	22-Jul-89	0000	0.249	WTP											
1	23-Jul-89	0000	0.2889	WTP											
1	24-Jul-89	0000	0.2942	WTP											
1	25-Jul-89	0000	0.2041	WTP			GRAB	08-08-89	<0.085	0.034	0.003	0.354	<0.003	56.202	1319.889
1	26-Jul-89	0000	0.3331	WTP											
1	27-Jul-89	0000	0.3316	WTP											
1	28-Jul-89	0000	0.3474	WTP											
1	29-Jul-89	0000	0.3179	WTP											
1	30-Jul-89	0000	0.2548	WTP											
1	31-Jul-89	0000	0.3772	WTP		9.2									

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OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Aug-89	0000	0.2428	WTP											
1	02-Aug-89	0000	0.2356	WTP											
1	03-Aug-89	0000	0.4034	WTP											
1	04-Aug-89	0000	0.292	WTP											
1	05-Aug-89	0000	0.2578	WTP											
1	06-Aug-89	0000	0.3522	WTP											
1	07-Aug-89	0000	0.1988	WTP											
1	08-Aug-89	0000	0.136	WTP	9.2		GRAB	08/10/89	<0.057	0.011	0.024	0.117	<0.002	24.966	2090.361
1	09-Aug-89	0000	0.2363	WTP											
1	10-Aug-89	0000	0.3991	WTP											
1	11-Aug-89	0000	0.2752	WTP											
1	12-Aug-89	0000	0.3551	WTP											
1	13-Aug-89	0000	0.3485	WTP											
1	14-Aug-89	0000	0.36	WTP											
1	15-Aug-89	0000	0.3767	WTP			GRAB	08-29-89	<0.157	0.025	0.116	1.308	<0.006	31.433	3495.371
1	16-Aug-89	0000	0.2468	WTP											
1	17-Aug-89	0000	0.3191	WTP											
1	18-Aug-89	0000	0.3439	WTP											
1	19-Aug-89	0000	0.3166	WTP											
1	20-Aug-89	0000	0.3842	WTP											
1	21-Aug-89	0000	0.3405	WTP											
1	22-Aug-89	0000	0.3848	WTP											
1	23-Aug-89	0000	0.1319	WTP											
1	24-Aug-89	0000	0.1974	WTP											
1	25-Aug-89	0000	0.2489	WTP											
1	26-Aug-89	0000	0.2283	WTP											
1	27-Aug-89	0000	0.1559	WTP											
1	28-Aug-89	0000	0.0742	WTP											
1	29-Aug-89	0000	0.1669	WTP											
1	30-Aug-89	0000	0.0636	WTP											
1	31-Aug-89	0000	0.2302	WTP											

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OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Sep-89	0000	0.2658	WTP											
1	02-Sep-89	0000	0.1943	WTP											
1	03-Sep-89	0000	0.2357	WTP											
1	04-Sep-89	0000	0.4997	WTP											
1	05-Sep-89	0000	0.4997	WTP											
1	06-Sep-89	0000	0.5875	WTP											
1	07-Sep-89	0000	0.3485	WTP											
1	08-Sep-89	0000	0.2851	WTP											
1	09-Sep-89	0000	0.4997	WTP											
1	10-Sep-89	0000	0.5875	WTP											
1	11-Sep-89	0000	0.2851	WTP											
1	12-Sep-89	0000	0.3485	WTP											
1	13-Sep-89	0000	0.1714	WTP											
1	14-Sep-89	0000	0.3449	WTP	9.3		GRAB	09/15/89	<0.144	<0.023	<0.006	<0.227	<0.023		
1	15-Sep-89	0000	0.223	WTP											
1	16-Sep-89	0000	0.2447	WTP											
1	17-Sep-89	0000	0.254	WTP											
1	18-Sep-89	0000	0.2141	WTP											
1	19-Sep-89	0000	0.2155	WTP											
1	20-Sep-89	0000	0.2866	WTP											
1	21-Sep-89	0000	0.2032	WTP											
1	22-Sep-89	0000	0.1281	WTP											
1	23-Sep-89	0000	0.1669	WTP											
1	24-Sep-89	0000	0.0806	WTP											
1	25-Sep-89	0000	0.1567	WTP			GRAB	09-29-89	<0.065	<0.013	<0.003	0.118	<0.010		
1	26-Sep-89	0000	0.07	WTP											
1	27-Sep-89	0000	0.1719	WTP											
1	28-Sep-89	0000	0.3093	WTP											
1	29-Sep-89	0000	0.1807	WTP											
1	30-Sep-89	0000	0.2384	WTP											

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OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Jul-89		UNMEASUREABLE												
2	02-Jul-89		UNMEASUREABLE												
2	03-Jul-89		UNMEASUREABLE												
2	04-Jul-89		UNMEASUREABLE												
2	05-Jul-89		UNMEASUREABLE												
2	06-Jul-89		UNMEASUREABLE												
2	07-Jul-89		UNMEASUREABLE												
2	08-Jul-89		UNMEASUREABLE												
2	09-Jul-89		UNMEASUREABLE												
2	10-Jul-89		UNMEASUREABLE												
2	11-Jul-89		UNMEASUREABLE												
2	12-Jul-89		UNMEASUREABLE												
2	13-Jul-89		UNMEASUREABLE												
2	14-Jul-89		UNMEASUREABLE												
2	15-Jul-89		UNMEASUREABLE												
2	16-Jul-89		UNMEASUREABLE												
2	17-Jul-89		UNMEASUREABLE												
2	18-Jul-89		UNMEASUREABLE												
2	19-Jul-89		UNMEASUREABLE												
2	20-Jul-89		UNMEASUREABLE												
2	21-Jul-89		UNMEASUREABLE												
2	22-Jul-89		UNMEASUREABLE												
2	23-Jul-89		UNMEASUREABLE												
2	24-Jul-89		UNMEASUREABLE												
2	25-Jul-89		UNMEASUREABLE												
2	26-Jul-89		UNMEASUREABLE												
2	27-Jul-89		UNMEASUREABLE												
2	28-Jul-89		UNMEASUREABLE												
2	29-Jul-89		UNMEASUREABLE												
2	30-Jul-89		UNMEASUREABLE												
2	31-Jul-89		UNMEASUREABLE												

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OUTFALL NUMBER 2

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2	01-Aug-89		UNMEASUREABLE												
2	02-Aug-89		UNMEASUREABLE												
2	03-Aug-89		UNMEASUREABLE												
2	04-Aug-89		UNMEASUREABLE												
2	05-Aug-89		UNMEASUREABLE												
2	06-Aug-89		UNMEASUREABLE												
2	07-Aug-89		UNMEASUREABLE												
2	08-Aug-89		UNMEASUREABLE												
2	09-Aug-89		UNMEASUREABLE												
2	10-Aug-89		UNMEASUREABLE												
2	11-Aug-89		UNMEASUREABLE												
2	12-Aug-89		UNMEASUREABLE												
2	13-Aug-89		UNMEASUREABLE												
2	14-Aug-89		UNMEASUREABLE												
2	15-Aug-89		0.001				GRAB	08-29-89	<0.000	0.023	0.043	0.011	0.000	0.108	5.605
2	16-Aug-89		UNMEASUREABLE												
2	17-Aug-89		UNMEASUREABLE												
2	18-Aug-89		UNMEASUREABLE												
2	19-Aug-89		UNMEASUREABLE												
2	20-Aug-89		UNMEASUREABLE												
2	21-Aug-89		UNMEASUREABLE												
2	22-Aug-89		UNMEASUREABLE												
2	23-Aug-89		UNMEASUREABLE												
2	24-Aug-89		UNMEASUREABLE												
2	25-Aug-89		UNMEASUREABLE												
2	26-Aug-89		UNMEASUREABLE												
2	27-Aug-89		UNMEASUREABLE												
2	28-Aug-89		UNMEASUREABLE												
2	29-Aug-89		UNMEASUREABLE												
2	30-Aug-89		UNMEASUREABLE												
2	31-Aug-89		UNMEASUREABLE												

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OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Sep-89		UNMEASUREABLE												
2	02-Sep-89		UNMEASUREABLE												
2	03-Sep-89		UNMEASUREABLE												
2	04-Sep-89		UNMEASUREABLE												
2	05-Sep-89		UNMEASUREABLE												
2	06-Sep-89		UNMEASUREABLE												
2	07-Sep-89		UNMEASUREABLE												
2	08-Sep-89		UNMEASUREABLE												
2	09-Sep-89		UNMEASUREABLE												
2	10-Sep-89		UNMEASUREABLE												
2	11-Sep-89		UNMEASUREABLE												
2	12-Sep-89		UNMEASUREABLE												
2	13-Sep-89		UNMEASUREABLE												
2	14-Sep-89		0.003		5.7		GRAB	09/15/89	<0.001	0.015	0.007	0.041	0.001	<0.288	59.406
2	15-Sep-89		UNMEASUREABLE												
2	16-Sep-89		UNMEASUREABLE												
2	17-Sep-89		UNMEASUREABLE												
2	18-Sep-89		UNMEASUREABLE												
2	19-Sep-89		UNMEASUREABLE												
2	20-Sep-89		UNMEASUREABLE												
2	21-Sep-89		UNMEASUREABLE												
2	22-Sep-89		UNMEASUREABLE												
2	23-Sep-89		UNMEASUREABLE												
2	24-Sep-89		UNMEASUREABLE												
2	25-Sep-89		0.011				GRAB	09-29-89	<0.005	0.062	0.110	0.082	<0.001	<0.913	85.567
2	26-Sep-89		UNMEASUREABLE												
2	27-Sep-89		UNMEASUREABLE												
2	28-Sep-89		UNMEASUREABLE												
2	29-Sep-89		UNMEASUREABLE												
2	30-Sep-89		UNMEASUREABLE												

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OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Jul-89	0800	1.98	JP		78									
3	02-Jul-89	0800	1.98	JP		85									
3	03-Jul-89	0800	1.98	JP		81									
3	04-Jul-89	0800	1.98	MK		81									
3	05-Jul-89	1000	1.98	MK		81									
3	06-Jul-89	0900	1.98	MK		84									
3	07-Jul-89	0800	3.296	MK	7.2	87									
3	08-Jul-89	0800	2.38	MK		83									
3	09-Jul-89	0800	2.38	MK		82									
3	10-Jul-89	0700	2.38	MK		84									
3	11-Jul-89	0700	2.38	MK											
3	12-Jul-89	0700	2.829	DW		83									
3	13-Jul-89	0700	3.296	DW	7.3	83									
3	14-Jul-89	0700	3.296	DW		83									
3	15-Jul-89	0700	3.296	DW		81									
3	16-Jul-89	0900	3.296	DW		82									
3	17-Jul-89	0700	3.296	DW		80									
3	18-Jul-89	1000	3.296	DW		77									
3	19-Jul-89	0700	0.0004	TC	7.4	80									
3	20-Jul-89	1100	1.62	RWS		78									
3	21-Jul-89	1000	3.296	RWS		72									
3	22-Jul-89	0700	3.296	RWS		76									
3	23-Jul-89	0800	3.296	RWS		83									
3	24-Jul-89	0800	3.296	RWS		85									
3	25-Jul-89	0700	3.296	RWS		85									
3	26-Jul-89	1000	3.296	RWS		88	GRAB	08-08-89	<1.375	0.880	<0.055	0.358	<0.055		3052.833
3	27-Jul-89	0700	1.98	RWS	7.2	87									
3	28-Jul-89	0800	1.98	DH		89									
3	29-Jul-89	0800	2.289	JP		84									
3	30-Jul-89	0800	2.38	JP		85									
3	31-Jul-89	0800	1.98	JP		88									

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OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Aug-89	0700	3.296	JP		87									
3	02-Aug-89	0800	1.965	JP		86									
3	03-Aug-89	0800	1.965	JP		87									
3	04-Aug-89	0700	1.965	MK		87									
3	05-Aug-89	1100	1.965	MK		87									
3	06-Aug-89	0700	1.965	MK	7.8	83									
3	07-Aug-89	0700	1.965	MK		83									
3	08-Aug-89	0800	1.965	MK		83									
3	09-Aug-89	0800	1.965	MK		80									
3	10-Aug-89	0800	1.965	MK		83									
3	11-Aug-89	1100	1.965	DW		83									
3	12-Aug-89	1100	1.965	DW		83									
3	13-Aug-89	1100	1.965	DW		82									
3	14-Aug-89	0800	1.965	DW		85									
3	15-Aug-89	1100	1.965	DW	7.9	86									
3	16-Aug-89		1.965	DW		78									
3	17-Aug-89		1.965	TC		83									
3	18-Aug-89	0900	1.965	RS		83									
3	19-Aug-89	0700	1.965	RS		82									
3	20-Aug-89	0700	1.965	TC		81									
3	21-Aug-89	0700	1.965	TC		81									
3	22-Aug-89	0700	1.965	JP		81									
3	23-Aug-89	0900	1.965	JP	7.9	89									
3	24-Aug-89	0900	1.965	JP		85									
3	25-Aug-89	0700	1.965	JP		80									
3	26-Aug-89	0700	1.965	JP		85									
3	27-Aug-89	0700	1.965	JP		88									
3	28-Aug-89	0900	1.965	JP		81									
3	29-Aug-89	0700	1.965	JP		88									
3	30-Aug-89	0800	1.653	JP	8	80									
3	31-Aug-89	0700	1.653	JP	8	86	GRAB	09/15/89	<0.690	<0.110	<0.028	<0.690	<0.110	303.451	1668.980

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3	01-Sep-89	1300	2.823	CM		84									
3	02-Sep-89	0700	2.823	MK		87									
3	03-Sep-89	0700	2.823	MK		84									
3	04-Sep-89	0700	2.823	MK		86									
3	05-Sep-89	1100	2.823	MK	8	85									
3	06-Sep-89	0700	2.823	MK											
3	07-Sep-89	0700	2.823	MK		85									
3	08-Sep-89	0700	0.0588	DW		86									
3	09-Sep-89	0700	0.0588	DW		87									
3	10-Sep-89	0800	0.0588	DW		83									
3	11-Sep-89	0700	1.027	DW		81	GRAB	09/15/89	<0.428	<0.069	<0.017	<0.428	<0.069	<85.697	951.232
3	12-Sep-89	0800	0.0187	DW		72									
3	13-Sep-89	0700	2.823	DW	7.9	67									
3	14-Sep-89	0700	2.823	DW		69									
3	15-Sep-89	0900	1.925	TC		78									
3	16-Sep-89	0700	1.925	RS		80									
3	17-Sep-89	0700	1.925	RS		79									
3	18-Sep-89	0700	2.823	RS		83									
3	19-Sep-89	0800	1.925	RS	8.2	79									
3	20-Sep-89	0700	2.38	RS		74									
3	21-Sep-89	0700	2.38	RS		77									
3	22-Sep-89	0900	2.823	DH		74									
3	23-Sep-89	0800	2.823	JP		73									
3	24-Sep-89	0800	2.823	JP		72									
3	25-Sep-89	0800	2.823	JP											
3	26-Sep-89	0800	2.823	JP	8.1										
3	27-Sep-89	0800	2.823	JP											
3	28-Sep-89	0800	2.823	JP											
3	29-Sep-89	0700	2.823	MK											
3	30-Sep-89	0700	2.823	MK											

pH Values

JULY 1989

DATE	DAY	EVE	NITES
1	9.2	9.1	8.5
2		10.4	
3	9.3	9.1	9.1
4	9.3	9.1	9
5	9.7	9.4	9.1
6	8.7	9.2	9.2
7	8.9	9.3	9
8	9	9.1	9.1
9	9	9	9
10	8.9		
11	9.1		
12	9		
13	8.8	9	9.1
14	9.3	8.9	9
15	9	9	9.1
16	9.2	9.1	9.1
17			
18			
19			
20			
21		9.2	9.2
22	9.1	9.1	9
23	9	9	9
24	9	9	9
25	9.2	9.2	10.1
26	9.2	9	9.8
27	9.4	9	9.5
28		9	9.2
29			
30	9.3	9.1	9.1
31		9	9

AUG 1989

DATE	DAY	EVE	NITES
1	9.1	9.1	9
2	9.1	9.4	9.2
3		9.1	9.1
4	9	9.3	9.1
5	9	9.3	9.2
6	9.5	9.2	9.5
7	9	9	9.1
8		9.2	9
9	9.1	9.1	9.1
10	9	9.1	9
11			
12			
13			
14	9.3	9.2	9.2
15	9.3	9.3	9.1
16	9.2	9.1	9.3
17		9.2	9.1
18		9.2	9.1
19	9.2	9.2	9.2
20	9.2	9.2	9.2
21	9.1	9.1	9
22	9.2	9.2	
23			
24			
25	9		9.6
26	9.3		
27	9.1	9	9.8
28			
29	9.2	9.8	9.2
30	9.2	9.8	9.2
31	9.2	9.3	9.2

SEPT 1989

DATE	DAY	EVE	NITES
1	9.1	9.5	9.2
2	9.3	9.3	9.2
3	9	9.1	9.2
4	9	9	9.2
5	9.2		9.3
6	9.1	9.3	9.4
7	9.4	9.3	9.4
8	9.4	9.3	9.5
9	9.6	9.2	9
10	9.7	9.3	9.2
11	9.5	9.4	9.2
12	9.7	9.3	9.2
13	9.6	9.2	9.1
14	9.7	9.3	9.2
15	9.1	9.3	9.1
16	9.1	9.3	9.1
17	9.2	9	9
18	9	9	9
19	9	9.2	9.1
20	9.1	9.1	9.4
21	9	9	9.1
22	9.1	9.1	9.2
23	9.1	9.2	9.1
24	9		9.4
25	9.7	10.2	10.1
26			
27	9.3	9.2	9.1
28	9.3	9.3	9.1
29			
30			
31			

THE DOE RUN COMPANY
SMELTING DIVISION

J. E. FitzSimmons
GENERAL MANAGER

January 29, 1990

Mr. Gary Gaines, P. E.
Missouri Department of Natural Resources
Poplar Bluff Regional Office
948 Lester Street
Poplar Bluff, Missouri 63901

Re: Monitoring Data Report 4th Quarter of 1989

Dear Gary,

Enclosed you will find the monitoring data report for the fourth quarter of 1989.

In order to provide faster feedback to operations, a shorten analytical method was developed to provide qualitative feedback of the performance of the water treatment process. The average of this qualitative feedback for the fourth quarter was .33 pounds of lead per day.

If you have any questions, please feel free to call us.

Sincerely,

James M. Lanzafame

James M. Lanzafame
Environmental Superintendent

cc: Dan Vornberg

881 MAIN ST., HERCULANEUM, MO 63048
TELEPHONE 314-479-5311

bcc: J. FitzSimmons
E. Alsbury
M. Stites

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANOEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Oct-89	0000	0.0769	WTP											
1	02-Oct-89	0000	0.0321	WTP											
1	03-Oct-89	0000	0.144	WTP											
1	04-Oct-89	0000	0.144	WTP											
1	05-Oct-89	0000	0	WTP											
1	06-Oct-89	0000	0	WTP											
1	07-Oct-89	0000	0	WTP											
1	08-Oct-89	0000	0	WTP											
1	09-Oct-89	0000	0.144	WTP											
1	10-Oct-89	0000	0.144	WTP											
1	11-Oct-89	0000	0.144	WTP											
1	12-Oct-89	0000	0.144	WTP											
1	13-Oct-89	0000	0.19	WTP											
1	14-Oct-89	0000	0.0012	WTP											
1	15-Oct-89	0000	0.0071	WTP											
1	16-Oct-89	0000	0.0034	WTP											
1	17-Oct-89	0000	0.0571	WTP											
1	18-Oct-89	0000	0.0655	WTP											
1	19-Oct-89	0000	0.0526	WTP											
1	20-Oct-89	0000	0.055	WTP											
1	21-Oct-89	0000	1.697	WTP											
1	22-Oct-89	0000	0.1268	WTP											
1	23-Oct-89	0000	0.2873	WTP											
1	24-Oct-89	0000	0.4053	WTP			GRAB	11/03/89	<0.163	0.085	0.112	0.304	<0.027	<33.82	3257
1	25-Oct-89	0000	0.2623	WTP											
1	26-Oct-89	0000	0.1657	WTP											
1	27-Oct-89	0000	0.3129	WTP											
1	28-Oct-89	0000	0.278	WTP											
1	29-Oct-89	0000	0.1037	WTP											
1	30-Oct-89	0000	0.2705	WTP		9.2									
1	31-Oct-89	0000	0.1521	WTP											

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REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Nov-89	0000	0.9764	WTP											
1	02-Nov-89	0000	0.4203	WTP											
1	03-Nov-89	0000	0.164	WTP											
1	04-Nov-89	0000	0.198	WTP											
1	05-Nov-89	0000	0.1944	WTP											
1	06-Nov-89	0000	0.2146	WTP											
1	07-Nov-89	0000	0.2012	WTP											
1	08-Nov-89	0000	0.2728	WTP			GRAB	11/28/89	<0.114	0.064	0.020	0.189	<0.018	<22.76	2078
1	09-Nov-89	0000	0.2133	WTP											
1	10-Nov-89	0000	0.3066	WTP											
1	11-Nov-89	0000	0.3232	WTP											
1	12-Nov-89	0000	0.1793	WTP											
1	13-Nov-89	0000	0.3105	WTP											
1	14-Nov-89	0000	0.5181	WTP											
1	15-Nov-89	0000	1.2533	WTP		9.3									
1	16-Nov-89	0000	0.1825	WTP											
1	17-Nov-89	0000	0.1796	WTP											
1	18-Nov-89	0000	0.2105	WTP											
1	19-Nov-89	0000	0.1996	WTP											
1	20-Nov-89	0000	0.2434	WTP											
1	21-Nov-89	0000	0.1907	WTP											
1	22-Nov-89	0000	0.2995	WTP											
1	23-Nov-89	0000	0.231	WTP											
1	24-Nov-89	0000	0.252	WTP											
1	25-Nov-89	0000	0.2739	WTP											
1	26-Nov-89	0000	0.2957	WTP											
1	27-Nov-89	0000	0.4224	WTP											
1	28-Nov-89	0000	0.37	WTP											
1	29-Nov-89	0000	0.289	WTP											
1	30-Nov-89	0000	0.255	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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PERMIT NO. MO-0000281
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REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 1

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
1	01-Dec-89	0000	0.332	WTP											
1	02-Dec-89	0000	0.24	WTP											
1	03-Dec-89	0000	0.227	WTP											
1	04-Dec-89	0000	0.2874	WTP											
1	05-Dec-89	0000	0.3306	WTP											
1	06-Dec-89	0000	0.764	WTP											
1	07-Dec-89	0000	0.3955	WTP											
1	08-Dec-89	0000	0.4259	WTP											
1	09-Dec-89	0000	0.4221	WTP											
1	10-Dec-89	0000	0.4537	WTP											
1	11-Dec-89	0000	0.6588	WTP											
1	12-Dec-89	0000	0.5215	WTP											
1	13-Dec-89	0000	0.4514	WTP											
1	14-Dec-89	0000	0.5078	WTP											
1	15-Dec-89	0000	0.3	WTP											
1	16-Dec-89	0000	0.484	WTP											
1	17-Dec-89	0000	0.6113	WTP											
1	18-Dec-89	0000	0.542	WTP											
1	19-Dec-89	0000	0.4003	WTP											
1	20-Dec-89	0000	0.257	WTP											
1	21-Dec-89	0000	0.3637	WTP	9.2		GRAB	12/28/89	<0.152	2.519	0.149	0.513	<0.024	<30.35	7144
1	22-Dec-89	0000	0.2394	WTP											
1	23-Dec-89	0000	0.4399	WTP											
1	24-Dec-89	0000	0.4148	WTP											
1	25-Dec-89	0000	0.4999	WTP											
1	26-Dec-89	0000	0.4383	WTP											
1	27-Dec-89	0000	0.2358	WTP											
1	28-Dec-89	0000	0.3669	WTP											
1	29-Dec-89	0000	0.6827	WTP											
1	30-Dec-89	0000	0.3529	WTP											
1	31-Dec-89	0000	0.5534	WTP											

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANUEM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Oct-89		UNMEASUREABLE												
2	02-Oct-89		UNMEASUREABLE												
2	03-Oct-89		UNMEASUREABLE												
2	04-Oct-89		UNMEASUREABLE												
2	05-Oct-89		UNMEASUREABLE												
2	06-Oct-89		UNMEASUREABLE												
2	07-Oct-89		UNMEASUREABLE												
2	08-Oct-89		UNMEASUREABLE												
2	09-Oct-89		UNMEASUREABLE												
2	10-Oct-89		UNMEASUREABLE												
2	11-Oct-89		UNMEASUREABLE												
2	12-Oct-89		UNMEASUREABLE												
2	13-Oct-89		UNMEASUREABLE												
2	14-Oct-89		UNMEASUREABLE												
2	15-Oct-89		UNMEASUREABLE												
2	16-Oct-89		UNMEASUREABLE												
2	17-Oct-89		UNMEASUREABLE												
2	18-Oct-89		UNMEASUREABLE												
2	19-Oct-89		UNMEASUREABLE												
2	20-Oct-89		UNMEASUREABLE												
2	21-Oct-89		UNMEASUREABLE												
2	22-Oct-89		UNMEASUREABLE												
2	23-Oct-89		UNMEASUREABLE												
2	24-Oct-89		0.000518	JP	7.9		GRAB	11/03/89	<0.001	0.056	0.013	0.034	0.001	0.13	4
2	25-Oct-89		UNMEASUREABLE												
2	26-Oct-89		UNMEASUREABLE												
2	27-Oct-89		UNMEASUREABLE												
2	28-Oct-89		UNMEASUREABLE												
2	29-Oct-89		UNMEASUREABLE												
2	30-Oct-89		UNMEASUREABLE												
2	31-Oct-89		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Nov-89		UNMEASUREABLE												
2	02-Nov-89		UNMEASUREABLE												
2	03-Nov-89		UNMEASUREABLE												
2	04-Nov-89		UNMEASUREABLE												
2	05-Nov-89		UNMEASUREABLE												
2	06-Nov-89		UNMEASUREABLE												
2	07-Nov-89		UNMEASUREABLE												
2	08-Nov-89		0.00036	MS			GRAB	11/23/89	<0.001	0.008	0.002	0.023	0.000	0.05	3
2	09-Nov-89		UNMEASUREABLE												
2	10-Nov-89		UNMEASUREABLE												
2	11-Nov-89		UNMEASUREABLE												
2	12-Nov-89		UNMEASUREABLE												
2	13-Nov-89		UNMEASUREABLE												
2	14-Nov-89		UNMEASUREABLE												
2	15-Nov-89		UNMEASUREABLE												
2	16-Nov-89		UNMEASUREABLE												
2	17-Nov-89		UNMEASUREABLE												
2	18-Nov-89		UNMEASUREABLE												
2	19-Nov-89		UNMEASUREABLE												
2	20-Nov-89		UNMEASUREABLE												
2	21-Nov-89		UNMEASUREABLE												
2	22-Nov-89		UNMEASUREABLE												
2	23-Nov-89		UNMEASUREABLE												
2	24-Nov-89		UNMEASUREABLE												
2	25-Nov-89		UNMEASUREABLE												
2	26-Nov-89		UNMEASUREABLE												
2	27-Nov-89		UNMEASUREABLE												
2	28-Nov-89		UNMEASUREABLE												
2	29-Nov-89		UNMEASUREABLE												
2	30-Nov-89		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 2

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
2	01-Dec-89		UNMEASUREABLE												
2	02-Dec-89		UNMEASUREABLE												
2	03-Dec-89		UNMEASUREABLE												
2	04-Dec-89		UNMEASUREABLE												
2	05-Dec-89		UNMEASUREABLE												
2	06-Dec-89		UNMEASUREABLE												
2	07-Dec-89		UNMEASUREABLE												
2	08-Dec-89		UNMEASUREABLE												
2	09-Dec-89		UNMEASUREABLE												
2	10-Dec-89		UNMEASUREABLE												
2	11-Dec-89		UNMEASUREABLE												
2	12-Dec-89		UNMEASUREABLE												
2	13-Dec-89		UNMEASUREABLE												
2	14-Dec-89		UNMEASUREABLE												
2	15-Dec-89		UNMEASUREABLE												
2	16-Dec-89		UNMEASUREABLE												
2	17-Dec-89		UNMEASUREABLE												
2	18-Dec-89		UNMEASUREABLE												
2	19-Dec-89		UNMEASUREABLE												
2	20-Dec-89		UNMEASUREABLE												
2	21-Dec-89		UNMEASUREABLE												
2	22-Dec-89		UNMEASUREABLE												
2	23-Dec-89		UNMEASUREABLE												
2	24-Dec-89		UNMEASUREABLE												
2	25-Dec-89		UNMEASUREABLE												
2	26-Dec-89		UNMEASUREABLE												
2	27-Dec-89		UNMEASUREABLE												
2	28-Dec-89		UNMEASUREABLE												
2	29-Dec-89		UNMEASUREABLE												
2	30-Dec-89		UNMEASUREABLE												
2	31-Dec-89		UNMEASUREABLE												

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
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REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Oct-89		NO DISCHARGE												
3	02-Oct-89		NO DISCHARGE												
3	03-Oct-89		NO DISCHARGE												
3	04-Oct-89		NO DISCHARGE												
3	05-Oct-89		NO DISCHARGE												
3	06-Oct-89		NO DISCHARGE												
3	07-Oct-89		NO DISCHARGE												
3	08-Oct-89		NO DISCHARGE												
3	09-Oct-89		NO DISCHARGE												
3	10-Oct-89		NO DISCHARGE												
3	11-Oct-89		NO DISCHARGE												
3	12-Oct-89		NO DISCHARGE												
3	13-Oct-89		NO DISCHARGE												
3	14-Oct-89		NO DISCHARGE												
3	15-Oct-89		NO DISCHARGE												
3	16-Oct-89		NO DISCHARGE												
3	17-Oct-89		NO DISCHARGE												
3	18-Oct-89		NO DISCHARGE												
3	19-Oct-89		1.62	RS		7.9									
3	20-Oct-89		NO DISCHARGE												
3	21-Oct-89		NO DISCHARGE												
3	22-Oct-89		2.38	JP			80								
3	23-Oct-89		2.38	JP			74								
3	24-Oct-89		2.38	JP		8.2	72								
3	25-Oct-89		2.38	JP			69								
3	26-Oct-89		0.5716	JP			69								
3	27-Oct-89		2.38	CM			68								
3	28-Oct-89		2.38	MK			75								
3	29-Oct-89		2.354	MK			66								
3	30-Oct-89		2.354	MK											
3	31-Oct-89		2.38	MK		8.2	69								

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63043
REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Nov-89		2.38	MK		74									
3	02-Nov-89		2.83	MK		67									
3	03-Nov-89		2.83	GD		69									
3	04-Nov-89		2.83	DW		68									
3	05-Nov-89		2.83	DW		63									
3	06-Nov-89		2.83	DW		76									
3	07-Nov-89		2.83	GD		71									
3	08-Nov-89		2.83	DW		64									
3	09-Nov-89		1.577	DW	8.3	69									
3	10-Nov-89		2.376	RS		70									
3	11-Nov-89		2.83	RS		72									
3	12-Nov-89		2.83	RS		72									
3	13-Nov-89		2.83	RS											
3	14-Nov-89		2.83	RS	8.3	75									
3	15-Nov-89		2.376	RS											
3	16-Nov-89		2.83	RS		66									
3	17-Nov-89		2.376	DH		67	GRAB	11/28/89	<0.991	0.297	<0.040	<0.991	<0.159	<198.26	3152
3	18-Nov-89		2.376	JP		66									
3	19-Nov-89		2.83	JP		67									
3	20-Nov-89		1.98	JP		75									
3	21-Nov-89		2.38	JP		88									
3	22-Nov-89		2.38	JP	8.1	61									
3	23-Nov-89		2.38	JP		61									
3	24-Nov-89		2.83	MK		61									
3	25-Nov-89		1.98	MK		65									
3	26-Nov-89		2.83	MK		71									
3	27-Nov-89		2.83	MK		67									
3	28-Nov-89		2.83	MK	8.3	63									
3	29-Nov-89		2.83	MK		50									
3	30-Nov-89		2.83	MK		64									

MISSOURI DEPARTMENT OF NATURAL RESOURCES -- DIVISION OF ENVIRONMENTAL QUALITY
NPDES MONITORING REPORT FOR NON-MUNICIPAL WASTEWATER DISCHARGES
OWNER: PARTNERSHIP OF ST. JOE MINERALS CORP AND HOMESTAKE MINING CO
PERMIT NO. MO-0000281
FILE NUMBER: 3.500 JEFFERSON, POINT:
FACILITY NAME: THE DOE RUN COMPANY, HERCULANEUM SMELTING DIVISION, HERCULANEUM, MISSOURI 63048
REPORT COVERING PERIOD: 01-Oct-89 THROUGH 31-Dec-89
OUTFALL NUMBER 3

OUTFALL NUMBER	SAMPLING DATE	TIME OF DAY	FLOW MGD	SAMPLED BY	pH	TEMP	SAMPLE TYPE	DATE OF ANALYSIS	TOTAL AS, PDS	TOTAL Zn, PDS	TOTAL CD, PDS	TOTAL Pb, PDS	TOTAL Cu, PDS	SUSPENDED SOLIDS, PDS	SULFATE, PDS
3	01-Dec-89		0.767	GD		66									
3	02-Dec-89		2.38	DW											
3	03-Dec-89		2.38	DW	8.1										
3	04-Dec-89		0.001728	DW											
3	05-Dec-89		NO DISCHARGE												
3	06-Dec-89		NO DISCHARGE												
3	07-Dec-89		NO DISCHARGE												
3	08-Dec-89		NO DISCHARGE												
3	09-Dec-89		NO DISCHARGE												
3	10-Dec-89		NO DISCHARGE												
3	11-Dec-89		NO DISCHARGE												
3	12-Dec-89		NO DISCHARGE												
3	13-Dec-89		NO DISCHARGE												
3	14-Dec-89		NO DISCHARGE												
3	15-Dec-89		NO DISCHARGE												
3	16-Dec-89		NO DISCHARGE												
3	17-Dec-89		1.62	JP		50									
3	18-Dec-89		1.62	JP		56									
3	19-Dec-89		1.62	JP		63									
3	20-Dec-89		1.98	JP		58									
3	21-Dec-89		1.98	JP		52									
3	22-Dec-89		1.62	CM		51									
3	23-Dec-89		2.83	MK	8.3	45									
3	24-Dec-89		2.83	MK		62									
3	25-Dec-89		1.98	MK	8.3	74									
3	26-Dec-89		1.62	MK		56									
3	27-Dec-89		1.62	MK		70									
3	28-Dec-89		1.62	MK		66									
3	29-Dec-89		2.83	MB		70	GRAB	01/22/90	<1.181	<0.189	<0.047	1.629	<0.189	236.15	3896
3	30-Dec-89		1.62	DW		58									
3	31-Dec-89		1.62	DW		69									

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

12-MAR-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
3/3 001	.188	.078	.014	.025	.013	< 10.	768.
3/3 002	<.05	8.72	.9557	.114	.044	< 10.	1030.
3/3 003	<.05	.011	.002	.047	.018		
3/8 003	<.05	.006	<.002	.043	.018		
2/20 001	3.39	.086	.005	.014	.009	< 10.	887.
2/20 002	1.87	2.6	.66	.105	.044	24.	610.
2/23 001	.326	.036	.006	.008	.008	< 10.	663.
2/23 003	<.05	.007	.002	.017	.008		

3/28 001 COMP (analysis 4/19/93) < 10. 635.

2/23 001 0.30*

*Analysis done on April 27, 1993

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

23-FEB-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
1/3 001 ✓	.12	.02	.004	<.05	<.008		
1/3 003	<.05	0.06	0.007	0.11	0.04		
1/25 001 comp	<.05	0.02	0.003	<.05	.008	< 10.	928.
1/25 002	0.18	6.75	1.24	2.00	0.31	18.	475.
1/25 003	<.05	0.05	0.006	<.05	0.01		
1/26 001 ✓	0.11	0.08	0.01	<.05	0.008		
1/26 003	<.05	0.02	0.003	<.05	0.003		
2/1 003	<.05	0.005	<.002	<.05	<.008		
2/1 001 ✓	3.40	0.12	0.008	.250	.002		
2/11 002	0.62	4.20	.98	.11	.04		
2/11 001 ✓	11.5*						

*Analyzed on April 27, 1993

```
easurements for 1643C-                  -                  1

s.   193.699  288.98  192.50  194.42  95.328 0.08236 PPM
              291.04  197.14  193.62  96.009 0.08299 PPM
              296.25  194.33  194.45  101.85 0.08832 PPM

- 12:43:35  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1643C-                  -                  1 #MEAS.= 3

L      CONC/ sigma

s  0.08456/  3.9%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.090784nm  #Steps =  -92.00

easurements for BLK-                  -                  1

s   193.699  123.48  120.50  123.84 0.97843-0.00380 PPM
             121.49  120.45  125.56 -2.0307-0.00655 PPM *
             121.78  124.53  123.30 -2.0133-0.00653 PPM *
             126.76  120.97  124.37  3.7451-0.00127 PPM
             120.18  122.00  124.14 -3.1040-0.00753 PPM *
            Total number of measurements : 5
            Nb of meas.  with peak found : 2
            Calculation around 0

---- 12:49:52  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

le BLK-                  -                  1 #MEAS.= 3

      CONC/ sigma

s*-0.00687/  8.3%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.089578nm  #Steps =  -90.78

easurements for 1/3 001-                  -                  1

s   193.699  417.57  287.35  290.90  128.09  0.1192 PPM  ( BlK :   -0.007)
             426.68  287.58  291.54  136.72  0.1270 PPM  ( BlK :   -0.007)
             420.26  291.70  291.90  128.44  0.1195 PPM  ( BlK :   -0.007)

---- 12:55:06  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1/3 001-                  -                  1 #MEAS.= 3

      CONC/ sigma

s   0.1219/  3.7%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.088283nm  #Steps =  -89.47

easurements for 1/3 003-                  -                  1

s   193.699  236.01  232.25  230.17  5.0107 0.00675 PPM *  ( BlK :   -0.007)
```

```
                 238.84  233.49  231.74  6.3987 0.00802 PPM *  ( BlK :   -0.007)
                 244.72  235.56  232.99  10.709 0.01196 PPM  ( BlK :   -0.007)
                 245.02  236.62  231.79  11.301 0.01250 PPM  ( BlK :   -0.007)
                Total number of measurements : 5
                Nb of meas.  with peak found : 3

----- 12:59:50  2/22/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample 1/3 003-                -                1 #MEAS.= 3

EL      CONC/ sigma

As* 0.01244/  3.7%


Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.088969nm  #Steps =  -90.16

Measurements for 1/4 001-                -                1

As   193.699  375.46  281.07  285.89  91.498 0.08574 PPM  ( BlK :   -0.007)
              387.35  283.40  284.06  103.55 0.09674 PPM  ( BlK :   -0.007)
              381.51  282.63  283.34  98.451 0.09209 PPM  ( BlK :   -0.007)

----- 13:05:05  2/22/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample 1/4 001-                -                1 #MEAS.= 3

EL      CONC/ sigma

As* 0.09152/  6.0%


Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.087565nm  #Steps =  -88.74

Measurements for 1/4 002-                -                1

As   193.699  238.79  220.78  224.09  16.025 0.01681 PPM  ( BlK :   -0.007)
              238.62  222.39  222.09  16.413 0.01717 PPM  ( BlK :   -0.007)
              243.21  223.63  224.99  18.758 0.01931 PPM  ( BlK :   -0.007)

----- 13:09:49  2/22/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample 1/4 002-                -                1 #MEAS.= 3

EL      CONC/ sigma

As  0.01776/  7.6%


Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.087613nm  #Steps =  -88.79

Measurements for 1/25 001-                -                1

As   193.699  319.84  266.61  270.16  51.101 0.04884 PPM  ( BlK :   -0.007)
              312.15  269.93  273.81  39.891 0.03861 PPM  ( BlK :   -0.007)
              318.71  268.88  274.02  46.747 0.04487 PPM  ( BlK :   -0.007)

----- 13:14:32  2/22/93 -----    Method:  D:\USAS WITHOUT RATIO
```

:L CONC/ sigma

s 0.04411/ 12%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.086027nm #Steps = -87.18

easurements for CTL- - 1

s 193.699 262.59 184.10 187.42 76.493 0.06516 PPM
258.11 184.41 191.84 69.246 0.05855 PPM
259.40 190.83 190.52 68.753 0.05809 PPM

---- 13:19:16 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL- - 1 #MEAS.= 3

L CONC/ sigma

s 0.06060/ 6.5%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.087631nm #Steps = -88.81

easurements for 1/25 002- - 1

s 193.699 443.82 262.92 260.49 182.36 0.1687 PPM (Blk : -0.007)
457.81 264.15 262.61 194.58 0.1799 PPM (Blk : -0.007)
457.68 264.42 259.75 196.06 0.1812 PPM (Blk : -0.007)

---- 13:23:59 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

ample 1/25 002- - 1 #MEAS.= 3

CONC/ sigma

s 0.1766/ 3.9%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.087123nm #Steps = -88.29

easurements for 1/25 003- - 1

s 193.699 231.17 229.21 223.93 5.1237 0.00686 PPM (Blk : -0.007)
234.99 229.43 226.49 7.3252 0.00887 PPM (Blk : -0.007)
233.50 230.52 226.77 5.2343 0.00696 PPM (Blk : -0.007)

---- 13:28:43 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

ample 1/25 003- - 1 #MEAS.= 3

CONC/ sigma

s 0.00756/ 15%

```
ef. 193.031nm (calc: 193.230940nm)  Offset = -0.088016nm  #Steps =  -89.20

easurements for 1/26 001-                 -                 1

s   193.699  370.96  256.99  259.25  112.62  0.1050 PPM  ( BlK :   -0.007)
             372.21  258.10  261.17  112.27  0.1047 PPM  ( BlK :   -0.007)
             374.12  257.76  260.77  114.56  0.1068 PPM  ( BlK :   -0.007)

----- 13:33:27  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1/26 001-                 -                 1 #MEAS.= 3

L     CONC/ sigma

s   0.1055/  1.1%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.088015nm  #Steps =  -89.20

easurements for 1/26 003-                 -                 1

s   193.699  229.84  226.81  223.94  4.7459 0.00651 PPM  ( BlK :   -0.007)
             232.26  231.17  228.00  2.9948 0.00491 PPM  ( BlK :   -0.007)
             230.53  227.19  223.87  5.3331 0.00705 PPM  ( BlK :   -0.007)

----- 13:38:11  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1/26 003-                 -                 1 #MEAS.= 3

L     CONC/ sigma

s   0.00616/  18%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.088214nm  #Steps =  -89.40

easurements for 2/1 001-                 -                 1

s   193.699  3927.1  259.71  264.94  3664.2  3.349 PPM  ( BlK :   -0.007)
             4027.4  260.37  266.23  3763.6  3.439 PPM  ( BlK :   -0.007)
             3986.3  259.27  266.59  3722.7  3.402 PPM  ( BlK :   -0.007)

----- 13:42:55  2/22/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 2/1 001-                 -                 1 #MEAS.= 3

-     CONC/ sigma

s   3.397/  1.3%


  193.031nm (calc: 193.230940nm)  Offset = -0.088039nm  #Steps =  -89.22

easurements for CTL-                 -                 1

s   193.699  272.15  186.60  187.06  85.269 0.07318 PPM
             267.18  187.59  190.57  77.806 0.06636 PPM
             270.96  186.67  187.68  83.689 0.07174 PPM
```

ample U/L- - 1 #MEAS.= 3

CONC/ sigma

s 0.07043/ 5.1%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.087151nm #Steps = -88.32

easurements for 2/1 003- - 1

s 193.699	225.41	225.08	222.09	2.1279	0.00412 PPM	(BlK :	-0.007)
	227.49	227.14	222.41	3.1829	0.00508 PPM	(BlK :	-0.007)
	227.71	225.51	223.99	3.1124	0.00502 PPM	(BlK :	-0.007)

----- 13:52:22 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

ample 2/1 003- - 1 #MEAS.= 3

CONC/ sigma

s 0.00474/ 11%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.087776nm #Steps = -88.95

easurements for 2/11 001- - 1

193.699	10697	274.43	291.94	10412	9.511 PPM	(BlK :	-0.007)
	10907	274.53	291.55	10623	9.703 PPM	(BlK :	-0.007)
	10754	273.42	292.15	10469	9.563 PPM	(BlK :	-0.007)

--- 13:57:06 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

mple 2/11 001- - 1 #MEAS.= 3

CONC/ sigma

s 9.592/ 1.0%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090020nm #Steps = -91.23

easurements for 2/11 002- - 1

193.699	932.32	236.31	235.32	696.60	0.6383 PPM	(BlK :	-0.007)
	915.00	236.62	237.81	677.66	0.6210 PPM	(BlK :	-0.007)
	901.20	235.41	237.89	664.31	0.6089 PPM	(BlK :	-0.007)

--- 14:01:50 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

e 2/11 002- - 1 #MEAS.= 3

CONC/ sigma

0.6227/ 2.4%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.087187nm #Steps = -88.36

easurements for CTL- - 1

s	193.699	261.20	184.37	186.93	75.297	0.06407 PPM
		263.44	185.91	187.49	76.585	0.06525 PPM
		265.09	187.52	184.79	79.208	0.06764 PPM

---- 14:06:34 2/22/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL- - 1 #MEAS.= 3

L CONC/ sigma

s 0.06565/ 2.8%

Analytical Method: USAS Without Ratio 193.9245 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 F10

Help Accept ISA-JY

```
Zero order has been found at step number :      98367.0
Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.089626nm  #Steps =  -90.83
Zn : 213.856nm (calc: 214.052245nm)  Offset =  0.030224nm  #Steps =   30.83

R    193.031nm (calc: 193.230940nm)  Offset = -0.091707nm  #Steps =  -92.94
Z    214.438nm (calc: 214.638000nm)  Offset =  0.021683nm  #Steps =   22.12

Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.093040nm  #Steps =  -94.29
Pb : 220.353nm (calc: 220.341069nm)  Offset = -0.170547nm  #Steps = -174.35

Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.094201nm  #Steps =  -95.47
Cu : 327.396nm (calc: 327.567682nm)  Offset =  0.108498nm  #Steps =  116.44

Ref. 193.031nm (calc: 193.230940nm)  Offset = -0.092024nm  #Steps =  -93.26

Results for STDLOW

Zn   213.856  310.20  0.0000  288.01  22.187
              305.68  0.0000  288.61  17.078
              312.74  0.0000  287.15  25.591
Cd   214.438  194.79  188.81  0.0000  5.9720
              190.41  189.47  0.0000  0.93333 *
              189.55  191.51  0.0000  -1.9533 *
              189.69  189.51  0.0000  0.17333 *
              Total number of measurements : 4
              Nb of meas.  with peak found : 1
              Calculation around 0
Pb   220.353  348.36  347.47  0.0000  0.88667 *
              346.99  345.23  0.0000  1.7600 *
              355.71  348.45  0.0000  7.2533 *
              Calculation around 0
Cu   327.396  1727.6  0.0000  0.0000  1727.6
              1709.7  0.0000  0.0000  1709.7
              1714.6  0.0000  0.0000  1714.6

-----18:37:33  3/12/93 -----

esults for STDLOW #MEAS.=3 (R)

L  SIGNAL/sigma  EL  SIGNAL/sigma  EL  SIGNAL/sigma  EL  SIGNAL/sigma

n   21.619/  20% Cd*-0.28222/  530% Pb*  3.3000/  100% Cu  1717.3/ 0.54%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.090904nm  #Steps =  -92.12

esults for STDHIGH

n   213.856  415260  0.0000  2276.7  412980
            407560  0.0000  2264.7  405290
            404960  0.0000  2272.7  402680
d   214.438  53250  406.97  0.0000  52843
            52911  433.40  0.0000  52477
            52448  431.80  0.0000  52016
    220.353  20929  488.83  0.0000  20440
            20456  516.87  0.0000  19939
            20664  518.27  0.0000  20146
u   327.396  353480  0.0000  0.0000  353480
            280170  0.0000  0.0000  280170
            274190  0.0000  0.0000  274190
```

Results for STDHIGH #MEAS.=3 (R)

EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
Zn	406990/ 1.3%	Cd	52446/ 0.79%	Pb	20175/ 1.2%	Cu	302610/ 15%

Intensities for Recalibration:

El	Wave	LOW		HI	
Zn	213.856	STDLOW:	21.6187	STDHIGH:	406986.4756
Cd	214.438	STDLOW:	-0.2822	STDHIGH:	52445.5461
Pb	220.353	STDLOW:	3.3000	STDHIGH:	20174.9728
Cu	327.396	STDLOW:	1717.2964	STDHIGH:	302609.9318

Regression Results :

El	Wave	Intercept	Slope	2nd Order
Zn	213.856	-0.000265608	0.0000122861	0.00000
Cd	214.438	0.0000134530	0.0000476682	0.00000
Pb	220.353	-0.00163596	0.000495745	0.00000
Cu	327.396	-0.0285367	0.0000166172	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
Zn 213.856					
	STDLOW	21.619	0.0000	0.0000	0.0
	STDHIGH	406990	5.0000	5.0000	0.0
Cd 214.438					
	STDLOW	-0.28222	0.0000	0.0000	0.0
	STDHIGH	52446	2.5000	2.5000	0.0
Pb 220.353					
	STDLOW	3.3000	0.0000	0.0000	0.0
	STDHIGH	20175	10.000	10.000	0.0
Cu 327.396					
	STDLOW	1717.3	0.0000	0.0000	0.0
	STDHIGH	302610	5.0000	5.0000	0.0

inal Regression Results for Method : WATER

El	Opt. Wave	Intercept	Slope	2nd Order
Zn	213.856	-0.000265608	0.0000122861	0.00000
Cd	214.438	0.0000134530	0.0000476682	0.00000
Pb	220.353	-0.00163596	0.000495745	0.00000
Cu	327.396	-0.0285367	0.0000166172	0.00000

ef. 193.031nm (calc: 193.230940nm) Offset = -0.091875nm #Steps = -93.11

leasurements for 1643C- - 1

Zn	213.856	4842.8	0.0000	334.05	4508.7	0.05513 PPM
		4942.7	0.0000	333.08	4609.6	0.05637 PPM
		4924.2	0.0000	334.50	4589.7	0.05612 PPM
Cd	214.438	421.80	203.13	0.0000	218.67	0.01044 PPM
		411.28	204.48	0.0000	206.80	0.00987 PPM
		418.93	205.57	0.0000	213.37	0.01018 PPM
Pb	220.353	488.94	370.32	0.0000	118.62	0.05717 PPM
		477.59	370.00	0.0000	107.59	0.05170 PPM
		474.57	369.93	0.0000	104.64	0.05024 PPM
Cu	327.396	2646.6	0.0000	0.0000	2646.6	0.01544 PPM
		2653.9	0.0000	0.0000	2653.9	0.01556 PPM
		2650.8	0.0000	0.0000	2650.8	0.01551 PPM

18:52:37 [illegible]/92/93 Method: D:\WATER WITHOUT [illegible]

Method: D:\WATER WITHOUT RATIO

sample 1643C- - 1 #MEAS.= 3

EL CONC/ sigma

n 0.05587/ 1.2%

d 0.01016/ 2.8%

b 0.05304/ 6.9%

u 0.01551/ 0.39%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090325nm #Steps = -91.54

easurements for CTL- - 1

n	213.856	3278.3	0.0000	271.01	3007.2	0.03668 PPM
		3362.0	0.0000	272.09	3090.0	0.03770 PPM
		3305.7	0.0000	272.14	3033.6	0.03700 PPM
d	214.438	579.67	171.28	0.0000	408.39	0.01948 PPM
		589.25	172.45	0.0000	416.80	0.01988 PPM
		602.70	171.14	0.0000	431.56	0.02059 PPM
b	220.353	532.49	312.54	0.0000	219.95	0.1074 PPM
		531.00	311.12	0.0000	219.88	0.1074 PPM
		539.58	308.65	0.0000	230.93	0.1128 PPM
u	327.396	3963.7	0.0000	0.0000	3963.7	0.03733 PPM
		3948.3	0.0000	0.0000	3948.3	0.03707 PPM
		3923.7	0.0000	0.0000	3923.7	0.03666 PPM

---- 19:01:32 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample CTL- - 1 #MEAS.= 3

CONC/ sigma

n 0.03713/ 1.4%

d 0.01998/ 2.8%

b 0.1092/ 2.9%

u 0.03702/ 0.91%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090858nm #Steps = -92.08

easurements for BLK- - 1

	213.856	245.87	0.0000	225.20	20.670	-0.00001 PPM
		242.95	0.0000	224.65	18.307	-0.00004 PPM
		246.56	0.0000	225.51	21.053	-0.000000 PPM
	214.438	148.65	146.19	0.0000	2.4533	0.00013 PPM *
		149.30	146.09	0.0000	3.2067	0.00017 PPM *
		146.68	146.59	0.0000	0.09333	0.00002 PPM *
		Calculation around 0				
	220.353	271.78	265.62	0.0000	6.1600	0.00142 PPM *
		272.49	266.04	0.0000	6.4467	0.00156 PPM *
		276.88	266.27	0.0000	10.613	0.00363 PPM

```
          No of meas. with peak found : 1
          Calculation around 0
u   327.396  1351.5  0.0000  0.0000  1351.5-0.00608 PPM *
             1392.3  0.0000  0.0000  1392.3-0.00540 PPM
             1397.9  0.0000  0.0000  1397.9-0.00531 PPM
             1387.8  0.0000  0.0000  1387.8-0.00548 PPM
          Total number of measurements : 4
          Nb of meas.  with peak found : 3

----- 19:08:51  3/12/93 -----    Method:  D:\WATER WITHOUT RATIO

ample BLK-              -                  1 #MEAS.= 3

L      CONC/ sigma

n -0.00002/   92%

d* 0.00010/   74%

b* 0.00144/  7.4%

u*-0.00540/  1.6%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.091303nm  #Steps =  -92.53

easurements for 3/3 001-              -                  1

n   213.856  6826.0  0.0000  387.83  6438.2 0.07885 PPM  ( BlK :   -0.000)
             6699.0  0.0000  383.69  6315.3 0.07734 PPM  ( BlK :   -0.000)
             6835.4  0.0000  385.61  6449.8 0.07900 PPM  ( BlK :   -0.000)
d   214.438  535.05  235.21  0.0000  299.84 0.01420 PPM  ( BlK :    0.000)
             544.62  235.27  0.0000  309.34 0.01465 PPM  ( BlK :    0.000)
             540.32  237.17  0.0000  303.15 0.01436 PPM  ( BlK :    0.000)
b   220.353  509.37  450.82  0.0000  58.554 0.02595 PPM  ( BlK :    0.001)
             507.19  448.73  0.0000  58.459 0.02590 PPM  ( BlK :    0.001)
             503.53  448.64  0.0000  54.887 0.02413 PPM  ( BlK :    0.001)
u   327.396  2157.3  0.0000  0.0000  2157.3 0.01271 PPM  ( BlK :   -0.005)
             2195.2  0.0000  0.0000  2195.2 0.01334 PPM  ( BlK :   -0.005)
             2204.8  0.0000  0.0000  2204.8 0.01350 PPM  ( BlK :   -0.005)

---- 19:15:33  3/12/93 -----    Method:  D:\WATER WITHOUT RATIO

ample 3/3 001-              -                  1 #MEAS.= 3

      CONC/ sigma

n  0.07840/  1.2%

d  0.01440/  1.6%

b  0.02533/  4.1%

u  0.01318/  3.2%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.089877nm  #Steps =  -91.08

easurements for 3/3 002-              -                  1

n   213.856  716550  0.0000  4662.0  711890   8.746 PPM  ( BlK :   -0.000)
```

		720420	0.0000	4632.7	715790	8.794	PPM	(Blk :	[illegible]
		707270	0.0000	4563.3	702710	8.633	PPM	(Blk :	-0.000)
	214.438	20089	387.42	0.0000	19701	0.9390	PPM	(Blk :	0.000)
		20574	415.87	0.0000	20158	0.9608	PPM	(Blk :	0.000)
		20676	416.73	0.0000	20260	0.9657	PPM	(Blk :	0.000)
b	220.353	701.28	461.49	0.0000	239.78	0.1158	PPM	(Blk :	0.001)
		698.39	463.47	0.0000	234.92	0.1134	PPM	(Blk :	0.001)
		692.53	459.25	0.0000	233.28	0.1126	PPM	(Blk :	0.001)
u	327.396	4103.6	0.0000	0.0000	4103.6	0.04505	PPM	(Blk :	-0.005)
		4021.3	0.0000	0.0000	4021.3	0.04368	PPM	(Blk :	-0.005)
		4046.4	0.0000	0.0000	4046.4	0.04410	PPM	(Blk :	-0.005)

----- 19:21:53 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample 3/3 002- - 1 #MEAS.= 3

L	CONC/	sigma
n	8.724/	0.95%
d	0.9552/	1.5%
b	0.1139/	1.5%
u	0.04428/	1.6%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.090610nm #Steps = -91.83

urements for 3/3 003- - 1

Zn	213.856	1269.6	0.0000	316.83	952.73	0.01146	PPM	(Blk :	-0.000)
		1251.7	0.0000	320.03	931.71	0.01120	PPM	(Blk :	-0.000)
		1245.2	0.0000	316.20	929.01	0.01117	PPM	(Blk :	-0.000)
Cd	214.438	242.20	209.20	0.0000	33.000	0.00148	PPM	(Blk :	0.000)
		243.81	207.65	0.0000	36.162	0.00163	PPM	(Blk :	0.000)
		244.09	208.84	0.0000	35.252	0.00159	PPM	(Blk :	0.000)
Pb	220.353	482.07	377.82	0.0000	104.25	0.04860	PPM	(Blk :	0.001)
		476.42	381.35	0.0000	95.068	0.04405	PPM	(Blk :	0.001)
		480.61	378.86	0.0000	101.75	0.04736	PPM	(Blk :	0.001)
Cu	327.396	2467.0	0.0000	0.0000	2467.0	0.01785	PPM	(Blk :	-0.005)
		2484.2	0.0000	0.0000	2484.2	0.01814	PPM	(Blk :	-0.005)
		2484.5	0.0000	0.0000	2484.5	0.01814	PPM	(Blk :	-0.005)

------ 19:28:16 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

Sample 3/3 003- - 1 #MEAS.= 3

EL	CONC/	sigma
Zn	0.01128/	1.4%
Cd	0.00157/	4.7%
Pb	0.04667/	5.0%
Cu	0.01805/	0.92%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.089241nm #Steps = -90.44

n.	213.856	850.50	0.0000	312.05	516.44	0.00612	PPM	(Blk :	-0.000)
		832.45	0.0000	311.89	520.56	0.00615	PPM	(Blk :	-0.000)
		823.39	0.0000	312.22	511.17	0.00603	PPM	(Blk :	-0.000)
d.	214.439	211.24	205.63	0.0000	5.6067	0.00018	PPM *	(Blk :	0.000)
		211.59	206.67	0.0000	4.9267	0.00014	PPM *	(Blk :	0.000)
		216.18	204.21	0.0000	11.964	0.00048	PPM	(Blk :	0.000)
		212.85	208.09	0.0000	4.7600	0.00014	PPM *	(Blk :	0.000)

Total number of measurements : 4
Nb of meas. with peak found : 1
Calculation around 0

b	220.353	471.26	379.35	0.0000	91.915	0.04249	PPM	(Blk :	0.001)
		465.48	378.05	0.0000	87.438	0.04027	PPM	(Blk :	0.001)
		476.47	377.05	0.0000	99.419	0.04621	PPM	(Blk :	0.001)
u	327.396	2448.4	0.0000	0.0000	2448.4	0.01754	PPM	(Blk :	-0.005)
		2444.6	0.0000	0.0000	2444.6	0.01748	PPM	(Blk :	-0.005)
		2449.3	0.0000	0.0000	2449.3	0.01756	PPM	(Blk :	-0.005)

---- 19:34:37 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample 3/8 003- - 1 #MEAS.= 3

L	CONC/	sigma
n	0.00610/	0.99%
d%	0.00015/	14%
b	0.04299/	7.0%
u	0.01753/	0.23%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.088741nm #Steps = -89.93

easurements for CTL- - 1

n	213.856	4617.4	0.0000	309.55	4307.9	0.05266	PPM
		4599.6	0.0000	310.55	4289.0	0.05243	PPM
		4587.5	0.0000	308.38	4279.1	0.05231	PPM
d	214.438	347.78	188.91	0.0000	158.86	0.00759	PPM
		354.29	189.33	0.0000	164.95	0.00788	PPM
		350.76	191.00	0.0000	159.76	0.00763	PPM
b	220.353	443.15	342.21	0.0000	100.94	0.04841	PPM
		437.69	339.87	0.0000	97.824	0.04686	PPM
		433.13	342.72	0.0000	90.412	0.04319	PPM
u	327.396	2417.8	0.0000	0.0000	2417.8	0.01164	PPM
		2424.9	0.0000	0.0000	2424.9	0.01176	PPM
		2429.4	0.0000	0.0000	2429.4	0.01183	PPM

---- 19:41:10 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample CTL- - 1 #MEAS.= 3

	CONC/	sigma
n	0.05247/	0.34%
d	0.00770/	2.0%
b	0.04615/	1.9%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.089230nm #Steps = -90.43

easurements for 2/20 001- - 1

	213.856	7424.5	0.0000	372.61	7051.9	0.08639	PPM	(Blk :	-0.000)
		7434.7	0.0000	370.46	7064.2	0.08655	PPM	(Blk :	-0.000)
		7265.7	0.0000	373.82	6891.9	0.08443	PPM	(Blk :	-0.000)
d	214.438	323.71	224.81	0.0000	98.899	0.00462	PPM	(Blk :	0.000)
		321.14	224.66	0.0000	96.483	0.00451	PPM	(Blk :	0.000)
		328.78	225.21	0.0000	103.57	0.00485	PPM	(Blk :	0.000)
b	220.353	463.10	421.01	0.0000	42.097	0.01779	PPM	(Blk :	0.001)
		454.82	420.81	0.0000	34.011	0.01378	PPM	(Blk :	0.001)
		451.46	422.07	0.0000	29.393	0.01149	PPM	(Blk :	0.001)
u	327.396	1895.3	0.0000	0.0000	1895.3	0.00835	PPM	(Blk :	-0.005)
		1900.3	0.0000	0.0000	1900.3	0.00844	PPM	(Blk :	-0.005)
		1936.5	0.0000	0.0000	1936.5	0.00904	PPM	(Blk :	-0.005)

----- 19:47:29 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample 2/20 001- - 1 #MEAS.= 3

L CONC/ sigma

n 0.08579/ 1.4%

d 0.00466/ 3.7%

b 0.01435/ 22%

0.00861/ 4.3%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.089211nm #Steps = -90.41

easurements for 2/20 002- - 1

n	213.856	216560	0.0000	1616.0	214950	2.641	PPM	(Blk :	-0.000)
		212490	0.0000	1613.3	210880	2.591	PPM	(Blk :	-0.000)
		211190	0.0000	1618.0	209570	2.575	PPM	(Blk :	-0.000)
d	214.438	14198	291.13	0.0000	13907	0.6628	PPM	(Blk :	0.000)
		13832	320.00	0.0000	13512	0.6440	PPM	(Blk :	0.000)
		14626	319.60	0.0000	14306	0.6819	PPM	(Blk :	0.000)
b	220.353	636.02	418.34	0.0000	217.68	0.1048	PPM	(Blk :	0.001)
		636.03	415.85	0.0000	220.19	0.1061	PPM	(Blk :	0.001)
		632.04	414.91	0.0000	217.12	0.1046	PPM	(Blk :	0.001)
u	327.396	4083.5	0.0000	0.0000	4083.5	0.04471	PPM	(Blk :	-0.005)
		4067.7	0.0000	0.0000	4067.7	0.04445	PPM	(Blk :	-0.005)
		4041.7	0.0000	0.0000	4041.7	0.04402	PPM	(Blk :	-0.005)

---- 19:53:50 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

ample 2/20 002- - 1 #MEAS.= 3

CONC/ sigma

n 2.602/ 1.3%

d 0.6629/ 2.9%

b 0.1052/ 0.77%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.088147nm #Steps = -89.33

easurements for 2/23 003- - 1

	213.856	886.93	0.0000	313.49	573.44	0.00680	PPM	(Blk :	-0.000)
		901.92	0.0000	315.49	586.44	0.00696	PPM	(Blk :	-0.000)
		892.51	0.0000	313.92	578.59	0.00686	PPM	(Blk :	-0.000)
	214.438	255.56	206.21	0.0000	49.349	0.00226	PPM	(Blk :	0.000)
		257.29	205.48	0.0000	51.808	0.00238	PPM	(Blk :	0.000)
		258.31	207.46	0.0000	50.846	0.00233	PPM	(Blk :	0.000)
	220.353	421.07	380.57	0.0000	40.499	0.01700	PPM	(Blk :	0.001)
		422.38	380.71	0.0000	41.675	0.01758	PPM	(Blk :	0.001)
		409.97	377.43	0.0000	32.540	0.01305	PPM *	(Blk :	0.001)
		419.60	380.59	0.0000	39.011	0.01626	PPM	(Blk :	0.001)

Total number of measurements : 4
Nb of meas. with peak found : 3

	327.396	1827.7	0.0000	0.0000	1827.7	0.00723	PPM	(Blk :	-0.005)
		1830.7	0.0000	0.0000	1830.7	0.00728	PPM	(Blk :	-0.005)
		1835.6	0.0000	0.0000	1835.6	0.00736	PPM	(Blk :	-0.005)

---- 20:07:00 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

1 #MEAS.= 3

EL CONC/ sigma

Zn 0.00687/ 1.2%

Cd 0.002327/ 2.5%

Pb 0.01695/ 3.9%

Cu 0.00729/ 0.91%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.089733nm #Steps = -90.94

Measurements for CTL- 1

Zn	213.856	4290.0	0.0000	305.83	3984.1	0.04868 PPM
		4466.1	0.0000	306.47	4159.6	0.05084 PPM
		4371.9	0.0000	309.29	4062.6	0.04965 PPM
Cd	214.438	347.95	189.67	0.0000	158.28	0.00756 PPM
		354.06	188.13	0.0000	165.93	0.00792 PPM
		356.35	191.89	0.0000	164.46	0.00785 PPM
Pb	220.353	442.60	341.95	0.0000	100.65	0.04826 PPM
		432.25	343.08	0.0000	89.175	0.04257 PPM
		438.76	343.05	0.0000	95.709	0.04581 PPM
Cu	327.396	2425.7	0.0000	0.0000	2425.7	0.01177 PPM
		2383.3	0.0000	0.0000	2383.3	0.01107 PPM
		2404.3	0.0000	0.0000	2404.3	0.01142 PPM

--- 20:13:32 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

Sample CTL- 1 #MEAS.= 3

EL CONC/ sigma

Zn 0.04972/ 2.2%

Cd 0.00778/ 2.5%

Pb 0.04555/ 6.3%

Cu 0.01142/ 3.1%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.089966nm #Steps = -91.17
S : 193.699nm (calc: 193.699001nm) Offset = 0.195202nm #Steps = 197.86

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.090514nm #Steps = -91.73

Results for STDLOW

	193.699	119.57	122.26	123.11	-3.3987 *
		117.53	120.97	120.99	-3.4587 *
		119.01	120.15	123.27	-3.0187 *

Calculation around 0

--- 20:26:26 3/12/93 -----

Results for STDLOW #MEAS.=3 (R)

As* -3.2920/ 7.2%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.089298nm #Steps = -90.50

Results for STDHIGH

As	193.699	6136.3	142.37	161.41	5982.6
		6278.3	146.55	159.26	6124.1
		6133.3	148.75	163.23	5975.9

------20:31:09 3/12/93 -----

Results for STDHIGH #MEAS.=3 (R)

EL SIGNAL/sigma

As 6027.5/ 1.4%

Intensities for Recalibration:

El	Wave	LOW		HI	
As	193.699	STDLOW:	-3.2920	STDHIGH:	6027.5041

Regression Results :

El	Wave	Intercept	Slope	2nd Order
As	193.699	0.00272932	0.000829078	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
As 193.699					
	STDLOW	-3.2920	0.0000	0.0000	0.0
	STDHIGH	6027.5	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

El	Opt.	Wave	Intercept	Slope	2nd Order
As		193.699	0.00272932	0.000829078	0.00000

ef. 193.031nm (calc: 193.230940nm) Offset = -0.091220nm #Steps = -92.45

easurements for 1643C- - 1

s	193.699	310.57	207.71	207.27	103.12	0.08822 PPM
		311.46	207.59	207.84	103.72	0.08872 PPM
		307.45	209.35	209.77	97.844	0.08385 PPM

---- 20:38:13 3/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample 1643C- - 1 #MEAS.= 3

L CONC/ sigma

0.08693/ 3.1%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.091826nm #Steps = -93.06

```
easurements for BLK-                                    1

As   193.699  121.63  118.99  121.02   1.4226 0.00391 PPM
              117.60  117.85  121.69  -2.5547 0.00061 PPM *
              118.69  121.49  120.48  -2.1987 0.00091 PPM *
              118.61  119.21  120.97  -1.6520 0.00136 PPM *
             Total number of measurements : 4
             Nb of meas.  with peak found : 1
             Calculation around 0

----- 20:43:58  3/12/93 -----    Method:  D:\USAS WITHOUT RATIO

ample BLK-                 -                  1 #MEAS.= 3

L      CONC/ sigma

s* 0.00096/   39%


ef. 193.031nm (calc: 193.230940nm)  Offset = -0.090236nm  #Steps =  -91.45

easurements for 3/3 001-                -                  1

As   193.699  509.97  283.25  287.02  224.46  0.1879 PPM  ( BlK :    0.001)
              506.85  287.57  285.54  220.49  0.1846 PPM  ( BlK :    0.001)
              519.00  286.46  291.29  229.64  0.1922 PPM  ( BlK :    0.001)

----- 20:48:58  3/12/93 -----    Method:  D:\USAS WITHOUT RATIO

ample 3/3 001-                                  1 #MEAS.= 3

L      CONC/ sigma

s  0.1882/  2.0%

[illegible]

[illegible] #Steps = -91.55

[illegible]

[illegible] ( BlK :    0.001)
[illegible] ( BlK :    0.001)
[illegible] PPM ( BlK :    0.001)

[illegible]

[illegible] #Steps = -92.09

easurements for 3/3 003-                                1

As   193.699  245.01  253.75  248.08  -5.3400-0.00266 PPM * ( BlK :    0.001)
              252.55  252.96  249.23   1.8263 0.00328 PPM  ( BlK :    0.001)
              255.26  252.85  251.41   3.2714 0.00449 PPM  ( BlK :    0.001)
```

Total number of measurements : 4
Nb of meas. with peak found : 3

---- 20:58:25 3/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple 3/3 003- - 1 #MEAS.= 3

CONC/ sigma

:% 0.00370/ 18%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090622nm #Steps = -91.84

easurements for 3/8 003- - 1

s 193.699 242.31 248.11 246.70 -4.9587-0.00234 PPM * (BlK : 0.001)
253.11 247.91 242.66 8.3511 0.00869 PPM (BlK : 0.001)
249.29 256.04 245.75-0.57054 0.00130 PPM (BlK : 0.001)
248.36 252.02 248.91 -1.7960 0.00028 PPM * (BlK : 0.001)
251.93 253.95 246.63 2.3684 0.00373 PPM (BlK : 0.001)
Total number of measurements : 5
Nb of meas. with peak found : 3

---- 21:03:26 3/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample 3/8 003- - 1 #MEAS.= 3

CONC/ sigma

.00458/ 82%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090172nm #Steps = -91.38

easurements for CTL - - 1

s 193.699 304.96 206.42 206.17 98.686 0.08455 PPM
303.34 207.03 204.07 98.088 0.08405 PPM
304.31 207.64 203.73 99.014 0.08482 PPM

---- 21:08:40 3/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL - - 1 #MEAS.= 3

L CONC/ sigma

s 0.08447/ 0.46%

193.031nm (calc: 193.230940nm) Offset = -0.090287nm #Steps = -91.50

easurements for 2/20 001- - 1

s 193.699 4389.4 274.09 285.66 4108.4 3.408 PPM (BlK : 0.001)
4356.9 280.49 281.51 4075.8 3.381 PPM (BlK : 0.001)
4340.8 275.84 285.52 4059.2 3.367 PPM (BlK : 0.001)

---- 21:13:23 3/12/93 ----- Method: D:\USAS WITHOUT RATIO

3.385/ 0.61% 1 #MEAS.= 3

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090149nm #Steps = -91.36

easurements for 2/20 002- 1

s 193.699 2532.9 282.70 279.81 2251.9 1.869 PPM (Blk : 0.001)
                2528.6 280.93 279.89 2248.3 1.866 PPM (Blk : 0.001)
                2544.6 280.27 279.96 2264.5 1.879 PPM (Blk : 0.001)

---- 21:18:06 3/12/93 ---- Method: D:\USAS WITHOUT RATIO

ample 2/20 002- 1 #MEAS.= 3

CONC/ sigma

s 1.871/ 0.38%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090744nm #Steps = -91.96

easurements for 2/23 001- 1

s 193.699 657.47 268.06 268.20 389.33 0.3246 PPM (Blk : 0.001)
                661.95 266.78 273.17 391.34 0.3262 PPM (Blk : 0.001)
                663.83 272.15 270.88 392.45 0.3271 PPM (Blk : 0.001)

---- 21:22:50 3/12/93 ---- Method: D:\USAS WITHOUT RATIO

ample 2/23 001- 1 #MEAS.= 3

CONC/ sigma

s 0.3260/ 0.40%

f. 193.031nm (calc: 193.230940nm) Offset = -0.089120nm #Steps = -90.32

surements for 2/23 003- 1

193.699 244.61 249.47 244.07 -1.6280 0.00042 PPM (Blk : 0.001)
                246.46 249.67 241.39 1.7553 0.00323 PPM (Blk : 0.001)
                244.58 250.97 241.73 -0.84933 0.00107 PPM * (Blk : 0.001)
                245.57 248.87 244.29 -0.55200 0.00131 PPM * (Blk : 0.001)
                250.79 253.37 242.13 4.1700 0.00523 PPM (Blk : 0.001)
Total number of measurements : 5
Nb of meas. with peak found : 3

21:27:33 3/12/93 ---- Method: D:\USAS WITHOUT RATIO

2/23 003- 1 #MEAS.= 3

CONC/ sigma

ef. 193.031nm (calc: 193.230940nm) Offset = -0.089913nm #Steps = -91.12

urements for CTL- - 1

s	193.699	294.18	201.95	203.29	91.422	0.07853 PPM
		298.23	204.01	202.78	94.958	0.08146 PPM
		301.18	201.29	201.65	99.674	0.08537 PPM

----- 21:32:17 3/12/93 ------ Method: D:\USAS WITHOUT RATIO

ample CTL- - 1 #MEAS.= 3

L CONC/ sigma

s 0.08178/ 4.2%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.091317nm #Steps = -92.54
b : 220.353nm (calc: 220.341069nm) Offset = 0.225572nm #Steps = 230.62

ef. 193.031nm (calc: 193.230940nm) Offset = -0.090636nm #Steps = -91.85

esults for STDLOW

b	220.353	595.67	590.13	0.0000	5.5333 *
		597.33	594.13	0.0000	3.2000 *
		591.60	590.67	0.0000	0.93333 *

Calculation around 0

----21:38:47 3/12/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

b* 3.2222/ 71%

ef. 193.031nm (calc: 193.230940nm) Offset = -0.089341nm #Steps = -90.54

esults for STDHIGH

b	220.353	26975	837.07	0.0000	26138
		25683	853.53	0.0000	24829
		27052	861.80	0.0000	26190

----21:43:21 3/12/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

b 25719/ 3.0%

ntensities for Recalibration:

Pb 220.353 STDLOW: 3.2222 STDHIGH: 25719.1257

Regression Results :

El	Wave	Intercept	Slope	2nd Order
Pb	220.353	-0.00125301	0.000388864	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
Pb 220.353					
	STDLOW	3.2222	0.0000	0.0000	0.0
	STDHIGH	25719	10.000	10.000	0.0

Final Regression Results for Method : USPB

El	Opt.	Wave	Intercept	Slope	2nd Order
Pb		220.353	-0.00125301	0.000388864	0.00000

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.092652nm #Steps = -93.90

Measurements for 1643C- - 1

Pb	220.353	833.61	708.67	0.0000	124.94	0.04733 PPM
		862.87	714.60	0.0000	148.27	0.05641 PPM
		822.66	712.80	0.0000	109.86	0.04147 PPM

----- 21:48:02 3/12/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 1643C- - 1 #MEAS.= 3

	CONC/	sigma
Pb	0.04840/	16%

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.091807nm #Steps = -93.04

Measurements for 3/7 SVG123- - 1

Pb	220.353	1179.4	865.40	0.0000	314.00	0.1209 PPM
		1162.5	864.67	0.0000	297.84	0.1146 PPM
		1125.2	866.60	0.0000	258.59	0.09930 PPM

----- 21:52:43 3/12/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 3/7 SVG123- - 1 #MEAS.= 3

	CONC/	sigma
Pb	0.1116/	9.9%

193.031nm (calc: 193.230940nm) Offset = -0.091391nm #Steps = -92.62

Measurements for A.BREWER- - 1

Pb	220.353	1449.8	1118.7	0.0000	331.12	0.1275 PPM
		1478.3	1122.0	0.0000	356.29	0.1373 PPM
		1464.9	1120.7	0.0000	344.26	0.1326 PPM

Ref. 193.031nm (calc: 193.230940nm) Offset = -0.087919nm #Steps = -89.10

Measurements for 2/23 001- - 1

Zn	213.856	3336.6	0.0000	354.35	2982.2	0.03639	PPM	(Blk :	-0.000)
		3332.8	0.0000	351.59	2981.2	0.03638	PPM	(Blk :	-0.000)
		3253.8	0.0000	353.62	2900.2	0.03539	PPM	(Blk :	-0.000)
Cd	214.438	359.36	223.11	0.0000	136.24	0.00640	PPM	(Blk :	0.000)
		360.23	224.47	0.0000	135.76	0.00638	PPM	(Blk :	0.000)
		359.10	224.39	0.0000	134.70	0.00633	PPM	(Blk :	0.000)
Pb	220.353	453.83	421.52	0.0000	32.311	0.01294	PPM	(Blk :	0.001)
		448.49	423.16	0.0000	25.330	0.00948	PPM	(Blk :	0.001)
		444.59	421.33	0.0000	23.253	0.00845	PPM *	(Blk :	0.001)
		446.07	421.35	0.0000	24.720	0.00918	PPM *	(Blk :	0.001)
		446.97	426.31	0.0000	20.653	0.00716	PPM *	(Blk :	0.001)
		Total number of measurements : 5							
		Nb of meas. with peak found : 2							
		Calculation around 0							
Cu	327.396	1856.3	0.0000	0.0000	1856.3	0.00771	PPM	(Blk :	-0.005)
		1861.1	0.0000	0.0000	1861.1	0.00778	PPM	(Blk :	-0.005)
		1833.4	0.0000	0.0000	1833.4	0.00732	PPM	(Blk :	-0.005)

----- 20:00:13 3/12/93 ----- Method: D:\WATER WITHOUT RATIO

Sample 2/23 001- - 1 #MEAS.= 3

EL	CONC/	sigma
[illegible]	0.03605/	1.6%
Cd	0.00637/	0.59%
Pb*	0.00826/	12%
Cu	0.00760/	3.2%

MONTHLY FLOW AND SAMPLE LOG FOR April 19 75

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
PREV										N	Moore
1		447450	330							N	"
2		463660	321							N	"
3		398500	275								
4		432430	299								
5		649650	450								
6		681520	472								
7		678750	469								
8		335080	231							D	Moore
9		535680	370								
10		565060	391							D	Moore
11		[illegible]	415								
12		775880	537								
13		677620	469	Flooded						D	Bowyer
14		631970	438							D	"
15		561040	388								
16		493020	341								
17		793660	550							N	Moore
18		761280	527								
19		405420	280								
[illegible]		340490	235							D	Matayo
21		620720	430							D	"
22		415600	287							D	"
23		622780	431							D	Moore
24		430520	297								
25		567650	393								
26		279230	192								
27		549440	380							D	Bowyer
28		629170	435							D	"
29		681830	472							D	"
30		688280	477								
31											

001 COMPOSITE SAMPLE DATE: _____ 1/MONTH - ¼ LITER EVERY 2 HRS.

001 GRAB pH DATE: 4-13-93 pH 9.2 1/MONTH & 001 GRAB SAMPLE DATE: 4-30-93 1/MONTH - ONE LITE

002 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGE

003 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

003 pH SAMPLE TO BE TAKEN ONCE PER WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

DATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
PREV											
1		597770	483								
2		884070	611								
3		550070	384								
4		882850	570								
5		645340	447							D	MATHYA
6		551860	382							N	BOWYER
7		820220	568							D	MATHYA
8		578810	400							N	BELOW
9		393560	272								
10		419730	290								
11		465450	322							D	MOORE
12		493270	341							D	BOWYER
13		617700	427	Flooded						D	"
14		638060	442							D	STURM
15		378950	262							D	BELOW
16		272450	188							N	MOORE
17		139860	96							N	"
18		281190	194								
19		370820	256							D	STEINMA
20		380310	263							D	"
[illegible]		656450	454							D	"
22		624560	432							D	"
23		617180	427							D	MOORE
24		405470	280							D	MOORE
25		332470	229								
26		295460	204								
27		645660	447							D	BOWYER
28		655600	454							N	STEINMA
29		578590	400							D	STURM
30		435330	301							D	STURM
31		507910	351							N	STEINMA

01 COMPOSITE SAMPLE DATE: 5-13-93 1/MONTH - ¼ LITER EVERY 2 HRS.

01 GRAB pH DATE: 5-14 pH 8.9 1/MONTH & 001 GRAB SAMPLE DATE: 5-21-93 1/MONTH - ONE LITE

02 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGE

03 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

03 pH SAMPLE TO BE TAKEN ONCE PER WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

ATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

A _____ -- pH _____ DATE: _____ -- pH _____

MONTHLY FLOW AND SAMPLE LOG FOR JUNE 19 93

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
PREV											
1		,560120	387	WEIR	FLOODED						
2		,286430	198								
3		,424260	293							D	Steinme
4		,334580	231							N	Bowyer
5		,356920	246								
6		,745390	517							N	Bowyer
7		,634780	439							D	Moore
8		,563240	390								
9		,299040	206								
10		,614350	425								
11		,634080	439							D	Bowyer
12		,436430	302							D	STURM
13		,408360	282							N	Steinme
14		,500700	346							D	STURM
15		,682200	472								
16		,613240	424							D	Belew
17		,364110	252							N	Moore
18		,535590	370							N	STURM
19		,075990	52							D	Steinme
20		,127170	87							N	STURM
21		,399720	276							D	Steinme
22		,390190	270								
23		,359820	249								
24		,427110	295								
25		,566650	392								
26		,370540	256							D	STURM
27		,450100	311								
28		,116100	79								
29		[illegible]	[illegible]								
30		[illegible]	[illegible]	WEIR	FLOODED						
31											

001 COMPOSITE SAMPLE DATE: 6-18-93 1/MONTH - ¼ LITER EVERY 2 HRS.

001 GRAB pH DATE: 6-30-93 pH 9.9 1/MONTH & 001 GRAB SAMPLE DATE: 6-16-93 1/MONTH - ONE LITE

002 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGE

003 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

003 pH SAMPLE TO BE TAKEN ONCE PER WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

DATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE: _____ -- pH _____ DATE: _____ -- pH _____

NPDES PERMITTEE DATA REPORT FORM

(Certified Carrier No. _____)

Send Original and one (1) copy

Form Approved. OMB No. 2080-0021 Approval expires 7-31-94

United States Environmental Protection Agency

EPA

NPDES (DMR QA)

Laboratory Performance Evaluation

(These data are collected under the authority of the Federal Water Pollution Control Act.)

Study No.	Permit Number	Card No.
N 1 3	[illegible]	0 1
1 2 3	4 5 6 7 8 9 10 11 12 13 14 15 16	

Current Permittee Address Label *(Make corrections here, for shipping and mailing address, and testing status.)*

[illegible]
Dee Run Division
[illegible] Budget Action Gov Kentucky
881 Main Street
Herculaneum, Mo 63048

APR 2 3 1993

Enter Permittee Name as Desired for Report Heading (20–55)

Laboratory Identification Section (CHEM or TOX)

Laboratory 1

Block 56 for EPA Use Only (56)

Name	Address	Analytes Measured	Multiple Permit Option Exercised: *(Chemistry Only)*
The Dee Run Co. Smelting Div.	881 Main Herculaneum	As, Cd, Cu, Pb Zn, pH TSS	☐ Yes ☒ No

Mark "X" for Type of Laboratory (58): ☐ Federal ☐ State ☐ Local Government ☒ Industrial ☐ Commercial ☐ Other

Laboratory 2 *(if any)*

Name	Address	Analytes Measured	Multiple Permit Option Exercised: *(Chemistry Only)*
			☐ Yes ☐ No

Mark "X" for Type of Laboratory (59): ☐ Federal ☐ State ☐ Local Government ☐ Industrial ☐ Commercial ☐ Other

Laboratory 3 *(if any, see instructions on pages 7 and 10)*

The Multiple Permit Option was used and the following data resulted from analyzing the samples mailed to another permit number (specify)
(Use only if Multiple Permit Option Exercised above was marked 'Yes')

Lab 1
Lab 2
(61–69)

Certification

(By permit holder or authorized representative as per 40 CFR Part 122.22. See instructions.)

For Study Number Twelve conducted in February through June 1992 the permittee below:

	Yes	No		Yes	No		Yes	No
Received Samples			Submitted Data			Received a Report in Response		
	71	72		74	75		77	78

Permittee Name and Address (street no., city, State, and ZIP Code, if different from label above.)
(This section should not be used to make corrections, to the above address.)

Telephone Number

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. The reported data were produced in the laboratory (ies) that perform our routine permit-required self-monitoring analyses. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and Title of Certifying Official *(type or print)*	Signature	Date Signed
F. James Szydlowski Lab Superintendent	F. James Szydlowski	23 Apr 93

Continued from page 1

CHEMISTRY DATA

Study No.	Permit Number
N13	MD000028

TRACE METALS (recovery in micrograms/l)

Study and Permit Number	Card No.	Aluminum VA	Aluminum MC	Aluminum < / >	Aluminum Quantity	Arsenic VA	Arsenic MC	Arsenic < / >	Arsenic Quantity	Beryllium VA	Beryllium MC	Beryllium < / >	Beryllium Quantity
DUPLICATE	02						13		292				
		20	21 22	23	24 - 28	30	31 32	33	34 - 38	40	41 42	43	44 - 48

Study and Permit Number	Card No.	Cadmium VA	Cadmium MC	Cadmium < / >	Cadmium Quantity	Chromium VA	Chromium MC	Chromium < / >	Chromium Quantity	Cobalt VA	Cobalt MC	Cobalt < / >	Cobalt Quantity
			13		009.6								
		50	51 52	53	54 - 58	60	61 62	63	64 - 68	70	71 72	73	74 - 78

Study and Permit Number	Card No.	Copper VA	Copper MC	Copper < / >	Copper Quantity	Iron VA	Iron MC	Iron < / >	Iron Quantity	Lead VA	Lead MC	Lead < / >	Lead Quantity
DUPLICATE	03		13		059.						13		84.5
		20	21 22	23	24 - 28	30	31 32	33	34 - 38	40	41 42	43	44 - 48

Study and Permit Number	Card No.	Manganese VA	Manganese MC	Manganese < / >	Manganese Quantity	Mercury VA	Mercury MC	Mercury < / >	Mercury Quantity	Nickel VA	Nickel MC	Nickel < / >	Nickel Quantity
		50	51 52	53	54 - 58	60	61 62	63	64 - 68	70	71 72	73	74 - 78

Study and Permit Number	Card No.	Selenium VA	Selenium MC	Selenium < / >	Selenium Quantity	Vanadium VA	Vanadium MC	Vanadium < / >	Vanadium Quantity	Zinc VA	Zinc MC	Zinc < / >	Zinc Quantity
DUPLICATE	04										13		1022
		20	21 22	23	24 - 28	30	31 32	33	34 - 38	40	41 42	43	44 - 48

MISCELLANEOUS ANALYSES

pH Analysis (standard units) VA	pH MC	pH < / >	pH Quantity	Total Suspended Solids (recovery in mg/l) VA	Total Suspended Solids MC	Total Suspended Solids < / >	Total Suspended Solids Quantity	Oil and Grease (recovery in mg/l) VA	Oil and Grease MC	Oil and Grease < / >	Oil and Grease Quantity
	12		8.80		12		38.4				
50	51 52	53	54 - 58	60	61 62	63	64 - 68	70	71 72	73	74 - 78

NUTRIENTS (recovery in mg/l)

Study and Permit Number	Card No.	Ammonia as N VA	Ammonia as N MC	Ammonia as N < / >	Ammonia as N Quantity	Nitrate as N VA	Nitrate as N MC	Nitrate as N < / >	Nitrate as N Quantity	Kjeldahl Nitrogen VA	Kjeldahl Nitrogen MC	Kjeldahl Nitrogen < / >	Kjeldahl Nitrogen Quantity
DUPLICATE	05												
		20	21 22	23	24 - 28	30	31 32	33	34 - 38	40	41 42	43	44 - 48

Total Phosphorus as P VA	Total Phosphorus as P MC	Total Phosphorus as P < / >	Total Phosphorus as P Quantity	Orthophosphate as P VA	Orthophosphate as P MC	Orthophosphate as P < / >	Orthophosphate as P Quantity	Carbonaceous - BOD VA	Carbonaceous - BOD MC	Carbonaceous - BOD < / >	Carbonaceous - BOD Quantity
50	51 52	53	54 - 58	60	61 62	63	64 - 68	70	71 72	73	74 - 78

DEMANDS (recovery in mg/l)

Study and Permit Number	Card No.	COD VA	COD MC	COD < / >	COD Quantity	TOC VA	TOC MC	TOC < / >	TOC Quantity	5-Day BOD VA	5-Day BOD MC	5-Day BOD < / >	5-Day BOD Quantity
DUPLICATE	06												
		20	21 22	23	24 - 28	30	31 32	33	34 - 38	40	41 42	43	44 - 48

ADDITIONAL MISCELLANEOUS ANALYSES (recovery in mg/l)

Total Cyanide VA	Total Cyanide MC	Total Cyanide < / >	Total Cyanide Quantity	Total Phenolics (by 4AAP) VA	Total Phenolics (by 4AAP) MC	Total Phenolics (by 4AAP) < / >	Total Phenolics (by 4AAP) Quantity	Total Residual Chlorine VA	Total Residual Chlorine MC	Total Residual Chlorine < / >	Total Residual Chlorine Quantity
50	51 52	53	54 - 58	60	61 62	63	64 - 68	70	71 72	73	74 - 78

Continued from page 2

TOXICITY DATA

Study No.	Permit Number
N13	[illegible]

WHOLE EFFLUENT TOXICITY DATA (as % of the sample ready for analysis)

Study and Permit Number	Card No.	FATHEAD MINNOW ACUTE MHSF, 20° - LC50 (VA, MC, < / >, Quantity)	FATHEAD MINNOW ACUTE MHSF, 25° - LC50 (VA, MC, < / >, Quantity)	FATHEAD MINNOW ACUTE 20% DMW, 25° - LC50 (VA, MC, < / >, Quantity)
DUPLICATE	07	11	13	14

Study and Permit Number	Card No.	FATHEAD MINNOW CHRONIC MHSF - SURVIVAL, NOEC (VA, MC, < / >, Quantity)	FATHEAD MINNOW CHRONIC MHSF - GROWTH, IC25 (VA, MC, < / >, Quantity)	FATHEAD MINNOW CHRONIC MHSF - GROWTH, NOEC (VA, MC, < / >, Quantity)
DUPLICATE	07	15	15	15

Study and Permit Number	Card No.	FATHEAD MINNOW CHRONIC 20% DMW - SURVIVAL, NOEC (VA, MC, < / >, Quantity)	FATHEAD MINNOW CHRONIC 20% DMW - GROWTH, IC25 (VA, MC, < / >, Quantity)	FATHEAD MINNOW CHRONIC 20% DMW - GROWTH, NOEC (VA, MC, < / >, Quantity)
DUPLICATE	08	16	16	16

Study and Permit Number	Card No.	CERIODAPHNIA ACUTE MHSF, 20° - LC50 (VA, MC, < / >, Quantity)	CERIODAPHNIA ACUTE 20% DMW, 20° - LC50 (VA, MC, < / >, Quantity)	CERIODAPHNIA ACUTE MHSF, 25° - LC50 (VA, MC, < / >, Quantity)
DUPLICATE	08	17	18	19

Study and Permit Number	Card No.	CERIODAPHNIA ACUTE 20% DMW, 25° - LC50 (VA, MC, < / >, Quantity)	CERIODAPHNIA CHRONIC MHSF - SURVIVAL, NOEC (VA, MC, < / >, Quantity)	CERIODAPHNIA CHRONIC MHSF - REPROD., IC25 (VA, MC, < / >, Quantity)
DUPLICATE	09	20	21	21

Study and Permit Number	Card No.	CERIODAPHNIA CHRONIC MHSF - REPROD., NOEC (VA, MC, < / >, Quantity)	CERIODAPHNIA CHRONIC 20% DMW - SURVIVAL, NOEC (VA, MC, < / >, Quantity)	CERIODAPHNIA CHRONIC 20% DMW - REPROD., IC25 (VA, MC, < / >, Quantity)
DUPLICATE	09	21	22	22

Study and Permit Number	Card No.	CERIODAPHNIA CHRONIC 20% DMW - REPROD., NOEC (VA, MC, < / >, Quantity)	DAPHNIA MAGNA ACUTE MHSF, 20° - LC50 (VA, MC, < / >, Quantity)	DAPHNIA PULEX ACUTE MHSF, 20° - LC50 (VA, MC, < / >, Quantity)
DUPLICATE	10	22	32	36

Study and Permit Number	Card No.	DAPHNIA PULEX ACUTE MHSF, 25° - LC50 (VA, MC, < / >, Quantity)
DUPLICATE	10	38

Continued from page 3

TOXICITY DATA

Study No.: Permit Number

N 1 3

1 2 3 4 5 6 7 8 9 10 11 12

WHOLE EFFLUENT TOXICITY DATA (as % of the sample ready for analysis)

Study and Permit Number	Card No.	MYSID ACUTE 40 F, 20° - LC50	MYSID CHRONIC 40 F - SURVIVAL, NOEC	MYSID CHRONIC 40 F - GROWTH, IC25
		VA MC < / > Quantity	VA MC < / > Quantity	VA MC < / > Quantity
DUPLICATE	1 1	4 2	4 3	4 3
1 14	15 16	20 21 22 23 24 - 28	30 31 32 33 34 - 38	40 41 42 43 44 - 48

	MYSID CHRONIC 40 F - GROWTH, NOEC	MYSID CHRONIC 40 F - FECUNDITY, NOEC	MENIDIA ACUTE 40 F, 20° - LC50
	VA MC < / > Quantity	VA MC < / > Quantity	VA MC < / > Quantity
	4 3	4 3	4 4
	50 51 52 53 54 - 58	60 61 62 63 64 - 68	70 71 72 73 74 - 78

Study and Permit Number	Card No.	SHEEPSHEAD MINNOW ACUTE 40 F, 20° - LC50	SHEEPSHEAD MINNOW CHRONIC 40 F - SURVIVAL, NOEC	SHEEPSHEAD MINNOW CHRONIC 40 F - GROWTH, IC25
		VA MC < / > Quantity	VA MC < / > Quantity	VA MC < / > Quantity
DUPLICATE	1 2	4 6	4 7	4 7
1 14	15 16	20 21 22 23 24 - 28	30 31 32 33 34 - 38	40 41 42 43 44 - 48

	SHEEPSHEAD MINNOW ACUTE 40 F - GROWTH, NOEC
	VA MC < / > Quantity
	4 7
	50 51 52 53 54 - 58

ro order has been found at step number : 82439.0
f. 193.031nm (calc: 193.041739nm) Offset = 0.127118nm #Steps = 128.82
: 193.699nm (calc: 193.699001nm) Offset = 0.006878nm #Steps = 6.97

193.031nm (calc: 193.041739nm) Offset = 0.126779nm #Steps = 128.48

sults for STDLOW

193.699	167.62	114.19	168.05	35.478
[illegible]	162.99	114.13	166.78	31.304 *
[illegible]	161.27	113.33	166.27	30.298 *

161.27 113.33 166.27 30.298 *
165.71 116.57 168.38 31.869 *
Total number of measurements : 4
Nb of meas. with peak found : 1
Calculation around 0

----- 4:48:38 4/27/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma

s* 31.157/ 2.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126167nm #Steps = 127.86

esults for STDHIGH

s 193.699 6791.9 166.45 202.22 6613.5
6950.7 169.15 204.87 6769.6
7211.7 169.89 206.48 7029.6

----- 4:53:07 4/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 6804.3/ 3.1%

ntensities for Recalibration:

El	Wave	LOW	HI
s	193.699	STDLOW: 31.1570	STDHIGH: 6804.2541

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0230006	0.000738215	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	31.157	0.0000	0.0000	0.0
	STDHIGH	6804.3	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

l	Opt.	Wave	Intercept	Slope	2nd Order
s		193.699	-0.0230006	0.000738215	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125942nm #Steps = 127.63

urements for NBS1643C-

s 193.699 383.67 225.36 272.13 142.72 0.08236 PPM
394.23 222.80 273.61 154.50 0.09105 PPM
383.14 222.55 274.40 143.30 0.08279 PPM

---- 5:02:49 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

CONC/ sigma

0.08540/ 5.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126411nm #Steps = 128.11

easurements for FEB 1 001- - 1

193.699	5550.7	353.83	387.67	5185.6	3.805 PPM
	5645.3	353.13	390.30	5279.8	3.875 PPM
	5558.2	353.84	387.02	5193.3	3.811 PPM

---- 5:11:08 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample FEB 1 001- - 1 #MEAS.= 3

CONC/ sigma

3.830/ 1.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.127752nm #Steps = 129.46

easurements for FEB 20 001- - 1

193.699	4909.9	331.93	373.63	4564.1	3.346 PPM
	4965.2	332.06	364.53	4622.3	3.389 PPM
	4919.2	332.55	369.63	4574.3	3.354 PPM

---- 5:15:22 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample FEB 20 001- - 1 #MEAS.= 3

CONC/ sigma

3.363/ 0.68%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.127322nm #Steps = 129.03

easurements for FEB 23 001- - 1

193.699	757.38	298.39	344.07	443.76	0.3046 PPM
	758.76	297.98	344.59	445.25	0.3057 PPM
	753.24	300.03	343.21	438.81	0.3009 PPM

---- 5:19:36 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample FEB 23 001- - 1 #MEAS.= 3

CONC/ sigma

0.3037/ 0.82%

asurements for 5 AS- 4 - 1

193.699	6126.9	151.74	173.89	5967.8	4.383 PPM
	6098.0	148.68	174.33	5940.8	4.363 PPM
	6104.8	149.73	175.53	5946.5	4.367 PPM

---- 5:24:56 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

mple 5 AS- - 1 #MEAS.= 3

CONC/ sigma

s 4.371/ 0.24%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126530nm #Steps = 128.23

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125769nm #Steps = 127.46

ef. 193.031nm (calc: 193.041739nm) Offset = 0.129802nm #Steps = 131.54

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125488nm #Steps = 127.17

esults for STDLOW

s 193.699	129.04	0.0000	129.02	0.02074	
	124.93	0.0000	128.32	-3.3867	*
	127.95	0.0000	130.75	-2.8067	*
	131.81	0.0000	133.61	-1.7966	
	125.49	0.0000	129.65	-4.1600	*

Total number of measurements : 5
Nb of meas. with peak found : 2
Calculation around 0

---- 5:40:31 4/27/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

s* -3.4511/ 20%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126616nm #Steps = 128.31

esults for STDHIGH

s 193.699	5375.9	0.0000	157.77	5218.1
	5257.0	0.0000	157.48	5099.5
	5259.6	0.0000	157.92	5101.6

---- 5:45:00 4/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

s 5139.8/ 1.3%

[illegible] of Recalibration:

	Wave	LOW	HI
s	193.699	STDLOW: -3.4511	STDHIGH: 5139.7593

egression Results :

	Wave	Intercept	Slope	2nd Order
s	193.699	0.00335502	0.000972155	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	-3.4511	0.0000	0.0000	0.0
	STDHIGH	5139.8	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

l Opt.	Wave	Intercept	Slope	2nd Order
s	193.699	0.00335502	0.000972155	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125819nm #Steps = 127.51

easurements for NBS1643C- - 1

s	193.699	308.64	0.0000	221.73	86.911	0.08785 PPM
		307.76	0.0000	222.37	85.391	0.08637 PPM
		308.36	0.0000	220.83	87.529	0.08845 PPM

---- 7:00:37 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample NBS1643C- - 1 #MEAS.= 3

CONC/ sigma

s 0.08755/ 1.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124558nm #Steps = 126.23

easurements for 2/11 001- - 1

s	193.699	12357	0.0000	382.40	11975	11.64 PPM
		12106	0.0000	383.47	11722	11.40 PPM
		12122	0.0000	388.47	11733	11.41 PPM

---- 7:06:25 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample 2/11 001- - 1 #MEAS.= 3

CONC/ sigma

s 11.48/ 1.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125001nm #Steps = 126.68

easurements for 2/1 001- - 1

s	193.699	4168.5	0.0000	313.28	3855.2	3.751 PPM
		4174.1	0.0000	316.11	3858.0	3.754 PPM

----- 7:12:55 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample 2/1 001- - 1 #MEAS.= 3

L CONC/ sigma

s 3.820/ 3.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125390nm #Steps = 127.07

easurements for 2/20 001- - 1

s	193.699	4028.6	0.0000	305.49	3723.1	3.623 PPM
		3982.3	0.0000	304.05	3678.2	3.579 PPM
		4044.6	0.0000	310.46	3734.1	3.633 PPM

----- 7:17:00 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample 2/20 001- - 1 #MEAS.= 3

CONC/ sigma

s 3.612/ 0.80%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125574nm #Steps = 127.26

easurements for 2/23 001- - 1

s	193.699	596.59	0.0000	294.25	302.35	0.2973 PPM
		602.78	0.0000	296.35	306.43	0.3013 PPM
		618.91	0.0000	298.65	320.26	0.3147 PPM

----- 7:21:05 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

mple 2/23 001- - 1 #MEAS.= 3

CONC/ sigma

0.3044/ 3.0%

[illegible] 0.124779nm #Steps = 126.45

[illegible]

[illegible] 0.00087 PPM

[illegible] 0.00119 PPM

Total number of measurements 3

No of meas. with peak found 2

Calculation around 0

----- 7:27:24 4/27/93 ----- Method: D:\USAS WITHOUT RATIO

CONC/ sigma

4* 0.00114/ 22%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125178nm #Steps = 126.86

easurements for 5 AS- - 1

s 193.699 5297.5 0.0000 161.49 5136.0 4.996 PPM
5386.8 0.0000 159.23 5227.6 5.085 PPM
5013.3 0.0000 158.35 4855.0 4.723 PPM

----- 7:31:05 4/27/93 ------ Method: D:\USAS WITHOUT RATIO

ample 5 AS- - 1 #MEAS.= 3

CONC/ sigma

s 4.935/ 3.8%

ero order has been found at step number : 82405.0

ef.	193.031nm (calc: 193.041739nm)	Offset =	0.130720nm	#Steps =	132.47	
s :	193.699nm (calc: 193.699001nm)	Offset =	0.006878nm	#Steps =	6.97	*
s :	193.699nm (calc: 193.699001nm)	Offset =	-0.000080nm	#Steps =	-0.08	
	193.031nm (calc: 193.041739nm)	Offset =	0.131890nm	#Steps =	133.66	

esults for STDLOW

s	193.699	135.07	0.0000	132.88	2.1890
		130.97	0.0000	133.29	-2.3133 *
		130.50	0.0000	132.27	-1.7733 *
		132.35	0.0000	131.76	0.59361
		131.61	0.0000	132.81	-1.1954

Total number of measurements : 5
Nb of meas. with peak found : 3

-----11:34:02 4/28/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma

s* 0.52907/ 320%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131150nm #Steps = 132.91

esults for STDHIGH

s	193.699	5221.3	0.0000	159.28	5062.1
		5226.6	0.0000	160.51	5066.1
		5337.3	0.0000	161.55	5175.7

-----11:38:31 4/28/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 5101.3/ 1.3%

ntensities for Recalibration:

El	Wave	LOW	HI
s	193.699	STDLOW: 0.5291	STDHIGH: 5101.2946

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.000518614	0.000980245	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	0.52907	0.0000	0.0000	0.0
	STDHIGH	5101.3	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131796nm #Steps = 133.56

easurements for HBS1643C- - 1

s	193.699	302.04	0.0000	216.43	85.609	0.08340 PPM
		292.31	0.0000	218.21	74.101	0.07212 PPM
		297.58	0.0000	215.29	82.293	0.08015 PPM

----- 11:47:18 4/28/93 ------ Method: D:\USAS WITHOUT RATIO

ample NBS1643C- - 1 #MEAS.= 3

L CONC/ sigma

s 0.07856/ 7.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131252nm #Steps = 133.01

easurements for SVG1 4/27- - 1

s	193.699	951.45	0.0000	292.57	658.88	0.6453 PPM
		996.92	0.0000	295.25	701.67	0.6873 PPM
		997.65	0.0000	298.12	699.53	0.6852 PPM

----- 11:53:37 4/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG1 4/27- - 1 #MEAS.= 3

L CONC/ sigma

s 0.6726/ 3.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.132256nm #Steps = 134.03

easurements for SVG2 4/27- - 1

s	193.699	920.71	0.0000	290.00	630.71	0.6177 PPM
		927.91	0.0000	293.89	634.03	0.6210 PPM
		942.20	0.0000	294.26	647.94	0.6346 PPM

----- 11:57:42 4/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG2 4/27- - 1 #MEAS.= 3

L CONC/ sigma

s 0.6244/ 1.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131683nm #Steps = 133.45

easurements for SVG3 4/27 - - 1

s	193.699	875.10	0.0000	285.33	589.77	0.5776 PPM
		878.12	0.000[illegible]	[illegible]	607.77	0.5952 PPM

```
Sample SVG3 4/27 - -                    1 #MEAS.= 3

EL      CONC/ sigma

As    0.3902/  1.9%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131735nm  #Steps =  133.50

Measurements for WTR BOTL BL-                          1

As   193.699  125.45  0.0000  129.15 -3.7000-0.00415 PPM *
              127.09  0.0000  128.65 -1.5600-0.00205 PPM *
              129.78  0.0000  131.09 -1.3154-0.00181 PPM **
              131.64  0.0000  129.25  2.3899 0.00182 PPM
              129.97  0.0000  129.38 0.58607 0.00006 PPM
             Total number of measurements : 5
             Nb of meas. with peak found : 3

----- 12:05:51  4/28/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample WTR BOTL BL-                          1 #MEAS.= 3

EL      CONC/ sigma

As* 0.00002/+o***%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131243nm  #Steps =  133.00

Measurements for NBS1643C-                          1

As   193.698  303.23  0.0000  215.61  87.614 0.08536 PPM
              304.06  0.0000  217.83  86.224 0.08400 PPM
              295.03  0.0000  219.37  75.667 0.07365 PPM

----- 12:12:36  4/28/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample NBS1643C-                          1 #MEAS.= 3

EL      CONC/ sigma

As   0.08101/  7.9%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.132809nm  #Steps =  134.59
Pb : 220.353nm (calc: 220.546682nm)  Offset = -0.169849nm  #Steps = -173.65

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.129704nm  #Steps =  131.44

ults for STDLOW

Pb   220.353  617.07  595.27  0.0000  21.800 *
              630.58  599.13  0.0000  31.447
              644.83  606.80  0.0000  38.027
              621.93  599.00  0.0000  22.933 *
              638.55  607.07  0.0000  31.487
             Total number of measurements : 5
```

Total number of measurements : 5
Nb of meas. with peak found : 3

-----12:21:27 4/28/93 -----

Results for STDLOW #MEAS.=3 (R)

EL SIGNAL/sigma

Pb* 33.654/ 11%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.129992nm #Steps = 131.74

Results for STDHIGH

Pb	220.353	24510	685.47	0.0000	23824
		25105	694.47	0.0000	24410
		25503	695.27	0.0000	24807

-----12:25:55 4/28/93 -----

Results for STDHIGH #MEAS.=3 (R)

EL SIGNAL/sigma

Pb 24347/ 2.0%

Densities for Recalibration:

El	Wave	LOW	HI
Pb	220.353	STDLOW: 33.6539	STDHIGH: 24347.3240

Regression Results :

El	Wave	Intercept	Slope	2nd Order
Pb	220.353	-0.0138415	0.000411291	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
Pb 220.353					
	STDLOW	33.654	0.0000	0.0000	0.0
	STDHIGH	24347	10.000	10.000	0.0

Final Regression Results for Method : USPB

El Opt.	Wave	Intercept	Slope	2nd Order
Pb	220.353	-0.0138415	0.000411291	0.00000

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.130673nm #Steps = 132.43

Measurements for 1643C-202555- 1

Pb	220.353	823.58	725.47	0.0000	98.113	0.02651 PPM
		828.70	719.87	0.0000	108.84	0.03092 PPM
		829.36	720.20	0.0000	109.16	0.03106 PPM

----- 12:33:12 4/28/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 1643C-202555- 1 #MEAS.= 3

CONC.

b 0.02950/ 8.8%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.129796nm #Steps = 131.54

ie rements for SVG1-202549- 1

b 220.353 1149.8 843.13 0.0000 306.69 0.1123 PPM
1170.2 864.53 0.0000 305.68 0.1119 PPM
1171.4 864.60 0.0000 306.81 0.1123 PPM

---- 12:40:43 4/28/93 ----- Method: D:\USPB WITHOUT RATIO

ample SVG1-202549- 1 #MEAS.= 3

L CONC/ sigma

b 0.1122/ 0.23%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.129455nm #Steps = 131.19

easurements for SVG2-202550- 1

b 220.353 1028.2 839.67 0.0000 188.55 0.06371 PPM
1040.4 851.20 0.0000 189.22 0.06398 PPM
1037.7 868.20 0.0000 169.49 0.05587 PPM

- 12:44:48 4/28/93 ----- Method: D:\USPB WITHOUT RATIO

ample SVG2-202550- 1 #MEAS.= 3

L CONC/ sigma

b 0.06119/ 7.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.129652nm #Steps = 131.39

easurements for SVG3 -202551- 1

b 220.353 1500.9 833.07 0.0000 667.86 0.2608 PPM
1542.9 847.33 0.0000 695.60 0.2723 PPM
1554.4 856.93 0.0000 697.48 0.2730 PPM

---- 12:48:52 4/28/93 ----- Method: D:\USPB WITHOUT RATIO

ample SVG3 -202551- 1 #MEAS.= 3

L CONC/ sigma

b 0.2687/ 2.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.129501nm #Steps = 131.24

easurements for BTL-BLK-202552- 1

```
220.353  614.80  600.00  0.0000  14.800-0.00775 PPM *
         634.02  608.60  0.0000  25.418-0.00339 PPM
         624.53  605.47  0.0000  19.067-0.00600 PPM *
         624.60  608.67  0.0000  15.933-0.00729 PPM *
        Total number of measurements : 4
        Nb of meas.  with peak found : 1
        Calculation around 0

------ 12:52:56  4/28/93 ------    Method:  D:\USPB WITHOUT RATIO

ample BTL BLK-202552-                1 #MEAS.= 3

      CONC/ sigma

b%-0.00701/   13%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.129166nm  #Steps =  130.90

easurements for 1643C-202555-                1

b   220.353  812.76  715.93  0.0000  96.826 0.02598 PPM
             814.75  724.93  0.0000  89.818 0.02310 PPM
             830.30  724.87  0.0000  105.43 0.02952 PPM

------ 12:55:29  4/28/93 ------    Method:  D:\USPB WITHOUT RATIO

ample 1643C-202555-                1 #MEAS.= 3

      CONC/ sigma

  0.02620/   12%


nalytical Method:  USPB Without Ratio                          220.5540  nm

                    I S A   J O B I N - Y V O N

                      I C P  -  S Y S T E M

                    (c)  Version 3.374 (10 nov 89)

            Analyze                    Auto Search

            Calibrate                  Auto Attenuate

            Select Method              Profile

            Method                     Graph Profiles

            Set Parameters             Diagnostics

            Exit

F8      F10
elp     Accept                                                  ISA-JY
```

ero order has been found at step number : 82433.0

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.131550nm #Steps = 133.31

s.: 193.699nm (calc: 193.699001nm) Offset = 0.001190nm #Steps = 1.21

ef. 193.031nm (calc: 193.041739nm) Offset = 0.130707nm #Steps = 132.46

ts for STDLOW

s	193.699	128.38	0.0000	130.30	-1.9185
		127.79	0.0000	130.49	-2.6991
		131.20	0.0000	128.24	2.9605

---- 7:04:33 4/29/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

-0.55237/ 560%

f. 193.031nm (calc: 193.041739nm) Offset = 0.130135nm #Steps = 131.88

sults for STDHIGH

193.699	4931.2	0.0000	159.48	4771.7
	4952.7	0.0000	157.67	4795.1
	4849.1	0.0000	158.51	4690.6

-- 08:37 4/29/93 -----

ults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

4752.4/ 1.2%

ensities for Recalibration:

Wave	LOW	HI
193.699	STDLOW: -0.5524	STDHIGH: 4752.4454

ession Results :

Wave	Intercept	Slope	2nd Order
93.699	0.000581073	0.00105197	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	-0.55237	0.0000	0.0000	0.0
	STDHIGH	4752.4	5.0000	5.0000	0.0

ression Results for Method : USAS

Wave	Intercept	Slope	2nd Order
193.699	0.000581073	0.00105197	0.00000

0.7015/ 1.6%

193.031nm (calc: 193.041739nm) Offset = 0.131651nm #Steps = 133.42

easurements for 1643C-202617- 1

s	193.699	301.96	0.0000	212.79	89.171	0.09439 PPM
		296.70	0.0000	214.44	82.261	0.08712 PPM
		300.16	0.0000	215.61	84.554	0.08953 PPM

------ 7:49:31 4/29/93 ------ Method: D:\USAS WITHOUT RATIO

ample 1643C-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.09034/ 4.1%

```
oZero order has been found at step number :     82669.0
Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.132075nm  #Steps =  133.85

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.130884nm  #Steps =  132.64
As : 193.699nm (calc: 193.699001nm)  Offset = -0.000430nm  #Steps =   -0.44

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131717nm  #Steps =  133.48

Results for STDLOW

As   193.699  137.61  0.0000  140.24 -2.6333 *
              140.31  0.0000  138.71  1.6031
              135.50  0.0000  139.29 -3.7867 *
              136.76  0.0000  141.39 -4.6315
              135.76  0.0000  140.28 -4.5200 *
             Total number of measurements : 5
             Nb of meas.  with peak found : 2
             Calculation around 0

-----12:39:17  4/29/93 -----

Results for STDLOW #MEAS.=3 (R)

EL  SIGNAL/sigma

As* -3.6467/   26%



Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131076nm  #Steps =  132.83

Results for STDHIGH

As   193.699  5227.8  0.0000  169.45  5058.4
              5338.8  0.0000  168.58  5170.2
              5504.1  0.0000  172.61  5331.5

-----12:43:46  4/29/93 -----

Results for STDHIGH #MEAS.=3 (R)

EL  SIGNAL/sigma

As   5186.7/  2.6%


Intensities for Recalibration:
El     Wave                LOW                    HI
As   193.699          STDLOW:  -3.6467      STDHIGH: 5186.6884


Regression Results :
El  Wave          Intercept          Slope          2nd Order
As 193.699        0.00351294       0.000963329        0.00000

            Standard  Intensity  Concentration  Calc. Conc.  % Error
            --------  ---------  -------------  -----------  -------
As  193.699
            STDLOW    -3.6467      0.0000        0.0000       0.0
            STDHIGH    5186.7      5.0000        5.0000       0.0
```

Wave Intercept 0.00096332
93.699 0.00351294 Offset = 0.131713nm #St
.031nm (calc: 193.041739nm) 1
ments for 1643C-202617-

93.699	306.65	0.0000	227.07	79.580	0.08017 PPM
	315.07	0.0000	226.73	88.335	0.08861 PPM
	310.07	0.0000	228.61	81.454	0.08198 PPM

12:51:34 4/29/93 ----- Method: D:\USAS WITHOUT RATIO
1 #MEAS.= 3
le 1643C-202617-
CONC/ sigma
0.08359/ 5.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131134nm #Steps = 132.89
1
leasurements for SVG 4/29 T-202633-

As	193.699	521.35	0.0000	279.57	241.78	0.2364 PPM
		536.21	0.0000	279.66	256.55	0.2507 PPM
		528.63	0.0000	276.91	251.73	0.2460 PPM

----- 13:06:26 4/29/93 ----- Method: D:\USAS WITHOUT RATIO
1 #MEAS.= 3
ample SVG 4/29 T-202633-
L CONC/ sigma
As 0.2444/ 3.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.132031nm #Steps = 133.80
1
leasurements for RC 4/29 T-202634-

As	193.699	510.42	0.0000	274.69	235.73	0.2306 PPM
		511.03	0.0000	278.71	232.31	0.2273 PPM
		495.47	0.0000	277.92	217.55	0.2131 PPM

----- 13:10:31 4/29/93 ----- Method: D:\USAS WITHOUT RATIO
1 #MEAS.= 3
ample RC 4/29 T-202634-
L CONC/ sigma
As 0.2237/ 4.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131559nm #Steps = 133.32
1
ments for 4BAY T-202635-

```
                4251.8  0.0000  293.97  3957.9   3.676 PPM
                4326.6  0.0000  292.99  4033.6   3.889 PPM

----- 13:14:36  4/29/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample 4BAY T-202635-                1 #MEAS.= 3

IL      CONC/ sigma

As     3.858/ 0.97%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.130800nm  #Steps =  132.55

Measurements for PONTOON T-              -                1

As   193.699   21002  0.0000  394.80   20607   19.85 PPM
               20669  0.0000  392.67   20277   19.54 PPM
               21249  0.0000  396.33   20853   20.09 PPM

----- 13:18:40  4/29/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample PONTOON T-            -                1 #MEAS.= 3

IL      CONC/ sigma

As     19.83/  1.4%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131645nm  #Steps =  133.41

Measurements for CTL-202637-                1

As   193.699  298.26  0.0000  214.51  83.749 0.08419 PPM
              296.43  0.0000  211.74  84.687 0.08509 PPM
              302.46  0.0000  214.01  88.456 0.08873 PPM

----- 13:22:45  4/29/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample CTL-202637-                1 #MEAS.= 3

IL      CONC/ sigma

As  0.08600/  2.8%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.131179nm  #Steps =  132.94

Measurements for SVG D-202638-                1

As   193.699  523.06  0.0000  264.70  258.36  0.2524 PPM
              519.96  0.0000  265.63  254.33  0.2485 PPM
              523.93  0.0000  269.43  254.50  0.2487 PPM

----- 13:26:50  4/29/93 -----   Method:  D:\USAS WITHOUT RATIO

Sample SVG D-202638-                1 #MEAS.= 3

      CONC/ sigma
```

292.90	0.0000	206.85	86.048	0.08641 PPM
294.32	0.0000	205.56	58.764	0.08902 PPM

------ 13:43:10 4/29/93 ------ Method: D:\USAS WITHOUT RATIO

ample 1643C-202642- 1 #MEAS.= 3

L CONC/ sigma

s 0.08639/ 3.0%

Analytical Method: USAS Without Ratio 193.9294 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 Help F10 Accept

ISA-JY

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108861nm #Steps = 110.32

esults for STDLOW

193.699	146.27	0.0000	137.47	8.7966
	141.54	0.0000	139.06	2.4833
	141.31	0.0000	139.47	1.8400 *
	142.09	0.0000	136.93	5.1610

Total number of measurements : 4
Nb of meas. with peak found : 3

---- 8:44:10 5/ 7/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma

s* 5.4803/ 58%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.107839nm #Steps = 109.28

esults for STDHIGH

193.699	4211.1	0.0000	170.10	4041.0
	4027.9	0.0000	164.03	3863.9
	3695.8	0.0000	170.91	3524.9

---- 8:48:26 5/ 7/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 3810.0/ 6.9%

ntensities for Recalibration:

El	Wave	LOW		HI	
s	193.699	STDLOW:	5.4803	STDHIGH:	3809.9561

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.00720242	0.00131424	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	5.4803	0.0000	0.0000	0.0
	STDHIGH	3810.0	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

l	Opt. Wave	Intercept	Slope	2nd Order
s	193.699	-0.00720242	0.00131424	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.107171nm #Steps = 108.61

easurements for AS .1-202617- 1

s 193.699 226.01 0.0000 139.49 86.513 0.1065 PPM
215.64 0.0000 140.48 75.159 0.09157 PPM
218.21 0.0000 139.56 78.653 0.09617 PPM

--- 8:53:44 5/ 7/93 ------ Method: D:\USAS WITHOUT RATIO

ample AS .1-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.09808/ 7.8%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.107874nm #Steps = 109.32

easurements for BLK-202617- 1

s 193.699 150.04 0.0000 137.89 12.154 0.00877 PPM
148.15 0.0000 136.67 11.480 0.00789 PPM
152.94 0.0000 136.42 16.522 0.01451 PPM

---- 9:05:28 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample BLK-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.01039/ 35%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.107097nm #Steps = 108.53

easurements for 5/3 4BAY T-203041- 1

s 193.699 674.66 0.0000 271.41 403.25 0.5124 PPM (Blk : 0.010)
665.61 0.0000 270.47 395.15 0.5017 PPM (Blk : 0.010)
683.56 0.0000 280.33 403.23 0.5124 PPM (Blk : 0.010)

---- 9:09:33 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/3 4BAY T-203041- 1 #MEAS.= 3

CONC/ sigma

s 0.5088/ 1.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.107683nm #Steps = 109.13

urements for 5/3 RC T-203042- 1

s 193.699 1272.8 0.0000 274.50 998.35 1.294 PPM (Blk : 0.010)
1299.7 0.0000 278.59 1021.1 1.324 PPM (Blk : 0.010)
1353.7 0.0000 280.34 1073.3 1.393 PPM (Blk : 0.010)

---- 9:13:38 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

1.337/ 3.8%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108688nm #Steps = 110.15

easurements for 5/3 SVG T-203043- 1

s	193.699	1275.1	0.0000	277.38	997.68	1.294 PPM	(BlK : 0.010)
		1342.5	0.0000	290.11	1052.4	1.366 PPM	(BlK : 0.010)
		971.45	0.0000	269.46	701.99	0.9050 PPM	(BlK : 0.010)

---- 9:17:43 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/3 SVG T-203043- 1 #MEAS.= 3

L CONC/ sigma

s 1.188/ 21%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108060nm #Steps = 109.51

easurements for 5/5 RC T-203185- 1

s	193.699	1360.0	0.0000	290.07	1070.0	1.389 PPM	(BlK : 0.010)
		1360.2	0.0000	284.09	1076.2	1.397 PPM	(BlK : 0.010)
		1405.3	0.0000	290.01	1115.3	1.448 PPM	(BlK : 0.010)

---- 9:21:48 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/5 RC T-203185- 1 #MEAS.= 3

CONC/ sigma

s 1.411/ 2.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.109074nm #Steps = 110.54

easurements for 5/5 4BAY T-203186- 1

s	193.699	881.23	0.0000	278.52	602.71	0.7745 PPM	(BlK : 0.010)
		898.58	0.0000	276.71	621.87	0.7997 PPM	(BlK : 0.010)
		733.11	0.0000	278.37	454.75	0.5801 PPM	(BlK : 0.010)

---- 9:25:53 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/5 4BAY T-203186- 1 #MEAS.= 3

CONC/ sigma

s 0.7181/ 17%

```
easurements for CTL-202617-                    1

s   193.699  1486.1  0.0000  148.43  1337.7   1.751 PPM
             1410.8  0.0000  148.68  1262.1   1.652 PPM
             1503.0  0.0000  153.01  1350.0   1.767 PPM

-----  9:29:58  5/ 7/93 ------   Method:  D:\USAS WITHOUT RATIO

ample CTL-202617-                  1 #MEAS.= 3

L      CONC/ sigma

s    1.723/  3.6%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.109138nm  #Steps =  110.60

easurements for 5/5 SVG T-203187-                  1

s   193.699  1317.7  0.0000  285.66  1032.1   1.339 PPM  ( BlK :    0.010)
             1313.5  0.0000  284.77  1028.8   1.334 PPM  ( BlK :    0.010)
             1336.6  0.0000  289.13  1047.4   1.359 PPM  ( BlK :    0.010)

-----  9:34:02  5/ 7/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 5/5 SVG T-203187-                  1 #MEAS.= 3

L      CONC/ sigma

    1.344/ 0.97%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.108014nm  #Steps =  109.46

easurements for 5/5 PONTN T-203188-                  1

s   193.699  721.66  0.0000  267.14  454.52  0.5798 PPM  ( BlK :    0.010)
             735.11  0.0000  269.25  465.86  0.5947 PPM  ( BlK :    0.010)
             750.62  0.0000  268.19  482.43  0.6164 PPM  ( BlK :    0.010)

-----  9:38:07  5/ 7/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 5/5 PONTN T-203188-                  1 #MEAS.= 3

L      CONC/ sigma

s   0.5970/  3.1%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.107462nm  #Steps =  108.90

urements for 5/3 4BAY D-203041-                  1

s   193.699  316.56  0.0000  258.35  58.204 0.05890 PPM  ( BlK :    0.010)
             324.03  0.0000  267.33  56.707 0.05693 PPM  ( BlK :    0.010)
             330.16  0.0000  265.19  64.969 0.06779 PPM  ( BlK :    0.010)

-----  9:42:12  5/ 7/93 -----   Method:  D:\USAS WITHOUT RATIO
```

EL CONC/ sigma

As 0.06121/ 9.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108374nm #Steps = 109.83

easurements for 5/3 RC D-203042- 1

As	193.699	1289.7	0.0000	276.86	1012.9	1.314 PPM	(Blk : 0.010)
		1290.8	0.0000	282.38	1008.4	1.308 PPM	(Blk : 0.010)
		1316.7	0.0000	279.01	1037.7	1.346 PPM	(Blk : 0.010)

---- 9:46:17 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/3 RC D-203042- 1 #MEAS.= 3

EL CONC/ sigma

s 1.322/ 1.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108548nm #Steps = 110.00

easurements for CTL-202617- 1

s	193.699	1274.9	0.0000	272.88	1002.0	1.299 PPM	(Blk : 0.010)
		1324.5	0.0000	277.70	1046.8	1.358 PPM	(Blk : 0.010)
		1343.0	0.0000	276.62	1066.3	1.384 PPM	(Blk : 0.010)

---- 9:50:22 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

CONC/ sigma

s 1.347/ 3.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108559nm #Steps = 110.01

easurements for 5/3 SVG D-203043- 1

s	193.699	1372.5	0.0000	149.21	1223.3	1.590 PPM	(Blk : 0.010)
		1452.4	0.0000	147.57	1304.8	1.697 PPM	(Blk : 0.010)
		1465.9	0.0000	148.08	1317.9	1.714 PPM	(Blk : 0.010)

---- 9:54:27 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/3 SVG D-203043- 1 #MEAS.= 3

CONC/ sigma

s 1.667/ 4.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.109388nm #Steps = 110.83

easurements for 5/5 RC D-203185- 1

s 193.699 1198.0 0.0000 261.38 916.67 1.187 PPM (Blk : 0.010)
1230.8 0.0000 282.31 948.47 1.229 PPM (Blk : 0.010)
1280.8 0.0000 285.42 995.40 1.291 PPM (Blk : 0.010)

----- 9:58:32 5/ 7/93 ------ Method: D:\USAS WITHOUT RATIO

ample 5/5 RC D-203185- 1 #MEAS.= 3

L CONC/ sigma

s 1.236/ 4.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108670nm #Steps = 110.13

easurements for 5/5 4BAY-203186- 1

s 193.699 358.15 0.0000 271.17 86.978 0.09672 PPM (Blk : 0.010)
379.88 0.0000 273.85 106.04 0.1218 PPM (Blk : 0.010)
352.72 0.0000 266.61 86.115 0.09558 PPM (Blk : 0.010)

---- 10:02:37 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/5 4BAY-203186- 1 #MEAS.= 3

CONC/ sigma

0.1047/ 14%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108802nm #Steps = 110.26

easurements for 5/5 SVG-203187- 1

s 193.699 1195.2 0.0000 284.63 910.61 1.179 PPM (Blk : 0.010)
1391.3 0.0000 288.07 1103.3 1.432 PPM (Blk : 0.010)
1439.9 0.0000 288.78 1151.2 1.495 PPM (Blk : 0.010)

---- 10:06:42 5/ 7/93 ------ Method: D:\USAS WITHOUT RATIO

ample 5/5 SVG-203187- 1 #MEAS.= 3

CONC/ sigma

s 1.369/ 12%

193.031nm (calc: 193.041739nm) Offset = 0.107812nm #Steps = 109.26

easurements for 5/5 PONTN D-203188- 1

s 193.699 290.28 0.0000 257.24 33.037 0.02583 PPM (Blk : 0.010)
299.36 0.0000 267.48 31.881 0.02431 PPM (Blk : 0.010)
292.04 0.0000 268.10 23.941 0.01387 PPM (Blk : 0.010)

ample 5/5 PONTN D-203188- 1 #MEAS.= 3

L CONC/ sigma

s 0.02134/ 31%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108269nm #Steps = 109.72

easurements for CTL-202617- 1

s 193.699 127.80 0.0000 129.29 -1.4867-0.00916 PPM *
133.46 0.0000 128.79 4.6778-0.00106 PPM
129.98 0.0000 127.58 2.3976-0.00405 PPM
125.47 0.0000 125.72-0.25333-0.00754 PPM *
127.98 0.0000 126.11 1.8738-0.00474 PPM
Total number of measurements : 5
Nb of meas. with peak found : 3

---- 10:14:52 5/ 7/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

L CONC/ sigma

s*-0.00328/ 60%

vtical Method: USAS Without Ratio 193.8811 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 F10
help Accept ISA-JY

e 193.031nm (calc: 193.041739nm) Offset = 0.107482nm #Steps = 108.92

easurements for CTL-202617- 1

s 193.699 1362.1 0.0000 153.64 1208.5 1.581 PPM
1454.7 0.0000 149.54 1305.2 1.708 PPM
1317.9 0.0000 150.57 1140.7 1.521 PPM

```
----- 11:[illegible]:17  5/ 7/93 -----    Method:  D:\USAS WITHOUT RATIO

ample CTL-202617-                  1 #MEAS.= 3

      CONC/ sigma

s   1.603/  6.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.107614nm  #Steps =  109.06

easurements for 5/3 4BAY T-203041-                  1

s   193.699  131.38  0.0000  131.39-0.00667-0.01760 PPM *  ( BlK :    0.010)
             133.76  0.0000  130.43  3.3291-0.01322 PPM  ( BlK :    0.010)

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.107951nm  #Steps =  109.40

easurements for NBS1643-203192-                  1

s   193.699  251.90  0.0000  208.60  43.299 0.04970 PPM
             272.60  0.0000  210.46  62.143 0.07447 PPM
             259.05  0.0000  208.91  50.141 0.05869 PPM

----- 11:30:47  5/ 7/93 -----    Method:  D:\USAS WITHOUT RATIO

ample NBS1643-203192-                  1 #MEAS.= 3

      CONC/ sigma

s  0.06096/   21%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.106557nm  #Steps =  107.99

easurements for .1 AS-203192-                  1

s   193.699  196.61  0.0000  142.14  54.470 0.06438 PPM
             203.48  0.0000  139.97  63.512 0.07627 PPM
             194.16  0.0000  139.03  55.124 0.06524 PPM

----- 11:36:46  5/ 7/93 -----    Method:  D:\USAS WITHOUT RATIO

ample .1 AS-203192-                  1 #MEAS.= 3

      CONC/ sigma

s  0.06863/  9.7%


vtical Method:  USPB Without Ratio                                193.8801  nm

                    I S A   J O B I N - Y V O N

                      I C P  -  S Y S T E M

                    (c)  Version 3.374 (10 nov 89)
```

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 Help F10 Accept

ISA-JY

ef. 193.031nm (calc: 193.041739nm) Offset = 0.106141nm #Steps = 107.56
b : 220.353nm (calc: 220.546682nm) Offset = -0.160724nm #Steps = -164.32

:

:ef. 193.031nm (calc: 193.041739nm) Offset = 0.103961nm #Steps = 105.39

:esults for STDLOW

[illegible]	220.353	608.27	602.00	0.0000	6.2667 %
		608.87	608.33	0.0000	0.53333 %
		613.53	609.67	0.0000	3.8667 %

Calculation around 0

-----11:46:29 5/ 7/93 -----

:esults for STDLOW #MEAS.=3 (R)

'L SIGNAL/sigma

'b* 3.5556/ 81%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.103479nm #Steps = 104.87

:esults for STDHIGH

:b	220.353	17072	674.73	0.0000	16397
		16248	681.67	0.0000	15567
		14876	697.73	0.0000	14179

-----11:50:33 5/ 7/93 -----

[illegible]lts for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

b 15381/ 7.3%

:ensities for Recalibration:

:1	Wave	LOW		HI	
b	220.353	STDLOW:	3.5556	STDHIGH:	15380.9038

egression Results :

	Wave	Intercept	Slope	2nd Order
1				
b	220.353	-0.00231220	0.000650307	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
b	220.353				
	STDLOW	3.5556	0.0000	0.0000	0.0
	STDHIGH	15381	10.000	10.000	0.0

inal Regression Results for Method : USPB

[illegible]pt.

	Wave	Intercept	Slope	2nd Order
b	220.353	-0.00231220	0.000650307	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102948nm #Steps = 104.33

easurements for NBS1643C-203192-

```
759.24  699.40  0.0000   59.838 0.03660 PPM
791.53  701.27  0.0000   90.260 0.05638 PPM
771.49  689.67  0.0000   81.821 0.05090 PPM
Total number of measurements : 4
Nb of meas.  with peak found : 3

- 11:56:28  5/ 7/93 -----   Method:  D:\USPB WITHOUT RATIO

Sample NBS1643C-203192-                1 #MEAS.= 3

EL      CONC/ sigma

Pb* 0.04796/    21%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.103005nm  #Steps =  104.39

Measurements for 1 PB-203192-                1

Pb   220.353  2244.4  635.60  0.0000  1608.8   1.044 PPM
              2183.5  629.80  0.0000  1553.7   1.008 PPM
              2159.6  630.47  0.0000  1529.1  0.9921 PPM

----- 12:01:08  5/ 7/93 -----   Method:  D:\USPB WITHOUT RATIO

Sample 1 PB-203192-                1 #MEAS.= 3

EL      CONC/ sigma

Pb      1.015/   2.6%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.102650nm  #Steps =  104.03

Measurements for BLK-203193-                1

Pb   220.353  645.42  608.67  0.0000  36.749 0.02159 PPM
              649.30  613.53  0.0000  35.770 0.02095 PPM
              681.42  618.40  0.0000  63.022 0.03867 PPM

----- 12:13:06  5/ 7/93 -----   Method:  D:\USPB WITHOUT RATIO

Sample BLK-203193-                1 #MEAS.= 3

EL      CONC/ sigma

Pb  0.02707/    37%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.103407nm  #Steps =  104.79

Measurements for 5/3 4BAY T-203194-                1

Pb   220.353  11306  815.53  0.0000  10490  6.793 PPM  (BlK :   0.027)
              11123  819.47  0.0000  10303  6.671 PPM  (BlK :   0.027)
              11569  816.13  0.0000  10753  6.963 PPM  (BlK :   0.027)

----- 12:15:50  5/ 7/93 -----   Method:  D:\USPB WITHOUT RATIO
```

EL CONC/ sigma

Pb 6.809/ 2.2%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.103323nm #Steps = 104.71

Measurements for 5/3 RC T-203195- 1

Pb	220.353	1322.1	806.47	0.0000	515.61	0.3059 PPM	(Blk :	0.027)
		1418.3	809.40	0.0000	608.95	0.3666 PPM	(Blk :	0.027)
		1309.8	813.93	0.0000	495.90	0.2931 PPM	(Blk :	0.027)

------ 12:19:54 5/ 7/93 ------ Method: D:\USPB WITHOUT RATIO

Sample 5/3 RC T-203195- 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.3219/ 12%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.103141nm #Steps = 104.52

Measurements for 5/3 SVG T-203196- 1

Pb	220.353	957.60	803.07	0.0000	154.53	0.07111 PPM	(Blk :	0.027)
		961.70	809.07	0.0000	152.63	0.06988 PPM	(Blk :	0.027)
		980.60	816.87	0.0000	163.73	0.07710 PPM	(Blk :	0.027)

----- 12:23:58 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 5/3 SVG T-203196- 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.07269/ 5.3%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.102423nm #Steps = 103.80

Measurements for 5/5 RC T-203197- 1

Pb	220.353	1136.3	832.60	0.0000	303.67	0.1681 PPM	(Blk :	0.027)
		1070.5	815.20	0.0000	255.33	0.1367 PPM	(Blk :	0.027)
		1097.3	822.80	0.0000	274.45	0.1491 PPM	(Blk :	0.027)

---- 12:28:02 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 5/5 RC T-203197- 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.1513/ 10%

easurements for 5/5 4BAT T-203198- 1

b	220.353	7795.0	822.80	0.0000	6972.2	4.505 PPM	(Blk :	0.027)
		8352.8	831.13	0.0000	7521.7	4.862 PPM	(Blk :	0.027)
		7780.4	838.07	0.0000	6942.3	4.485 PPM	(Blk :	0.027)

---- 12:32:06 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample 5/5 4BAT T-203198- 1 #MEAS.= 3

L CONC/ sigma

b 4.617/ 4.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102905nm #Steps = 104.28

easurements for CTL-203193- 1

b	220.353	2151.5	627.00	0.0000	1524.5	0.9620 PPM	(Blk :	0.027)
		2247.6	623.00	0.0000	1624.6	1.027 PPM	(Blk :	0.027)
		2380.7	631.33	0.0000	1749.3	1.108 PPM	(Blk :	0.027)

---- 12:36:10 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample CTL-203193- 1 #MEAS.= 3

L CONC/ sigma

1.032/ 7.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101783nm #Steps = 103.15

easurements for 5/5 SVG T-203199- 1

b	220.353	971.42	803.33	0.0000	168.09	0.07993 PPM	(Blk :	0.027)
		997.39	815.07	0.0000	182.32	0.08919 PPM	(Blk :	0.027)
		1039.8	826.40	0.0000	213.35	0.1094 PPM	(Blk :	0.027)

---- 12:40:14 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample 5/5 SVG T-203199- 1 #MEAS.= 3

CONC/ sigma

b 0.09283/ 16%

193.031nm (calc: 193.041739nm) Offset = 0.102342nm #Steps = 103.71

easurements for 5/5 PNT T-203200- 1

b	220.353	5031.8	807.33	0.0000	4224.5	2.718 PPM	(Blk :	0.027)
		5033.0	813.27	0.0000	4219.7	2.715 PPM	(Blk :	0.027)
		5173.3	817.47	0.0000	4355.9	2.803 PPM	(Blk :	0.027)

---- 12:44:19 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

#MEAS.= 3

CONC/ sigma

2.745/ 1.8%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101930nm #Steps = 103.30

easurements for 5/3 4BAY D-203201- 1

220.353	2488.6	797.47	0.0000	1691.2	1.070 PPM	(BlK :	0.027)
	2447.5	801.73	0.0000	1645.8	1.041 PPM	(BlK :	0.027)
	2458.7	809.47	0.0000	1649.2	1.043 PPM	(BlK :	0.027)

----- 12:48:22 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample 5/3 4BAY D-203201- 1 #MEAS.= 3

CONC/ sigma

1.051/ 1.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101347nm #Steps = 102.71

easurements for 5/3 RC D-203202- 1

220.353	876.44	793.07	0.0000	63.373	0.02484 PPM	(BlK :	0.027)
	919.20	808.20	0.0000	111.00	0.04280 PPM	(BlK :	0.027)
	888.64	821.20	0.0000	67.442	0.01448 PPM	(BlK :	0.027)

----- 12:52:26 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample 5/3 RC D-203202- 1 #MEAS.= 3

CONC/ sigma

0.02737/ 52%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101297nm #Steps = 102.66

easurements for 5/3 SVG D-203203- 1

220.353	930.81	803.13	0.0000	127.18	0.05332 PPM	(BlK :	0.027)
	951.16	815.67	0.0000	135.49	0.05873 PPM	(BlK :	0.027)
	953.21	818.40	0.0000	134.81	0.05829 PPM	(BlK :	0.027)

---- 12:56:30 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

le 5/3 SVG D-203203- 1 #MEAS.= 3

CONC/ sigma

0.05678/ 5.3%

ample 5/5 SVG D-203206- 1 #MEAS.= 3

CONC/ sigma

0.04963/ 78%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102923nm #Steps = 104.30

easurements for 5/5 PTN D-203207- 1

b	220.353	4357.0	841.53	0.0000	3515.5	2.257 PPM	(Blk : 0.027)
		4511.3	846.67	0.0000	3664.6	2.354 PPM	(Blk : 0.027)
		4583.3	843.53	0.0000	3739.7	2.403 PPM	(Blk : 0.027)

----- 13:16:50 5/ 7/93 ------ Method: D:\USPB WITHOUT RATIO

ample 5/5 PTN D-203207- 1 #MEAS.= 3

CONC/ sigma

2.338/ 3.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101488nm #Steps = 102.85

asurements for CTL-203192 - 1

	220.353	2760.0	641.47	0.0000	2118.5	1.375 PPM
		2762.3	653.00	0.0000	2109.3	1.369 PPM
		2761.2	663.47	0.0000	2097.7	1.362 PPM

---- 13:20:54 5/ 7/93 ----- Method: D:\USPB WITHOUT RATIO

ample CTL-203192 - 1 #MEAS.= 3

CONC/ sigma

1.369/ 0.50%

187.14/ 16%

193.031nm (calc: 193.041739nm) Offset = 0.119468nm #Steps = 121.07

esults for STDHIGH

s	193.699	3753.5	0.0000	196.01	3557.5
		3779.5	0.0000	194.13	3585.4
		3691.2	0.0000	197.66	3493.5

---- 7:06:42 5/11/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 3545.5/ 1.3%

ntensities for Recalibration:

El	Wave	LOW	HI
s	193.699	STDLOW: 187.1406	STDHIGH: 3545.4827

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.278620	0.00148883	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	187.14	0.0000	0.0000	0.0
	STDHIGH	3545.5	5.0000	5.0000	0.0

inal Regression Results for Method : USAS

l	Opt. Wave	Intercept	Slope	2nd Order
s	193.699	-0.278620	0.00148883	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.120527nm #Steps = 122.14

easurements for 2AS-202617- 1

s	193.699	117.42	0.0000	117.16	0.26374	-0.2782 PPM
		119.00	0.0000	118.13	0.86880	-0.2773 PPM
		117.46	0.0000	117.95	-0.48667	-0.2793 PPM *
		120.97	0.0000	115.71	5.2590	-0.2708 PPM

Total number of measurements : 4
Nb of meas. with peak found : 3

---- 7:47:04 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

le 2AS-202617- 1 #MEAS.= 3

CONC/ sigma

s* -0.2754/ 1.5%

easurements for 2AS-202617- 1

s	193.699	297.88	0.0000	159.03	138.85	2.005 PPM
		296.60	0.0000	161.57	135.03	1.948 PPM
		292.13	0.0000	162.49	129.64	1.867 PPM

- 8:12:08 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample 2AS-202617- 1 #MEAS.= 3

L CONC/ sigma

s 1.940/ 3.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118705nm #Steps = 120.30

easurements for .1 AS-202617- 1

s	193.699	162.46	0.0000	158.83	3.6308	-0.02114 PPM
		165.47	0.0000	158.34	7.1311	0.03130 PPM
		165.61	0.0000	157.67	7.9383	0.04340 PPM

---- 8:18:04 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample .1 AS-202617- 1 #MEAS.= 3

L CONC/ sigma

.01785/ 190%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118154nm #Steps = 119.74

easurements for BLK-202614- 1

s	193.699	161.49	0.0000	156.91	4.5813	-0.00690 PPM
		157.69	0.0000	160.51	-2.8200	-0.1178 PPM *
		162.97	0.0000	157.43	5.5452	0.00754 PPM
		156.27	0.0000	159.16	-2.8933	-0.1189 PPM *
		156.39	0.0000	161.37	-4.9867	-0.1503 PPM *

Total number of measurements : 5
Nb of meas. with peak found : 2
Calculation around 0

---- 8:27:05 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample BLK-202614- 1 #MEAS.= 3

CONC/ sigma

s* -0.1290/ 14%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118826nm #Steps = 120.42

easurements for 4BAY 5/10 T-202614- 1

[illegible] 439.79 6.643 PPM (Blk : -0.129)
[illegible] 442.92 6.690 PPM (Blk : -0.129)

----- 8:31:34 5/11/93 ------ Method: D:\USAS WITHOUT RATIO

ample 4BAY 5/10 T-202614- 1 #MEAS.= 3

CONC/ sigma

s 6.662/ 0.37%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119200nm #Steps = 120.80

easurements for 4BAY D-202614- 1

s 193.699	378.83	0.0000	193.80	185.03	2.826 PPM	(Blk :	-0.129)
	391.95	0.0000	192.65	199.30	3.040 PPM	(Blk :	-0.129)
	386.94	0.0000	192.18	194.76	2.972 PPM	(Blk :	-0.129)

----- 8:35:39 5/11/93 ------ Method: D:\USAS WITHOUT RATIO

ample 4BAY D-202614- 1 #MEAS.= 3

CONC/ sigma

2.946/ 3.7%

193.031nm (calc: 193.041739nm) Offset = 0.119332nm #Steps = 120.93

asurements for AFTER RC T-202614- 1

193.699	233.34	0.0000	187.59	45.746	0.7389 PPM	(Blk :	-0.129)
	232.81	0.0000	192.25	40.561	0.6612 PPM	(Blk :	-0.129)
	228.13	0.0000	187.25	40.873	0.6659 PPM	(Blk :	-0.129)

--- 8:39:44 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

mple AFTER RC T-202614- 1 #MEAS.= 3

CONC/ sigma

0.6886/ 6.3%

f. 193.031nm (calc: 193.041739nm) Offset = 0.119043nm #Steps = 120.64

asurements for AFTER RC D-202614- 1

193.699	232.38	0.0000	188.17	44.203	0.7157 PPM	(Blk :	-0.129)
	232.27	0.0000	191.13	41.142	0.6699 PPM	(Blk :	-0.129)
	234.87	0.0000	189.11	45.764	0.7391 PPM	(Blk :	-0.129)

--- 8:43:49 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ple AFTER RC D-202614- 1 #MEAS.= 3

CONC/ sigma

[illegible] 5.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118915nm #Steps = 120.51

easurements for AVG 1 T-202614- 1

s 193.699 207.08 0.0000 188.66 18.421 0.3294 PPM (BlK : -0.129)
206.01 0.0000 189.34 16.674 0.3033 PPM (BlK : -0.129)
205.82 0.0000 190.00 15.821 0.2905 PPM (BlK : -0.129)

----- 8:47:54 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample AVG 1 T-202614- 1 #MEAS.= 3

L CONC/ sigma

s 0.3077/ 6.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118959nm #Steps = 120.55

easurements for CTL-202617- 1

s 193.699 295.88 0.0000 162.07 133.81 1.929 PPM
297.37 0.0000 161.63 135.75 1.958 PPM
300.95 0.0000 161.99 138.96 2.006 PPM

- 8:51:59 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

CONC/ sigma

1.965/ 2.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119097nm #Steps = 120.69

easurements for SVG 1 D-202614- 1

s 193.699 202.60 0.0000 189.59 13.002 0.2483 PPM (BlK : -0.129)
205.02 0.0000 190.22 14.798 0.2752 PPM (BlK : -0.129)
204.28 0.0000 187.09 17.191 0.3110 PPM (BlK : -0.129)

---- 8:56:04 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 1 D-202614- 1 #MEAS.= 3

CONC/ sigma

0.2781/ 11%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119314nm #Steps = 120.91

easurements for SVG 2 A-202614- 1

[illegible] 188.13 18.475 0.3303 PPM (BlK : -0.129)
204.86 0.0000 189.05 15.807 0.2903 PPM (BlK : -0.129)

---- 9:00:09 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 2 T-202614- 1 #MEAS.= 3

L CONC/ sigma

s 0.2985/ 9.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119305nm #Steps = 120.90

easurements for SVG2 D-202614- 1

s 193.699 204.39 0.0000 190.84 13.551 0.2565 PPM (BlK : -0.129)
209.20 0.0000 189.80 19.396 0.3441 PPM (BlK : -0.129)
202.63 0.0000 189.76 12.869 0.2463 PPM (BlK : -0.129)

---- 9:04:14 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG2 D-202614- 1 #MEAS.= 3

L CONC/ sigma

s 0.2823/ 19%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119650nm #Steps = 121.25

easurements for SVG 3 T-202614- 1

s 193.699 207.16 0.0000 189.31 17.850 0.3209 PPM (BlK : -0.129)
205.69 0.0000 188.33 17.359 0.3135 PPM (BlK : -0.129)
203.60 0.0000 189.51 14.090 0.2646 PPM (BlK : -0.129)

---- 9:08:19 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 3 T-202614- 1 #MEAS.= 3

L CONC/ sigma

s 0.2997/ 10%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118429nm #Steps = 120.02

easurements for SVG3 D-202614- 1

s 193.699 210.60 0.0000 192.11 18.492 0.3305 PPM (BlK : -0.129)
202.34 0.0000 188.78 13.556 0.2565 PPM (BlK : -0.129)
204.79 0.0000 190.34 14.453 0.2700 PPM (BlK : -0.129)

---- 9:12:24 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG3 D-202614- 1 #MEAS.= 3

CONC/ sigma

0.2857/ 14%

193.031nm (calc: 193.041739nm) Offset = 0.120076nm #Steps = 121.69

easurements for CTL-202617- 1

s	193.699	287.84	0.0000	161.61	126.24	1.816 PPM
		283.63	0.0000	164.07	119.56	1.716 PPM
		282.71	0.0000	164.88	117.83	1.690 PPM

----- 9:16:29 5/11/93 ------ Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

L CONC/ sigma

s 1.741/ 3.8%

Analytical Method: USAS Without Ratio 193.8939 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 F10
elp Accept ISA-JY

f. 193.031nm (calc: 193.041739nm) Offset = 0.119150nm #Steps = 120.75

asurements for 5 AS-202614- 1

	193.699	503.71	0.0000	162.99	340.71	5.029 PPM
		510.36	0.0000	161.50	348.86	5.151 PPM
		503.03	0.0000	160.06	342.97	5.063 PPM

----- 9:29:19 5/11/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5 AS-202614- 1 #MEAS.= 3

CONC/ sigma

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.118931nm  #Steps =  120.53
b : 220.353nm (calc: 220.546682nm)  Offset = -0.160724nm  #Steps = -16[illegible].32 *

a  193.031nm (calc: 193.041739nm)  Offset =  0.116241nm  #Steps =  117.80

esults for STDLOW

b   220.353  655.15  649.85  0.0000  5.2933 *
             659.63  649.13  0.0000  10.507 *
             656.91  649.60  0.0000  7.3133 *
            Calculation around 0

----- 9:35:23  5/11/93 -----

esults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma

b*  7.7044/   34%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.115857nm  #Steps =  117.41

esults for STDHIGH

b   220.353  1437.9  650.20  0.0000  787.71
             1462.6  647.89  0.0000  814.74
             1475.2  639.44  0.0000  835.75

---- 9:39:27  5/11/93 -----

esults for STDHIGH #MEAS.=3 (R)

  SIGNAL/sigma

b   812.74/  3.0%


ntensities for Recalibration:
El     Wave              LOW                    HI
b    220.353        STDLOW:   7.7044      STDHIGH: 812.7362

egression Results :
l  Wave        Intercept        Slope        2nd Order
b 220.353      -0.0957036       0.0124219        0.00000

          Standard  Intensity  Concentration  Calc. Conc.  % Error
          ---------  ---------  -------------  -----------  -------
b  220.353
          STDLOW     7.7044       0.0000        0.0000       0.0
          STDHIGH    812.74       10.000        10.000       0.0

[illegible] for Method : USPB
[illegible]
[illegible]  Intercept        Slope        2nd Order
[illegible]  0.0124219        0.00000
```

			As (total)	As (dissvd)	Pb (total)	Pb (disvd)	pH
	Pontoon Pump						
	~~[illegible]~~		.43	.03			
5/11	Forebay		.77	.03			6.8
5/11	R/C		.55	.45			9.0
5/11	SVG		.48	.50			
5/12	Forebay	B	1.06	.12			6.9
5/12	Pontoon Pump	A	3.21	.12			
5/12	R/C	C	.58	.08			10.1
5/12	~~After~~ R/C over	D	.29	.28			8.6
5/12	B.F. gran		.30	.05			
5/12	A.P. eff.		.22	.06			
5/12	SVG 1	E	.31	.28			
5/12	SVG 2		.29	.33			
5/[illegible]	SVG 3		.32	.26			

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.114358nm #Steps = 115.89

Measurements for 1 PB- - 1

Pb	220.353	723.43	654.72	0.0000	68.706	0.7578 PPM
		731.18	652.49	0.0000	78.691	0.8818 PPM
		737.33	655.01	0.0000	82.312	0.9268 PPM

----- 9:51:24 5/11/93 ----- Method: D:\USPB WITHOUT RATIO

Sample 1 PB- - 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.8554/ 10%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.115250nm #Steps = 116.79

Measurements for 1 PB- - 1

Pb	220.353	731.96	649.31	0.0000	82.656	0.9310 PPM
		735.65	661.19	0.0000	74.462	0.8292 PPM
		736.05	649.49	0.0000	86.561	0.9795 PPM

----- 9:55:49 5/11/93 ----- Method: D:\USPB WITHOUT RATIO

ple 1 PB- - 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.9133/ 8.4%

Ref. 193.031nm (calc: 193.041739nm) Offset = [illegible]

Measurements for [illegible]

Pb [illegible]

[illegible]

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.115534nm #Steps = 117.08

Measurements for 4B-1 5/10-202655- 1

Pb	220.353	1936.2	678.41	0.0000	1257.8	15.53 PPM (Blk : 0.002)
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PPM (Blk : 0.002)

```
                2013.4   678.67  0.0000  1334.8   16.48 PPM  ( BlK :     0.002)

---- 10:05:50  5/11/93 ------    Method:  D:\USPB WITHOUT RATIO

ample 4B T  5/10-202655-                  1 #MEAS.= 3

     CONC/ sigma

    16.01/  3.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.115487nm  #Steps =  117.04

easurements for 4B D-202655-                  1

    220.353  1230.9  677.93  0.0000  552.97   6.771 PPM  ( BlK :     0.002)
             1260.1  671.49  0.0000  588.57   7.213 PPM  ( BlK :     0.002)
             1266.5  676.78  0.0000  589.67   7.227 PPM  ( BlK :     0.002)

---- 10:09:54  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO

ample 4B D-202655-                  1 #MEAS.= 3

     CONC/ sigma

    7.071/  3.7%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.115683nm  #Steps =  117.23

easurements for RC T-202655-                  1

    220.353  681.25  665.01  0.0000  16.240  0.1040 PPM *  ( BlK :     0.002)
             687.63  661.30  0.0000  26.327  0.2293 PPM *  ( BlK :     0.002)
             678.04  668.22  0.0000  9.8200 0.02421 PPM *  ( BlK :     0.002)
            Calculation around 0

---- 10:13:58  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO

ample RC T-202655-                  1 #MEAS.= 3

     CONC/ sigma

b*  0.1191/   87%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.113807nm  #Steps =  115.33

easurements for RC D-202655-                  1

    220.353  669.37  663.63  0.0000  5.7400-0.02647 PPM *  ( BlK :     0.002)
             676.73  668.69  0.0000  8.0400 0.00210 PPM *  ( BlK :     0.002)
             685.23  671.09  0.0000  14.140 0.07787 PPM *  ( BlK :     0.002)
            Calculation around 0

---- 10:18:02  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO
```

```
b* 0.01783/  300%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.113464nm  #Steps =  114.99

easurements for 1 T-202655-                    1

b   220.353  682.06  664.60  0.0000  17.460  0.1191 PPM *  ( Blk :    0.002)
             696.53  656.69  0.0000  39.836  0.3971 PPM  ( Blk :    0.002)
             697.48  666.86  0.0000  30.616  0.2825 PPM  ( Blk :    0.002)
             686.66  664.23  0.0000  22.427  0.1808 PPM *  ( Blk :    0.002)
             684.45  663.89  0.0000  20.553  0.1575 PPM *  ( Blk :    0.002)
             Total number of measurements : 5
             Nb of meas.. with peak found : 2
             Calculation around 0

---- 10:22:06  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO

ample 1 T-202655-                    1 #MEAS.= 3

L     CONC/ sigma

b*  0.1525/   20%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.113594nm  #Steps =  115.12

urements for CTL-202655-                    1

b   220.353  732.14  644.93  0.0000  87.210  0.9855 PPM  ( Blk :    0.002)
             739.88  641.03  0.0000  98.856  1.130 PPM  ( Blk :    0.002)
             727.83  643.59  0.0000  84.244  0.9487 PPM  ( Blk :    0.002)

---- 10:26:35  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO

ample CTL-202655-                    1 #MEAS.= 3

_     CONC/ sigma

b     1.021/  9.4%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.114086nm  #Steps =  115.62

easurements for 1 DIS-202655-                    1

b   220.353  674.11  667.27  0.0000  6.8467-0.01273 PPM *  ( Blk :    0.002)
             671.59  668.69  0.0000  2.9067-0.06167 PPM *  ( Blk :    0.002)
             677.18  669.75  0.0000  7.4333-0.00544 PPM *  ( Blk :    0.002)
             Calculation around 0

---- 10:30:39  5/11/93 -----    Method:  D:\USPB WITHOUT RATIO

ample 1 DIS-202655-                    1 #MEAS.= 3

_     CONC/ sigma

b*-0.02661/  110%
```

ef. 193.031nm (calc: 193.041739nm) Offset = 0.115333nm #Steps = 116.88

easurements for 2 TOT-202655- 1

220.353 681.42 672.13 0.0000 9.2867 0.01738 PPM * (Blk : 0.002)
685.09 669.66 0.0000 15.433 0.09394 PPM * (Blk : 0.002)
687.35 671.77 0.0000 15.573 0.09568 PPM * (Blk : 0.002)
Calculation around 0

---- 10:34:44 5/11/93 ------ Method: D:\USPB WITHOUT RATIO

ample 2 TOT-202655- 1 #MEAS.= 3

CONC/ sigma

o* 0.06907/ 65%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.116344nm #Steps = 117.90

easurements for 2 DIS-202655- 1

220.353 675.14 677.70 0.0000 -2.5600 -0.1296 PPM * (Blk : 0.002)
673.92 669.77 0.0000 4.1533-0.04618 PPM * (Blk : 0.002)
679.85 672.78 0.0000 7.0733-0.00991 PPM * (Blk : 0.002)
Calculation around 0

10:39:48 5/11/93 ----- Method: D:\USPB WITHOUT RATIO

mple 2 DIS-202655- 1 #MEAS.= 3

CONC/ sigma

*-0.06189/ 99%

f. 193.031nm (calc: 193.041739nm) Offset = 0.116310nm #Steps = 117.87

asurements for 3 TOT-202655- 1

220.353 681.34 667.25 0.0000 14.093 0.07729 PPM * (Blk : 0.002)
681.10 672.08 0.0000 9.0200 0.01427 PPM * (Blk : 0.002)
682.65 678.64 0.0000 4.0133-0.04792 PPM * (Blk : 0.002)
Calculation around 0

--- 10:42:53 5/11/93 ----- Method: D:\USPB WITHOUT RATIO

nple 3 TOT-202655- 1 #MEAS.= 3

CONC/ sigma

.01455/ 430%

f. 193.031nm (calc: 193.041739nm) Offset = 0.115173nm #Steps = 116.72

677.91 678.63 0.0000-0.72000 -0.1067 PPM * (BlK : 0.002)
683.56 675.49 0.0000 8.0667 0.00243 PPM * (BlK : 0.002)
Calculation around 0

------ 10:46:57 5/11/93 ------ Method: D:\USPB WITHOUT RATIO

Sample 3 DIS-202655- 1 #MEAS.= 3

EL CONC/ sigma

Pb*-0.03881/ 150%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.116247nm #Steps = 117.81

Measurements for CTL-202655- 1

Pb 220.353 737.17 652.73 0.0000 84.439 0.9511 PPM (BlK : 0.002)
736.41 647.61 0.0000 88.799 1.005 PPM (BlK : 0.002)
736.89 650.33 0.0000 86.560 0.9775 PPM (BlK : 0.002)

------ 10:51:01 5/11/93 ------ Method: D:\USPB WITHOUT RATIO

Sample CTL-202655- 1 #MEAS.= 3

EL CONC/ sigma

Pb 0.9780/ 2.8%

Analytical Method: USPB Without Ratio 220.5501 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F10
Help Accept

ISA-JY

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

11-MAY-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD
5/10 FOREBAY	6.66	2.95	16.0	7.07
5/10 AFTER R/C	.69	.71	.12	<.05
SVG 1	.31	.28	.15	<.05
SVG 2	.30	.28	.07	<.05
SVG 3	.30	.29	<.05	<.05

3.031nm (calc: 193.041739nm) Offset = 0.126184nm #Steps = 127.88
for STDLOW
93.699 149.58 0.0000 147.61 1.9669
147.82 0.0000 147.84 -0.02000 *
152.51 0.0000 149.37 3.1326
151.33 0.0000 150.85 0.48000 *
155.01 0.0000 150.65 4.3533
Total number of measurements : 5
Nb of meas. with peak found : 3

8:19:32 5/12/93 ----
lts for STDLOW #MEAS.=3 (R)
SIGNAL/sigma
3.1509/ 38%

f. 193.031nm (calc: 193.041739nm) Offset = 0.127359nm #Steps = 129.07
esults for STDHIGH
193.699 496.50 0.0000 152.83 343.67
490.38 0.0000 149.95 340.43
501.83 0.0000 152.46 349.37

---- 8:24:01 5/12/93 ----
esults for STDHIGH #MEAS.=3 (R)
SIGNAL/sigma
344.49/ 1.3%

ntensities for Recalibration: HI
LOW STDHIGH: 344.4909
STDLOW: 3.1509

Wave Slope 2nd Order
193.699 0.0146482 0.00000

ession Results :
Wave Intercept
193.699 -0.0461554

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699	STDLOW	3.1509	0.0000	0.0000	0.0
	STDHIGH	344.49	5.0000	5.0000	0.0

inal Regression Results for Method : USAS
Opt. Wave Intercept Slope 2nd Order
193.699 -0.0461554 0.0146482 0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.127367nm #Steps = 129.08
easurements for 2 AS-202617- 1
193.699 285.20 0.0000 150.40 134.80 1.928 PPM
285.85 0.0000 147.89 137.97 1.975 PPM
285.89 0.0000 149.57 136.33 1.951 PPM

---- 8:36:32 5/12/93 ----- Method: D:\USAS WITHOUT RATIO
ample 2 AS-202617- 1 #MEAS.= 3
CONC/ sigma
1.951/ 1.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126753nm #Steps = 128.45
easurements for 1 AS-203562- 1
193.699 215.51 0.0000 150.72 64.794 0.9030 PPM
217.27 0.0000 148.43 68.846 0.9623 PPM
218.21 0.0000 147.69 70.526 0.9869 PPM

8:46:54 5/12/93 ----- Method: D:\USAS WITHOUT RATIO
1 #MEAS.= 3

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  [illegible]
leasurements for BLK-203563-                    1
s    193.699   146.17   0.0000   145.93  0.24000-0.04264 PPM *
               151.70   0.0000   147.74   3.9569 0.01181 PPM
               151.36   0.0000   148.12   3.2401 0.00131 PPM
               147.00   0.0000   150.61  -3.6067-0.09899 PPM *
               151.96   0.0000   148.08   3.8802 0.01068 PPM
             Total number of measurements : 5
             No of meas.  with peak found : 3
-----  8:55:10  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample BLK-203563-                  1 #MEAS.= 3
L      CONC/ sigma
s* 0.00793/   73%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127369nm  #Steps =  129.08
leasurements for S POND-203564-                  1
s    193.699   211.51   0.0000   178.42   33.091   0.4306 PPM  ( BlK :    0.008)
               212.37   0.0000   181.31   31.058   0.4009 PPM  ( BlK :    0.008)
               212.45   0.0000   178.48   33.972   0.4435 PPM  ( BlK :    0.008)
-----  8:59:39  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample S POND-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s    0.4250/  5.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127241nm  #Steps =  128.95
leasurements for S POND DIS-203565-                  1
s    193.699   184.11   0.0000   177.28   6.8310 0.04597 PPM  ( BlK :    0.008)
               182.36   0.0000   180.00   2.3645-0.01945 PPM  ( BlK :    0.008)
               188.07   0.0000   179.90   8.1728 0.06563 PPM  ( BlK :    0.008)
-----  9:03:44  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample S POND DIS-203565-                  1 #MEAS.= 3
L      CONC/ sigma
s   0.03072/  150%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127052nm  #Steps =  128.76
easurements for 4BAY T-203566-                  1
s    193.699   240.85   0.0000   182.53   58.321   0.8002 PPM  ( BlK :    0.008)
               236.48   0.0000   182.47   54.008   0.7370 PPM  ( BlK :    0.008)
               241.55   0.0000   184.71   56.845   0.7786 PPM  ( BlK :    0.008)
-----  9:07:49  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample 4BAY T-203566-                  1 #MEAS.= 3
L      CONC/ sigma
s    0.7719/  4.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127509nm  #Steps =  129.22
easurements for 4BAY DIS-203567-                  1
s    193.699   185.41   0.0000   181.85   3.5600-0.00194 PPM *  ( BlK :    0.008)
               188.23   0.0000   183.71   4.5127 0.01202 PPM  ( BlK :    0.008)
               187.22   0.0000   180.01   7.2177 0.05164 PPM  ( BlK :    0.008)
               187.08   0.0000   182.57   4.5101 0.01198 PPM  ( BlK :    0.008)
             Total number of measurements : 4
             Nb of meas.  with peak found : 3
-----  9:11:54  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample 4BAY DIS-203567-                  1 #MEAS.= 3
L      CONC/ sigma
s* 0.02521/   91%


ef. 193.031nm (calc: 193.041739nm)  Offset =  [illegible]
```

```
As    193.699   215.92   0.0000   147.90   68.016   0.9501 PPM
                219.81   0.0000   150.72   69.091   0.9659 PPM
                221.77   0.0000   148.35   73.413    1.029 PPM
----  9:16:11  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample CTL 1 AS-203562-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.9818/  4.3%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127175nm  #Steps =  128.88
Measurements for RC T-203568-                1
As    193.699   220.82   0.0000   182.87   37.948   0.5018 PPM  ( BlK :    0.008)
                221.73   0.0000   182.96   38.772   0.5139 PPM  ( BlK :    0.008)
                228.97   0.0000   182.79   46.181   0.6224 PPM  ( BlK :    0.008)
----  9:20:15  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample RC T-203568-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.5460/   12%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126847nm  #Steps =  128.55
Measurements for RC DIS-203569-                1
As    193.699   222.07   0.0000   186.89   35.179   0.4612 PPM  ( BlK :    0.008)
                220.33   0.0000   185.99   34.348   0.4491 PPM  ( BlK :    0.008)
                220.07   0.0000   185.91   34.158   0.4463 PPM  ( BlK :    0.008)
----  9:24:20  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample RC DIS-203569-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.4522/  1.8%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127090nm  #Steps =  128.79
Measurements for SVG T-203570-                1
As    193.699   219.90   0.0000   180.35   39.549   0.5252 PPM  ( BlK :    0.008)
                220.85   0.0000   183.75   37.105   0.4894 PPM  ( BlK :    0.008)
                216.47   0.0000   183.87   32.601   0.4235 PPM  ( BlK :    0.008)
----  9:28:25  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample SVG T-203570-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.4794/   11%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126819nm  #Steps =  128.52
Measurements for SVG D-203571-                1
As    193.699   222.05   0.0000   182.68   39.373   0.5227 PPM  ( BlK :    0.008)
                220.36   0.0000   185.16   35.202   0.4616 PPM  ( BlK :    0.008)
                222.24   0.0000   183.37   38.864   0.5152 PPM  ( BlK :    0.008)
----  9:32:30  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample SVG D-203571-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.4998/  6.7%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126249nm  #Steps =  127.94
Measurements for 1 AS-203562-                1
As    193.699   212.61   0.0000   147.09   65.513   0.9135 PPM
                208.40   0.0000   149.35   59.051   0.8188 PPM
                218.10   0.0000   146.86   71.235   0.9973 PPM
----  9:36:35  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
```

```
[illegible]
      CONC/ sigma
s   0.9099/  9.8%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126089nm  #Steps =  127.78
easurements for BLK-203563-                    1
s   193.699  145.67  0.0000  147.83 -2.1667-0.07789 PPM *
             147.47  0.0000  148.47 -1.0067-0.06090 PPM *
             152.54  0.0000  149.48  3.0590-0.00135 PPM
             149.45  0.0000  147.65  1.7917-0.01991 PPM
             150.69  0.0000  146.27  4.4144 0.01851 PPM
            Total number of measurements : 5
            Nb of meas.  with peak found : 3
----- 9:52:01  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
ample BLK-203563-                1 #MEAS.= 3
      CONC/ sigma
s*-0.00092/+o***%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126492nm  #Steps =  128.19
easurements for 5/12 4B T-203564-                 1
s   193.699  265.05  0.0000  187.75  77.301   1.087 PPM  ( BlK :   -0.001)
             259.09  0.0000  185.91  73.183   1.027 PPM  ( BlK :   -0.001)
             260.48  0.0000  187.27  73.207   1.027 PPM  ( BlK :   -0.001)
----- 9:56:30  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
ample 5/12 4B T-203564-                1 #MEAS.= 3
      CONC/ sigma
s    1.047/  3.3%


e[illegible] 193.031nm (calc: 193.041739nm)  Offset =  0.125417nm  #Steps =  127.10
easurements for 5/12 4B D-203564-                 1
s   193.699  188.54  0.0000  187.52  1.0217-0.03027 PPM  ( BlK :   -0.001)
             191.29  0.0000  187.33  3.9626 0.01281 PPM  ( BlK :   -0.001)
             191.18  0.0000  186.[illegible]  [illegible] 0.03049 PPM  ( [illegible]
---- 10:00:35  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
ample 5/12 4B D-203564-                1 #MEAS.= 3
      CONC/ sigma
s  0.00434/  720%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127139nm  #Steps =  128.84
easurements for PTN T-203564-                 1
s   193.699  401.07  0.0000  192.05  209.01   3.016 PPM  ( BlK :   -0.001)
             407.34  0.0000  192.03  215.31   3.109 PPM  ( BlK :   -0.001)
             397.72  0.0000  191.98  205.74   2.968 PPM  ( BlK :   -0.001)
---- 10:04:40  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
ample PTN T-203564-                1 #MEAS.= 3
      CONC/ sigma
s    3.031/  2.4%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126886nm  #Steps =  128.59
e[illegible]rements for PTN D-203564-                 1
s   193.699  154.21  0.0000  148.27  5.9389 0.04175 PPM  ( BlK :   -0.001)
             153.90  0.0000  149.26  4.6369 0.02268 PPM  ( BlK :   -0.001)
             148.01  0.0000  148.85-0.84000-0.05754 PPM *  ( BlK :   -0.001)
             152.46  0.0000  148.45  4.0156 0.01358 PPM  ( BlK :   -0.001)
            Total number of measurements : 4
            Nb of meas.  with peak found : 3
---- 10:08:45  5/12/93 -----   Method:  D:\USAS WITHOUT RATIO
ample PTN D-203564-
```

```
      ...../ sigma
s* 0.02601/    55%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126459nm  #Steps =  128.16
easurements for RC T-203564-                  1
s   193.699  146.11  0.0000  146.84-0.72667-0.05588 PPM *  ( BlK :   -0.001)
             150.35  0.0000  145.90  4.4488 0.01993 PPM  ( BlK :   -0.001)
             150.99  0.0000  146.13  4.8525 0.02584 PPM  ( BlK :   -0.001)
             146.15  0.0000  150.43 -4.2800 -0.1079 PPM *  ( BlK :   -0.001)
             146.87  0.0000  146.51 0.36000-0.03997 PPM *  ( BlK :   -0.001)
            Total number of measurements : 5
            Nb of meas.  with peak found : 2
            Calculation around 0
----- 10:13:02  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample RC T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.06793/    52%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127404nm  #Steps =  129.11
easurements for CTL-203564-                  1
s   193.699  150.33  0.0000  151.45 -1.1201-0.06165 PPM  ( BlK :   -0.001)
             154.97  0.0000  147.65  7.3196 0.06198 PPM  ( BlK :   -0.001)
             147.48  0.0000  148.02-0.54000-0.05315 PPM *  ( BlK :   -0.001)
             150.01  0.0000  147.46  2.5491-0.00790 PPM  ( BlK :   -0.001)
            Total number of measurements : 4
            Nb of meas.  with peak found : 3
----- 10:17:31  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample CTL-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.00252/+o***%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127523nm  #Steps =  129.23
easurements for RC D-203564-                  1
s   193.699  153.05  0.0000  149.23  3.8152 0.01065 PPM  ( BlK :   -0.001)
             147.63  0.0000  152.29 -4.6600 -0.1135 PPM *  ( BlK :   -0.001)
             150.74  0.0000  148.91  1.8316-0.01841 PPM  ( BlK :   -0.001)
             153.28  0.0000  149.19  4.0946 0.01474 PPM  ( BlK :   -0.001)
            Total number of measurements : 4
            Nb of meas.  with peak found : 3
----- 10:21:48  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample RC D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s* 0.00233/   780%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127089nm  #Steps =  128.79
easurements for RC OVER T-203564-                  1
s   193.699  146.93  0.0000  150.85 -3.9267 -0.1028 PPM *  ( BlK :   -0.001)
             148.85  0.0000  150.99 -2.1400-0.07659 PPM *  ( BlK :   -0.001)
             149.43  0.0000  150.68 -1.2533-0.06360 PPM *  ( BlK :   -0.001)
            Calculation around 0
----- 10:26:05  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample RC OVER T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
.08098/    25%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127607nm  #Steps =  129.32
easurements for RC OVER D-203564-                  1
s   193.699  151.61  0.0000  151.10 0.50667-0.03782 PPM *  ( BlK :   -0.001)
             151.86  0.0000  151.59 0.27428-0.04122 PPM  ( BlK :   -0.001)
```

```
                 151.52  0.0000  149.47  2.0301-0.01500 PPM    ( Blk :    -0.001)
                Total number of measurements : 5
                Nb of meas.  with peak found : 3
----- 10:30:10  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample RC OVER D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.02320/   68%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126930nm  #Steps =  128.63
Measurements for BF GRAN T-203564-                  1
s    193.699  149.35  0.0000  150.85 -1.5000-0.06721 PPM *  ( Blk :    -0.001)
              149.01  0.0000  149.41-0.40000-0.05110 PPM *  ( Blk :    -0.001)
              146.12  0.0000  150.65 -4.5267 -0.1115 PPM *  ( Blk :    -0.001)
             Calculation around 0
----- 10:34:39  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample BF GRAN T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.07662/   41%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127918nm  #Steps =  129.63
Measurements for BF GRAN D-203564-                  1
s    193.699  153.44  0.0000  151.59  1.8549-0.01807 PPM  ( Blk :    -0.001)
              146.84  0.0000  149.41 -2.5667-0.08284 PPM *  ( Blk :    -0.001)
              152.88  0.0000  148.63  4.2553 0.01709 PPM  ( Blk :    -0.001)
              147.46  0.0000  149.19 -1.7333-0.07063 PPM *  ( Blk :    -0.001)
              150.30  0.0000  152.13 -1.8327-0.07208 PPM  ( Blk :    -0.001)
             Total number of measurements : 5
             Nb of meas.  with peak found : 3
----- 10:38:44  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample BF GRAN D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.02435/  180%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127807nm  #Steps =  129.52
Measurements for CTL-203564-                  1
s    193.699  152.20  0.0000  149.48  2.7165-0.00636 PPM
              152.94  0.0000  150.59  2.3507-0.01172 PPM
              155.86  0.0000  150.30  5.5612 0.03531 PPM
----- 10:43:13  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample CTL-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s  0.00574/  450%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127190nm  #Steps =  128.90
Measurements for AP EFF T-203564-                  1
s    193.699  154.30  0.0000  151.05  3.2551 0.00244 PPM  ( Blk :    -0.001)
              148.11  0.0000  152.15 -4.0333 -0.1043 PPM *  ( Blk :    -0.001)
              150.54  0.0000  148.61  1.9334-0.01692 PPM  ( Blk :    -0.001)
              155.86  0.0000  151.11  4.7500 0.02434 PPM  ( Blk :    -0.001)
             Total number of measurements : 4
             Nb of meas.  with peak found : 3
----- 10:47:18  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample AP EFF T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s* 0.00329/  630%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127010nm  #Steps =  128.71
Measurements for AP EFF D-203564-                  1
```

```
149.81  0.0000  150.85 -1.0400-0.06047 PPM *  ( BlK :   -0.001)
149.37  0.0000  150.21-0.83333-0.05745 PPM *  ( BlK :   -0.001)
155.97  0.0000  151.65  4.3220 0.01807 PPM   ( BlK :   -0.001)
Total number of measurements : 5
Nb of meas.  with peak found : 3
```

----- 10:51:35 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

e AP EFF D-203564- 1 #MEAS.= 3

L CONC/ sigma

s* 0.01793/ 70%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126858nm #Steps = 128.56

easurements for SVG 1 T-203564- 1

```
s   193.699  150.97  0.0000  151.15-0.18000-0.04788 PPM *  ( BlK :   -0.001)
             154.02  0.0000  152.61  1.4086-0.02461 PPM   ( BlK :   -0.001)
             149.19  0.0000  151.39 -2.1933-0.07737 PPM *  ( BlK :   -0.001)
             154.71  0.0000  153.44  1.2706-0.02663 PPM   ( BlK :   -0.001)
             152.13  0.0000  152.04 0.09333-0.04387 PPM *  ( BlK :   -0.001)
             Total number of measurements : 5
             Nb of meas.  with peak found : 2
             Calculation around 0
```

----- 10:56:04 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 1 T-203564- 1 #MEAS.= 3

L CONC/ sigma

s*-0.05637/ 32%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125508nm #Steps = 127.19

easurements for SVG 1 DD-203564- 1

```
s   193.699  151.54  0.0000  150.69 0.84667-0.03284 PPM *  ( BlK :   -0.001)
             153.46  0.0000  153.73-0.26456-0.04911 PPM   ( BlK :   -0.001)
             149.27  0.0000  150.35 -1.0867-0.06116 PPM *  ( BlK :   -0.001)
             155.43  0.0000  150.63  4.8036 0.02512 PPM   ( BlK :   -0.001)
             155.74  0.0000  153.81  1.9301-0.01697 PPM   ( BlK :   -0.001)
             Total number of measurements : 5
             Nb of meas.  with peak found : 3
```

---- 11:00:33 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 1 DD-203564- 1 #MEAS.= 3

L CONC/ sigma

s*-0.01365/ 270%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126001nm #Steps = 127.69

easurements for SVG2 T-203564- 1

```
s   193.699  148.95  0.0000  151.83 -2.8800-0.08743 PPM *  ( BlK :   -0.001)
             152.86  0.0000  152.37 0.49067-0.03805 PPM   ( BlK :   -0.001)
             150.36  0.0000  151.63 -1.2733-0.06389 PPM *  ( BlK :   -0.001)
             150.47  0.0000  154.61 -4.1333 -0.1058 PPM *  ( BlK :   -0.001)
             Total number of measurements : 4
             Nb of meas.  with peak found : 1
             Calculation around 0
```

---- 11:05:02 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG2 T-203564- 1 #MEAS.= 3

L CONC/ sigma

s*-0.08570/ 25%

e 193.031nm (calc: 193.041739nm) Offset = 0.125667nm #Steps = 127.35

urements for CTL-203564- 1

```
s   193.699  156.49  0.0000  151.26  5.2292 0.03044 PPM
             155.81  0.0000  152.91  2.8923-0.00379 PPM
             154.84  0.0000  150.68  4.1627 0.01482 PPM
```

---- 11:09:19 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-203564- 1 #MEAS.= 3

CONC/ sigma

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125894nm  #Steps =  127.59
easurements for SVG2 D-203564-                    1
s   193.699  156.21  0.0000  152.20  4.0063 0.01345 PPM  ( BlK :   -0.001)
             151.13  0.0000  154.56 -3.4267-0.09543 PPM *  ( BlK :   -0.001)
             157.73  0.0000  151.43  6.3069 0.04715 PPM  ( BlK :   -0.001)
             151.93  0.0000  154.15 -2.2267-0.07786 PPM *  ( BlK :   -0.001)
             153.42  0.0000  152.11  1.3169-0.02595 PPM  ( BlK :   -0.001)
            Total number of measurements : 5
            Nb of meas.  with peak found : 3
----- 11:13:23  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample SVG2 D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s* 0.01155/  320%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125692nm  #Steps =  127.38
easurements for SVG3 T-203564-                    1
s   193.699  155.57  0.0000  153.03  2.5363-0.00809 PPM  ( BlK :   -0.001)
             151.08  0.0000  150.65 0.43333-0.03889 PPM *  ( BlK :   -0.001)
             154.78  0.0000  152.09  2.6968-0.00574 PPM  ( BlK :   -0.001)
             148.90  0.0000  153.68 -4.7800 -0.1153 PPM *  ( BlK :   -0.001)
             153.67  0.0000  153.85-0.17333-0.04778 PPM *  ( BlK :   -0.001)
            Total number of measurements : 5
            Nb of meas.  with peak found : 2
            Calculation around 0
----- 11:17:52  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample SVG3 T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.06731/   62%
```

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124005nm  #Steps =  125.67
easurements for BLK-203563-                    1
s    193.699  154.03  0.0000  154.11-0.08000-0.04733 PPM *
              152.53  0.0000  155.85 -3.3267-0.09488 PPM *
              151.97  0.0000  152.73-0.76000-0.05729 PPM *
             Calculation around 0
----- 11:24:13  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample BLK-203563-                  1 #MEAS.= 3
L      CONC/ sigma
s*-0.06650/   38%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124295nm  #Steps =  125.96
easurements for 5/12 4B T-203564-                    1
s    193.699  266.70  0.0000  195.84  70.865   1.058 PPM  ( BlK :   -0.067)
              266.71  0.0000  195.51  71.208   1.063 PPM  ( BlK :   -0.067)
              267.27  0.0000  196.51  70.759   1.057 PPM  ( BlK :   -0.067)
----- 11:28:18  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample 5/12 4B T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s     1.060/ 0.32%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124457nm  #Steps =  126.13
easurements for 5/12 4B D-203564-                    1
s    193.699  201.52  0.0000  192.69  8.8336  0.1497 PPM  ( BlK :   -0.067)
              201.47  0.0000  193.17  8.2985  0.1419 PPM  ( BlK :   -0.067)
              195.89  0.0000  192.83  3.0600 0.06517 PPM *  ( BlK :   -0.067)
              196.49  0.0000  194.09  2.4009 0.05551 PPM  ( BlK :   -0.067)
             Total number of measurements : 4
             Nb of meas.  with peak found : 3
----- 11:32:23  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample 5/12 4B D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s*  0.1157/   45%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124209nm  #Steps =  125.87
easurements for PTN T-203564-                    1
s    193.699  412.43  0.0000  196.65  215.79   3.181 PPM  ( BlK :   -0.067)
              415.12  0.0000  198.46  216.66   3.194 PPM  ( BlK :   -0.067)
              417.92  0.0000  197.02  220.90   3.256 PPM  ( BlK :   -0.067)
----- 11:36:40  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample PTN T-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s     3.210/  1.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124071nm  #Steps =  125.73
easurements for PTN D-203564-                    1
s    193.699  198.94  0.0000  192.49  6.4468  0.1148 PPM  ( BlK :   -0.067)
              200.37  0.0000  192.71  7.6613  0.1326 PPM  ( BlK :   -0.067)
              199.89  0.0000  193.78  6.1115  0.1099 PPM  ( BlK :   -0.067)
----- 11:40:46  5/12/93 -----    Method:  D:\USAS WITHOUT RATIO
ample PTN D-203564-                  1 #MEAS.= 3
L      CONC/ sigma
s   0.1191/   10%
```

easurements for RC T-203564- 1

s	193.699	234.10	0.0000	198.56	35.543	0.5410 PPM	(BlK :	-0.067)
		234.93	0.0000	199.94	34.987	0.5328 PPM	(BlK :	-0.067)
		237.92	0.0000	194.80	43.121	0.6520 PPM	(BlK :	-0.067)

---- 11:44:51 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample RC T-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.5753/ 12%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123129nm #Steps = 124.78

easurements for CTL-203564- 1

s	193.699	226.59	0.0000	155.88	70.713	1.056 PPM	(BlK :	-0.067)
		225.37	0.0000	156.50	68.866	1.029 PPM	(BlK :	-0.067)
		225.57	0.0000	158.04	67.534	1.010 PPM	(BlK :	-0.067)

---- 11:48:56 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-203564- 1 #MEAS.= 3

CONC/ sigma

s 1.032/ 2.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124387nm #Steps = 126.05

easurements for RC D-203564- 1

s	193.699	198.60	0.0000	194.68	3.9155	0.07770 PPM	(BlK :	-0.067)
		199.47	0.0000	195.88	3.5857	0.07287 PPM	(BlK :	-0.067)
		197.01	0.0000	193.08	3.9342	0.07797 PPM	(BlK :	-0.067)

---- 11:53:01 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample RC D-203564- 1 #MEAS.= 3

CONC/ sigma

.07618/ 3.8%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124401nm #Steps = 126.07

easurements for RC OVER T-203564- 1

s	193.699	210.97	0.0000	192.66	18.307	0.2885 PPM	(BlK :	-0.067)
		214.97	0.0000	193.83	21.139	0.3300 PPM	(BlK :	-0.067)
		209.16	0.0000	192.85	16.307	0.2592 PPM	(BlK :	-0.067)

---- 11:57:06 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample RC OVER T-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.2926/ 12%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123335nm #Steps = 124.99

easurements for RC OVER D-203564- 1

s	193.699	210.50	0.0000	193.46	17.040	0.2699 PPM	(BlK :	-0.067)
		214.28	0.0000	195.53	18.747	0.2950 PPM	(BlK :	-0.067)
		212.99	0.0000	194.71	18.272	0.2880 PPM	(BlK :	-0.067)

---- 12:01:11 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample RC OVER D-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.2843/ 4.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124400nm #Steps = 126.07

easurements for BF GRAN T-203564- 1

s	193.699	212.10	0.0000	192.05	20.058	0.3142 PPM	(BlK :	-0.067)
		213.04	0.0000	193.12	19.925	0.3122 PPM	(BlK :	-0.067)
		209.53	0.0000	192.22	17.313	0.2739 PPM	(BlK :	-0.067)

---- 12:05:16 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

[redacted] 1 #MEAS.= 3

CONC/ sigma

0.3001/ 7.6%

193.031nm (calc: 193.041739nm) Offset = 0.124047nm #Steps = 125.71

asurements for BF GRAN D-203564- 1

193.699	188.48	0.0000	187.12	1.3600	0.04027 PPM	(Blk : -0.067)
	189.63	0.0000	186.45	3.1728	0.06682 PPM	(Blk : -0.067)
	189.14	0.0000	187.02	2.1220	0.05143 PPM	(Blk : -0.067)

--- 12:09:21 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple BF GRAN D-203564- 1 #MEAS.= 3

CONC/ sigma

0.05284/ 25%

f. 193.031nm (calc: 193.041739nm) Offset = 0.122770nm #Steps = 124.42

asurements for CTL-203564- 1

193.699	229.00	0.0000	157.51	71.496	1.001 PPM
	229.65	0.0000	156.51	73.136	1.025 PPM
	221.36	0.0000	157.34	64.015	0.8915 PPM

--- 12:13:26 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple CTL-203564- 1 #MEAS.= 3

CONC/ sigma

0.9726/ 7.3%

f. 193.031nm (calc: 193.041739nm) Offset = 0.123118nm #Steps = 124.77

rements for AP EFF T-203564- 1

193.699	253.26	0.0000	237.97	15.264	0.2439 PPM	(Blk : -0.067)
	254.72	0.0000	240.46	14.257	0.2292 PPM	(Blk : -0.067)
	252.56	0.0000	240.37	12.183	0.1988 PPM	(Blk : -0.067)

--- 12:17:30 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple AP EFF T-203564- 1 #MEAS.= 3

CONC/ sigma

0.2240/ 10%

f. 193.031nm (calc: 193.041739nm) Offset = 0.123855nm #Steps = 125.52

asurements for AP EFF D-203564- 1

193.699	206.36	0.0000	206.41	-0.04594	0.01967 PPM **	(Blk : -0.067)
	208.12	0.0000	206.61	2.5037	0.05702 PPM	(Blk : -0.067)
	214.52	0.0000	207.90	6.6153	0.1172 PPM	(Blk : -0.067)

--- 12:21:35 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple AP EFF D-203564- 1 #MEAS.= 3

CONC/ sigma

0.06465/ 76%

f. 193.031nm (calc: 193.041739nm) Offset = 0.123126nm #Steps = 124.78

asurements for SVG 1 T-203564- 1

193.699	214.15	0.0000	193.78	20.372	0.3188 PPM	(Blk : -0.067)
	211.03	0.0000	190.12	20.906	0.3266 PPM	(Blk : -0.067)
	208.12	0.0000	190.31	17.810	0.2812 PPM	(Blk : -0.067)

--- 12:25:40 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG 1 T-203564- 1 #MEAS.= 3

CONC/ sigma

0.3089/ 7.9%

easurements for SVG 1 DD-203564- 1

s	193.699	208.08	0.0000	191.80	16.276	0.2508 PPM	(B1K :	-0.067)
		209.45	0.0000	190.45	18.972	0.2982 PPM	(B1K :	-0.067)
		209.74	0.0000	191.63	18.106	0.2856 PPM	(B1K :	-0.067)

----- 12:29:45 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

e SVG 1 DD-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.2809/ 7.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.122094nm #Steps = 123.73

easurements for SVG2 T-203564- 1

s	193.699	206.28	0.0000	190.92	15.356	0.2453 PPM	(B1K :	-0.067)
		212.10	0.0000	189.00	23.099	0.3587 PPM	(B1K :	-0.067)
		207.64	0.0000	190.06	17.577	0.2778 PPM	(B1K :	-0.067)

----- 12:33:50 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG2 T-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.2939/ 20%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.122738nm #Steps = 124.38

easurements for CTL-203564- 1

s	193.699	220.55	0.0000	155.86	64.692	0.9015 PPM
		220.22	0.0000	154.45	65.766	0.9172 PPM
		218.49	0.0000	154.45	64.042	0.8919 PPM

----- 12:37:55 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-203564- 1 #MEAS.= 3

CONC/ sigma

s 0.9035/ 1.4%

f. 193.031nm (calc: 193.041739nm) Offset = 0.123304nm #Steps = 124.96

asurements for SVG2 D-203564- 1

	193.699	205.65	0.0000	187.86	17.788	0.2809 PPM	(B1K :	-0.067)
		211.41	0.0000	188.49	22.916	0.3560 PPM	(B1K :	-0.067)
		209.68	0.0000	186.67	23.002	0.3573 PPM	(B1K :	-0.067)

--- 12:42:00 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

mple SVG2 D-203564- 1 #MEAS.= 3

CONC/ sigma

0.3314/ 13%

f. 193.031nm (calc: 193.041739nm) Offset = 0.123273nm #Steps = 124.93

asurements for SVG3 T-203564- 1

	193.699	207.54	0.0000	189.10	18.440	0.2905 PPM	(B1K :	-0.067)
		209.99	0.0000	186.95	23.038	0.3578 PPM	(B1K :	-0.067)
		209.75	0.0000	189.03	20.723	0.3239 PPM	(B1K :	-0.067)

--- 12:46:05 5/12/93 ----- Method: D:\USAS WITHOUT RATIO

ple SVG3 T-203564- 1 #MEAS.= 3

CONC/ sigma

.3241/ 10%

f. 193.031nm (calc: 193.041739nm) Offset = 0.122727nm #Steps = 124.37

asurements for SVG3 D-203564- 1

	193.699	208.29	0.0000	189.66	18.630	0.2267 PPM
		[illegible]	0.0000	187.43	24.195	0.3083 PPM

WITHOUT RATIO

1 #MEAS.= 3

CONC/ sigma

0.2532/ 19%

193.031nm (calc: 193.041739nm) Offset = 0.122654nm #Steps = 124.30

rements for CTL-203564- 1

193.699	217.11	0.0000	153.65	63.456	0.6834 PPM
	222.93	0.0000	156.37	67.558	0.9434 PPM
	221.17	0.0000	154.54	66.630	0.9299 PPM

---- 12:54:14 5/12/93 ------ Method: D:\USAS WITHOUT RATIO

mple CTL-203564- 1 #MEAS.= 3

CONC/ sigma

0.9189/ 3.4%

s 1774.5/ 2.0%

tensities for Recalibration:

	Wave	LOW	HI
s	193.699	STDLOW: 148.2138	STDHIGH: 1774.4848

egression Results :

Wave	Intercept	Slope	2nd Order
193.699	-0.182274	0.00122981	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699	STDLOW	148.21	0.0000	0.0000	0.0
	STDHIGH	1774.5	2.0000	2.0000	0.0

inal Regression Results for Method : USAS

l Opt.	Wave	Intercept	Slope	2nd Order
s	193.699	-0.182274	0.00122981	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126547nm #Steps = 128.24

easurements for 1 AS-202617- 1

s 193.699	217.16	0.0000	0.0000	217.16	0.08479 PPM
	217.78	0.0000	0.0000	217.78	0.08555 PPM
	214.80	0.0000	0.0000	214.80	0.08189 PPM

---- 12:16:54 5/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample 1 AS-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.08408/ 2.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126065nm #Steps = 127.76

easurements for 1 AS-202617- 1

s 193.699	953.48	0.0000	0.0000	953.48	0.9903 PPM
	950.66	0.0000	0.0000	950.66	0.9869 PPM
	962.08	0.0000	0.0000	962.08	1.001 PPM

---- 12:20:43 5/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample 1 AS-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.9927/ 0.74%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126327nm #Steps = 128.02

easurements for BLK-202617- 1

s 193.699	144.70	0.0000	0.0000	144.70	-0.00432 PPM
	140.81	0.0000	0.0000	140.81	-0.00911 PPM
	139.20	0.0000	0.0000	139.20	-0.01108 PPM

---- 12:27:52 5/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample BLK-202617- 1 #MEAS.= 3

L CONC/ sigma

s -0.00817/ 43%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126821nm #Steps = 128.52

easurements for SVG1 T-203562- 1

s 193.699	864.11	0.0000	0.0000	864.11	0.8886 PPM	(BLK : -0.008)
	663.41	0.0000	0.0000	663.41	0.6418 PPM	(BLK : -0.008)
	764.16	0.0000	0.0000	764.16	0.7657 PPM	(BLK : -0.008)

12:31:47 5/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample SVG1 T-203562- 1 #MEAS.= 3

L CONC/ sigma

s 0.7653/ 16%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.126770nm #Steps = 128.47

```
easurements for SVG1 D-203562-                    1
s    193.699  650.58  0.0000  0.0000  650.58  0.6260 PPM  ( BlK :   -0.008)
              677.04  0.0000  0.0000  677.04  0.6585 PPM  ( BlK :   -0.008)
              664.30  0.0000  0.0000  664.30  0.6429 PPM  ( BlK :   -0.008)
---- 12:35:42  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample SVG1 D-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    0.6425/  2.5%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126858nm  #Steps =  128.56
easurements for SVG2 T-203562-                    1
s    193.699  646.56  0.0000  0.0000  646.56  0.6210 PPM  ( BlK :   -0.008)
              647.36  0.0000  0.0000  647.36  0.6220 PPM  ( BlK :   -0.008)
              647.64  0.0000  0.0000  647.64  0.6224 PPM  ( BlK :   -0.008)
---- 12:39:37  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample SVG2 T-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    0.6218/ 0.11%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126958nm  #Steps =  128.66
easurements for SVG2 D-203562-                    1
s    193.699  620.21  0.0000  0.0000  620.21  0.5886 PPM  ( BlK :   -0.008)
              633.97  0.0000  0.0000  633.97  0.6056 PPM  ( BlK :   -0.008)
              628.30  0.0000  0.0000  628.30  0.5986 PPM  ( BlK :   -0.008)
---- 12:43:32  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample SVG2 D-203562-                1 #MEAS.= 3
L     CONC/ sigma
    0.5976/  1.4%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127216nm  #Steps =  128.92
easurements for CTL-203562-                       1
s    193.699  998.00  0.0000  0.0000  998.00  1.053 PPM  ( BlK :   -0.008)
              994.34  0.0000  0.0000  994.34  1.049 PPM  ( BlK :   -0.008)
              1029.8  0.0000  0.0000  1029.8  1.092 PPM  ( BlK :   -0.008)
---- 12:47:27  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample CTL-203562-                 1 #MEAS.= 3
L     CONC/ sigma
s     1.065/  2.3%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127515nm  #Steps =  129.23
easurements for SVG3 T-203562-                    1
s    193.699  682.43  0.0000  0.0000  682.43  0.6652 PPM  ( BlK :   -0.008)
              671.22  0.0000  0.0000  671.22  0.6514 PPM  ( BlK :   -0.008)
              677.96  0.0000  0.0000  677.96  0.6597 PPM  ( BlK :   -0.008)
---- 12:51:22  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample SVG3 T-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    0.6587/  1.1%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126495nm  #Steps =  128.19
easurements for SVG3 D-203562-                    1
s    193.699  690.45  0.0000  0.0000  690.45  0.6750 PPM  ( BlK :   -0.008)
              692.94  0.0000  0.0000  692.94  0.6781 PPM  ( BlK :   -0.008)
              706.55  0.0000  0.0000  706.55  0.6948 PPM  ( BlK :   -0.008)
---- 12:55:17  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
```

```
EL      CONC/ sigma
As    0.6826/  1.6%

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127161nm  #Steps =  128.87
urements for 4B T-203562-                1
As    193.699  1482.4  0.0000  0.0000  1482.4   1.649 PPM  ( BlK :   -0.008)
               1561.0  0.0000  0.0000  1561.0   1.746 PPM  ( BlK :   -0.008)
               1537.2  0.0000  0.0000  1537.2   1.716 PPM  ( BlK :   -0.008)
----- 12:59:12  5/18/93 -----    Method:  D:\USAS WITHOUT RATIO
Sample 4B T-203562-                1 #MEAS.= 3
L      CONC/ sigma
s    1.704/  2.9%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127765nm  #Steps =  129.48
easurements for 4B D-203562-                1
s    193.699  378.05  0.0000  0.0000  378.05  0.2908 PPM  ( BlK :   -0.008)
              376.77  0.0000  0.0000  376.77  0.2893 PPM  ( BlK :   -0.008)
              371.00  0.0000  0.0000  371.00  0.2821 PPM  ( BlK :   -0.008)
---- 13:03:07  5/18/93 -----    Method:  D:\USAS WITHOUT RATIO
ample 4B D-203562-                1 #MEAS.= 3
L      CONC/ sigma
s    0.2874/  1.6%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126815nm  #Steps =  128.52
easurements for CTL-203562-                1
193.699  1026.9  0.0000  0.0000  1026.9   1.081 PPM
         980.13  0.0000  0.0000  980.13   1.023 PPM
         1003.7  0.0000  0.0000  1003.7   1.052 PPM
---- 13:07:02  5/18/93 -----    Method:  D:\USAS WITHOUT RATIO
ample CTL-203562-                1 #MEAS.= 3
      CONC/ sigma
    1.052/  2.7%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.127333nm  #Steps =  129.04
easurements for RC T-203562-                1
    193.699  861.04  0.0000  0.0000  861.04  0.8848 PPM  ( BlK :   -0.008)
             836.54  0.0000  0.0000  836.54  0.8547 PPM  ( BlK :   -0.008)
             881.90  0.0000  0.0000  881.90  0.9105 PPM  ( BlK :   -0.008)
---- 13:09:36  5/18/93 -----    Method:  D:\USAS WITHOUT RATIO
mple RC T-203562-                1 #MEAS.= 3
      CONC/ sigma
    0.8833/  3.2%

f. 193.031nm (calc: 193.041739nm)  Offset =  0.128210nm  #Steps =  129.93
asurements for RC D-203562-                1
    193.699  713.54  0.0000  0.0000  713.54  0.7034 PPM  ( BlK :   -0.008)
             713.42  0.0000  0.0000  713.42  0.7033 PPM  ( BlK :   -0.008)
             704.34  0.0000  0.0000  704.34  0.6921 PPM  ( BlK :   -0.008)
--- 13:11:33  5/18/93 -----    Method:  D:\USAS WITHOUT RATIO
mple RC D-203562-                1 #MEAS.= 3
      CONC/ sigma
    0.6996/ 0.93%
```

```
[illegible] 193.031nm (calc: 193.041739nm)  Offset =  0.127582nm  #Steps =  [illegible]
Measurements for PONTOON T-203562-                1
As   193.699  610.43  0.0000  0.0000  610.43  0.5766 PPM  ( BlK :   -0.008)
              656.38  0.0000  0.0000  656.38  0.6331 PPM  ( BlK :   -0.008)
              627.83  0.0000  0.0000  627.83  0.5980 PPM  ( BlK :   -0.008)
----- 13:13:36  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
S[illegible]le PONTOON T-203562-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.6026/  4.7%

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126219nm  #Steps =  127.91
Measurements for PTN D-203562-                1
As   193.699  557.34  0.0000  0.0000  557.34  0.5113 PPM  ( BlK :   -0.008)
              570.14  0.0000  0.0000  570.14  0.5271 PPM  ( BlK :   -0.008)
              572.25  0.0000  0.0000  572.25  0.5297 PPM  ( BlK :   -0.008)
----- 13:15:52  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample PTN D-203562-                1 #MEAS.= 3
EL      CONC/ sigma
As    0.5227/  1.9%

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126682nm  #Steps =  128.38
Measurements for CTL-203562-                1
As   193.699  1028.7  0.0000  0.0000  1028.7   1.083 PPM
              1024.0  0.0000  0.0000  1024.0   1.077 PPM
              1021.3  0.0000  0.0000  1021.3   1.074 PPM
---- 13:18:02  5/18/93 -----   Method:  D:\USAS WITHOUT RATIO
ample CTL-203562-                1 #MEAS.= 3
[illegible]   CONC/ sigma
s     1.078/ 0.43%

ero order has been found at step number :      82482.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126607nm  #Steps =  128.30
s : 193.699nm (calc: 193.699001nm)  Offset =  0.014854nm  #Steps =   15.06
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123694nm  #Steps =  125.35
esults for STDLOW
s    193.699  131.64  0.0000  0.0000  131.64
              130.31  0.0000  0.0000  130.31
              132.37  0.0000  0.0000  132.37
---- 7:34:52  5/19/93 -----
esults for STDLOW #MEAS.=3 (R)
L  SIGNAL/sigma
s    131.44/ 0.79%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124636nm  #Steps =  126.31
esults for STDHIGH
s    193.699  1592.7  0.0000  0.0000  1592.7
              1598.2  0.0000  0.0000  1598.2
              1614.4  0.0000  0.0000  1614.4
---- 7:38:46  5/19/93 -----
[illegible]lts for STDHIGH #MEAS.=3 (R)
[illegible] SIGNAL/sigma
s    1601.8/ 0.71%

ntensities for Recalibration:
El      Wave          LOW                    HI
s     193.699     STDLOW: 131.4389     STDHIGH: 1601.7514
```

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

18-MAY-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD	pH
5/17 SVG 1	.77	.64			
5/17 SVG 2	.62	.60			
5/17 SVG 3	.66	.68			
5/17 FOREBAY	1.70	.29			
5/17 R/C	.88	.70			
PONTOON 5/17	.60	.52			

```
ression Results
l  Wave          Intercept          Slope          2nd Order
s 193.699        -0.178790        0.00136026        0.00000

              Standard  Intensity  Concentration  Calc. Conc.  % Error
s  193.699
              STDLOW      131.44       0.0000        0.0000       0.0
              STDHIGH     1601.8       2.0000        2.0000       0.0

inal Regression Results for Method : USAS
l Opt.  Wave          Intercept          Slope          2nd Order
s     193.699        -0.178790        0.00136026        0.00000
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124126nm  #Steps =  125.79
easurements for .1 AS-202617-                  1
s   193.699  194.65  0.0000  0.0000  194.65 0.08598 PPM
             195.32  0.0000  0.0000  195.32 0.08690 PPM
             195.58  0.0000  0.0000  195.58 0.08725 PPM
----  7:50:54  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample .1 AS-202617-                1 #MEAS.= 3
L     CONC/ sigma
s  0.08671/ 0.75%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125464nm  #Steps =  127.15
easurements for 1 AS-202617-                  1
s   193.699  882.26  0.0000  0.0000  882.26   1.021 PPM
             864.88  0.0000  0.0000  864.88  0.9977 PPM
             868.93  0.0000  0.0000  868.93   1.003 PPM
----  8:03:45  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample 1 AS-202617-                1 #MEAS.= 3
L     CONC/ sigma
s    1.007/  1.2%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125791nm  #Steps =  127.48
easurements for BLK-202617-                  1
s   193.699  127.39  0.0000  0.0000  127.39-0.00551 PPM
             125.15  0.0000  0.0000  125.15-0.00856 PPM
             125.85  0.0000  0.0000  125.85-0.00760 PPM
----  8:11:45  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample BLK-202617-                1 #MEAS.= 3
L     CONC/ sigma
s -0.00722/   22%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125227nm  #Steps =  126.91
easurements for PONTN 519 T-203562-                  1
s   193.699  1012.9  0.0000  0.0000  1012.9   1.206 PPM  ( BlK :   -0.007)
             965.81  0.0000  0.0000  965.81   1.142 PPM  ( BlK :   -0.007)
             1026.0  0.0000  0.0000  1026.0   1.224 PPM  ( BlK :   -0.007)
----  8:15:40  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample PONTN 519 T-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    1.191/  3.6%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125329nm  #Steps =  127.01
easurements for PONTN 519 D-203562-                  1
s   193.699  641.75  0.0000  0.0000  641.75  0.7014 PPM  ( BlK :   -0.007)
             654.09  0.0000  0.0000  654.09  0.7182 PPM  ( BlK :   -0.007)
             663.71  0.0000  0.0000  663.71  0.7312 PPM  ( BlK :   -0.007)
----  8:19:35  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
```

```
s    0.7159/   2.1%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125327nm  #Steps =  127.01
easurements for 4B 519 T-203562-                1
s    193.699  815.04  0.0000  0.0000  815.04  0.9371 PPM  ( BlK :   -0.007)
              835.22  0.0000  0.0000  835.22  0.9645 PPM  ( BlK :   -0.007)
              806.92  0.0000  0.0000  806.92  0.9261 PPM  ( BlK :   -0.007)
----  8:23:30  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample 4B 519 T-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    0.9426/   2.1%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125626nm  #Steps =  127.31
easurements for 4B 519 D-203562-                1
s    193.699  390.88  0.0000  0.0000  390.88  0.3601 PPM  ( BlK :   -0.007)
              392.10  0.0000  0.0000  392.10  0.3618 PPM  ( BlK :   -0.007)
              398.76  0.0000  0.0000  398.76  0.3708 PPM  ( BlK :   -0.007)
----  8:27:25  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
ample 4B 519 D-203562-                1 #MEAS.= 3
L     CONC/ sigma
s    0.3643/   1.6%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125327nm  #Steps =  127.01
easurements for CTL-203562-                1
s    193.699  881.56  0.0000  0.0000  881.56  1.028 PPM  ( BlK :   -0.007)
              899.00  0.0000  0.0000  899.00  1.051 PPM  ( BlK :   -0.007)
              874.24  0.0000  0.0000  874.24  1.018 PPM  ( BlK :   -0.007)
      8:31:20  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
mple CTL-203562-                1 #MEAS.= 3
     CONC/ sigma
    1.032/   1.7%

f. 193.031nm (calc: 193.041739nm)  Offset =  0.126651nm  #Steps =  128.35
asurements for RC 519 T-203562-                1
   193.699  608.06  0.0000  0.0000  608.06  0.6556 PPM  ( BlK :   -0.007)
            582.04  0.0000  0.0000  582.04  0.6202 PPM  ( BlK :   -0.007)
            564.04  0.0000  0.0000  564.04  0.5957 PPM  ( BlK :   -0.007)
---  8:35:15  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
mple RC 519 T-203562-                1 #MEAS.= 3
     CONC/ sigma
   0.6238/   4.8%

f. 193.031nm (calc: 193.041739nm)  Offset =  0.126228nm  #Steps =  127.92
asurements for RC 5/19 D-203562-                1
   193.699  569.85  0.0000  0.0000  569.85  0.6036 PPM  ( BlK :   -0.007)
            558.19  0.0000  0.0000  558.19  0.5877 PPM  ( BlK :   -0.007)
            575.38  0.0000  0.0000  575.38  0.6111 PPM  ( BlK :   -0.007)
      8:39:10  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
    RC 5/19 D-203562-                1 #MEAS.= 3
     CONC/ sigma
   0.6008/   2.0%

   193.031nm (calc: 193.041739nm)  Offset =  0.126401nm  #Steps =  128.10
```

```
As    193.699   3967.5  0.0000  0.0000  3967.5   5.225 PPM  ( BIK :   -0.007)
                3983.0  0.0000  0.0000  3983.0   5.246 PPM  ( BIK :   -0.007)
                3976.3  0.0000  0.0000  3976.3   5.237 PPM  ( BIK :   -0.007)
----- 8:43:05  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample BFGRN 518 -203562-                1 #MEAS.= 3
EL     CONC/ sigma
As     5.236/ 0.20%

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.127030nm  #Steps =  128.73
Measurements for BFGRN 518 D-203562-                1
As    193.699   3479.3  0.0000  0.0000  3479.3   4.561 PPM  ( BIK :   -0.007)
                3787.3  0.0000  0.0000  3787.3   4.980 PPM  ( BIK :   -0.007)
                3631.7  0.0000  0.0000  3631.7   4.768 PPM  ( BIK :   -0.007)
----- 8:47:00  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample BFGRN 518 D-203562-                1 #MEAS.= 3
EL     CONC/ sigma
As     4.770/  4.4%

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.126778nm  #Steps =  128.48
Measurements for CTL-203562-                1
As    193.699   871.60  0.0000  0.0000  871.60   1.014 PPM  ( BIK :   -0.007)
                878.16  0.0000  0.0000  878.16   1.023 PPM  ( BIK :   -0.007)
                886.72  0.0000  0.0000  886.72   1.035 PPM  ( BIK :   -0.007)
----- 8:50:55  5/19/93 -----   Method:  D:\USAS WITHOUT RATIO
Sample CTL-203562-                1 #MEAS.= 3
EL     CONC/ sigma
As     1.024/  1.0%
```

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

19-MAY-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD	pH
5/19 PONTOON	1.19	.72			
5/19 FOREBAY	.94	.36			
5/19 RC	.62	.60			
5/18 BF GRAN.	5.24	4.77			

3.031nm (calc: 193.041739nm) Offset = 0.124947nm #Steps = 126.62
3.699nm (calc: 193.699001nm) Offset = 0.012683nm #Steps = 12.65

93.031nm (calc: 193.041739nm) Offset = 0.125643nm #Steps = 127.33

s for STDLOW

.699 146.09 0.0000 0.0000 146.09
142.14 0.0000 0.0000 142.14
143.33 0.0000 0.0000 143.33

6:13:03 5/21/93 -----

its for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

143.85/ 1.4%

. 193.031nm (calc: 193.041739nm) Offset = 0.125083nm #Steps = 126.76

sults for STDHIGH

193.699 914.51 0.0000 0.0000 914.51
936.95 0.0000 0.0000 936.95
950.20 0.0000 0.0000 950.20

---- 6:16:10 5/21/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

933.89/ 1.9%

tensities for Recalibration:
Wave LOW STDLOW: 143.8540 HI STDHIGH: 933.8888
193.699

egression Results :
Intercept Slope 2nd Order
-0.364171 0.00253153 0.00000

99

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699	STDLOW	143.85	0.0000	0.0000	0.0
	STDHIGH	933.89	2.0000	2.0000	0.0

Regression Results for Method : USAS

Opt.	Wave	Intercept	Slope	2nd Order
	193.699	-0.364171	0.00253153	0.00000

f. 193.031nm (calc: 193.041739nm) Offset = 0.125738nm #Steps = 127.42

easurements for NBS-202617- 1

193.699 516.56 0.0000 0.0000 516.56 0.9435 PPM
512.24 0.0000 0.0000 512.24 0.9326 PPM
514.95 0.0000 0.0000 514.95 0.9394 PPM

---- 6:22:19 5/21/93 ----- Method: D:\USAS WITHOUT RATIO

mple NBS-202617- 1 #MEAS.= 3

CONC/ sigma

0.9385/ 0.59%

f. 193.031nm (calc: 193.041739nm) Offset = 0.124847nm #Steps = 126.52

f. 193.031nm (calc: 193.041739nm) Offset = 0.124747nm #Steps = 126.42

esults for STDLOW

193.699 325.51 0.0000 129.43 196.08
323.60 0.0000 128.99 194.61
309.23 0.0000 129.45 179.78

---- 6:32:54 5/21/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124226nm #Steps = 125.89

esults for STDHIGH

s	193.699	2199.2	0.0000	144.21	2055.0
		2213.0	0.0000	145.10	2067.9
		2258.3	0.0000	147.38	2110.9

-- :36:58 5/21/93 -----

es for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 2077.9/ 1.4%

ntensities for Recalibration:

El	Wave	LOW	HI
s	193.699	STDLOW: 190.1560	STDHIGH: 2077.9422

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.201459	0.00105944	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	190.16	0.0000	0.0000	0.0
	STDHIGH	2077.9	2.0000	2.0000	0.0

inal Regression Results for Method : USAS

l Opt.	Wave	Intercept	Slope	2nd Order
s	193.699	-0.201459	0.00105944	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123982nm #Steps = 125.64

easurements for NBS-202617- 1

s	193.699	330.35	0.0000	203.21	127.14	-0.06676 PPM
		341.55	0.0000	206.10	135.45	-0.05795 PPM
		331.90	0.0000	202.87	129.04	-0.06475 PPM

---- 6:42:29 5/21/93 ----- Method: D:\USAS WITHOUT RATIO

a NBS-202617- 1 #MEAS.= 3

CONC/ sigma

s -0.06315/ 7.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123310nm #Steps = 124.96

easurements for 1 PPM AS-202617- 1

	193.699	1199.4	0.0000	137.27	1062.1	0.9238 PPM
		1245.9	0.0000	136.83	1109.1	0.9736 PPM
		1208.4	0.0000	133.23	1075.2	0.9376 PPM

---- 6:46:25 5/21/93 ----- Method: D:\USAS WITHOUT RATIO

mple 1 PPM AS-202617- 1 #MEAS.= 3

CONC/ sigma

s 0.9450/ 2.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123409nm #Steps = 125.06

easurements for BLK-202617- 1

s	193.699	191.04	0.0000	127.73	63.307	-0.1344 PPM
		191.81	0.0000	130.06	61.748	-0.1360 PPM
		196.60	0.0000	128.37	68.224	-0.1292 PPM

---- 6:52:59 5/21/93 ----- Method: D:\USAS WITHOUT RATIO

mple BLK-202617- 1 #MEAS.= 3

CONC/ sigma

s -0.1332/ 2.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124765nm #Steps = 126.44

easurements for BF GRN T-202617- 1

193.699 19419 0.0000 526.93 18992 19.95 PPM (RIK) -0.1331

```
---- 6:07:00  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
mple BF GRN T-202617-              1 #MEAS.= 3
     CONC/ sigma
    20.10/ 0.92%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.124505nm  #Steps =  126.17
asurements for BF GRN D-202617-              1
  193.699   14261  0.0000  419.40   13841   14.60 PPM  ( BlK :   -0.133)
            14207  0.0000  415.47   13792   14.54 PPM  ( BlK :   -0.133)
            14178  0.0000  420.20   13758   14.51 PPM  ( BlK :   -0.133)
---- 7:01:06  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
mple BF GRN D-202617-              1 #MEAS.= 3
     CONC/ sigma
    14.55/ 0.31%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.125192nm  #Steps =  126.87
asurements for 4B T-202617-              1
  193.699  1874.6  0.0000  341.65  1532.9   1.556 PPM  ( BlK :   -0.133)
           1812.0  0.0000  343.75  1468.3   1.487 PPM  ( BlK :   -0.133)
           1844.9  0.0000  343.91  1501.0   1.522 PPM  ( BlK :   -0.133)
--- 7:05:13  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
mple 4B T-202617-              1 #MEAS.= 3
     CONC/ sigma
    1.522/  2.3%


 031nm (calc: 193.041739nm)  Offset =  0.125458nm  #Steps =  127.14
asurements for 4B D-202617-              1
  193.699  406.55  0.0000  316.11  90.439 0.02756 PPM  ( BlK :   -0.133)
           406.90  0.0000  313.52  93.382 0.03068 PPM  ( BlK :   -0.133)
           412.11  0.0000  316.22  95.887 0.03333 PPM  ( BlK :   -0.133)
-- 7:09:18  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
ple 4B D-202617-              1 #MEAS.= 3
     CONC/ sigma
  0.03052/  9.5%


 193.031nm (calc: 193.041739nm)  Offset =  0.125731nm  #Steps =  127.42
surements for CRTL-202617-              1
  193.699  1146.3  0.0000  137.74  1008.5   1.000 PPM  ( BlK :   -0.133)
           1093.9  0.0000  136.29  957.60  0.9463 PPM  ( BlK :   -0.133)
           1143.4  0.0000  140.42  1003.0  0.9944 PPM  ( BlK :   -0.133)
-- 7:13:22  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
ple CRTL-202617-              1 #MEAS.= 3
     CONC/ sigma
  0.9803/  3.0%


 193.031nm (calc: 193.041739nm)  Offset =  0.124842nm  #Steps =  126.52
 nts for RCO T-202617-              1
 193.699  701.77  0.0000  300.03  401.74  0.3574 PPM  ( BlK :   -0.133)
           718.95  0.0000  300.55  418.40  0.3750 PPM  ( BlK :   -0.133)
           718.52  0.0000  301.51  417.02  0.3735 PPM  ( BlK :   -0.133)
-- 7:17:27  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO
ple RCO T-202617-              1 #MEAS.= 3
     CONC/ sigma
```

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124830nm  #Steps =  126.50
easurements for RCO D-202617-                1

   193.699  675.35  0.0000  295.20  380.15  0.3345 PPM  ( BlK :   -0.133)
            686.43  0.0000  294.16  392.27  0.3473 PPM  ( BlK :   -0.133)
            686.04  0.0000  299.89  386.16  0.3409 PPM  ( BlK :   -0.133)

--- 7:21:31  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO

ample RCO D-202617-                1 #MEAS.= 3

     CONC/ sigma

   0.3409/  1.9%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124265nm  #Steps =  125.93
easurements for RCO T 12-202617-                1

   193.699  603.85  0.0000  297.23  306.62  0.2587 PPM  ( BlK :   -0.133)
            634.00  0.0000  303.93  330.07  0.2814 PPM  ( BlK :   -0.133)
            623.19  0.0000  305.94  317.25  0.2679 PPM  ( BlK :   -0.133)

---- 7:25:36  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO

ample RCO T 12-202617-                1 #MEAS.= 3

     CONC/ sigma

   0.2693/  4.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125515nm  #Steps =  127.20
easurements for RCO D 12-202617-                1

   193.699  628.60  0.0000  299.95  328.65  0.2799 PPM  ( BlK :   -0.133)
            621.61  0.0000  304.49  317.12  0.2677 PPM  ( BlK :   -0.133)
            624.86  0.0000  307.77  317.09  0.2677 PPM  ( BlK :   -0.133)

--- 7:29:40  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO

ample RCO D 12-202617-                1 #MEAS.= 3

     CONC/ sigma

   0.2718/  2.6%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123842nm  #Steps =  125.50
easurements for CTL-202617-                1

   193.699  1060.3  0.0000  137.41  922.88  0.9095 PPM  ( BlK :   -0.133)
            1094.6  0.0000  136.67  957.91  0.9466 PPM  ( BlK :   -0.133)
            1141.9  0.0000  137.95  1003.9  0.9954 PPM  ( BlK :   -0.133)

---- 7:32:33  5/21/93 -----   Method:  D:\USAS WITHOUT RATIO

ample CTL-202617-                1 #MEAS.= 3

     CONC/ sigma

   0.9505/  4.5%
```

F1 ICP-SYSTEM

F2 List Methods

F3 Help for Special Commands

F4 List Analytical Results

F5 Delete Files !

F6 Offline Commands

F8 Documentation

Esc Return to DOS

5/24/93

ro order has been found at step number : 82444.0
f. 193.031nm (calc: 193.041739nm) Offset = 0.125675nm #Steps = 127.36

asurements for NBS-202617-

```
            278.30  0.0000  202.88  75.421 0.06996 PPM
            279.53  0.0000  205.57  73.959 0.06812 PPM

----- 9:05:36  5/24/93 ------   Method:  D:\USAS WITHOUT RATIO

ple NBS-202617-                  1 #MEAS.= 3

     CONC/ sigma

s  0.07175/  6.7%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125286nm  #Steps =  126.97

easurements for BLK-202617-                1

s   193.699  143.01  0.0000  127.20  15.805-0.00504 PPM
             143.67  0.0000  127.79  15.885-0.00494 PPM
             145.32  0.0000  127.21  18.116-0.00214 PPM

----- 9:29:12  5/24/93 ------   Method:  D:\USAS WITHOUT RATIO

ample BLK-202617-                1 #MEAS.= 3

L     CONC/ sigma

s -0.00404/   41%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125158nm  #Steps =  126.84

easurements for RCO 5/21-202617-               1

s   193.699  486.43  0.0000  277.96  208.47  0.2414 PPM  ( Blk :   -0.004)
             479.87  0.0000  282.40  197.47  0.2276 PPM  ( Blk :   -0.004)
             472.81  0.0000  282.29  190.52  0.2188 PPM  ( Blk :   -0.004)

----- 9:33:16  5/24/93 ------   Method:  D:\USAS WITHOUT RATIO

ample RCO 5/21-202617-               1 #MEAS.= 3

     CONC/ sigma

s   0.2293/  5.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125297nm  #Steps =  126.98

easurements for RCO D-202617-              1

s   193.699  473.00  0.0000  284.72  188.28  0.2160 PPM  ( Blk :   -0.004)
             474.19  0.0000  285.73  188.46  0.2162 PPM  ( Blk :   -0.004)
             482.94  0.0000  286.55  196.39  0.2262 PPM  ( Blk :   -0.004)

----- 9:37:20  5/24/93 ------   Method:  D:\USAS WITHOUT RATIO

ample RCO D-202617-                  1 #MEAS.= 3

     CONC/ sigma
```

s 0.2195/ 2.7%

193.031nm (calc: 193.041739nm) Offset = 0.125652nm #Steps = 127.34

easurements for 4B T-202617- 1

s	193.699	648.54	0.0000	302.18	346.36	0.4149 PPM	(Blk :	-0.004)
		674.26	0.0000	308.08	366.18	0.4398 PPM	(Blk :	-0.004)
		645.46	0.0000	304.97	340.49	0.4075 PPM	(Blk :	-0.004)

----- 9:41:24 5/24/93 ----- Method: D:\USAS WITHOUT RATIO

ample 4B T-202617- 1 #MEAS.= 3

L CONC/ sigma

s 0.4207/ 4.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124961nm #Steps = 126.64

easurements for 4B D-202617- 1

s	193.699	327.98	0.0000	289.53	38.443	0.02748 PPM	(Blk :	-0.004)
		329.77	0.0000	291.91	37.860	0.02675 PPM	(Blk :	-0.004)
		322.61	0.0000	292.33	30.285	0.01721 PPM	(Blk :	-0.004)

----- 9:45:29 5/24/93 ----- Method: D:\USAS WITHOUT RATIO

ample 4B D-202617- 1 #MEAS.= 3

L CONC/ sigma

= 0.02381/ 24%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125198nm #Steps = 126.88

easurements for CTL-202617- 1

s	193.699	274.29	0.0000	201.89	72.399	0.07020 PPM	(Blk :	-0.004)
		274.20	0.0000	205.40	68.805	0.06568 PPM	(Blk :	-0.004)
		275.89	0.0000	205.98	69.905	0.06706 PPM	(Blk :	-0.004)

----- 9:49:33 5/24/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

L CONC/ sigma

= 0.06765/ 3.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125296nm #Steps = 126.98

```
193.699  495.19  0.0000  283.13  212.06  0.2459 PPM  ( BlK :   -0.004)
         494.90  0.0000  280.11  214.78  0.2493 PPM  ( BlK :   -0.004)
         493.76  0.0000  281.63  212.[illegible]  0.2460 PPM  ( BlK :   -0.004)

------  9:53:38  5/24/93 ------    Method:  D:\USAS WITHOUT RATIO

Sample RCO 7.8 T-202617-                  1 #MEAS.= 3

CL      CONC/ sigma

ns   0.2471/ 0.79%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.125325nm  #Steps =  127.01

Measurements for RCO 7.8 D-202617-                  1

ns   193.699  457.73  0.0000  281.79  175.94  0.2005 PPM  ( BlK :   -0.004)
              470.94  0.0000  282.23  188.71  0.2165 PPM  ( BlK :   -0.004)
              461.84  0.0000  286.93  174.91  0.1992 PPM  ( BlK :   -0.004)

------  9:57:42  5/24/93 ------    Method:  D:\USAS WITHOUT RATIO

Sample RCO 7.8 D-202617-                  1 #MEAS.= 3

CL      CONC/ sigma

ns   0.2054/  4.7%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.124958nm  #Steps =  126.63

Measurements for RCO 6.9 T-202617-                  1

ns   193.699  487.00  0.0000  282.21  204.78  0.2368 PPM  ( BlK :   -0.004)
              486.89  0.0000  285.37  201.52  0.2327 PPM  ( BlK :   -0.004)
              490.02  0.0000  283.98  206.04  0.2383 PPM  ( BlK :   -0.004)

------ 10:01:46  5/24/93 ------    Method:  D:\USAS WITHOUT RATIO

Sample RCO 6.9 T-202617-                  1 #MEAS.= 3

CL      CONC/ sigma

ns   0.2359/  1.2%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.124733nm  #Steps =  126.41

Measurements for RCO 6.9 D-202617-                  1

ns   193.699  459.56  0.0000  284.75  174.81  0.1991 PPM  ( BlK :   -0.004)
              470.26  0.0000  282.17  188.09  0.2158 PPM  ( BlK :   -0.004)
              459.78  0.0000  284.88  174.90  0.1992 PPM  ( BlK :   -0.004)

------ 10:05:50  5/24/93 ------    Method:  D:\USAS WITHOUT RATIO

Sample RCO 6.9 D-202617-                  1 #MEAS.= 3
```

s 0.2047/ 4.7%

e 193.031nm (calc: 193.041739nm) Offset = 0.124353nm #Steps = 126.02

easurements for CTL-202617- 1

s 193.699 276.44 0.0000 204.95 71.489 0.06501 PPM
275.65 0.0000 205.19 70.468 0.06373 PPM
281.28 0.0000 205.76 75.515 0.07008 PPM

----- 10:09:55 5/24/93 ------ Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

CONC/ sigma

s 0.06627/ 5.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125748nm #Steps = 127.43

easurements for RCO 8.9 T-202617- 1

193.699 442.72 0.0000 274.95 167.77 0.1902 PPM (Blk : -0.004)
444.03 0.0000 274.15 169.88 0.1928 PPM (Blk : -0.004)
447.08 0.0000 279.34 167.74 0.1901 PPM (Blk : -0.004)

10:13:59 5/24/93 ----- Method: D:\USAS WITHOUT RATIO

mple RCO 8.9 T-202617- 1 #MEAS.= 3

CONC/ sigma

0.1911/ 0.81%

f. 193.031nm (calc: 193.041739nm) Offset = 0.125049nm #Steps = 126.73

asurements for RCO 8.9 D-202617- 1

193.699 448.26 0.0000 277.89 167.37 0.1897 PPM (Blk : -0.004)
455.80 0.0000 280.02 175.78 0.2003 PPM (Blk : -0.004)
456.19 0.0000 277.43 178.76 0.2040 PPM (Blk : -0.004)

--- 10:18:04 5/24/93 ----- Method: D:\USAS WITHOUT RATIO

ple RCO 8.9 D-202617- 1 #MEAS.= 3

CONC/ sigma

.1980/ 3.8%

193.031nm (calc: 193.041739nm) Offset = 0.124668nm #Steps = 126.34

173.677	1031.9	0.0000	135.38	896.47	1.103 PPM
	1032.0	0.0000	135.87	896.09	1.102 PPM
	1004.7	0.0000	131.81	872.85	1.073 PPM

------ 10:22:09 5/24/93 ------ Method: D:\USAS WITHOUT RATIO

ample CTL-202617- 1 #MEAS.= 3

L CONC/ sigma

s 1.093/ 1.6%

Analytical Method: USAS Without Ratio 194.1455 nm

I S A J O B I N - Y V O N

I C P - S Y S T E M

(c) Version 3.374 (10 nov 89)

Analyze	Auto Search
Calibrate	Auto Attenuate
Select Method	Profile
Method	Graph Profiles
Set Parameters	Diagnostics
Exit	

F8 Help F10 Accept

ISA-JY

ef. 193.031nm (calc: 193.0[illegible]

esults for STDLOW

s 193.699 143.20 0.0000 148.52 -5.3200 *
[illegible] 148.56 0.0000 146.34 1.2358 **
149.34 0.0000 146.19 3.1534
147.67 0.0000 147.79-0.11912 **
Total number of measurements : 4
Nb of meas. with peak found : 3

----- 6:06:46 5/27/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma

s* 1.4233/ 120%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125538nm #Steps = 127.22

esults for STDHIGH

s 193.699 435.57 0.0000 152.17 283.39
440.03 0.0000 152.83 287.20
436.78 0.0000 154.87 281.91

----- 6:11:02 5/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma

s 284.16/ 0.96%

ntensities for Recalibration:

I	Wave	LOW		HI	
s	193.699	STDLOW:	1.4233	STDHIGH:	284.1649

egression Results :

	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0251704	0.0176840	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s	193.699				
	STDLOW	1.4233	0.0000	0.0000	0.0
	STDHIGH	284.16	5.0000	5.0000	0.0

Regression Results for Method : USAS

Opt.	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0251704	0.0176840	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125262nm #Steps = 126.94

easurements for 1 ASS-203562-

```
s   193.699  199.59  0.0000  147.09  52.506  0.9033 PPM
             198.72  0.0000  148.53  50.195  0.8622 PPM
             203.73  0.0000  145.19  58.536   1.010 PPM

----  6:17:36  5/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1 ASS-203562-                1 #MEAS.= 3

_     CONC/ sigma

s   0.9253/  8.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126171nm  #Steps =  127.86

easurements for 5/26 RCO-203562-TOTAL    1

s   193.699  197.62  0.0000  176.03  21.586  0.3566 PPM
             198.93  0.0000  173.28  25.652  0.4285 PPM
             196.89  0.0000  176.08  20.815  0.3429 PPM

----  6:33:31  5/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 5/26 RCO-203562-TOTAL   1 #MEAS.= 3

_     CONC/ sigma

s   0.3760/   12%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.125784nm  #Steps =  127.47

easurements for 5/25 RCO-203562-DISVD    1

s   193.699  198.70  0.0000  177.73  20.964  0.3456 PPM
             200.60  0.0000  177.63  22.970  0.3810 PPM
             200.83  0.0000  178.69  22.133  0.3662 PPM

----  6:37:35  5/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 5/25 RCO-203562-DISVD   1 #MEAS.= 3

_     CONC/ sigma

s   0.3643/  4.9%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124362nm  #Steps =  126.03

easurements for NBS 1623-202617-    1

s   193.699  156.91  0.0000  156.45 0.46667-0.01692 PPM *
             159.20  0.0000  154.11  5.0933 0.06490 PPM *
             162.72  0.0000  155.81  6.9181 0.09717 PPM
             162.40  0.0000  157.72  4.6756 0.05751 PPM
             161.07  0.0000  155.52  5.5487 0.07295 PPM
            Total number of measurements : 5
            Nb of meas.  with peak found : 3
```

```
6:42:03  5/27/93 -----    Method:  D:\USAS WITHOUT RATIO

ample NBS 1623-202617-      1 #MEAS.= 3

      CONC/ sigma

s[illegible].07588/    26%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124362nm  #Steps =  126.03

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126003nm  #Steps =  127.69
s : 193.699nm (calc: 193.699001nm)  Offset =  0.012641nm  #Steps =   12.81

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.126082nm  #Steps =  127.77
n : 213.856nm (calc: 214.063273nm)  Offset = -0.185129nm  #Steps = -188.86

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123766nm  #Steps =  125.43
d : 214.438nm (calc: 214.638000nm)  Offset = -0.179457nm  #Steps = -183.11

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123401nm  #Steps =  125.06
o : 220.353nm (calc: 220.546682nm)  Offset = -0.157938nm  #Steps = -161.48

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123078nm  #Steps =  124.73
u : 327.396nm (calc: 327.567682nm)  Offset = -0.090742nm  #Steps =  -97.38

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.124171nm  #Steps =  125.84

esults for STDLOW

   213.856  232.70  0.0000  0.0000  232.70
            255.89  0.0000  0.0000  255.89
            233.08  0.0000  0.0000  233.08
d  214.438  139.47  0.0000  0.0000  139.47 *
            143.27  0.0000  0.0000  143.27
            140.21  0.0000  0.0000  140.21 *
            140.10  0.0000  0.0000  140.10 *
           Total number of measurements : 4
           Nb of meas.  with peak found : 1
           Calculation around 0
o  220.353  254.57  256.00  0.0000 -1.4267 *
            255.19  252.31  0.0000  2.8800 *
            257.11  255.17  0.0000  1.9467 *
           Calculation around 0
   327.396  1320.1  0.0000  0.0000  1320.1
            1305.7  0.0000  0.0000  1305.7
            1311.8  0.0000  0.0000  1311.8

---- 9:32:50  5/27/93 -----

esults for STDLOW #MEAS.=3 (R)

   SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma

n  240.56/  5.5% Cd*  139.93/ 0.28% Pb*  1.1333/  200% Cu   1312.57 0.55%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.123753nm  #Steps =  125.41

esults for STDHIGH
```

	216320	0.0000	0.0000	216320
214.438	22329	0.0000	0.0000	22329
	23527	0.0000	0.0000	23527
	22796	0.0000	0.0000	22796
220.353	10561	333.55	0.0000	10227
	10061	328.80	0.0000	9732.3
	10233	332.95	0.0000	9900.0
327.396	170180	0.0000	0.0000	170180
	177160	0.0000	0.0000	177160
	177710	0.0000	0.0000	177710

----- 9:38:29 5/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
209550/ 2.9%	Cd	22884/ 2.6%	Pb	9953.2/ 2.5%	Cu	175020/ 2.4%

tensities for Recalibration:

Wave	LOW	HI
213.856	STDLOW: 240.5564	STDHIGH: 209545.0937
214.438	STDLOW: 139.9289	STDHIGH: 22884.2071
220.353	STDLOW: 1.1333	STDHIGH: 9953.1949
327.396	STDLOW: 1312.5062	STDHIGH: 175020.2971

gression Results :

Wave	Intercept	Slope	2nd Order
[illegible]	-0.00574656	0.0000238886	0.00000
4.438	-0.0153807	0.000109918	0.00000
220.353	-0.00113879	0.00100482	0.00000
327.396	-0.0377791	0.0000287840	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
213.856					
	STDLOW	240.56	0.0000	0.0000	0.0
	STDHIGH	209550	5.0000	5.0000	0.0
214.438					
	STDLOW	139.93	0.0000	0.0000	0.0
	STDHIGH	22884	2.5000	2.5000	0.0
220.353					
	STDLOW	1.1333	0.0000	0.0000	0.0
	STDHIGH	9953.2	10.000	10.000	0.0
327.396					
	STDLOW	1312.5	0.0000	0.0000	0.0
	STDHIGH	175020	5.0000	5.0000	0.0

nal Regression Results for Method : WATER

Opt. Wave	Intercept	Slope	2nd Order
213.856	-0.00574656	0.0000238886	0.00000
214.438	-0.0153807	0.000109918	0.00000
220.353	-0.00113879	0.00100482	0.00000
327.396	-0.0377791	0.0000287840	0.00000

f. 193.031nm (calc: 193.041739nm) Offset = 0.125158nm #Steps = 126.84

asurements for NBS61-202617- 1

213.856 3173.6 0.0000 0.0000 3173.6 0.07007 PPM

		3151.1	0.0000	0.0000	3151.1	0.06953 PPM
	214.438	280.72	0.0000	0.0000	280.72	0.01548 PPM
		281.22	0.0000	0.0000	281.22	0.01553 PPM
		277.91	0.0000	0.0000	277.91	0.01517 PPM
	220.353	339.02	301.82	0.0000	37.200	0.03624 PPM
		335.68	301.16	0.0000	34.523	0.03355 PPM
		342.49	302.55	0.0000	39.946	0.03900 PPM
	327.396	2024.1	0.0000	0.0000	2024.1	0.02048 PPM
		2052.0	0.0000	0.0000	2052.0	0.02128 PPM
		2037.6	0.0000	0.0000	2037.6	0.02087 PPM

----- 10:33:30 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample NB661-202617- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
0.06969/	0.46%	Cd	0.01539/	1.3%	Pb	0.03626/	7.5%	Cu	0.02088/	1.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124765nm #Steps = 126.44

easurements for 5/26 RCO-202617-TOTAL 1

	213.856	3548.1	0.0000	0.0000	3548.1	0.07901 PPM
		3463.6	0.0000	0.0000	3463.6	0.07699 PPM
		3426.1	0.0000	0.0000	3426.1	0.07610 PPM
	214.438	245.05	0.0000	0.0000	245.05	0.01156 PPM
		244.01	0.0000	0.0000	244.01	0.01144 PPM
		245.25	0.0000	0.0000	245.25	0.01158 PPM
	220.353	546.86	366.03	0.0000	180.82	0.1806 PPM
		547.26	369.26	0.0000	178.00	0.1777 PPM
		536.08	366.21	0.0000	169.88	0.1696 PPM
	327.396	1717.5	0.0000	0.0000	1717.5	0.01166 PPM
		1731.7	0.0000	0.0000	1731.7	0.01207 PPM
		1734.0	0.0000	0.0000	1734.0	0.01213 PPM

----- 10:41:19 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample 5/26 RCO-202617-TOTAL 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
0.07737/	1.9%	Cd	0.01152/	0.63%	Pb	0.1759/	3.2%	Cu	0.01195/	2.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124399nm #Steps = 126.07

easurements for 5/26 RCO-202617-DISVD 1

	213.856	528.74	0.0000	0.0000	528.74	0.00688 PPM
		525.87	0.0000	0.0000	525.87	0.00682 PPM
		537.27	0.0000	0.0000	537.27	0.00709 PPM
	214.438	219.96	0.0000	0.0000	219.96	0.00880 PPM
		224.13	0.0000	0.0000	224.13	0.00926 PPM
		216.41	0.0000	0.0000	216.41	0.00841 PPM *
		215.84	0.0000	0.0000	215.84	0.00834 PPM *
		223.12	0.0000	0.0000	223.12	0.00915 PPM

Total number of measurements : 5

Nb of meas. with peak found : 3

220.353 420.19 344 [illegible]

		414.75	370.75	0.0000	44.019	0.04307 PPM
	327.396	1701.6	0.0000	0.0000	1701.6	0.01123 PPM
		1696.2	0.0000	0.0000	1696.2	0.01104 PPM
		1703.1	0.0000	0.0000	1703.1	0.01124 PPM

----- 10:46:51 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample 5/26 RCD-202617-DISVD 1 #MEAS.= 3

	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
1	0.00693/	2.0%	Cd*	0.00907/	2.6%	Pb	0.04682/	12%	Cu	0.01116/	0.93%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124570nm #Steps = 126.24

easurements for NBS-202617- 1

1	213.856	2963.2	0.0000	0.0000	2963.2	0.06504 PPM
		3045.1	0.0000	0.0000	3045.1	0.06700 PPM
		3075.9	0.0000	0.0000	3075.9	0.06773 PPM
3	214.438	267.44	0.0000	0.0000	267.44	0.01402 PPM
		270.46	0.0000	0.0000	270.46	0.01435 PPM
		267.43	0.0000	0.0000	267.43	0.01401 PPM
5	220.353	342.45	300.80	0.0000	41.650	0.04071 PPM
		342.08	298.95	0.0000	43.123	0.04219 PPM
		349.84	298.00	0.0000	51.842	0.05095 PPM
7	327.396	2044.0	0.0000	0.0000	2044.0	0.02106 PPM
		2043.4	0.0000	0.0000	2043.4	0.02104 PPM
		2028.1	0.0000	0.0000	2028.1	0.02060 PPM

----- 10:52:40 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample NBS-202617- 1 #MEAS.= 3

	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
	0.06659/	2.1%	Cd	0.01413/	1.4%	Pb	0.04462/	12%	Cu	0.02090/	1.2%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124514nm #Steps = 126.18

easurements for 5/26 001-202617-TOTAL 1

1	213.856	584.00	0.0000	0.0000	584.00	0.00820 PPM
		584.75	0.0000	0.0000	584.75	0.00822 PPM
		581.27	0.0000	0.0000	581.27	0.00814 PPM
3	214.438	226.28	0.0000	0.0000	226.28	0.00949 PPM
		229.93	0.0000	0.0000	229.93	0.00989 PPM
		227.43	0.0000	0.0000	227.43	0.00962 PPM
5	220.353	411.57	368.12	0.0000	43.453	0.04252 PPM
		419.45	372.47	0.0000	46.973	0.04606 PPM
		417.08	370.52	0.0000	46.564	0.04565 PPM
7	327.396	1625.8	0.0000	0.0000	1625.8	0.00902 PPM
		1605.4	0.0000	0.0000	1605.4	0.00843 PPM
		1611.1	0.0000	0.0000	1611.1	0.00860 PPM

----- 11:02:42 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample 5/26 001-202617-TOTAL 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

0.00819/ 0.54% Cd 0.00967/ 2.1% Pb 0.04474/ 4.3% Cu 0.00865/ 3.5%

193.031nm (calc: 193.041739nm) Offset = 0.124353nm #Steps = 126.05

easurements for 5/27 RCO-202617-TOTAL 1

n	213.856	5407.2	0.0000	0.0000	5407.2	0.1234 PPM
		5505.0	0.0000	0.0000	5505.0	0.1258 PPM
		5611.2	0.0000	0.0000	5611.2	0.1283 PPM
d	214.438	263.43	0.0000	0.0000	263.43	0.01357 PPM
		259.56	0.0000	0.0000	259.56	0.01315 PPM
		259.39	0.0000	0.0000	259.39	0.01313 PPM
b	220.353	633.39	362.03	0.0000	271.35	0.2715 PPM
		639.39	364.48	0.0000	274.91	0.2751 PPM
		637.06	360.06	0.0000	277.00	0.2772 PPM
u	327.396	1869.0	0.0000	0.0000	1869.0	0.01602 PPM
		1854.3	0.0000	0.0000	1854.3	0.01560 PPM
		1857.9	0.0000	0.0000	1857.9	0.01570 PPM

---- 11:10:50 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample 5/27 RCO-202617-TOTAL 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

n 0.1258/ 1.9% Cd 0.01329/ 1.9% Pb 0.2746/ 1.0% Cu 0.01577/ 1.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125476nm #Steps = 127.16

easurements for NBS-202617- 1

n	213.856	2972.3	0.0000	0.0000	2972.3	0.06526 PPM
		3021.8	0.0000	0.0000	3021.8	0.06644 PPM
		3022.2	0.0000	0.0000	3022.2	0.06645 PPM
d	214.438	259.68	0.0000	0.0000	259.68	0.01316 PPM
		265.64	0.0000	0.0000	265.64	0.01382 PPM
		266.75	0.0000	0.0000	266.75	0.01394 PPM
b	220.353	335.69	294.65	0.0000	41.039	0.04010 PPM
		334.96	295.31	0.0000	39.643	0.03870 PPM
		334.85	297.57	0.0000	37.272	0.03631 PPM
u	327.396	2021.1	0.0000	0.0000	2021.1	0.02040 PPM
		2032.0	0.0000	0.0000	2032.0	0.02071 PPM
		2031.6	0.0000	0.0000	2031.6	0.02070 PPM

---- 11:16:22 5/27/93 ------ Method: D:\WATER WITHOUT RATIO

ample NBS-202617- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

0.06605/ 1.0% Cd 0.01364/ 3.1% Pb 0.03837/ 5.0% Cu 0.02060/ 0.86%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.125514nm #Steps = 127.20

: 193.699nm (calc: 193.699001nm) Offset = 0.013796nm #Steps = 13.98

...lts for STDLOW

193.699	157.79	0.0000	117.27	40.321
	155.14	0.0000	117.29	37.840
	162.10	0.0000	118.11	43.996

-11:37:09 5/27/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

s 40.788/ 7.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124325nm #Steps = 125.99

esults for STDHIGH

s 193.699	3944.8	0.0000	201.39	3743.4
	4123.1	0.0000	201.00	3922.1
	4079.3	0.0000	202.11	3877.2

----11:41:13 5/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

3847.6/ 2.4%

tensities for Recalibration:

Wave	LOW	HI
193.699	STDLOW: 40.7877	STDHIGH: 3847.5740

gression Results :

Wave	Intercept	Slope	2nd Order
193.699	-0.0535724	0.00131344	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	40.788	0.0000	0.0000	0.0
	STDHIGH	3847.6	5.0000	5.0000	0.0

... Regression Results for Method: USAS

Cal. Wave	Intercept	Slope	2nd Order
193.699	-0.0535724	0.00131344	0.00000

193.031nm (calc: 193.041739nm) Offset = 0.124409nm #Steps = 126.08

ssurements for NBS 1623-202617- 1

193.699	264.06	0.0000	193.32	70.744	0.03935 PPM
	269.11	0.0000	191.07	78.032	0.04893 PPM
	266.61	0.0000	193.21	71.408	0.04022 PPM

ample NBS 1623-202617- 1 #MEAS.= 3

CONC/ sigma

0.04233/ 12%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124295nm #Steps = 125.96

easurements for 5/25 RCO-203562-TTL 1

s	193.699	643.72	0.0000	274.02	369.70	0.4320 PPM
		660.03	0.0000	281.69	378.34	0.4434 PPM
		679.27	0.0000	279.53	399.75	0.4715 PPM

----- 11:53:20 5/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/25 RCO-203562-TTL 1 #MEAS.= 3

CONC/ sigma

s 0.4489/ 4.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.124111nm #Steps = 125.78

easurements for 5/26 RCO D-202617- 1

s	193.699	661.28	0.0000	280.67	380.61	0.4463 PPM
		658.58	0.0000	282.03	376.54	0.4410 PPM
		658.52	0.0000	282.18	376.34	0.4407 PPM

----- 11:57:24 5/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample 5/26 RCO D-202617- 1 #MEAS.= 3

CONC/ sigma

0.4427/ 0.72%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123755nm #Steps = 125.41

easurements for [illegible] 1

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PPM
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PPM
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible] PPM

[illegible] Method: D:\USAS WITHOUT RATIO

[illegible] RCO-202617- [illegible] #MEAS.= 3

CONC/ sigma

s 0.4048/ 2.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.123613nm #Steps = 178.57

easurements for NBS-202617- 1

s	193.699	167.27	0.0000	163.15	4.0930	-0.04020 PPM
		107.53	0.0000	106.97	2.5276	-0.05012 PPM
		107.97	0.0000	106.24	1.7263	-0.05131 PPM

----- 12:05:32 5/27/93 ------ Method: D:\USAS WITHOUT RATIO

ample NBS-202617- 1 #MEAS.= 3

CONC/ sigma

s -0.04987/ 3.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.119650nm #Steps = 121.25

easurements for NBS 1623-202617- 1

s	193.699	263.52	0.0000	197.70	65.825	0.03288 PPM
		270.53	0.0000	196.60	73.925	0.04352 PPM
		269.98	0.0000	196.87	73.110	0.04245 PPM

```
ero order has been found at step number :      81875.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.120948nm  #Steps =  122.57
s : 193.699nm (calc: 193.699001nm)  Offset =  0.012164nm  #Steps =   12.33
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.120398nm  #Steps =  122.01
esults for STDLOW
s  193.699  121.94  0.0000  118.66  3.2753
            123.79  0.0000  120.59  3.1931
            120.32  0.0000  119.61  0.70924
----11:18:46  6/ 8/93 -----
esults for STDLOW #MEAS.=3 (R)
SIGNAL/sigma
s  2.3926/  61%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.120416nm  #Steps =  122.03
esults for STDHIGH
s  193.699  1483.3  0.0000  141.64  1341.7
            1501.1  0.0000  141.09  1360.0
            1451.7  0.0000  140.79  1310.9
---11:23:19  6/ 8/93 -----
ults for STDHIGH #MEAS.=3 (R)
SIGNAL/sigma
1337.5/  1.9%

ities for Recalibration:
 Wave
93.699
                    LOW
              STDLOW:   2.3926
                                  HI
on Results :                  STDHIGH: 1337.5229
9      Intercept
      -0.00896004
                    Slope
                  0.00374495
                                2nd Order
                                  0.00000
```

esults for STDLOW

193.699	125.99	0.0000	118.85	7.1462	
	120.43	0.0000	119.97	0.46667	*
	122.39	0.0000	121.29	1.0969	
	127.07	0.0000	122.99	4.0883	

Total number of measurements : 4
Nb of meas. with peak found : 3

----11:29:47 6/ 8/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma

:* 4.1104/ 74%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.120562nm #Steps = 122.18

esults for STDHIGH

193.699	1434.5	0.0000	139.86	1294.6
	1466.1	0.0000	141.60	1324.5
	1478.6	0.0000	142.27	1336.3

----11:34:03 6/ 8/93 -----

ts for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma

1318.5/ 1.6%

tensities for Recalibration:

Wave	LOW		HI	
193.699	STDLOW:	4.1104	STDHIGH:	1318.4884

egression Results :

Wave	Intercept	Slope	2nd Order
193.699	-0.00625458	0.00152163	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	4.1104	0.0000	0.0000	0.0
	STDHIGH	1318.5	2.0000	2.0000	0.0

nal Regression Results for Method : USAS

ot. Wave	Intercept	Slope	2nd Order
193.699	-0.00625458	0.00152163	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.120199nm #Steps = 121.81

easurements for NBS 1643C-202617- 1

193.699 261.10 0.0000 204.59 56.513 0.07974 PPM

253.51 0.0000 201.11 52.407 0.07349 PPM

11:52:21 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

e NBS 1643C-202617- 1 #MEAS.= 3

CONC/ sigma

0.07641/ 4.1%

. 193.031nm (calc: 193.041739nm) Offset = 0.119033nm #Steps = 120.63

1

asurements for BLK-202617-

193.699 122.44 0.0000 121.17 1.2695-0.00432 PPM
123.98 0.0000 122.33 1.6559-0.00374 PPM
122.98 0.0000 121.12 1.8645-0.00342 PPM

---- 11:56:55 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

ample BLK-202617- 1 #MEAS.= 3

CONC/ sigma

s -0.00383/ 12%

193.031nm (calc: 193.041739nm) Offset = 0.118985nm #Steps = 120.56

1

easurements for 6/7 SVG T-202617-

193.699 431.00 0.0000 279.09 151.92 0.2287 PPM (BlK : -0.004)
422.80 0.0000 280.53 142.27 0.2141 PPM (BlK : -0.004)
429.17 0.0000 275.76 153.41 0.2310 PPM (BlK : -0.004)

--- 12:01:28 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

ample 6/7 SVG T-202617- 1 #MEAS.= 3

CONC/ sigma

s 0.2246/ 4.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.118970nm #Steps = 120.57

1

easurements for 6/7 SVG D-202617-

193.699 417.88 0.0000 276.50 141.38 0.2127 PPM (BlK : -0.004)
428.95 0.0000 280.15 148.81 0.2240 PPM (BlK : -0.004)
417.96 0.0000 280.23 137.74 0.2072 PPM (BlK : -0.004)

---- 12:06:02 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

SVG D-202617- 1 #MEAS.= 3

f. 193.031nm (calc: 193.041739nm) Offset = 0.117536nm #Steps = 119.11

urements for 6/7 4B T-202617- 1

193.699	1668.0	0.0000	310.89	1357.1	2.063 PPM	(Blk :	-0.004)
	1616.0	0.0000	310.15	1305.8	1.985 PPM	(Blk :	-0.004)
	1627.5	0.0000	312.93	1314.5	1.998 PPM	(Blk :	-0.004)

----- 12:10:37 6/ 8/93 ------ Method: D:\USAS WITHOUT RATIO

ample 6/7 4B T-202617- 1 #MEAS.= 3

CONC/ sigma

2.015/ 2.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.117398nm #Steps = 118.97

easurements for 6/7 4B D-202617- 1

193.699	1302.0	0.0000	308.93	993.09	1.509 PPM	(Blk :	-0.004)
	1306.8	0.0000	308.10	998.70	1.517 PPM	(Blk :	-0.004)
	1326.6	0.0000	306.86	1019.7	1.549 PPM	(Blk :	-0.004)

----- 12:15:12 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

ample 6/7 4B D-202617- 1 #MEAS.= 3

CONC/ sigma

1.525/ 1.4%

f. 193.031nm (calc: 193.041739nm) Offset = 0.116843nm #Steps = 118.41

easurements for NBS- - 1

193.699	257.44	0.0000	201.21	56.226	0.07930 PPM
	265.24	0.0000	203.23	62.003	0.08809 PPM
	260.89	0.0000	202.03	58.838	0.08328 PPM

----- 12:19:46 6/ 8/93 ----- Method: D:\USAS WITHOUT RATIO

mple NBS- - 1 #MEAS.= 3

CONC/ sigma

0.08356/ 5.3%

nalytical Method: USAS Without Ratio 193.8584 nm

```
ero order has been found at step number =      81651.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102953nm  #Steps =  104.[illegible]
 : 193.699nm (calc: 193.699001nm)  Offset =  0.034633nm  #Steps =   35.[illegible]

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102603nm  #Steps =  103.[illegible]
 : 220.353nm (calc: 220.546682nm)  Offset =  0.086067nm  #Steps =   88.[illegible]
 : 220.353nm (calc: 220.546682nm)  Offset =  0.115407nm  #Steps =  [illegible]
 : 220.353nm (calc: 220.546682nm)  Offset =  0.115407nm  #Steps =  [illegible]
 : 220.353nm (calc: 220.546682nm)  Offset =  0.027388nm  #Steps =  [illegible]
 : 220.353nm (calc: 220.546682nm)  Offset =  0.027388nm  #Steps =  [illegible]

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101741nm  #Steps =  103.10
 : 220.353nm (calc: 220.546682nm)  Offset = -0.149662nm  #Steps =  [illegible]

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101943nm  #Steps =  103.31
 : 193.699nm (calc: 193.699001nm)  Offset =  0.034633nm  #Steps =   35.10 *

 193.031nm (calc: 193.041739nm)  Offset =  0.100706nm  #Steps =  102.06
 : 220.353nm (calc: 220.546682nm)  Offset = -0.060635nm  #Steps =  -61.99 *
 : 220.353nm (calc: 220.546682nm)  Offset = -0.146703nm  #Steps = -149.99 *
 : 220.353nm (calc: 220.546682nm)  Offset = -0.150034nm  #Steps = -153.39

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101608nm  #Steps =  102.97
 : 193.699nm (calc: 193.699001nm)  Offset =  0.034766nm  #Steps =   35.24

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101674nm  #Steps =  103.04
 : 220.353nm (calc: 220.546682nm)  Offset = -0.150520nm  #Steps = -153.89

f. 193.031nm (calc: 193.041739nm)  Offset =  0.101996nm  #Steps =  103.36

esults for STDLOW

    193.699  126.83  0.0000  124.81  2.0198
             127.03  0.0000  122.78  4.2469
             124.73  0.0000  122.18  2.5524
    220.353  566.37  557.54  0.0000  8.8267 *
             566.99  562.61  0.0000  4.3867 *
             557.63  555.17  0.0000  2.4600 *
            Calculation around 0

---- 7:18:25  6/16/93 -----

ts for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma

s   2.9397/   40% Pb*  5.2244/   62%
```

193.031nm (calc: 193.041739nm) Offset = 0.101029nm #steps = 103.00

sults for STDHIGH

193.699	1581.6	0.0000	133.58	1446.1
	1394.2	0.0000	133.47	1460.7
	1574.6	0.0000	134.12	1440.5
220.353	1854.7	580.59	0.0000	1274.1
	1911.7	581.01	0.0000	1330.7
	1935.3	581.09	0.0000	1354.2

---- 7:23:08 6/16/93 -----

sults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma EL SIGNAL/sigma

1449.1/ 0.72% Pb 1319.7/ 3.1%

tensities for Recalibration:

Wave	LOW		HI	
193.699	STDLOW:	2.9397	STDHIGH:	1449.0790
220.353	STDLOW:	5.2244	STDHIGH:	1319.6633

gression Results :

Wave	Intercept	Slope	2nd Order
193.699	-0.00406553	0.00138299	0.00000
220.353	-0.00397466	0.000760781	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	2.9397	0.0000	0.0000	0.0
	STDHIGH	1449.1	2.0000	2.0000	0.0
220.353					
	STDLOW	5.2244	0.0000	0.0000	0.0
	STDHIGH	1319.7	1.0000	1.0000	0.0

nal Regression Results for Method : USAS

Opt.	Wave	Intercept	Slope	2nd Order
	193.699	-0.00406553	0.00138299	0.00000
	220.353	-0.00397466	0.000760781	0.00000

f. 193.031nm (calc: 193.041739nm) Offset = 0.101640nm #Steps = 103.00

easurements for NBS 1643C-203185- 1

193.699	253.61	0.0000	183.33	70.272	0.09312 PPM
	249.90	0.0000	186.39	63.504	0.08376 PPM
	248.85	0.0000	185.53	63.313	0.08350 PPM
220.353	658.24	589.21	0.0000	69.037	0.04855 PPM
	648.76	593.68	0.0000	55.079	0.03793 PPM
	665.56	592.39	0.0000	73.177	0.05170 PPM

---- 7:30:32 6/16/93 ----- Method: D:\USAS WITHOUT RATIO

ample NBS 1643C-203185- 1 #MEAS.= 3

CONC/ sigma/EL CONC/ sigma

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102638nm  #Steps =  104.01

urements for BLK-203185-                    1

s   193.699  112.35  0.0000  112.34 0.01476-0.00405 PPM
             117.02  0.0000  111.99  5.0333 0.00290 PPM
             115.66  0.0000  112.30  3.3635 0.00059 PPM
b   220.353  514.77  507.19  0.0000  7.5800 0.00179 PPM *
             517.43  506.18  0.0000  11.247 0.00458 PPM *
             518.83  511.43  0.0000  7.4000 0.00166 PPM *
           Calculation around 0

----- 7:36:29  6/16/93 -----    Method:  D:\USAS WITHOUT RATIO

ample BLK-203185-                  1 #MEAS.= 3

L      CONC/ sigma EL      CONC/ sigma

s -0.00019/+o***% Pb* 0.00268/   62%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103071nm  #Steps =  104.45

easurements for RCO 6/15 T-203185-                1

s   193.699  304.56  0.0000  283.61  20.955 0.02510 PPM  ( Blk :   -0.000)
             303.43  0.0000  280.24  23.186 0.02819 PPM  ( Blk :   -0.000)
             302.29  0.0000  281.90  20.395 0.02433 PPM  ( Blk :   -0.000)
b   220.353  1555.8  741.61  0.0000  814.23  0.6128 PPM  ( Blk :    0.003)
             1544.8  742.61  0.0000  802.23  0.6037 PPM  ( Blk :    0.003)
             1551.0  746.86  0.0000  804.14  0.6051 PPM  ( Blk :    0.003)

----- 7:41:12  6/16/93 -----    Method:  D:\USAS WITHOUT RATIO

ample RCO 6/15 T-203185-                  1 #MEAS.= 3

L      CONC/ sigma EL      CONC/ sigma

s  0.02587/  7.9% Pb  0.6072/ 0.81%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102817nm  #Steps =  104.20

easurements for RCO 6/15 D-203185-                1

s   193.699  281.57  0.0000  275.26  6.3075 0.00485 PPM  ( Blk :   -0.000)
             274.75  0.0000  274.93-0.18667-0.00414 PPM *  ( Blk :   -0.000)
             276.37  0.0000  276.47-0.10000-0.00402 PPM *  ( Blk :   -0.000)
             288.11  0.0000  277.13  10.988 0.01132 PPM  ( Blk :   -0.000)
             283.44  0.0000  276.33  7.1114 0.00596 PPM  ( Blk :   -0.000)
           Total number of measurements : 5
           Nb of meas. with peak found : 3
b   220.353  781.92  731.03  0.0000  50.886 0.03206 PPM  ( Blk :    0.003)
             736.88  737.27  0.0000-0.39333-0.00695 PPM *  ( Blk :    0.003)
             770.30  739.97  0.0000  30.337 0.01643 PPM  ( Blk :    0.003)
             743.23  733.30  0.0000  9.9333 0.00091 PPM *  ( Blk :    0.003)
             749.49  737.19  0.0000  12.307 0.00271 PPM *  ( Blk :    0.003)
```

No of meas. with peak found : 1
Calculation around 0

---- 7:48:55 6/16/93 ----- Method: D:\USAS WITHOUT RATIO

ample RCO 6/15 D-203185- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

% 0.00737/ 47% Pb*-0.00111/ 460%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102713nm #Steps = 104.09

easurements for DF GRN T-203185- 1

s	193.699	679.16	0.0000	242.01	437.15	0.6007 PPM	(BlK :	-0.000)
		667.04	0.0000	241.21	425.83	0.5850 PPM	(BlK :	-0.000)
		668.64	0.0000	240.03	428.62	0.5889 PPM	(BlK :	-0.000)
o	220.353	16344	824.75	0.0000	15520	11.80 PPM	(BlK :	0.003)
		16899	856.93	0.0000	16042	12.20 PPM	(BlK :	0.003)
		16875	858.80	0.0000	16016	12.18 PPM	(BlK :	0.003)

---- 7:51:27 6/16/93 ----- Method: D:\USAS WITHOUT RATIO

ample DF GRN T-203185- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

0.5915/ 1.4% Pb 12.06/ 1.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.104087nm #Steps = 105.48

easurements for DF GRN D-203185- 1

	193.699	256.57	0.0000	219.31	37.262	0.04765 PPM	(BlK :	-0.000)
		255.95	0.0000	221.34	34.611	0.04399 PPM	(BlK :	-0.000)
		261.30	0.0000	222.97	38.329	0.04913 PPM	(BlK :	-0.000)
	220.353	1033.9	664.22	0.0000	369.70	0.2746 PPM	(BlK :	0.003)
		1157.1	663.01	0.0000	494.11	0.3693 PPM	(BlK :	0.003)
		1038.5	663.35	0.0000	375.12	0.2787 PPM	(BlK :	0.003)

---- 7:56:10 6/16/93 ----- Method: D:\USAS WITHOUT RATIO

mple DF GRN D-203185- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

0.04692/ 5.6% Pb 0.3075/ 17%

193.031nm (calc: 193.041739nm) Offset = 0.102981nm #Steps = 104.36

easurements for 4B 6/16 T-203185- 1

	193.699	327.22	0.0000	269.18	58.041	0.07639 PPM	(BlK :	-0.000)
		321.94	0.0000	272.95	48.983	0.06387 PPM	(BlK :	-0.000)
		321.52	0.0000	275.73	45.784	0.05944 PPM	[illegible]	[illegible]

```
...le 4B 6/16 T-203185-                  Method:  D:\USAS WITHOUT RATIO
                                                  1 #MEAS.= 3
      CONC/ sigma EL          CONC/ sigma
s  0.06657/   13% Pb    2.083/   11%

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103416nm  #Steps =  104.80
easurements for 4B 6/16 D-203185-                                  1
s   193.699  267.64  0.0000  271.15 -3.5067-0.00873 PPM *  ( B1K :   -0.000)
             276.77  0.0000  273.89  2.8821 0.00011 PPM  ( B1K :   -0.000)
             275.39  0.0000  270.73  4.6569 0.00256 PPM  ( B1K :   -0.000)
             273.16  0.0000  276.05 -2.8933-0.00788 PPM *  ( B1K :   -0.000)
             278.56  0.0000  273.74  4.8243 0.00279 PPM  ( B1K :   -0.000)
             Total number of measurements : 5
5   220.353  Nb of meas.  with peak found : 3
             858.12  738.08  0.0000  120.04 0.08467 PPM  ( B1K :   0.003)
             872.74  734.50  0.0000  138.24 0.09852 PPM  ( B1K :   0.003)
             921.26  739.49  0.0000  181.77  0.1316 PPM  ( B1K :   0.003)
----  8:05:36  6/16/93 -----  Method:  D:\USAS WITHOUT RATIO
ample 4B 6/16 D-203185-                                  1 #MEAS.= 3
      CONC/ sigma EL          CONC/ sigma
s* 0.00182/   82% Pb    0.1049/   23%

f. 193.031nm (calc: 193.041739nm)  Offset =  0.103400nm  #Steps =  104.79
easurements for NBS 1643C-203185-                                  1
   193.699  234.36  0.0000  178.95  55.411 0.07257 PPM
            231.18  0.0000  178.08  53.096 0.06937 PPM
            228.65  0.0000  179.04  49.615 0.06455 PPM
   220.353  635.02  574.19  0.0000  60.831 0.04230 PPM
            628.91  568.03  0.0000  60.874 0.04234 PPM
            638.09  574.37  0.0000  63.717 0.04450 PPM
-  8:10:44  6/16/93 -----  Method:  D:\USAS WITHOUT RATIO
e NBS 1643C-203185-                                  1 #MEAS.= 3
      CONC/ sigma EL          CONC/ sigma
06883/   5.9% Pb  0.04305/   2.9%
```

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

16-JUN-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD
6/15 RCO	.03	<.05	.61	<.05
6/15 DF GRANULATER	.59	.05	12.1	.31
6/15 FOREBAY	.07	<.05	2.08	.10

```
ero order has been found at step number :      81531.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101834nm  #Steps =  103.20
s : 193.699nm (calc: 193.699001nm)  Offset =  0.035353nm  #Steps =   35.83

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.101099nm  #Steps =  102.45
b : 220.353nm (calc: 220.546682nm)  Offset = -0.149289nm  #Steps = -152.63

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100862nm  #Steps =  102.21

esults for STDLOW

s   193.699  110.56  0.0000  110.84-0.28000 *
             112.76  0.0000  110.52  2.2382
             111.42  0.0000  113.43 -2.0048
             112.51  0.0000  111.77  0.74671
           Total number of measurements : 4
           Nb of meas.  with peak found : 3
    220.353  513.38  511.28  0.0000  2.1000 *
             514.61  513.24  0.0000  1.3667 *
             514.73  509.67  0.0000  5.0667 *
           Calculation around 0

---- 8:48:11  6/18/93 -----

sults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma

* 0.32670/  660% Pb*  2.8444/   69%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.100464nm  #Steps =  101.81

sults for STDHIGH

   193.699  1376.4  0.0000  126.87  1249.5
            1413.0  0.0000  128.11  1284.9
            1440.2  0.0000  128.05  1312.1
   220.353  1538.2  555.31  0.0000  982.89
            1555.8  558.62  0.0000  997.20
            1542.6  556.10  0.0000  986.54

---- 8:53:06  6/18/93 -----

sults for STDHIGH #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma
```

ensities for Recalibration:

Wave	LOW		HI	
193.699	STDLOW:	0.3267	STDHIGH:	1282.1937
220.353	STDLOW:	2.8444	STDHIGH:	988.8783

gression Results :

Wave	Intercept	Slope	2nd Order
193.699	-0.000509730	0.00156022	0.00000
220.353	-0.00288473	0.00101416	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					
	STDLOW	0.32670	0.0000	0.0000	0.0
	STDHIGH	1282.2	2.0000	2.0000	0.0
220.353					
	STDLOW	2.8444	0.0000	0.0000	0.0
	STDHIGH	988.88	1.0000	1.0000	0.0

nal Regression Results for Method : USAS

Opt.	Wave	Intercept	Slope	2nd Order
	193.699	-0.000509730	0.00156022	0.00000
	220.353	-0.00288473	0.00101416	0.00000

f. 193.031nm (calc: 193.041739nm) Offset = 0.099874nm #Steps = 101.21

arements for NBS1643C-203041- 1

193.699	222.36	0.0000	175.67	46.688	0.07233	PPM
	224.11	0.0000	176.69	47.424	0.07348	PPM
	223.41	0.0000	178.51	44.899	0.06954	PPM
220.353	629.71	569.79	0.0000	59.918	0.05788	PPM
	619.58	580.86	0.0000	38.719	0.03638	PPM
	635.99	571.64	0.0000	64.352	0.06238	PPM

---- 8:59:43 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

mple NBS1643C-203041- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

0.07179/ 2.8% Pb 0.05221/ 27%

f. 193.031nm (calc: 193.041739nm) Offset = 0.099005nm #Steps = 100.33

asurements for BLK-203185- 1

193.699	113.87	0.0000	110.67	3.1958	0.00448	PPM
	112.02	0.0000	112.17	-0.14585	-0.00074	PPM
	111.01	0.0000	110.72	0.29365	-0.00005	PPM
220.353	503.66	497.55	0.0000	6.1133	0.00332	PPM *
	505.69	503.49	0.0000	2.2000	-0.00065	PPM *
	505.27	499.73	0.0000	5.5400	0.00273	PPM *

Calculation around 0

---- 19:10:17 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

```
ample BLK-203185-                    1 #MEAS.= 3

L:     CONC/ sigma EL      CONC/ sigma

s  0.00123/  230% Pb* 0.00180/  120%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.097838nm  #Steps =   99.15

easurements for 6/16 4B T-203185-                1

s   193.699  277.36  0.0000  267.05  10.315 0.01435 PPM  ( Blk :    0.001)
             275.35  0.0000  264.23  11.122 0.01561 PPM  ( Blk :    0.001)
             275.26  0.0000  260.24  15.018 0.02169 PPM  ( Blk :    0.001)
b   220.353   10571  783.75  0.0000  9787.1   9.921 PPM  ( Blk :    0.002)
              10792  779.87  0.0000   10013   10.15 PPM  ( Blk :    0.002)
              10778  786.35  0.0000  9991.6   10.13 PPM  ( Blk :    0.002)

-----  9:15:00  6/18/93 ------    Method:  D:\USAS WITHOUT RATIO

ample 6/16 4B T-203185-                  1 #MEAS.= 3

L     CONC/ sigma EL      CONC/ sigma

s  0.01722/   23% Pb    10.07/  1.3%


193.031nm (calc: 193.041739nm)  Offset =  0.098852nm  #Steps =  100.18

easurements for 6/16 4B D-203185-                1

s   193.699  261.83  0.0000  250.79  11.039 0.01548 PPM  ( Blk :    0.001)
             258.94  0.0000  256.38  2.5636 0.00226 PPM  ( Blk :    0.001)
             251.75  0.0000  254.51 -2.7600-0.00605 PPM *  ( Blk :    0.001)
             256.43  0.0000  256.16 0.26667-0.00132 PPM *  ( Blk :    0.001)
             256.39  0.0000  254.79  1.6000 0.00076 PPM *  ( Blk :    0.001)
           Total number of measurements : 5
           Nb of meas.  with peak found : 2
           Calculation around 0
b   220.353  882.58  699.71  0.0000  182.87  0.1808 PPM  ( Blk :    0.002)
             904.81  707.09  0.0000  197.72  0.1958 PPM  ( Blk :    0.002)
             896.40  697.63  0.0000  198.78  0.1969 PPM  ( Blk :    0.002)

-----  9:19:43  6/18/93 ------    Method:  D:\USAS WITHOUT RATIO

ample 6/16 4B D-203185-                  1 #MEAS.= 3

_     CONC/ sigma EL      CONC/ sigma

s*-0.00220/  160% Pb    0.1912/  4.7%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100512nm  #Steps =  101.86

easurements for 6/16 RCO T-203185-               1

s   193.699  264.04  0.0000  256.27  7.7748 0.01039 PPM  ( Blk :    0.001)
             267.88  0.0000  259.51  8.3778 0.01133 PPM  ( Blk :    0.001)
```

```
            973.01  706.39  0.0000  266.62  0.2657 PPM  ( BlK :    0.00[illegible]
            992.55  703.14  0.0000  269.41  0.28[illegible] PPM  ( BlK :    0.002)

---- 9:24:[illegible]  6/18/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 6/16 RCO T-203185-                  1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

  0.01160/   12% Pb   0.2730/  5.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100268nm  #Steps =  101.61

easurements for 6/16 RCO D-203185-                  1

   193.699  257.69  0.0000  255.49  2.1933 0.00168 PPM *  ( BlK :    0.001)
            257.97  0.0000  259.49 -1.5267-0.00412 PPM *  ( BlK :    0.001)
            261.86  0.0000  257.57  4.2867 0.00495 PPM *  ( BlK :    0.001)
           Calculation around 0
   220.353  739.45  696.09  0.0000  43.360 0.03929 PPM  ( BlK :    0.002)
            734.55  698.67  0.0000  35.878 0.03170 PPM  ( BlK :    0.002)
            741.35  697.99  0.0000  43.368 0.03930 PPM  ( BlK :    0.002)

---- 9:29:34  6/18/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 6/16 RCO D-203185-                  1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

  0.00084/  550% Pb  0.03676/   12%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.100314nm  #Steps =  101.66

easurements for 6/16 SVG T-203185-                  1

   193.699  266.70  0.0000  254.39  12.310 0.01747 PPM  ( BlK :    0.001)
            266.02  0.0000  250.62  15.397 0.02228 PPM  ( BlK :    0.001)
            266.34  0.0000  256.35  9.9942 0.01385 PPM  ( BlK :    0.001)
   220.353  868.38  698.96  0.0000  169.42  0.1671 PPM  ( BlK :    0.002)
            874.52  691.77  0.0000  182.75  0.1807 PPM  ( BlK :    0.002)
            877.32  698.06  0.0000  179.26  0.1771 PPM  ( BlK :    0.002)

---- 9:34:17  6/18/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 6/16 SVG T-203185-                  1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

  0.01787/   24% Pb   0.1750/  4.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100403nm  #Steps =  101.75

easurements for NBS1643C-203185-                  1

   193.699  223.29  0.0000  175.63  47.656 0.07384 PPM
            224.81  0.0000  [illegible]
```

```
   220.353  610.75  564.71  0.0000  46.039 0.04381 PPM
            621.82  562.67  0.0000  [illegible] [illegible] PPM
            617.70  560.72  0.0000  56.954 0.05491 PPM

------  9:39:00  6/18/93 ------    Method:  D:\USAS WITHOUT RATIO

e NBS1643C-203185-                  1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma

s  0.07421/  3.1% Pb  0.05194/   14%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.099872nm  #Steps =  101.21

easurements for 6/16 SVG D-203185-                  1

s   193.699  265.39  0.0000  252.78  12.609 0.01793 PPM  ( BlK :    0.001)
             269.56  0.0000  252.38  17.175 0.02506 PPM  ( BlK :    0.001)
             264.75  0.0000  251.72  13.026 0.01858 PPM  ( BlK :    0.001)
s   220.353  738.17  688.74  0.0000  49.429 0.04545 PPM  ( BlK :    0.002)
             739.08  692.89  0.0000  46.193 0.04216 PPM  ( BlK :    0.002)
             732.85  691.59  0.0000  41.259 0.03716 PPM  ( BlK :    0.002)

-----  9:43:43  6/18/93 -----    Method:  D:\USAS WITHOUT RATIO

ample 6/16 SVG D-203185-                  1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma

  0.02053/   19% Pb  0.04159/   10%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.100133nm  #Steps =  101.48

easurements for 6/17 4B T-203185-                  1

   193.699  454.24  0.0000  259.94  194.30  0.3014 PPM  ( BlK :    0.001)
            460.37  0.0000  255.33  205.05  0.3182 PPM  ( BlK :    0.001)
            464.52  0.0000  256.96  207.56  0.3221 PPM  ( BlK :    0.001)
   220.353  7479.9  735.35  0.0000  6744.5   6.835 PPM  ( BlK :    0.002)
            7701.6  757.91  0.0000  6943.7   7.037 PPM  ( BlK :    0.002)
            7709.8  745.95  0.0000  6963.8   7.058 PPM  ( BlK :    0.002)

-----  9:48:26  6/18/93 -----    Method:  D:\USAS WITHOUT RATIO

mple 6/17 4B T-203185-                  1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma

   0.3139/  3.5% Pb    6.977/  1.8%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100140nm  #Steps =  101.48

easurements for 6/17 4B D-203185-                  1

s   193.699  515.45  0.0000  257.75  257.70  0.4003 PPM  ( BlK :    0.001)
             [illegible]
```

[illegible]	[illegible]	741.[illegible]	[illegible]				
	5522.8	737.84	0.0000	4734.[illegible]	[illegible].842 PPM	(BlK :	[illegible]
	5568.9	744.91	0.0000	[illegible]	[illegible].889 PPM	(BlK :	[illegible]

----- 9:53:09 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

[illegible]e 6/17 4B D-203185- 1 #MEAS.= 3

L	CONC/ sigma	EL	CONC/ sigma
As	0.3655/ 8.4%	Pb	4.857/ 0.57%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.099484nm #Steps = 100.82

easurements for 6/17 4B-203185- 1

s	193.699	299.35	0.0000	268.93	30.417	0.04572 PPM	(BlK :	0.001)
		297.04	0.0000	271.31	25.731	0.03841 PPM	(BlK :	0.001)
		294.26	0.0000	270.49	23.769	0.03535 PPM	(BlK :	0.001)
b	220.353	1220.3	723.71	0.0000	496.59	0.4989 PPM	(BlK :	0.002)
		1311.3	727.68	0.0000	583.57	0.5872 PPM	(BlK :	0.002)
		1244.1	733.29	0.0000	510.77	0.5133 PPM	(BlK :	0.002)

----- 9:57:52 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample 6/17 ~~4B~~ RCO 7 203185- 1 #MEAS.= 3

L	CONC/ sigma	EL	CONC/ sigma
	[illegible].03982/ 13%	Pb	0.5331/ 8.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.099521nm #Steps = 100.86

easurements for 6/17 4B D-203185- 1

s	193.699	277.83	0.0000	268.86	8.9701	0.01226 PPM	(BlK :	0.001)
		281.14	0.0000	269.35	11.782	0.01664 PPM	(BlK :	0.001)
		278.13	0.0000	272.76	5.3668	0.00664 PPM	(BlK :	0.001)
[illegible]	220.353	726.01	728.23	0.0000	-2.2267	-0.00694 PPM *	(BlK :	0.002)
		725.03	719.53	0.0000	5.5000	0.00089 PPM *	(BlK :	0.002)
		743.63	723.65	0.0000	19.981	0.01558 PPM	(BlK :	0.002)
		749.98	718.68	0.0000	31.300	0.02706 PPM	(BlK :	0.002)
		747.98	722.16	0.0000	25.821	0.02150 PPM	(BlK :	0.002)

Total number of measurements : 5
No of meas. with peak found : 3

----- 10:02:35 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

[illegible]ple 6/17 ~~4B~~ RCO D-203185- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
	0.01184/ 42%	Pb*	0.02138/ 27%

[illegible] 93.031nm (calc: 193.041739nm) Offset = 0.100283nm #Steps = 101.63

193.699	222.64	0.0000	174.75	47.886	0.07420	PPM
	220.98	0.0000	179.20	41.784	0.06468	PPM
	221.18	0.0000	177.92	43.255	0.06698	PPM
220.353	609.81	561.54	0.0000	48.270	0.04607	PPM
	623.83	563.64	0.0000	60.188	0.05816	PPM
	622.24	562.75	0.0000	59.497	0.05746	PPM

----- 10:07:42 6/18/93 ----- Method: D:\USAS WITHOUT RATIO

ample NB61643C-203185- 1 #MEAS.= 3

L CONC/ sigma EL CONC/ sigma

s 0.06862/ 7.2% Pb 0.05389/ 13%

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

18-JUN-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD
6/16 FOREBAY	<.05	<.05	10.1	0.19
6/16 RCO	<.05	<.05	.27	<.05
6/16 SVG	<.05	<.05	0.18	<.05
6/17 FOREBAY	.31	.37	6.98	4.86
6/17 RCO	<.05	<.05	.053	<.05

```
pro order has been found at step number :      [illegible]
ef. 193.031nm (calc: 193.041739nm)  Offset =  [illegible]  #Steps =  [illegible]
b : 214.43800 nm      Voltage = 990      Gain = 0
  : 220.[illegible] nm      Voltage = 990      Gain = 0

  193.031nm (calc: 193.041739nm)  Offset =  0.109065nm  #Steps =  110.53
  214.438nm (calc: 214.638000nm)  Offset = -0.163874nm  #Steps = -167.21

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.107780nm  #Steps =  109.23
b : 220.353nm (calc: 220.546682nm)  Offset = -0.158469nm  #Steps = -162.02 *

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.105532nm  #Steps =  106.95

esults for STDLOW

d   214.438  555.28  0.0000  555.33-0.05333 *
             556.37  0.0000  554.93  1.4333 *
             561.97  0.0000  557.71  4.2600 *
            Calculation around 0
b   220.353  654.73  647.04  663.24 0.94563 *
             655.27  656.15  662.45 -3.5002 *
             655.77  645.87  655.51  5.9819 *
            Calculation around 0

----- 6:33:54  6/29/93 -----

esults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma

  1.8800/  120% Pb*  1.1091/  [illegible]%


  193.031nm (calc: 193.041739nm)  Offset =  0.106259nm  #Steps =  107.68

esults for STDHIGH

  214.438  3374.5  0.0000  566.84  2807.6
           3427.1  0.0000  570.30  2856.8
           3332.6  0.0000  570.61  2762.0
  220.353  1493.[illegible]  659.04  [illegible]  834.[illegible]
           1515.0  664.37  671.90  847.47
           1535.1  657.82  672.69  871.07

---- 6:39:20  6/29/93 -----

esults for STDHIGH #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma

d   2808.8/  1.7% Pb   851.03/  2.2%


nsities for Recalibration:
     Wave              LOW                  HI
d    214.438        STDLOW:   1.8800     STDHIGH: 2808.7902
b    220.353        STDLOW:   1.1091     STDHIGH: 851.0327


gression Results :
   Wave          Intercept          Slope          2nd Order
```

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					
[illegible]	[illegible]	[illegible]	0.0000	0.0000	[illegible]
[illegible]	2808.8	2.5000	2.5000	[illegible]	[illegible]
220.353					
[illegible]	1.1091	0.0000	0.0000	0.0	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

inal Regression Results for Method : AUG13

Opt.	Wave	Intercept	Slope	2nd Order
[illegible]	214.438	-0.00167444	0.000890659	0.00000
[illegible]	220.353	-0.0130496	0.0117658	0.00000

egression Results :

	Wave	Intercept	Slope	2nd Order
d	214.438	-0.00167444	0.000890659	0.00000
b	220.353	-0.0130496	0.0117658	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
[illegible]	214.438				
	STDLOW	1.8800	0.0000	0.0000	0.0
	STDHIGH	2808.8	2.5000	2.5000	0.0
b	220.353				
	STDLOW	1.1091	0.0000	0.0000	0.0
	STDHIGH	851.03	10.000	10.000	0.0

inal Regression Results for Method : AUG13

Opt.	Wave	Intercept	Slope	2nd Order
	214.438	-0.00167444	0.000890659	[illegible]
	220.353	-0.0130496	0.0117658	[illegible]

[illegible] 193.031nm (calc: 193.041739nm) Offset = 0.109956nm #Steps = 111.33

easurements for LOW CTL-206888- 1

[illegible]	214.438	1039.4	0.0000	587.93	451.51	0.4005 PPM
		1055.0	0.0000	583.73	471.29	0.4181 PPM
		1046.1	0.0000	588.53	457.60	0.4059 PPM
	220.353	774.04	680.47	693.20	88.269	1.025 PPM
		778.82	681.80	685.00	95.689	1.113 PPM
		778.26	681.13	690.67	93.157	1.083 PPM

----- 7:22:16 6/29/93 ------ Method: D:\AUG13 WITHOUT [illegible]

ample LOW CTL-206888- 1 #MEAS.= 3

	CONC.	sigma EL	CONC/	sigma
	40.81/	2.2% Pb	107.4/	4.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.108515nm #Steps = 109.97

easurements for HI CTL-206889- 1

```
d    214.438   3207.5   0.0000   599.80   2607.7    2.321 PPM
               3272.7   0.0000   596.07   2676.7    2.382 PPM
               3180.6   0.0000   595.47   2585.1    2.301 PPM
d    220.353   1572.1   692.80   689.87   880.56   10.35 PPM
               1590.7   694.40   695.67   895.82   10.53 PPM
               1605.2   691.40   701.87   909.40   10.69 PPM

---- 7:27:28  6/29/93 -----    Method:  D:\AUB13 WITHOUT RATIO

ample H1 CTL-206889-                  1 #MEAS.= 3

L      CONC/ sigma EL      CONC/ sigma

J     233.5/  1.8% Pb      1052/  1.6%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.109124nm  #Steps =  110.59
n : 213.856nm (calc: 214.063273nm)  Offset = -0.176857nm  #Steps = -180.42

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.109692nm  #Steps =  111.16
d : 214.438nm (calc: 214.638000nm)  Offset = -0.164079nm  #Steps = -167.42

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.111108nm  #Steps =  112.60
b : 220.353nm (calc: 220.546682nm)  Offset = -0.163061nm  #Steps = -166.71

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.110623nm  #Steps =  112.11
u : 327.396nm (calc: 327.567682nm)  Offset = -0.090716nm  #Steps =  -97.35

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.108902nm  #Steps =  110.36

ts for STDLOW

n    213.856   290.59   0.0000   0.0000   290.59
               294.40   0.0000   0.0000   294.40
               287.35   0.0000   0.0000   287.35
d    214.438   169.80   0.0000   0.0000   169.80 *
               168.33   0.0000   0.0000   168.33 *
               169.41   0.0000   0.0000   169.41 *
             Calculation around 0
b    220.353   310.95   309.79   0.0000   1.1600 *
               314.65   309.16   0.0000   5.4867 *
               309.77   308.39   0.0000   1.3800 *
             Calculation around 0
     327.396   1838.1   0.0000   0.0000   1838.1
               1873.8   0.0000   0.0000   1873.8
               1877.6   0.0000   0.0000   1877.6

---- 8:01:15  6/29/93 -----

esults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma  EL  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma

   290.78/  1.2% Cd*  169.18/ 0.45% Pb*  2.6756/   91% Cu   1863.2/  1.2%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.109080nm  #Steps =  110.54

esults for STDHIGH
```

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	0.0000	0.0000	[illegible]
[illegible]	[illegible]	0.0000	0.0000	[illegible]
[illegible]	204230	0.0000	0.0000	204230

------ 8:07:14 6/29/93 ------

[illegible]

SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
194170/ 3.2%	Cd	20280/ 2.7%	Pb	8151.9/ 0.77%	Cu	206270/ 1.2%

Intensities for Recalibration:

Wave	LOW	HI
213.856	STDLOW: 290.7802	STDHIGH: 194165.7102
214.438	STDLOW: 169.1800	STDHIGH: 20279.7917
220.353	STDLOW: 2.6756	STDHIGH: 8151.9020
327.396	STDLOW: 1863.1551	STDHIGH: 206271.7086

Regression Results :

Wave	Intercept	Slope	2nd Order
213.856	-0.00749917	0.0000257895	0.00000
214.438	-0.0210312	0.000124312	0.00000
220.353	-0.00328320	0.00122711	0.00000
327.396	-0.0455743	0.0000244608	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
213.856					
	STDLOW	290.78	0.0000	0.0000	0.0
	STDHIGH	194170	5.0000	5.0000	0.0
214.438					
	STDLOW	169.18	0.0000	0.0000	[illegible]
	[illegible]	[illegible]	2.5000	2.5000	0.0
220.353					
	STDLOW	2.6756	0.0000	0.0000	0.0
	STDHIGH	8151.9	10.000	10.000	0.0
327.396					
	STDLOW	[illegible]	0.0000	0.0000	0.0
	[illegible]	[illegible]	[illegible]	5.0000	0.0

[illegible] Regression Results

			2nd Order
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	-0.0210312	0.000124312	0.00000
[illegible]	-0.00328320	0.00122711	0.00000
327.396	-0.0455743	0.0000244608	0.00000

[illegible] 193.031nm (calc: 193.041739nm) Offset = 0.112399nm #Steps = 113.91

Measurements for NRS1643C-206890-

		2922.1	0.0000	0.0000	2922.1	0.03768 PPM
	214.438	284.23	0.0000	0.0000	284.23	0.01430 PPM
		275.65	0.0000	0.0000	275.65	0.01324 PPM
		275.84	0.0000	0.0000	275.84	[illegible]
	[illegible]	372.23	337.30	[illegible]	[illegible]	[illegible]
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
		371.40	336.37	0.0000	[illegible]	0.03971 PPM
	327.396	2816.9	0.0000	0.0000	2816.9	0.02338 PPM
		2885.7	0.0000	0.0000	2885.7	0.02501 PPM
		2929.3	0.0000	0.0000	2929.3	0.02608 PPM

---- 8:20:47 6/29/93 ------ Method: D:\WATER WITHOUT RATIO

ample NB81643C-206890- 1 #MEAS.= 3

	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma
	0.06792/ 0.52% Cd	0.01360/ 4.5% Pb	0.03927/ 1.6% Cu	0.02482/ 5.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.111278nm #Steps = 112.77

easurements for 6/15/93 001-206890- 1

	213.856	3875.1	0.0000	0.0000	3875.1	0.09244 PPM
		3811.6	0.0000	0.0000	3811.6	0.09080 PPM
		3901.8	0.0000	0.0000	3901.8	0.09313 PPM
	214.438	320.90	0.0000	0.0000	320.90	0.01886 PPM
		309.40	0.0000	0.0000	309.40	0.01743 PPM
		311.41	0.0000	0.0000	311.41	0.01768 PPM
	220.353	731.93	388.60	0.0000	343.33	0.4180 PPM
		710.27	386.32	0.0000	323.95	0.3942 PPM
		703.61	383.00	0.0000	320.61	0.3901 PPM
	327.396	2682.7	0.0000	0.0000	2682.7	0.02005 PPM
		2687.2	0.0000	0.0000	2687.2	0.02016 PPM
		2816.1	0.0000	0.0000	2816.1	0.02331 PPM

---- 8:30:19 6/29/93 ------ Method: D:\WATER WITHOUT RATIO

ample 6/15/93 001-206890- 1 #MEAS.= 3

	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma
	0.09212/ 1.3% Cd	0.01799/ 4.2% Pb	0.4008/ 3.8% Cu	0.02117/ 8.8%

Zero order has been found at step number : 80916.0

```
ero order has been found at step number :      81208.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103778nm  #Steps =  105.17
s : 193.699nm (calc: 193.699001nm)  Offset =  0.036494nm  #Steps =   36.99

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103925nm  #Steps =  105.32
b : 220.353nm (calc: 220.546682nm)  Offset = -0.151095nm  #Steps = -154.48

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102309nm  #Steps =  103.68

esults for STDLOW

s   193.699  140.26  0.0000  135.12  5.1369
             135.67  0.0000  135.47  0.20667 *
             134.85  0.0000  135.31 -0.46667 *
             134.07  0.0000  135.71 -1.6333 *
            Total number of measurements : 4
            Nb of meas.  with peak found : 1
            Calculation around 0
b   220.353  638.84  627.48  0.0000  11.360 *
             634.37  629.00  0.0000  5.3667 *
             638.14  625.87  0.0000  12.273 *
            Calculation around 0

----12:02:38  6/24/93 -----

esults for STDLOW #MEAS.=3 (R)

L  SIGNAL/sigma   EL  SIGNAL/sigma

s*-0.63111/  150% Pb*  9.6667/   39%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102191nm  #Steps =  103.56

esults for STDHIGH

s   193.699  1677.8  0.0000  153.65  1524.1
             1709.7  0.0000  155.93  1553.7
             1715.1  0.0000  155.17  1560.0
b   220.353  2174.9  680.21  0.0000  1494.7
             2096.7  685.68  0.0000  1411.0
             2142.2  679.97  0.0000  1462.2

----12:07:33  6/24/93 -----

esults for STDHIGH #MEAS.=3 (R)

L  SIGNAL/sigma   EL  SIGNAL/sigma
```

As 1545.9/ 1.2% Pb 1456.0/ 2.9%

Intensities for Recalibration:

	Wave	LOW		HI	
	193.699	STDLOW:	-0.6311	STDHIGH:	1545.9383
	220.353	STDLOW:	9.6667	STDHIGH:	1455.9503

Regression Results :

El	Wave	Intercept	Slope	2nd Order
As	193.699	0.000816143	0.00129318	0.00000
Pb	220.353	-0.00668380	0.000691427	0.00000

		Standard	Intensity	Concentration	Calc. Conc.	% Error
As	193.699					
		STDLOW	-0.63111	0.0000	0.0000	0.0
		STDHIGH	1545.9	2.0000	2.0000	0.0
Pb	220.353					
		STDLOW	9.6667	0.0000	0.0000	0.0
		STDHIGH	1456.0	1.0000	1.0000	0.0

Final Regression Results for Method : USAS

El	Opt. Wave	Intercept	Slope	2nd Order
As	193.699	0.000816143	0.00129318	0.00000
Pb	220.353	-0.00668380	0.000691427	0.00000

193.031nm (calc: 193.041739nm) Offset = 0.102561nm #Steps = 103.94

Measurements for NBS16432C-205673- 1

As	193.699	278.88	0.0000	216.48	62.402	0.08151	PPM
		285.64	0.0000	216.94	68.704	0.08966	PPM
		277.96	0.0000	217.04	60.921	0.07960	PPM
Pb	220.353	744.99	723.28	0.0000	21.713	0.00833	PPM *
		775.89	722.63	0.0000	53.253	0.03014	PPM
		794.18	716.77	0.0000	77.408	0.04684	PPM
		743.89	715.86	0.0000	28.027	0.01269	PPM *
		788.80	716.00	0.0000	72.800	0.04365	PPM

Total number of measurements : 5
Nb of meas. with peak found : 3

----- 12:15:19 6/24/93 ----- Method: D:\USAS WITHOUT RATIO

Sample NBS16432C-205673- 1 #MEAS.= 3

EL	CONC/	sigma	EL	CONC/	sigma
As	0.08359/	6.4%	Pb*	0.04021/	22%

193.031nm (calc: 193.041739nm) Offset = 0.103149nm #Steps = 104.53

Measurements for BLK-205673- 1

As	193.699	136.09	0.0000	131.25	4.8349	0.00707	PPM
		134.60	0.0000	131.74	2.8615	0.00452	PPM
		133.92	0.0000	131.61	2.3142	0.00381	PPM
		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	PPM *

```
          016:43  1600.12   0.0000   8.3067-0.00094 PPM *
         Calculation around 0

---- 12:22:44  6/24/93 -----    Method:  D:\USAS WITHOUT RATIO

ample BLK-205673-                    1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

s  0.00513/   33% Pb*-0.00237/   64%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103286nm  #Steps =  104.67

easurements for RCO 6/23 T-203041-                  1

s   193.699  341.31  0.0000  324.51  16.805 0.01742 PPM  ( BlK :    0.005)
             345.76  0.0000  327.83  17.937 0.01888 PPM  ( BlK :    0.005)
             343.35  0.0000  320.87  22.476 0.02475 PPM  ( BlK :    0.005)
b   220.353  1756.7  874.75  0.0000  881.93  0.6055 PPM  ( BlK :   -0.002)
             1718.7  880.68  0.0000  838.05  0.5751 PPM  ( BlK :   -0.002)
             1775.0  877.33  0.0000  897.70  0.6164 PPM  ( BlK :   -0.002)

---- 12:27:27  6/24/93 -----    Method:  D:\USAS WITHOUT RATIO

ample RCO 6/23 T-203041-                  1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

s  0.02035/   19% Pb   0.5990/  3.6%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103716nm  #Steps =  105.11

easurements for RCO 6/23 D-203041-                  1

s   193.699  319.99  0.0000  316.88  3.1067-0.00030 PPM *  ( BlK :    0.005)
             319.48  0.0000  316.63  2.8467-0.00063 PPM *  ( BlK :    0.005)
             320.33  0.0000  319.02  1.3133-0.00262 PPM *  ( BlK :    0.005)
            Calculation around 0
b   220.353  914.09  827.79  0.0000  86.304 0.05536 PPM  ( BlK :   -0.002)
             909.92  837.81  0.0000  72.113 0.04555 PPM  ( BlK :   -0.002)
             907.47  835.31  0.0000  72.160 0.04553 PPM  ( BlK :   -0.002)

---- 12:32:10  6/24/93 -----    Method:  D:\USAS WITHOUT RATIO

mple RCO 6/23 D-203041-                  1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma

s*-0.00118/  110% Pb  0.04883/   12%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.100189nm  #Steps =  101.53

easurements for 4B 6/23 T-203041-                  1

s   193.699  657.74  0.0000  326.96  330.78  0.4235 PPM  ( BlK :    0.005)
             664.17  0.0000  329.55  334.62  0.4284 PPM  ( BlK :    0.005)
```

[illegible]	97204	1345.3	0.0000	95847	66.28 PPM	(Blk :	[illegible]
	96058	1380.9	0.0000	94677	65.46 PPM	(Blk :	-0.002)
	93629	1398.1	0.0000	92230	63.77 PPM	(Blk :	-0.002)

----- 12:36:53 6/24/93 ----- Method: D:\USAS WITHOUT RATIO

[illegible]le 4B 6/23 T-203041- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
s	0.4201/ 2.5%	Pb	65.17/ 2.0%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.103057nm #Steps = 104.44

easurements for 4B 6/23 D-203041- 1

s	193.699	321.08	0.0000	301.14	19.936	0.02147 PPM	(Blk : 0.005)
		314.43	0.0000	302.28	12.152	0.01140 PPM	(Blk : 0.005)
		333.18	0.0000	306.13	27.055	0.03067 PPM	(Blk : 0.005)
o	220.353	1659.5	804.52	0.0000	854.94	0.5868 PPM	(Blk : -0.002)
		1727.3	807.32	0.0000	919.99	0.6318 PPM	(Blk : -0.002)
		1649.6	813.07	0.0000	836.55	0.5741 PPM	(Blk : -0.002)

----- 12:41:36 6/24/93 ----- Method: D:\USAS WITHOUT RATIO

ample 4B 6/23 D-203041- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
	[illegible].02118/ 46%	Pb	0.5976/ 5.1%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.103952nm #Steps = 105.35

easurements for NBS 1643C-203041- 1

s	193.699	235.01	0.0000	184.40	50.612	0.06627 PPM
		230.90	0.0000	182.72	48.178	0.06312 PPM
		236.51	0.0000	187.07	49.443	0.06475 PPM
o	220.353	669.58	590.72	0.0000	78.863	0.04784 PPM
		682.17	592.63	0.0000	89.536	0.05522 PPM
		682.46	591.32	0.0000	91.136	0.05633 PPM

----- 12:46:19 6/24/93 ----- Method: D:\USAS WITHOUT RATIO

ample NBS 1643C-203041- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
	0.06471/ 2.4%	Pb	0.05313/ 8.7%

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

30-JUN-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
4/30 001	1.08	0.02	0.01	<.05	0.02		
5/21 001	.30	0.02	0.01	<.05	0.02		
6/16 001	0.09	0.04	0.02	0.17	0.03		

2nd 6.1 93

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

30-JUN-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
4/30 001	1.08	0.02	0.01	<.05	0.02	< 10.	295.
5/21 001	.30	0.02	0.01	<.05	0.02	< 10.	300.
6/16 001	0.09	0.04	0.02	0.17	0.03	< 10.	195.
analysis performed 7/5/93							
4/28 001 COMP						< 10.	319.
5/13 001 COMP						< 10.	286.
6/10 001 COMP						< 10.	290.

ef. 193.031nm (calc: 193.041739nm) Offset = 0.105366nm #Steps = 106.78
: 214.438nm (calc: 214.638000nm) Offset = -0.167377nm #Steps = -170.78

193. (calc: 193.041739nm) Offset = 0.105034nm #Steps = 106.44
220. nm (calc: 220.546682nm) Offset = -0.158468nm #Steps = -162.02 *

193.031nm (calc: 193.041739nm) Offset = 0.103401nm #Steps = 104.79

esults for STDLOW

3	214.438	336.61	0.0000	337.12	-0.50667 *
		336.40	0.0000	336.47	-0.07333 *
		338.17	0.0000	335.74	2.4333 *
		Calculation around 0			
5	220.353	394.75	390.18	395.45	2.3796 *
		394.43	386.90	396.78	3.4114 *
		392.84	393.30	396.77	-1.9040 *
		Calculation around 0			

---- 8:49:48 6/30/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma EL SIGNAL/sigma

d* 0.61778/ 260% Pb* 1.2957/ 220%

193.031nm (calc: 193.041739nm) Offset = 0.103553nm #Steps = 104.94

esults for STDHIGH

3	214.438	2157.3	0.0000	347.37	1809.9
		2108.9	0.0000	348.87	1760.1
		2081.8	0.0000	346.58	1735.2
5	220.353	950.42	393.93	396.85	555.28
		938.67	397.04	393.40	543.15
		958.63	399.11	395.22	561.14

---- 8:54:45 6/30/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma EL SIGNAL/sigma

1768.4/ 2.2% Pb 553.19/ 1.7%

tensities for Recalibration:

l	Wave	LOW		HI	
3	214.438	STDLOW:	0.6178	STDHIGH:	1768.3845
5	220.353	STDLOW:	1.2957	STDHIGH:	553.1885

egression Results:

l	Wave	Intercept	Slope	2nd Order
3	214.438	-0.000873670	0.00141421	0.00000
5	220.353	-0.0234773	0.0181195	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset =

esults for STDLOW

d	214.438	337.86	[illegible].0000	340.84	-2.9800	*
		338.4	0.0000	335.25	3.1600	*
		3[illegible]	0.0000	333.11	2.8333	*
		Calculation around 0				
b	220 [illegible]	394.62	395.17	398.77	-2.0500	*
		393.02	390.86	398.27	-0.92784	*
		393.31	390.97	395.45	0.46730	*
		Calculation around 0				

---- 9:02:36 6/30/93 -----

esults for STDLOW #MEAS.=3 (R)

L SIGNAL/sigma EL SIGNAL/sigma

d* 1.0044/ 340% Pb*-0.83686/ 150%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.103975nm #Steps = 105.37

esults for STDHIGH

d	214.438	2141.4	0.0000	344.17	1797.2
		2147.2	0.0000	345.68	1801.5
		2166.3	0.0000	343.76	1822.5
b	220.353	953.49	397.87	402.49	553.69
		948.55	398.93	403.00	547.93
		971.10	393.71	401.20	574.27

---- 9:07:33 6/30/93 -----

esults for STDHIGH #MEAS.=3 (R)

L SIGNAL/sigma EL SIGNAL/sigma

d 1807.1/ 0.75% Pb 558.63/ 2.5%

ntensities for Recalibration:

El	Wave	LOW		HI	
d	214.438	STDLOW:	1.0044	STDHIGH:	1807.0687
b	220.353	STDLOW:	-0.8369	STDHIGH:	558.6284

egression Results :

	Wave	Intercept	Slope	2nd Order
d	214.438	-0.00139038	0.00138423	0.00000
b	220.353	0.0149582	0.0178742	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
d 214.438					
	STDLOW	1.0044	0.0000	0.0000	0.0
	STDHIGH	1807.1	2.5000	2.5000	0.0
b 220.353					
	STDLOW	-0.83686	0.0000	0.0000	0.0
	STDHIGH	558.63	10.000	10.000	0.0

[illegible] Regression Results for Method [illegible]

[illegible]	339.17	[illegible]	[illegible]
[illegible]	337.15	324.41	[illegible]
[illegible]	338.89	[illegible]	[illegible] PPM
[illegible]	395.37	56.[illegible]	[illegible] PPM
[illegible]	394.[illegible]	67.806	1.138 PPM
389.39	391.[illegible]	58.155	1.054 PPM

[illegible] Method: D:\AUG13 WITHOUT RATIO

1 #MEAS. = 3

CONC sigma

107.[illegible] 5.6[illegible]

193.041739nm) Offset = 0.104527nm #Steps = 105.9[illegible]

-206945- 1

0.0000	344.49	1650.1	2.283 PPM
0.0000	343.17	1615.4	2.235 PPM
0.0000	345.18	1663.4	2.301 PPM
398.69	398.22	577.36	10.35 PPM
399.11	402.36	573.45	10.26 PPM
397.75	400.59	575.[illegible]	10.29 PPM

[illegible] Method: D:\AUG13 WITHOUT RATIO

[illegible] #MEAS. [illegible]

[illegible] sigma

[illegible] 0.[illegible]

[illegible] Offset = 0.104148nm #Steps [illegible]

[illegible] Offset = 0.180580nm #Steps [illegible]

[illegible]

[illegible]

[illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	
	167.47	0.0000	0.0000	167.47	
214.438	[illegible]	0.0000	0.0000	83.860	*
	84.867	0.0000	0.0000	84.867	*
	[illegible]	[illegible]	[illegible]	[illegible]	*
	Calculation around 0				
[illegible]	[illegible]	151.61	0.0000	2.3700	*
	[illegible]	[illegible]	[illegible]	2.4800	*
	[illegible]	[illegible]	[illegible]	[illegible]	*
	Calculation around 0				
377.396	1060.8	0.0000	0.0000	1060.8	
	1016.7	0.0000	0.0000	1016.7	
	1010.0	0.0000	0.0000	1010.0	

-----11:17:4 6/30/93 -----

esults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
167.08/ 2.0%	Cd*	84.678/ 0.90%	Pb*	2.6267/ 15%	Cu	1029.2/ 2.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.103565nm #Steps = 104.95

esults for STDHIGH

213.856	96791	0.0000	0.0000	96791
	97383	0.0000	0.0000	97383
	98494	0.0000	0.0000	98494
214.438	10363	0.0000	0.0000	10363
	11052	0.0000	0.0000	11052
	11252	0.0000	0.0000	11252
220.353	4793.4	196.09	0.0000	4597.4
	4968.5	196.44	0.0000	4772.1
	4902.2	197.09	0.0000	4705.1
327.396	89553	0.0000	0.0000	89553
	89970	0.0000	0.0000	89970
	89420	0.0000	0.0000	89420

-----11:32:48 6/30/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
97556/ 0.69%	Cd	10889/ 4.3%	Pb	4691.5/ 1.9%	Cu	89648/ 0.32%

ntensities for Recalibration:

Wave	LOW	HI
213.856	STDLOW: 167.0787	STDHIGH: 97556.2078
214.438	STDLOW: 84.6778	STDHIGH: 10888.8745
220.353	STDLOW: 2.6267	STDHIGH: 4691.5104
327.396	STDLOW: 1029.1827	STDHIGH: 89647.8140

egression Results :

Wave	Intercept	Slope	2nd Order
213.856	-0.00857789	0.0000513404	0.00000
214.438	-0.0195937	0.000231392	0.00000
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]					
	STDLOW	[illegible]	0.0000	0.0000	[illegible]
	STDHIGH	97566	5.0000	5.0000	0.0
214.438					
	STDLOW	84.678	0.0000	0.0000	0.0
	STDHIGH	10389	2.5000	2.5000	0.0
220.353					
	STDLOW	2.6267	0.0000	0.0000	0.0
	STDHIGH	4691.5	10.000	10.000	0.0
327.396					
	STDLOW	1029.2	0.0000	0.0000	0.0
	STDHIGH	89648	5.0000	5.0000	0.0

inal Regression Results for Method : WATER

Opt.	Wave	Intercept	Slope	2nd Order
	213.856	-0.00857789	0.0000513404	0.00000
	214.438	-0.0195937	0.000231392	0.00000
	220.353	-0.00560190	0.00213270	0.00000
	327.396	-0.0580681	0.0000564215	0.00000

f. 193.031nm (calc: 193.041739nm) Offset = 0.103210nm #Steps = 104.59

esurements for NBS 1643C-203041- 1

213.856	1647.1	0.0000	0.0000	1647.1	0.07599	PPM
	1628.3	0.0000	0.0000	1628.3	0.07502	PPM
	1654.9	0.0000	0.0000	1654.9	0.07639	PPM
214.438	151.94	0.0000	0.0000	151.94	0.01556	PPM
	150.82	0.0000	0.0000	150.82	0.01530	PPM
	149.33	0.0000	0.0000	149.33	0.01496	PPM
220.353	192.40	175.31	0.0000	17.092	0.03085	PPM
	195.18	175.13	0.0000	20.057	0.03717	PPM
	196.98	172.95	0.0000	24.008	0.04560	PPM
327.396	1496.8	0.0000	0.0000	1496.8	0.02638	PPM
	1485.4	0.0000	0.0000	1485.4	0.02574	PPM
	1473.0	0.0000	0.0000	1473.0	0.02504	PPM

---- 11:42:50 6/30/93 ------ Method: D:\WATER.WITHOUT RATIO

[illegible] NBS 1643C-203041- 1 #MEAS.= 3

CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma
0.07580/ 0.93% Cd	[illegible]	0.[illegible]88/ 20% Cu	0.02572/ 2.6%

[illegible] (calc: [illegible]) Offset = [illegible] #Steps = 104.27

[illegible]rements for BLK-203041- 1

213.856	149.35	0.0000	0.0000	149.35	-0.00091	PPM
	146.59	0.0000	0.0000	146.59	-0.00105	PPM
	150.75	0.0000	0.0000	150.75	-0.00084	PPM
214.438	85.120	0.0000	0.0000	85.120	0.00010	PPM *
	84.180	0.0000	0.0000	84.180	-0.00012	PPM *
	83.393	0.0000	0.0000	83.393	-0.00030	PPM *

```
          150.79  152.25  0.0000  3.8400 0.001[illegible] PPM [illegible]
         Calculation around 0
[illegible]
          956.35  0.0000  0.0000  956.35-0.00411 PPM
          953.85  0.0000  0.0000  953.85-0.00425 PPM
```

11:52:31 6/30/93 ------ Method: D:\WATER WITHOUT RATIO

```
mple BLK-203041-                1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma

n -0.00093/   12% Cd%-0.00010/  190% Pb% 0.00247/  110% Cu -0.00356/   30%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.102552nm  #Steps =  103.93

easurements for 4/30 001-203041-      1

n   213.856  467.64  0.0000  0.0000  467.64 0.01636 PPM  ( BlK :   -0.001)
             467.67  0.0000  0.0000  467.67 0.01637 PPM  ( BlK :   -0.001)
             474.19  0.0000  0.0000  474.19 0.01670 PPM  ( BlK :   -0.001)
    214.438  127.22  0.0000  0.0000  127.22 0.00995 PPM  ( BlK :   -0.000)
             124.49  0.0000  0.0000  124.49 0.00932 PPM  ( BlK :   -0.000)
             127.50  0.0000  0.0000  127.50 0.01001 PPM  ( BlK :   -0.000)
    220.353  224.07  199.04  0.0000  25.029 0.04531 PPM  ( BlK :    0.002)
             222.04  199.76  0.0000  22.276 0.03944 PPM  ( BlK :    0.002)
             220.33  197.96  0.0000  22.373 0.03964 PPM  ( BlK :    0.002)
    327.396  1352.8  0.0000  0.0000  1352.8 0.02182 PPM  ( BlK :   -0.004)
             1339.0  0.0000  0.0000  1339.0 0.02103 PPM  ( BlK :   -0.004)
             1307.7  0.0000  0.0000  1307.7 0.01927 PPM  ( BlK :   -0.004)
```

11:58:02 6/30/93 ------ Method: D:\WATER WITHOUT RATIO

```
mple 4/30 001-203041-     1 #MEAS.= 3

     CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma

[illegible]                                                  [illegible]2071/  6.3%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.103811nm  #Steps =  105.20

easurements for 5/21 001-203041-      1

    213.856  470.83  0.0000  0.0000  470.83 0.01653 PPM  ( BlK :   -0.001)
             480.41  0.0000  0.0000  480.41 0.01702 PPM  ( BlK :   -0.001)
             488.41  0.0000  0.0000  488.41 0.01743 PPM  ( BlK :   -0.001)
    214.438  139.48  0.0000  0.0000  139.48 0.01278 PPM  ( BlK :   -0.000)
             137.74  0.0000  0.0000  137.74 0.01238 PPM  ( BlK :   -0.000)
             139.66  0.0000  0.0000  139.66 0.01283 PPM  ( BlK :   -0.000)
    220.353  235.16  209.85  0.0000  25.300 0.04589 PPM  ( BlK :    0.002)
             234.84  211.93  0.0000  22.916 0.04080 PPM  ( BlK :    0.002)
             237.24  211.42  0.0000  25.822 0.04700 PPM  ( BlK :    0.002)
    327.396  1311.5  0.0000  0.0000  1311.5 0.01948 PPM  ( BlK :   -0.004)
             1308.3  0.0000  0.0000  1308.3 0.01931 PPM  ( BlK :   -0.004)
             1294.2  0.0000  0.0000  1294.2 0.01851 PPM  ( BlK :   -0.004)
```

12:03:34 6/30/93 ------ Method: D:\WATER WITHOUT RATIO

```
[illegible]
```

193.05nm (calc: 193.041739nm) Offset = 0.103217nm #Meas = [illegible]

easurements for 6/16 001-203041- 1

213.856	840.22	0.0000	0.0000	840.22	0.03549	PPM	(Blk :	-0.001)
	843.72	0.0000	0.0000	843.72	0.03567	PPM	(Blk :	[illegible]
	838.05	0.0000	0.0000	838.05	0.03538	PPM	(Blk :	-0.001)
214.438	149.53	0.0000	0.0000	149.55	0.01511	PPM	(Blk :	-0.000)
	154.65	0.0000	0.0000	154.65	0.01629	PPM	(Blk :	-0.000)
	154.18	0.0000	0.0000	154.18	0.01619	PPM	(Blk :	-0.000)
220.353	299.41	216.20	0.0000	83.214	0.1694	PPM	(Blk :	0.002)
	294.54	214.54	0.0000	80.000	0.1625	PPM	(Blk :	0.002)
	298.06	215.09	0.0000	82.969	0.1689	PPM	(Blk :	0.002)
327.396	1481.4	0.0000	0.0000	1481.4	0.02907	PPM	(Blk :	-0.004)
	1465.8	0.0000	0.0000	1465.8	0.02819	PPM	(Blk :	-0.004)
	1423.2	0.0000	0.0000	1423.2	0.02579	PPM	(Blk :	-0.004)

----- 12:09:05 6/30/93 ----- Method: D:\WATER WITHOUT RATIO

ample 6/16 001-203041- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
0.03552/	0.41%	Cd	0.01586/	4.1%	Pb	0.1669/	2.3%	Cu	0.02768/	6.1%

193.05nm (calc: 193.041739nm) Offset = 0.103203nm #Meas = 104.59

easurements for NBS-203041- 1

213.856	1451.5	0.0000	0.0000	1451.5	0.06683	PPM	(Blk :	-0.001)
	1461.3	0.0000	0.0000	1461.3	0.06739	PPM	(Blk :	-0.001)
	1473.3	0.0000	0.0000	1473.3	0.06799	PPM	(Blk :	-0.001)
214.438	144.74	0.0000	0.0000	144.74	0.01400	PPM	(Blk :	-0.000)
	141.40	0.0000	0.0000	141.40	0.01323	PPM	(Blk :	-0.000)
	142.43	0.0000	0.0000	142.43	0.01347	PPM	(Blk :	-0.000)
220.353	191.81	175.17	0.0000	16.643	0.02743	PPM	(Blk :	0.002)
	191.27	175.27	0.0000	15.933	0.02613	PPM	(Blk :	0.002)
	192.72	175.27	0.0000	17.453	0.02894	PPM	(Blk :	0.002)
327.396	1470.1	0.0000	0.0000	1470.1	0.02844	PPM	(Blk :	-0.004)
	1479.6	0.0000	0.0000	1479.6	0.02897	PPM	(Blk :	-0.004)
	1464.3	0.0000	0.0000	1464.3	0.02811	PPM	(Blk :	-0.004)

----- 12:14:36 6/30/93 ----- Method: D:\WATER WITHOUT RATIO

ple NBS-203041- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
0.06742/	0.83%	Cd	0.01357/	2.9%	Pb	0.02753/	5.3%	Cu	0.02250/	1.5%

193.05nm (calc: 193.[illegible]) Offset = [illegible]

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102511nm #Steps = [illegible]

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102607nm #Steps = [illegible]

ts for STDLOW

	193.699	118.36	0.0000	85.920	32.438
		116.74	0.0000	86.707	30.029
		117.52	0.0000	86.193	31.323
	220.353	324.26	316.11	0.0000	8.1533 *
		337.98	316.71	0.0000	21.270
		337.62	315.17	0.0000	22.450
		340.00	315.29	0.0000	24.712

Total number of measurements : 4
Nb of meas. with peak found : 3

-----12:24:51 6/30/93 ------

esults for STDLOW #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma
s	31.263/ 3.9%	Pb*	22.811/ 7.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102[illegible]nm #Steps = 103.48

ts for STDHIGH

s	193.699	1090.8	0.0000	96.767	994.02
		1069.6	0.0000	99.333	970.28
		1075.6	0.0000	97.347	978.30
	220.353	1108.4	340.87	0.0000	767.52
		1101.5	339.73	0.0000	761.81
		1139.5	336.65	0.0000	802.88

-----12:29:46 6/30/93 -----

esults for STDHIGH #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma
	980.87/ 1.2%	Pb	777.41/ 2.9%

tensities for Recalibration:

l	Wave	LOW	HI
	193.699	STDLOW: 31.2634	STDHIGH: 980.8664
	220.353	STDLOW: 22.8106	STDHIGH: 777.4064

ression Results :

ave	Intercept	Slope	2nd Order
193.699	-0.0658453	0.00210614	0.00000
220.353	-0.0302290	0.00132521	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
193.699					

STDLOW	22.511	0.0000	0.0000	0.0
STDHIGH	777.41	1.0000	[illegible]	0.0

Regression Results for Method : USAS

Pt.	Wave	Intercept	Slope	2nd Order
	193.699	-0.0658453	0.00210614	0.00000
	220.353	-0.0302290	0.00132521	0.00000

Pf. 193.031nm (calc: 193.041739nm) Offset = 0.101774nm #Steps = 103.14

Measurements for NBS 1643C-206890- 1

	193.699	178.17	0.0000	125.84	52.327	0.04436 PPM
		180.08	0.0000	125.64	54.445	0.04882 PPM
		178.49	0.0000	126.61	51.878	0.04342 PPM
	220.353	396.73	355.65	0.0000	41.075	0.02420 PPM
		397.57	360.76	0.0000	36.808	0.01855 PPM
		399.53	362.29	0.0000	37.243	0.01913 PPM

---- 12:36:57 6/30/93 ----- Method: D:\USAS WITHOUT RATIO

Sample NBS 1643C-206890- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
	0.04553/ 6.3%	Pb	0.02063/ 15%

Pf. 193.031nm (calc: 193.041739nm) Offset = 0.102540nm #Steps = 103.91

Results for STDLOW

193.699	92.069	0.0000	83.240	8.8293
	96.562	0.0000	81.973	14.589
	95.972	0.0000	81.127	14.846
220.353	314.89	303.78	0.0000	11.109
	317.02	307.75	0.0000	9.2723
	333.69	306.67	0.0000	27.021

----12:41:06 6/30/93 -----

Results for STDLOW #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma
	12.755/ 27%	Pb	15.801/ 62%

Pf. 193.031nm (calc: 193.041739nm) Offset = 0.102060nm #Steps = 103.43

Results for STDHIGH

193.699	1060.9	0.0000	97.460	963.45
	1061.2	0.0000	98.633	962.58
	1049.9	0.0000	99.180	950.70
220.353	1135.9	-340.11	0.0000	795.77
	1252.1	338.67	0.0000	913.40
	1095.7	339.08	0.0000	756.58

----12:44:29 6/30/93 -----

esults for STDHIGH #MEAS.=3 (R)

SIGNAL/sigma EL SIGNAL/sigma

958.91/ 0.74% Pb 821.91/ 9.9%

ntensities for Recalibration:

	Wave	LOW		HI	
s	193.699	STDLOW:	12.7546	STDHIGH:	958.9109
b	220.353	STDLOW:	15.8006	STDHIGH:	821.9148

egression Results :

	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0269610	0.00211382	0.00000
b	220.353	-0.0196010	0.00124052	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	12.755	0.0000	0.0000	0.0
	STDHIGH	958.91	2.0000	2.0000	0.0
b 220.353					
	STDLOW	15.801	0.0000	0.0000	0.0
	STDHIGH	821.91	1.0000	1.0000	0.0

inal Regression Results for Method : USAS

	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0269610	0.00211382	0.00000
b	220.353	-0.0196010	0.00124052	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.101622nm #Steps = 102.98

easurements for NBS 1643C-206890- 1

s	193.699	184.96	0.0000	126.33	58.638	0.09699 PPM
		180.40	0.0000	127.69	81.716	0.09447 PPM
		183.42	0.0000	126.56	56.858	0.09323 PPM
b	220.353	394.78	364.35	0.0000	30.434	0.01815 PPM
		396.22	359.62	0.0000	36.598	0.02580 PPM
		398.46	357.56	0.0000	40.897	0.03113 PPM

----- 12:50:29 6/30/93 ----- Method: D:\USAS WITHOUT RATIO

ample NBS 1643C-206890- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

0.09156/ 7.0% Pb 0.02503/ 24%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.102341nm #Steps = 103.71

easurements for BLK-206890- 1

s	193.699	87.020	0.0000	86.153	0.86667	-0.02513 PPM *
		89.999	0.0000	85.787	4.1126	-0.01827 PPM

[illegible]

[illegible] 6.6151-0.[illegible] PPM
[illegible] 6.[illegible]-0.[illegible] PPM
[illegible] 17.[illegible] 0.00[illegible] PPM
[illegible] 3.0667-0.01480 PPM
[illegible] 14.704-0.00136 PPM
number of [illegible]ements : 5
meas. [illegible] found : 3

12:57:52 [illegible]/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] #MEAS.= 3

CONC/ [illegible] EL CONC/ sigma

.02479/ [illegible] Pb*-0.00340/ [illegible]0%

193.031nm [illegible]lc: 193.041730[illegible]) Offset = 0.101859nm #Steps = 103.22

[illegible]rements [illegible]/30 001-206890 1

193.699	[illegible]85	0.0000	[illegible].99	500.86	1.057 PPM	(B1K :	-0.025)
	[illegible].69	0.0000	[illegible].85	509.84	1.076 PPM	(B1K :	-0.025)
	[illegible].57	0.0000	164.41	527.16	1.112 PPM	(B1K :	-0.025)
[illegible].333	[illegible].79	412.21	0.0000	50.579	0.04654 PPM	(B1K :	-0.003)
	[illegible].66	408.[illegible]	0.0000	57.542	0.05518 PPM	(B1K :	-0.003)
	[illegible].33	405.41	0.0000	57.915	0.05564 PPM	(B1K :	-0.003)

[illegible] [illegible]/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] [illegible]/30 [illegible]6890- 1 #MEAS.= [illegible]

CONC/ [illegible] EL CONC/ sigma

1.08[illegible]/ [illegible] Pb [illegible] [illegible].8%

[illegible] [illegible] Offset = 0.10148[illegible] #Steps = 102.84

[illegible] 5/21 001-206890 1

193.69	[illegible]7.54	0.0000	173.13	144.41	0.3031 PPM	(B1K :	-0.025)
	[illegible]4.95	0.0000	[illegible].56	142.39	0.2988 PPM	(B1K :	-0.025)
	[illegible].47	0.0000	[illegible].68	144.79	0.3039 PPM	(B1K :	-0.025)
[illegible]	[illegible]4.00	[illegible]	0.0000	63.641	0.06275 PPM	(B1K :	-0.003)
	[illegible]	[illegible]	[illegible]	54.929	0.05194 PPM	(B1K :	-0.003)
	[illegible].08	[illegible]	[illegible]	58.344	0.05[illegible] PPM	(B1K :	-0.003)

13:07:[illegible] 6/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] 5/21 [illegible]-206890- 1 #MEAS.= 3

CON[illegible] [illegible]gma EL CONC/ sigma

0.301[illegible] [illegible].90% Pb 0.05696/ 9.6%

```
f. 193.031nm (calc: 193.041739nm)  Offset =  0.102292nm  #Steps =  103.66

asurements for 6/16 001-206890-                    1

    193.699  261.60  0.0000  174.07  87.523  0.1828 PPM  ( BlK :   -0.025)
             199.73  0.0000  174.47  28.261 0.05122 PPM  ( BlK :   -0.025)
             191.68  0.0000  172.87  18.809 0.03753 PPM  ( BlK :   -0.025)
    220.353  577.15  439.77  0.0000  137.38  0.1542 PPM  ( BlK :   -0.003)
             595.10  435.84  0.0000  159.24  0.1613 PPM  ( BlK :   -0.003)
             578.34  436.53  0.0000  141.71  0.1596 PPM  ( BlK :   -0.003)

---- 15:12:38  6/30/93 -----    Method:  D:\USAS WITHOUT RATIO

mple 6/16 001-206890-                    1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma

  0.09088/   89% Pb   0.1651/  8.7%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.102020nm  #Steps =  103.39

easurements for NBS-206890-                    1

    193.699  168.73  0.0000  88.027  80.705  0.1684 PPM  ( BlK :   -0.025)
             83.327  0.0000  82.420 0.90667-0.00026 PPM *  ( BlK :   -0.025)
             83.382  0.0000  81.487  1.8951 0.00183 PPM  ( BlK :   -0.025)
             82.160  0.0000  79.707  2.4534 0.00301 PPM  ( BlK :   -0.025)
            Total number of measurements : 4
            Nb of meas. with peak found : 3
    220.353  284.60  285.04  0.0000-0.44000-0.01675 PPM *  ( BlK :   -0.003)
             281.75  281.27  0.0000 0.48000-0.01560 PPM *  ( BlK :   -0.003)
             282.84  280.72  0.0000  2.1200-0.01357 PPM *  ( BlK :   -0.003)
            Calculation around 0

---- 13:17:22  6/30/93 -----    Method:  D:\USAS WITHOUT RATIO

mple NBS-206890-                    1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma

* 0.05775/  170% Pb*-0.01531/  11%
```

probably mixed

```
f. 193.031nm (calc: 193.041739nm)  Offset =  0.101289nm  #Steps =  102.65

asurements for 6/30 4B T-206890-                    1

    193.699  274.41  0.0000  186.73  87.657  0.1873 PPM  ( BlK :   -0.025)
             278.31  0.0000  186.47  91.648  0.1910 PPM  ( BlK :   -0.025)
             273.81  0.0000  187.73  86.087  0.1798 PPM  ( BlK :   -0.025)
    220.353  4396.8  494.85  0.0000  3901.7  4.824 PPM  ( BlK :   -0.003)
             4534.5  498.80  0.0000  4035.7  4.742 PPM  ( BlK :   -0.003)
             4607.2  501.33  0.0000  4105.9  5.072 PPM  ( BlK :   -0.003)

---- 13:22:17  6/30/93 -----    Method:  D:\USAS WITHOUT RATIO

mple 6/30 4B T-206890-                    1 #MEAS.= 3

     CONC/ sigma EL     CONC/ sigma
```

[illegible] Offset = 0.10211nm #Steps = [illegible]

[illegible] 6/30 48 D-206890- 1

[illegible]	224.99	0.0000	178.31	46.672	0.09645	PPM	(B1K :	-0.[illegible])
	220.90	0.0000	181.19	39.709	0.08176	PPM	(B1K :	-0.028)
	227.26	0.0000	180.94	46.316	0.09573	PPM	(B1K :	-0.023)
220.353	699.79	481.05	0.0000	243.74	0.2924	PPM	(B1K :	-0.[illegible])
	694.62	449.88	0.0000	244.74	0.2874	PPM	(B1K :	-0.[illegible])
	720.71	456.65	0.0000	264.06	0.3114	PPM	(B1K :	-0.[illegible])

---- 13:27:00 6/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] 6/30 48 D-206890- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma
0.0[illegible]132/	9.1%	Pb	0.2970/	4.3%

[illegible] 193.031nm (calc: 193.041739nm) Offset = 0.101844nm #Steps = 103.21

[illegible]asurements for 6/30 RCO T-206890- 1

193.[illegible]	214.78	0.0000	182.21	32.674	0.06669	PPM	(B1K :	-0.025)
	215.96	0.0000	179.16	36.801	0.07562	PPM	(B1K :	-0.025)
	214.79	0.0000	181.03	33.759	0.06918	PPM	(B1K :	-0.025)
220.353	1989.6	469.58	0.0000	1520.0	1.869	PPM	(B1K :	-0.003)
	1949.1	464.04	0.0000	1485.1	1.826	PPM	(B1K :	-0.003)
	1944.3	468.44	0.0000	1475.8	1.815	PPM	(B1K :	-0.003)

---- 13:31:43 6/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] 6/30 RCO T-206890- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma
0.07050/	6.5%	Pb	1.837/	1.6%

[illegible] 193.031nm (calc: 193.041739nm) Offset = 0.101562nm #Steps = 102.92

[illegible]asurements for 6/30 RCO D-206890- 1

[illegible]	209.33	0.0000	177.35	31.978	0.06542	PPM	(B1K :	-0.025)
	[illegible]	[illegible]	[illegible]	[illegible]	0.06974	PPM	(B1K :	-0.025)
	[illegible]	[illegible]	[illegible]	[illegible]	0.07316	PPM	(B1K :	-0.025)
[illegible]	623.77	445.43	[illegible]	78.341	0.08098	PPM	(B1K :	-0.003)
	[illegible]	451.98	[illegible]	83.746	0.07357	PPM	(B1K :	-0.003)
	513.88	454.99	0.0000	58.870	0.06883	PPM	(B1K :	-0.003)

---- 13:36:27 6/30/93 ------ Method: D:\USAS WITHOUT RATIO

[illegible] 6/30 RCO D-206890- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma

[illegible] 0.[illegible] [illegible]

[illegible] MSS-206890-

[illegible]	[illegible]	0.0000	127.47	[illegible]	[illegible]	[illegible]
	174.10	0.0000	126.97	47.130	0.07286	PPM
	169.84	0.0000	126.85	42.994	0.06392	PPM
[illegible]	398.15	357.09	0.0000	41.062	0.03134	[illegible]
	393.43	360.44	0.0000	32.995	0.02133	PPM
	387.54	358.82	0.0000	28.721	0.01603	PPM

------ 13:41:10 6/30/93 ------ Method: D:\USAS WITHOUT RATIO

Sample MSS-206890- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma	
=	0.06929/ 6.8%	Pb	0.02290/	34%

THE DOE RUN COMPANY

SMELTING DIVISION
HERCULANEUM, MISSOURI

QUALITATIVE ANALYSIS FOR PB and AS in WWTP SAMPLES
reported in ppm

24-JUNE-93 ANALYST = MARILYN PRG = USAS

DATE	SAMPLE	PB ppm TOTAL	PB DISVLD	AS ppm TOTAL	AS DISVLD
6/23	RCO	.60	.05	<.05	<.05
6/23	FOREBAY	65.	.60	.42	<.05

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

30-JUN-93 ANALYST = MARILYN PRG = USPB & USAS

SAMPLE	AS TOTAL	AS DISVLD	PB TOTAL	PB DISVLD
6/30 FOREBAY	0.19	0.09	4.88	.30
6/30 RCO	0.07	0.07	1.84	0.07

```
o order has been found at step number :      80361.0
f. 193.031nm (calc: 193.041739nm)  Offset =  0.136425nm  #Steps =  138.26
: 213.856nm (calc: 214.063273nm)  Offset = -0.190001nm  #Steps = -193.83

f. 193.031nm (calc: 193.041739nm)  Offset =  0.133600nm  #Steps =  135.39
 14.438nm (calc: 214.638000nm)  Offset = -0.180393nm  #Steps = -184.06

f. 193.031nm (calc: 193.041739nm)  Offset =  0.131592nm  #Steps =  133.36
: 220.353nm (calc: 220.546682nm)  Offset = -0.166038nm  #Steps = -169.76

f. 193.031nm (calc: 193.041739nm)  Offset =  0.133707nm  #Steps =  135.50
: 327.396nm (calc: 327.567682nm)  Offset = -0.093405nm  #Steps = -100.24

f. 193.031nm (calc: 193.041739nm)  Offset =  0.132914nm  #Steps =  134.70

sults for STDLOW

   213.856  220.16  0.0000  0.0000  220.16
            220.99  0.0000  0.0000  220.99
            220.10  0.0000  0.0000  220.10
   214.438  130.07  0.0000  0.0000  130.07 *
            129.81  0.0000  0.0000  129.81 *
            130.12  0.0000  0.0000  130.12 *
           Calculation around 0
   220.353  253.71  242.02  0.0000  11.690
            247.43  243.59  0.0000  3.8467 *
            242.99  243.24  0.0000-0.25333 *
            252.83  237.79  0.0000  15.048
            247.56  239.85  0.0000  7.7083
           Total number of measurements : 5
           Nb of meas.  with peak found : 3
   327.396  1743.2  0.0000  0.0000  1743.2
            1768.5  0.0000  0.0000  1768.5
            1780.8  0.0000  0.0000  1780.8

--- 7:22:07  7/28/93 -----

sults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma

  220.42/ 0.22% Cd*  130.00/ 0.13% Pb*  11.482/   32% Cu   1764.2/  1.1%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.133958nm  #Steps =  135.75

esults for STDHIGH

   213.856  198720  0.0000  0.0000  198720
            195180  0.0000  0.0000  195180
            196140  0.0000  0.0000  196140
   214.438   27526  0.0000  0.0000   27526
             27586  0.0000  0.0000   27586
             29107  0.0000  0.0000   29107
   220.353   10739  318.08  0.0000   10421
             10743  318.43  0.0000   10425
             10849  316.89  0.0000   10532
   327.396  158510  0.0000  0.0000  158510
            162820  0.0000  0.0000  162820
            167390  0.0000  0.0000  167390

--- 7:22:07  7/28/93 -----
```

esults for STDHIGH #MEAS.=5 (K)

	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	196680/ 0.93%	Cd	28073/ 3.2%	Pb	10459/ 0.60%	Cu	162910/ 2.7%

ntensities for Recalibration:

El	Wave	LOW	HI
n	213.856	STDLOW: 220.4185	STDHIGH: 196678.3045
d	214.438	STDLOW: 130.0000	STDHIGH: 28073.1724
o	220.353	STDLOW: 11.4822	STDHIGH: 10459.1871
u	327.396	STDLOW: 1764.1714	STDHIGH: 162905.6374

egression Results :

l	Wave	Intercept	Slope	2nd Order
n	213.856	-0.00560981	0.0000254507	0.00000
d	214.438	-0.0116307	0.0000894673	0.00000
o	220.353	-0.0109901	0.000957148	0.00000
u	327.396	-0.0547398	0.0000310286	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
n 213.856					
	STDLOW	220.42	0.0000	0.0000	0.0
	STDHIGH	196680	5.0000	5.0000	0.0
d 214.438					
	STDLOW	130.00	0.0000	0.0000	0.0
	STDHIGH	28073	2.5000	2.5000	0.0
o 220.353					
	STDLOW	11.482	0.0000	0.0000	0.0
	STDHIGH	10459	10.000	10.000	0.0
u 327.396					
	STDLOW	1764.2	0.0000	0.0000	0.0
	STDHIGH	162910	5.0000	5.0000	0.0

nal Regression Results for Method : WATER

Opt.	Wave	Intercept	Slope	2nd Order
n	213.856	-0.00560981	0.0000254507	0.00000
d	214.438	-0.0116307	0.0000894673	0.00000
o	220.353	-0.0109901	0.000957148	0.00000
u	327.396	-0.0547398	0.0000310286	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.132602nm #Steps = 134.38

easurements for NBS1643C- - 1

n	213.856	2670.4	0.0000	0.0000	2670.4	0.06235 PPM
		2750.9	0.0000	0.0000	2750.9	0.06440 PPM
		2714.4	0.0000	0.0000	2714.4	0.06347 PPM
d	214.438	287.27	0.0000	0.0000	287.27	0.01407 PPM
		272.98	0.0000	0.0000	272.98	0.01279 PPM
		278.10	0.0000	0.0000	278.10	0.01325 PPM
o	220.353	316.31	280.82	0.0000	35.492	0.02298 PPM
		315.29	281.35	0.0000	33.941	0.02150 PPM
		322.04	282.08	0.0000	39.956	0.02725 PPM
u	327.396	2478.2	0.0000	0.0000	2478.2	0.02216 PPM
		2518.4	0.0000	0.0000	2518.4	0.02340 PPM
		2464.8	0.0000	0.0000	2464.8	0.02174 PPM

----- 7:38:00 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

L	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma
n*	0.06341/ 1.6%	Cd	0.01337/ 4.8%	Pb	0.02391/ 13%	Cu	0.02243/ 3.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137203nm #Steps = 139.04
n : 213.856nm (calc: 214.063273nm) Offset = -0.186801nm #Steps = -190.56

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138238nm #Steps = 140.09
d : 214.438nm (calc: 214.638000nm) Offset = -0.178083nm #Steps = -181.70

ef. 193.031nm (calc: 193.041739nm) Offset = 0.139052nm #Steps = 140.92
b : 220.353nm (calc: 220.546682nm) Offset = -0.166293nm #Steps = -170.02

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137269nm #Steps = 139.11
u : 327.396nm (calc: 327.567682nm) Offset = -0.094711nm #Steps = -101.64

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138747nm #Steps = 140.61

esults for STDLOW

n	213.856	208.23	0.0000	0.0000	208.23
		210.83	0.0000	0.0000	210.83
		211.88	0.0000	0.0000	211.88
d	214.438	126.75	0.0000	0.0000	126.75 *
		126.44	0.0000	0.0000	126.44 *
		125.52	0.0000	0.0000	125.52 *
		Calculation around 0			
b	220.353	236.71	235.09	0.0000	1.6133 *
		238.40	235.61	0.0000	2.7933 *
		238.21	235.57	0.0000	2.6400 *
		Calculation around 0			
u	327.396	1489.9	0.0000	0.0000	1489.9
		1493.3	0.0000	0.0000	1493.3
		1529.1	0.0000	0.0000	1529.1

---- 9:02:52 7/28/93 -----

esults for STDLOW #MEAS.=3 (R)

L	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	210.31/ 0.89%	Cd*	126.24/ 0.51%	Pb*	2.3489/ 27%	Cu	1504.1/ 1.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137736nm #Steps = 139.58

esults for STDHIGH

n	213.856	170890	0.0000	0.0000	170890
		177110	0.0000	0.0000	177110
		177750	0.0000	0.0000	177750
d	214.438	22559	0.0000	0.0000	22559
		22693	0.0000	0.0000	22693
		22187	0.0000	0.0000	22187
b	220.353	8379.3	294.05	0.0000	8085.2
		8319.8	295.01	0.0000	8024.7
		8384.1	300.32	0.0000	8083.7
u	327.396	159850	0.0000	0.0000	159850
		164450	0.0000	0.0000	164450

ample NBS1643C- - 1 #MEAS.= 3

L	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma
n	0.06341/ 1.6%	Cd	0.01337/ 4.8%	Pb	0.02391/ 13%	Cu	0.02243/ 3.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137203nm #Steps = 139.04
n : 213.856nm (calc: 214.063273nm) Offset = -0.186801nm #Steps = -190.56

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138238nm #Steps = 140.09
d : 214.438nm (calc: 214.638000nm) Offset = -0.178083nm #Steps = -181.70

ef. 193.031nm (calc: 193.041739nm) Offset = 0.139052nm #Steps = 140.92
b : 220.353nm (calc: 220.546682nm) Offset = -0.166293nm #Steps = -170.02

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137269nm #Steps = 139.11
u : 327.396nm (calc: 327.567682nm) Offset = -0.094711nm #Steps = -101.64

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138747nm #Steps = 140.61

esults for STDLOW

n	213.856	208.23	0.0000	0.0000	208.23
		210.83	0.0000	0.0000	210.83
		211.88	0.0000	0.0000	211.88
d	214.438	126.75	0.0000	0.0000	126.75 *
		126.44	0.0000	0.0000	126.44 *
		125.52	0.0000	0.0000	125.52 *
		Calculation around 0			
b	220.353	236.71	235.09	0.0000	1.6133 *
		238.40	235.61	0.0000	2.7933 *
		238.21	235.57	0.0000	2.6400 *
		Calculation around 0			
u	327.396	1489.9	0.0000	0.0000	1489.9
		1493.3	0.0000	0.0000	1493.3
		1529.1	0.0000	0.0000	1529.1

----- 9:02:52 7/28/93 -----

esults for STDLOW #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	210.31/ 0.89%	Cd*	126.24/ 0.51%	Pb*	2.3489/ 27%	Cu	1504.1/ 1.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137736nm #Steps = 139.58

esults for STDHIGH

n	213.856	170890	0.0000	0.0000	170890
		177110	0.0000	0.0000	177110
		177750	0.0000	0.0000	177750
d	214.438	22559	0.0000	0.0000	22559
		22693	0.0000	0.0000	22693
		22187	0.0000	0.0000	22187
b	220.353	8379.3	294.05	0.0000	8085.2
		8319.8	295.01	0.0000	8024.7
		8384.1	300.32	0.0000	8083.7
u	327.396	159850	0.0000	0.0000	159850

----- 9:19:30 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ample NBS1643C- - 1 #MEAS.= 3

	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
n	0.06057/	0.38%	Cd	0.01185/	2.1%	Pb	0.03840/	5.5%	Cu	0.01306/	3.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138282nm #Steps = 140.14

easurements for BLK-203564- 1

n	213.856	178.58	0.0000	0.0000	178.58	-0.00091 PPM
		176.00	0.0000	0.0000	176.00	-0.00098 PPM
		176.20	0.0000	0.0000	176.20	-0.00097 PPM
d	214.438	95.820	0.0000	0.0000	95.820	-0.00340 PPM *
		97.747	0.0000	0.0000	97.747	-0.00319 PPM *
		95.500	0.0000	0.0000	95.500	-0.00344 PPM *
		Calculation around 0				
b	220.353	179.31	178.28	0.0000	1.0333	-0.00163 PPM *
		177.30	177.56	0.0000	-0.26000	-0.00324 PPM *
		181.09	179.81	0.0000	1.2867	-0.00132 PPM *
		Calculation around 0				
u	327.396	1244.4	0.0000	0.0000	1244.4	-0.00812 PPM
		1246.7	0.0000	0.0000	1246.7	-0.00804 PPM
		1294.5	0.0000	0.0000	1294.5	-0.00655 PPM

----- 9:30:37 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ample BLK-203564- 1 #MEAS.= 3

	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
n	-0.00095/	4.3%	Cd*	-0.00334/	4.1%	Pb*	-0.00206/	50%	Cu	-0.00757/	12%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138542nm #Steps = 140.40

easurements for A RC 7/26-203564- 1

n	213.856	19057	0.0000	0.0000	19057	0.5393 PPM	(Blk : -0.001)
		20140	0.0000	0.0000	20140	0.5702 PPM	(Blk : -0.001)
		19550	0.0000	0.0000	19550	0.5534 PPM	(Blk : -0.001)
d	214.438	281.43	0.0000	0.0000	281.43	0.02070 PPM	(Blk : -0.003)
		274.80	0.0000	0.0000	274.80	0.01996 PPM	(Blk : -0.003)
		275.80	0.0000	0.0000	275.80	0.02007 PPM	(Blk : -0.003)
b	220.353	334.25	250.82	0.0000	83.429	0.1026 PPM	(Blk : -0.002)
		336.17	251.89	0.0000	84.281	0.1037 PPM	(Blk : -0.002)
		342.16	250.96	0.0000	91.196	0.1123 PPM	(Blk : -0.002)
u	327.396	1694.5	0.0000	0.0000	1694.5	0.01352 PPM	(Blk : -0.008)
		1730.2	0.0000	0.0000	1730.2	0.01464 PPM	(Blk : -0.008)
		1750.9	0.0000	0.0000	1750.9	0.01528 PPM	(Blk : -0.008)

----- 9:36:38 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ample A RC 7/26-203564- 1 #MEAS.= 3

	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138053nm #Steps = 139.90

urements for RCO 7/28-203564- 1

n	213.856	9100.9	0.0000	0.0000	9100.9	0.2549	PPM	(BlK :	-0.001)
		8985.0	0.0000	0.0000	8985.0	0.2516	PPM	(BlK :	-0.001)
		9273.5	0.0000	0.0000	9273.5	0.2598	PPM	(BlK :	-0.001)
d	214.438	215.69	0.0000	0.0000	215.69	0.01335	PPM	(BlK :	-0.003)
		220.88	0.0000	0.0000	220.88	0.01393	PPM	(BlK :	-0.003)
		215.90	0.0000	0.0000	215.90	0.01337	PPM	(BlK :	-0.003)
b	220.353	722.78	255.57	0.0000	467.21	0.5787	PPM	(BlK :	-0.002)
		723.86	256.51	0.0000	467.35	0.5788	PPM	(BlK :	-0.002)
		733.37	256.95	0.0000	476.42	0.5901	PPM	(BlK :	-0.002)
u	327.396	2021.0	0.0000	0.0000	2021.0	0.02372	PPM	(BlK :	-0.008)
		2046.8	0.0000	0.0000	2046.8	0.02453	PPM	(BlK :	-0.008)
		2066.5	0.0000	0.0000	2066.5	0.02514	PPM	(BlK :	-0.008)

---- 9:42:39 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ample RCO 7/28-203564- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma
n	0.2555/ 1.6%	Cd	0.01355/ 2.4%	Pb	0.5825/ 1.1%	Cu	0.02447/ 2.9%

193.031nm (calc: 193.041739nm) Offset = 0.139460nm #Steps = 141.33

easurements for PLT WTR-203564- 1

n	213.856	23005	0.0000	0.0000	23005	0.6521	PPM	(BlK :	-0.001)
		19078	0.0000	0.0000	19078	0.5399	PPM	(BlK :	-0.001)
		22688	0.0000	0.0000	22688	0.6430	PPM	(BlK :	-0.001)
d	214.438	543.47	0.0000	0.0000	543.47	0.05000	PPM	(BlK :	-0.003)
		535.58	0.0000	0.0000	535.58	0.04912	PPM	(BlK :	-0.003)
		533.19	0.0000	0.0000	533.19	0.04886	PPM	(BlK :	-0.003)
b	220.353	919.91	260.29	0.0000	659.62	0.8173	PPM	(BlK :	-0.002)
		906.50	260.11	0.0000	646.39	0.8009	PPM	(BlK :	-0.002)
		945.77	261.44	0.0000	684.33	0.8480	PPM	(BlK :	-0.002)
u	327.396	2508.1	0.0000	0.0000	2508.1	0.03894	PPM	(BlK :	-0.008)
		2541.1	0.0000	0.0000	2541.1	0.03997	PPM	(BlK :	-0.008)
		2540.3	0.0000	0.0000	2540.3	0.03995	PPM	(BlK :	-0.008)

---- 9:48:39 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ample PLT WTR-203564- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma
n	0.6117/ 10%	Cd	0.04933/ 1.2%	Pb	0.8221/ 2.9%	Cu	0.03962/ 1.5%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138750nm #Steps = 140.61

easurements for NBS-206890- 1

213.856 2047.7 0.0000 0.0000 2047.7 0.05248 PPM

	2007.4	0.0000	0.0000	2007.4	0.05134 PPM
	2035.4	0.0000	0.0000	2035.4	0.05214 PPM
214.438	173.26	0.0000	0.0000	173.26	0.00526 PPM
	173.96	0.0000	0.0000	173.96	0.00534 PPM
	174.31	0.0000	0.0000	174.31	0.00538 PPM
.353	229.90	204.67	0.0000	25.231	0.02838 PPM
	226.57	198.89	0.0000	27.688	0.03143 PPM
	230.34	202.46	0.0000	27.877	0.03166 PPM
327.396	1872.3	0.0000	0.0000	1872.3	0.01151 PPM
	1871.7	0.0000	0.0000	1871.7	0.01149 PPM
	1912.6	0.0000	0.0000	1912.6	0.01276 PPM

-- 9:54:41 7/28/93 ----- Method: D:\WATER WITHOUT RATIO

ple NBS-206890- 1 #MEAS.= 3

CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma	EL	CONC/	sigma
0.05199/	1.1%	Cd	0.00532/	1.1%	Pb	0.03049/	6.0%	Cu	0.01192/	6.1%

. 193.031nm (calc: 193.041739nm) Offset = 0.140896nm #Steps = 142.79
: 193.699nm (calc: 193.699001nm) Offset = 0.000125nm #Steps = 0.13 *
: 193.699nm (calc: 193.699001nm) Offset = 0.000125nm #Steps = 0.13 *

. 193.031nm (calc: 193.041739nm) Offset = 0.141070nm #Steps = 142.96
: 220.353nm (calc: 220.546682nm) Offset = -0.164643nm #Steps = -168.33

193.031nm (calc: 193.041739nm) Offset = 0.140995nm #Steps = 142.89

sults for STDLOW

193.699	102.44	0.0000	83.540	18.895	
	103.08	0.0000	83.367	19.716	
	104.08	0.0000	82.707	21.377	
220.353	364.69	352.78	0.0000	11.913	*
	363.50	363.12	0.0000	0.38000	*
	362.84	358.96	0.0000	3.8800	*

Calculation around 0

---10:41:04 7/28/93 -----

sults for STDLOW #MEAS.=3 (R)

SIGNAL/sigma		EL	SIGNAL/sigma	
19.996/	6.3%	Pb*	5.3911/	110%

f. 193.031nm (calc: 193.041739nm) Offset = 0.142848nm #Steps = 144.76

esults for STDHIGH

	193.699	586.30	0.0000	107.41	478.89
		577.35	0.0000	111.78	465.57
		585.18	0.0000	107.87	477.30
b	220.353	1868.7	371.73	0.0000	1496.9
		1915.0	377.03	0.0000	1537.9
		1895.8	369.91	0.0000	1525.9

Results for STDHIGH #MEAS.=3 (R)

EL	SIGNAL/sigma	EL	SIGNAL/sigma
s	473.92/ 1.5%	Pb	1520.3/ 1.4%

ntensities for Recalibration:

El	Wave	LOW		HI	
s	193.699	STDLOW:	19.9959	STDHIGH:	473.9213
b	220.353	STDLOW:	5.3911	STDHIGH:	1520.2502

egression Results :

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0440511	0.00220301	0.00000
b	220.353	-0.00355882	0.000660127	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	19.996	0.0000	0.0000	0.0
	STDHIGH	473.92	1.0000	1.0000	0.0
b 220.353					
	STDLOW	5.3911	0.0000	0.0000	0.0
	STDHIGH	1520.3	1.0000	1.0000	0.0

inal Regression Results for Method : USAS

l	Wave	Intercept	Slope	2nd Order
s	193.699	-0.0440511	0.00220301	0.00000
b	220.353	-0.00355882	0.000660127	0.00000

CH1	G1	HV1	CH2	G2	HV2	PT	STEP#	wave	result 1	result 2
5752	3	990				-7	192124	193.1707	958.67	1.00
5950	3	990				-6	192126	193.1727	991.67	1.00
7527	3	990				-5	192128	193.1746	1254.50	1.00
8086	3	990				-4	192130	193.1766	1347.67	1.00
9925	3	990				-3	192132	193.1786	1654.17	1.00
10292	3	990				-2	192134	193.1806	1715.33	1.00
11104	3	990				-1	192136	193.1825	1850.67	1.00
10904	3	990				0	192138	193.1845	1817.33	1.00
10861	3	990				1	192140	193.1865	1810.17	1.00
9651	3	990				2	192142	193.1885	1608.50	1.00
8304	3	990				3	192144	193.1904	1384.00	1.00
7319	3	990				4	192146	193.1924	1219.83	1.00
5745	3	990				5	192148	193.1944	957.50	1.00
4354	3	990				6	192150	193.1963	725.67	1.00

---- 10:51:41 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample NBS-206890- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
[illegible]	.05544/ 14%	Pb	0.03255/ 6.6%

---- 10:57:51 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

[illegible] 1 #MEAS.= 3

s -0.01785/ 15% Pb*-0.00122/ 330%

11:03:02 7/28/93 ------ Method: D:\USAS WITHOUT RATIO

ample BLK-203564- 1 #MEAS.= 3

L CONC/ sigma EL CONC/ sigma

s -0.00487/ 220% Pb 0.1159/ 3.8%

----- 11:08:13 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample A RC 7/26-203564- 1 #MEAS.= 3

L CONC/ sigma EL CONC/ sigma

s -0.00148/ 120% Pb ~~0.5554/ 2.0%~~

---- 11:13:24 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample RCO 7/28-203564- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

s 0.02102/ 24% Pb 0.7903/ 1.7%

---- 11:18:36 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample PLTWTR 7/28-203564- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

s 0.04620/ 2.7% Pb -0.08459/ 1.1%

---- 11:23:47 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-206890- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma

s 0.04038/ 2.2% Pb* -0.1196/ 0.64% Missed

---- 11:30:14 7/28/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-206890- 1 #MEAS.= 3

	CONC/	sigma EL	CONC/	sigma
s	0.9619/	2.4% Pb	0.9599/	1.5%

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES

reported in ppm

28-JUL-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
7/26 AFTER RC	<.05	.55	.02	.11	.01		
7/28 RCO	<.05	.26	.01	.58	.02		
7/28 PLANT WATER	.05	.61	.05	.82	.04		

f. 193.031nm (calc: 193.041739nm) Offset = 0.139129nm #Steps = 140.99

easurements for 1 PB CTL-203405- 1

	214.438	586.71	0.0000	355.83	230.88	0.3401 PPM
		601.35	0.0000	356.53	244.82	0.3606 PPM
		592.26	0.0000	355.45	236.80	0.3488 PPM
	220.353	491.72	422.90	423.95	68.382	1.151 PPM
		502.52	425.28	423.97	77.787	1.305 PPM
		501.30	424.08	424.10	77.211	1.296 PPM

---- 11:07:44 8/10/93 ----- Method: D:\AUG13 WITHOUT RATIO

mple 1 PB CTL-203405- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma
	0.3498/ 2.9%	Pb	1.251/ 6.9%

f. 193.031nm (calc: 193.041739nm) Offset = 0.139882nm #Steps = 141.76

esults for STDLOW

	214.438	362.35	0.0000	355.73	6.6133 *
		356.33	0.0000	352.51	3.8133 *
		360.91	0.0000	360.45	0.46000 *
		Calculation around 0			
	220.353	432.41	420.67	425.34	9.8001 *
		427.30	424.95	425.47	2.1367 *
		421.73	421.87	425.16	-1.5118 *
		Calculation around 0			

----11:13:44 8/10/93 -----

esults for STDLOW #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma
	3.6289/ 85%	Pb*	3.4750/ 170%

f. 193.031nm (calc: 193.041739nm) Offset = 0.138396nm #Steps = 140.25

esults for STDHIGH

	214.438	2376.9	0.0000	370.33	2006.5
		2389.1	0.0000	373.79	2015.3
		2370.6	0.0000	375.49	1995.1
	220.353	1077.8	430.17	431.31	647.11
		1080.4	424.38	429.17	654.04
		1096.7	431.86	427.29	666.74

----11:19:09 8/10/93 -----

esults for STDHIGH #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma

tensities for Recalibration:

El	Wave	LOW		HI	
d	214.438	STDLOW:	3.6289	STDHIGH:	2005.6617
b	220.353	STDLOW:	3.4750	STDHIGH:	655.9627

egression Results :

l	Wave	Intercept	Slope	2nd Order
d	214.438	-0.00453151	0.00124873	0.00000
b	220.353	-0.0532582	0.0153260	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
d 214.438					
	STDLOW	3.6289	0.0000	0.0000	0.0
	STDHIGH	2005.7	2.5000	2.5000	0.0
b 220.353					
	STDLOW	3.4750	0.0000	0.0000	0.0
	STDHIGH	655.96	10.000	10.000	0.0

inal Regression Results for Method : AUG13

l	Opt.	Wave	Intercept	Slope	2nd Order
d		214.438	-0.00453151	0.00124873	0.00000
b		220.353	-0.0532582	0.0153260	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.138564nm #Steps = 140.42

rements for 1 PB CTL-203405- 1

d	214.438	607.64	0.0000	355.99	251.66	0.3097 PPM
		594.75	0.0000	361.41	233.33	0.2868 PPM
		597.46	0.0000	357.27	240.19	0.2954 PPM
b	220.353	500.74	423.06	423.41	77.533	1.135 PPM
		499.52	426.37	428.01	72.472	1.057 PPM
		491.70	425.20	419.89	68.716	0.9999 PPM

---- 11:26:49 8/10/93 ----- Method: D:\AUG13 WITHOUT RATIO

ample 1 PB CTL-203405- 1 #MEAS.= 3

	CONC/	sigma EL	CONC/	sigma
d	0.2973/	3.9% Pb	1.064/	6.4%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.139106nm #Steps = 140.97

easurements for RC OVR 8/10-208384- 1

d	214.438	410.42	0.0000	385.04	25.383	0.02716 PPM
		414.55	0.0000	384.19	30.365	0.03339 PPM
		416.16	0.0000	380.77	35.397	0.03967 PPM
b	220.353	521.37	444.07	445.73	76.609	1.121 PPM
		514.87	444.53	450.07	68.037	0.9895 PPM
		519.01	440.12	448.21	75.522	1.104 PPM

---- 11:32:10 8/10/93 ----- Method: D:\AUG13 WITHOUT RATIO

```
      CONC/ sigma EL      CONC/ sigma

d  0.03341/   19% Pb     1.072/  6.7%


193.031nm (calc: 193.041739nm)  Offset =  0.140325nm  #Steps =  142.21

easurements for SVG 8/10-208385-                1

d   214.438  387.37  0.0000  380.06  7.3133 0.00460 PPM *
             385.11  0.0000  384.03  1.0733-0.00319 PPM *
             382.54  0.0000  381.80 0.74000-0.00361 PPM *
           Calculation around 0
    220.353  656.77  443.89  441.99  213.67   3.222 PPM
             662.38  446.90  446.43  215.68   3.252 PPM
             665.83  442.02  445.07  222.54   3.357 PPM

---- 11:37:31  8/10/93 -----   Method:  D:\AUG13 WITHOUT RATIO

mple SVG 8/10-208385-                1 #MEAS.= 3

      CONC/ sigma EL      CONC/ sigma

1*-0.00073/  630% Pb    3.277/  2.2%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.139903nm  #Steps =  141.78

ements for BF GRN 8/10-208386-                1

    214.438  2582.8  0.0000  439.93  2142.8   2.671 PPM
             2566.4  0.0000  445.13  2121.3   2.644 PPM
             2533.3  0.0000  438.47  2094.8   2.611 PPM
    220.353  5502.5  517.20  519.40  4984.4   76.34 PPM
             5526.4  516.67  523.87  5006.8   76.68 PPM
             5617.7  519.80  520.13  5097.8   78.07 PPM

--- 11:42:52  8/10/93 -----   Method:  D:\AUG13 WITHOUT RATIO

mple BF GRN 8/10-208386-                1 #MEAS.= 3

      CONC/ sigma EL      CONC/ sigma

     2.642/  1.1% Pb    77.03/  1.2%


f. 193.031nm (calc: 193.041739nm)  Offset =  0.140269nm  #Steps =  142.15

asurements for PPMP 8/10-208387-                1

    214.438  455.17  0.0000  418.93  36.241 0.04072 PPM
             452.48  0.0000  411.87  40.609 0.04618 PPM
             457.62  0.0000  416.93  40.684 0.04627 PPM
    220.353  2064.1  484.87  487.13  1578.3   24.14 PPM
             2039.7  487.67  487.87  1551.9   23.73 PPM
             2036.8  485.40  491.20  1548.9   23.69 PPM

--- 11:48:14  8/10/93 -----   Method:  D:\AUG13 WITHOUT RATIO
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THE DOE RUN COMPANY

SMELTING DIVISION
HERCULANEUM, MISSOURI

QUALITATIVE ANALYSIS FOR PB IN WWTP SAMPLES
reported in ppm

10-AUG-93 ANALYST = MARILYN PRG = AUG19

DATE	SAMPLE	PB ppm	RC pH	V NOTCH inches	GAL.	pounds per DAY
8/10	RC OVERFLOW	1.07				
8/10	SVG	3.3				
8/10	BF GRANULATOR	77.0				
8/10	PONTOON PUMP	23.9				
8/10	FOREBAY	5.6				

```
                82.867  0.0000  0.0000  82.867 0.00083 PPM *
                82.920  0.0000  0.0000  82.920 0.00065 PPM *
               Calculation around 0
     220.353    152.55  151.53  0.0000  1.0200 0.00087 PPM *
                151.25  152.05  0.0000-0.80000-0.00292 PPM *
                152.79  151.43  0.0000  1.3667 0.00159 PPM *
               Calculation around 0
     327.396    1283.8  0.0000  0.0000  1283.8 0.00192 PPM
                1276.7  0.0000  0.0000  1276.7 0.00160 PPM
                1288.5  0.0000  0.0000  1288.5 0.00213 PPM

----- 11:27:58  8/13/93 -----    Method:  D:\WATER WITHOUT RATIO

ample BLK-204405-                1 #MEAS.= 3

L      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma

n  0.00157/   83% Cd* 0.00069/   11% Pb*-0.00015/+o***% Cu  0.00188/   14%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.134052nm  #Steps =  135.85

easurements for SVG 1 8/12-204405-                1

n    213.856  875.47  0.0000  0.0000  875.47 0.02948 PPM  ( BlK :    0.002)
              882.23  0.0000  0.0000  882.23 0.02984 PPM  ( BlK :    0.002)
              860.31  0.0000  0.0000  860.31 0.02866 PPM  ( BlK :    0.002)
d    214.438  159.60  0.0000  0.0000  159.60 0.01896 PPM  ( BlK :    0.001)
              157.35  0.0000  0.0000  157.35 0.01841 PPM  ( BlK :    0.001)
              155.38  0.0000  0.0000  155.38 0.01792 PPM  ( BlK :    0.001)
     220.353  237.86  212.35  0.0000  25.511 0.05203 PPM  ( BlK :   -0.000)
              238.11  210.70  0.0000  27.411 0.05599 PPM  ( BlK :   -0.000)
              238.82  210.49  0.0000  28.325 0.05789 PPM  ( BlK :   -0.000)
     327.396  1516.2  0.0000  0.0000  1516.2 0.01048 PPM  ( BlK :    0.002)
              1523.7  0.0000  0.0000  1523.7 0.01081 PPM  ( BlK :    0.002)
              1533.7  0.0000  0.0000  1533.7 0.01126 PPM  ( BlK :    0.002)

----- 11:33:59  8/13/93 -----    Method:  D:\WATER WITHOUT RATIO

ample SVG 1 8/12-204405-                1 #MEAS.= 3

L      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma EL      CONC/ sigma

n  0.02933/  2.1% Cd  0.01843/  2.8% Pb  0.05530/  5.4% Cu  0.01085/  3.6%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.134037nm  #Steps =  135.83

easurements for SVG 3 8/12-204405-                1

     213.856  1124.4  0.0000  0.0000  1124.4 0.04291 PPM  ( BlK :    0.002)
              1140.8  0.0000  0.0000  1140.8 0.04380 PPM  ( BlK :    0.002)
              1151.6  0.0000  0.0000  1151.6 0.04438 PPM  ( BlK :    0.002)
     214.438  183.45  0.0000  0.0000  183.45 0.02487 PPM  ( BlK :    0.001)
              182.12  0.0000  0.0000  182.12 0.02454 PPM  ( BlK :    0.001)
              183.01  0.0000  0.0000  183.01 0.02477 PPM  ( BlK :    0.001)
     220.353  277.01  214.85  0.0000  62.153  0.1283 PPM  ( BlK :   -0.000)
              269.64  212.11  0.0000  57.534  0.1187 PPM  ( BlK :   -0.000)
              273.27  213.57  0.0000  59.693  0.1232 PPM  ( BlK :   -0.000)
     327.396  1492.3  0.0000  0.0000  1492.3 0.00940 PPM  ( BlK :    0.002)
              1477.2  0.0000  0.0000  1477.2 0.00873 PPM  ( BlK :    0.002)
```

1477.9 0.0000 0.0000 1477.9 0.00876 PPM (Blk : 0.0027

---- 11:40:00 8/13/93 ----- Method: D:\WATER WITHOUT RATIO

ample SVG 3 8/12-204405- 1 #MEAS.= 3

L	CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma
n	0.04369/	1.7%	Cd	0.02473/	0.68%	Pb	0.1234/	3.9%	Cu	0.00896/	4.3%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.135097nm #Steps = 136.91

easurements for CRO TNK8/12-204405- 1

n	213.856	6137.3	0.0000	0.0000	6137.3	0.3134	PPM	(Blk :	0.002)
		6270.2	0.0000	0.0000	6270.2	0.3206	PPM	(Blk :	0.002)
		6070.3	0.0000	0.0000	6070.3	0.3098	PPM	(Blk :	0.002)
d	214.438	271.93	0.0000	0.0000	271.93	0.04680	PPM	(Blk :	0.001)
		269.96	0.0000	0.0000	269.96	0.04631	PPM	(Blk :	0.001)
		274.68	0.0000	0.0000	274.68	0.04748	PPM	(Blk :	0.001)
b	220.353	422.02	218.58	0.0000	203.44	0.4226	PPM	(Blk :	-0.000)
		418.72	214.45	0.0000	204.27	0.4243	PPM	(Blk :	-0.000)
		424.65	217.57	0.0000	207.08	0.4302	PPM	(Blk :	-0.000)
u	327.396	1398.1	0.0000	0.0000	1398.1	0.00517	PPM	(Blk :	0.002)
		1398.2	0.0000	0.0000	1398.2	0.00518	PPM	(Blk :	0.002)
		1425.8	0.0000	0.0000	1425.8	0.00642	PPM	(Blk :	0.002)

---- 11:46:01 8/13/93 ----- Method: D:\WATER WITHOUT RATIO

le CRO TNK8/12-204405- 1 #MEAS.= 3

L	CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma
n	0.3146/	1.7%	Cd	0.04687/	1.3%	Pb	0.4257/	0.93%	Cu	0.00559/	13%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.135234nm #Steps = 137.05

easurements for CTL-204405- 1

n	213.856	5485.0	0.0000	0.0000	5485.0	0.2798	PPM
		5501.3	0.0000	0.0000	5501.3	0.2807	PPM
		5381.3	0.0000	0.0000	5381.3	0.2742	PPM
d	214.438	1368.4	0.0000	0.0000	1368.4	0.3192	PPM
		1364.8	0.0000	0.0000	1364.8	0.3183	PPM
		1412.9	0.0000	0.0000	1412.9	0.3302	PPM
b	220.353	657.29	165.36	0.0000	491.93	1.023	PPM
		657.89	167.45	0.0000	490.45	1.020	PPM
		659.61	164.46	0.0000	495.15	1.030	PPM
u	327.396	6303.8	0.0000	0.0000	6303.8	0.2275	PPM
		6442.7	0.0000	0.0000	6442.7	0.2337	PPM
		6388.5	0.0000	0.0000	6388.5	0.2313	PPM

- 11:52:02 8/13/93 ----- Method: D:\WATER WITHOUT RATIO

ample CTL-204405- 1 #MEAS.= 3

L	CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma EL		CONC/	sigma
n	0.2782/	1.3%	Cd	0.3226/	2.1%	Pb	1.025/	0.49%	Cu	0.2308/	1.4%

Regression Results :

El	Wave	Intercept	Slope	2nd Order
As	193.699	-0.0440511	0.00220301	0.00000
Pb	220.353	-0.00355882	0.000660127	0.00000

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.136280nm #Steps = 138.11
As : 193.699nm (calc: 193.699001nm) Offset = -0.007768nm #Steps = -7.87 *
As : 193.699nm (calc: 193.699001nm) Offset = -0.007768nm #Steps = -7.87 *

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.136297nm #Steps = 138.13

Results for STDLOW

As	193.699	81.812	0.0000	80.453	1.3582
		81.459	0.0000	80.053	1.4059
		83.263	0.0000	79.513	3.7495

-----12:01:59 8/13/93 -----

Results for STDLOW #MEAS.=3 (R)

EL SIGNAL/sigma

As 2.1712/ 63%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.135279nm #Steps = 137.09

Results for STDHIGH

As	193.699	481.42	0.0000	130.65	350.77
		469.61	0.0000	132.04	337.57
		473.85	0.0000	132.32	341.53

----12:04:35 8/13/93 -----

Results for STDHIGH #MEAS.=3 (R)

EL SIGNAL/sigma

As 343.29/ 2.0%

Intensities for Recalibration:

El	Wave	LOW		HI	
As	193.699	STDLOW:	2.1712	STDHIGH:	343.2891

Regression Results :

El	Wave	Intercept	Slope	2nd Order
As	193.699	-0.00636493	0.00293154	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
As 193.699					
	STDLOW	2.1712	0.0000	0.0000	0.0
	STDHIGH	343.29	1.0000	1.0000	0.0

Final Regression Results for Method : [illegible]

```
ero order has been found at step number :      80736.0
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.131675nm  #Steps =  133.44
 : 213.856nm (calc: 214.063273nm)  Offset = -0.187499nm  #Steps = -191.27 *
 : 213.856nm (calc: 214.063273nm)  Offset = -0.189523nm  #Steps = -193.34

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.128482nm  #Steps =  130.21
 214.438nm (calc: 214.638000nm)  Offset = -0.174947nm  #Steps = -178.50

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.129672nm  #Steps =  131.41
b : 220.353nm (calc: 220.546682nm)  Offset = -0.168116nm  #Steps = -171.88

ef. 193.031nm (calc: 193.041739nm)  Offset =  0.129347nm  #Steps =  131.08
 : 327.396nm (calc: 327.567682nm)  Offset = -0.089418nm  #Steps =  -95.96
```

ef. 193.031nm (calc: 193.041739nm)

esults for STDLOW

n	213.856	341.62	0.0000	0.0000	341.62	
		292.08	0.0000	0.0000	292.08	
		266.40	0.0000	0.0000	266.40	
d	214.438	80.073	0.0000	0.0000	80.073	*
		79.907	0.0000	0.0000	79.907	*
		80.940	0.0000	0.0000	80.940	*
		Calculation around 0				
b	220.353	149.65	150.01	0.0000	-0.36000	*
		151.43	149.20	0.0000	2.2267	*
		150.29	150.35	0.0000	-0.06000	*
		Calculation around 0				
u	327.396	1242.2	0.0000	0.0000	1242.2	
		1240.3	0.0000	0.0000	1240.3	
		1241.0	0.0000	0.0000	1241.0	

-----11:08:38 8/13/93 -----

esults for STDLOW #MEAS.=3 (R)

L	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	300.03/ 13%	Cd*	80.307/ 0.69%	Pb*	0.60222/ 230%	Cu	1241.2/ 0.08%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131690nm #Steps = 133.46

esults for STDHIGH

n	213.856	91840	0.0000	0.0000	91840
		92515	0.0000	0.0000	92515
		94532	0.0000	0.0000	94532
d	214.438	10252	0.0000	0.0000	10252
		10183	0.0000	0.0000	10183
		10071	0.0000	0.0000	10071
b	220.353	4997.4	184.35	0.0000	4813.0
		4990.2	184.21	0.0000	4806.0
		4974.7	187.64	0.0000	4787.1
u	327.396	113790	0.0000	0.0000	113790
		111270	0.0000	0.0000	111270
		112480	0.0000	0.0000	112480

-----11:14:37 8/13/93 -----

esults for STDHIGH #MEAS.=3 (R)

L	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	92962/ 1.5%	Cd	10169/ 0.90%	Pb	4802.0/ 0.28%	Cu	112510/ 1.1%

ntensities for Recalibration:

	Wave	LOW	HI
n	213.856	STDLOW: 300.0314	STDHIGH: 92962.4813
d	214.438	STDLOW: 80.3067	STDHIGH: 10168.5593
b	220.353	STDLOW: 0.6022	STDHIGH: 4802.0321
u	327.396	STDLOW: 1241.1719	STDHIGH: 112513.6358

egression Results :

Wave	Intercept	Slope	2nd Order
213.856	-0.0161895	0.0000539593	0.00000
214.438	-0.0199010	0.000247813	0.00000
220.353	-0.00125426	0.00208271	0.00000
327.396	-0.0557717	0.0000449347	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
213.856					
	STDLOW	300.03	0.0000	0.0000	0.0
	STDHIGH	92962	5.0000	5.0000	0.0
214.438					
	STDLOW	80.307	0.0000	0.0000	0.0
	STDHIGH	10169	2.5000	2.5000	0.0
220.353					
	STDLOW	0.60222	0.0000	0.0000	0.0
	STDHIGH	4802.0	10.000	10.000	0.0
327.396					
	STDLOW	1241.2	0.0000	0.0000	0.0
	STDHIGH	112510	5.0000	5.0000	0.0

inal Regression Results for Method : WATER

Opt.	Wave	Intercept	Slope	2nd Order
	213.856	-0.0161895	0.0000539593	0.00000
	214.438	-0.0199010	0.000247813	0.00000
	220.353	-0.00125426	0.00208271	0.00000
	327.396	-0.0557717	0.0000449347	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.131996nm #Steps = 133.77

urements for CTL-204405- 1

213.856	5584.7	0.0000	0.0000	5584.7	0.2852	PPM
	5686.4	0.0000	0.0000	5686.4	0.2906	PPM
	5579.4	0.0000	0.0000	5579.4	0.2849	PPM
214.438	1306.0	0.0000	0.0000	1306.0	0.3037	PPM
	1360.5	0.0000	0.0000	1360.5	0.3173	PPM
	1362.7	0.0000	0.0000	1362.7	0.3178	PPM
220.353	663.65	163.05	0.0000	500.60	1.041	PPM
	674.20	164.20	0.0000	510.00	1.061	PPM
	664.98	161.67	0.0000	503.31	1.047	PPM
327.396	7618.2	0.0000	0.0000	7618.2	0.2865	PPM
	7651.5	0.0000	0.0000	7651.5	0.2880	PPM
	7650.0	0.0000	0.0000	7650.0	0.2880	PPM

---- 11:21:39 8/13/93 ----- Method: D:\WATER WITHOUT RATIO

ample CTL-204405- 1 #MEAS.= 3

	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma	EL	CONC/ sigma
	0.2869/ 1.1%	Cd	0.3129/ 2.5%	Pb	1.050/ 0.96%	Cu	0.2875/ 0.29%

193.031nm (calc: 193.041739nm) Offset = 0.133185nm #Steps = 134.97

easurements for BLK-204405- 1

213.856	302.93	0.0000	0.0000	302.93	0.00016	PPM
	334.37	0.0000	0.0000	334.37	0.00185	PPM
	350.24	0.0000	0.0000	350.24	0.00271	PPM

```
El Opt.  Wave          Intercept          Slope          2nd Order
As      193.699     -0.00636493       0.00293154         0.00000

Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.136630nm  #Steps =  138.46

Measurements for CTL-203405-                  1

As   193.699  535.85  0.0000  130.71  405.14   1.181 PPM
              543.02  0.0000  129.24  413.78   1.207 PPM
              530.80  0.0000  131.35  399.45   1.165 PPM

----- 12:08:28  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample CTL-203405-                1 #MEAS.= 3

EL      CONC/ sigma

As     1.184/  1.8%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.136213nm  #Steps =  138.04

Measurements for BLK-203405-                  1

As   193.699  81.216  0.0000  79.547  1.6694-0.00147 PPM
              79.148  0.0000  77.307  1.8414-0.00097 PPM
              78.633  0.0000  79.813 -1.1800-0.00982 PPM *
              79.140  0.0000  79.613-0.47333-0.00775 PPM *
              77.707  0.0000  79.507 -1.8000-0.01164 PPM *
             Total number of measurements : 5
             Nb of meas.  with peak found : 2
             Calculation around 0

---- 12:14:31  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample BLK-203405-                1 #MEAS.= 3

EL      CONC/ sigma

As*-0.00974/   20%


Ref. 193.031nm (calc: 193.041739nm)  Offset =  0.136587nm  #Steps =  138.42

Measurements for SVG1 8/12-            -              1

As   193.699  197.28  0.0000  170.29  26.983 0.08247 PPM  ( BlK :   -0.010)
              197.98  0.0000  171.91  26.072 0.07981 PPM  ( BlK :   -0.010)
              200.85  0.0000  171.94  28.914 0.08814 PPM  ( BlK :   -0.010)

---- 12:19:30  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample SVG1 8/12-            -              1 #MEAS.= 3

EL      CONC/ sigma

As  0.08347/  5.1%
```

```
ef. 193.031nm (calc: 193.041739nm)  Offset =  0.136921nm  #Steps =  138.7

easurements for SVG3 8/12-              -                1

s   193.699  196.43  0.0000  170.24  26.188 0.08015 PPM  ( BlK :   -0.010)
             200.78  0.0000  169.86  30.919 0.09402 PPM  ( BlK :   -0.010)
             195.91  0.0000  172.61  23.292 0.07166 PPM  ( BlK :   -0.010)

---- 12:24:05  8/13/93 -----   Method:  D:\USAS WITHOUT RATIO

ample SVG3 8/12-              -                1 #MEAS.= 3

L      CONC/ sigma

s  0.08194/   14%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.136920nm  #Steps =  138.76

easurements for CRO TNK 812-              -                1

s   193.699  203.70  0.0000  174.41  29.284 0.08922 PPM  ( BlK :   -0.010)
             204.47  0.0000  176.62  27.847 0.08501 PPM  ( BlK :   -0.010)
             205.28  0.0000  176.32  28.956 0.08826 PPM  ( BlK :   -0.010)

---- 12:28:40  8/13/93 -----   Method:  D:\USAS WITHOUT RATIO

ample CRO TNK 812-              -                1 #MEAS.= 3

L      CONC/ sigma

s  0.08750/  2.5%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.136508nm  #Steps =  138.34

easurements for CTL-              -                1

s   193.699  526.51  0.0000  130.84  395.67   1.163 PPM  ( BlK :   -0.010)
             466.78  0.0000  136.34  330.44  0.9721 PPM  ( BlK :   -0.010)
             527.61  0.0000  129.45  398.16   1.171 PPM  ( BlK :   -0.010)

---- 12:33:14  8/13/93 -----   Method:  D:\USAS WITHOUT RATIO

ample CTL-              -                1 #MEAS.= 3

L      CONC/ sigma

s    1.102/   10%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.136840nm  #Steps =  138.68

easurements for RCO 8/10-              -                1

s   193.699  199.93  0.0000  165.47  34.461  0.1044 PPM  ( BlK :   -0.010)
             197.52  0.0000  168.24  29.278 0.08920 PPM  ( BlK :   -0.010)
             197.28  0.0000  169.16  28.123 0.08582 PPM  ( BlK :   -0.010)

---- 12:37:48  8/13/93 -----
```

```
ample RCO 8/10-                -                    1 #MEAS.= 3

L3      CONC/ sigma

s  0.09314/   11%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.137759nm  #Steps =  139.61

easurements for SVG 8/10-              -                  1

s   193.699  188.43  0.0000  166.39  22.038 0.06798 PPM  ( BlK :   -0.010)
             186.02  0.0000  168.51  17.509 0.05470 PPM  ( BlK :   -0.010)
             189.03  0.0000  166.65  22.373 0.06896 PPM  ( BlK :   -0.010)

----- 12:42:22  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

ample SVG 8/10-                -                    1 #MEAS.= 3

L      CONC/ sigma

s  0.06388/   12%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.136901nm  #Steps =  138.74

easurements for PNTN 8/12-              -                  1

s   193.699  210.65  0.0000  182.53  28.126 0.08583 PPM  ( BlK :   -0.010)
             208.95  0.0000  183.64  25.312 0.07758 PPM  ( BlK :   -0.010)
             209.62  0.0000  185.10  24.518 0.07525 PPM  ( BlK :   -0.010)

----- 12:46:56  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

ample PNTN 8/12-               -                    1 #MEAS.= 3

      CONC/ sigma

s  0.07955/  7.0%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.137915nm  #Steps =  139.76

easurements for 4BAY-8/12-                  1

s   193.699  220.60  0.0000  174.57  46.024  0.1383 PPM  ( BlK :   -0.010)
             222.28  0.0000  175.73  46.545  0.1398 PPM  ( BlK :   -0.010)
             220.75  0.0000  174.49  46.262  0.1390 PPM  ( BlK :   -0.010)

----- 12:51:31  8/13/93 -----    Method:  D:\USAS WITHOUT RATIO

e 4BAY-8/12-                   1 #MEAS.= 3

      CONC/ sigma

s   0.1390/ 0.55%
```

ef. 193.031nm (calc: 193.041739nm) Offset = 0.137482nm #Steps = 139.33

easurements for BF GRAN 812- - 1

3

s	193.699	140.43	0.0000	123.55	16.877	0.05285 PPM	(Blk :	-0.010)
		137.04	0.0000	122.47	14.573	0.04610 PPM	(Blk :	-0.010)
		137.36	0.0000	122.53	14.831	0.04685 PPM	(Blk :	-0.010)

------ 12:56:05 8/13/93 ------ Method: D:\USAS WITHOUT RATIO

ample BF GRAN 812- - 1 #MEAS.= 3

L CONC/ sigma

s 0.04860/ 7.6%

MONTHLY FLOW AND SAMPLE LOG FOR July 1993

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
PREV											
1				Flooded			no	DISCHARGE			
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											

001 COMPOSITE SAMPLE DATE: _____ 1/MONTH - ¼ LITER EVERY 2 HRS.

001 GRAB pH DATE: _____ pH_____ 1/MONTH & 001 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

002 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGED

003 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

003 pH SAMPLE TO BE TAKEN 1/WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

DATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE: _____ -- pH _____ DATE: _____ -- pH _____

MONTHLY FLOW AND SAMPLE LOG FOR August 1993

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
PREV											
1											
2				Flooded							
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19							909830				TH
20							909830				TH
21											
22								0.882			EST
23								0.882			EST
24							912475	0.882			JML
25											
26											
27											
28							914598	2.123			AP
29							915281	2.319			AP
30							917600	1.010			KN
31							918610	1.592			KN

001 COMPOSITE SAMPLE DATE: _____ 1/MONTH - ¾ LITER EVERY 2 HRS.

001 GRAB pH DATE: _____ pH_____ 1/MONTH & 001 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

002 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGED

003 GRAB SAMPLE DATE: 7, 3 1/MONTH - ONE LITER 8/24 JML

003 pH SAMPLE TO BE TAKEN 1/WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

DATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE: _____ -- pH _____ DATE: _____ -- pH _____

n 127.92/ 0.67% Cd* 76.247/ 0.94% Pb*-0.47778/ 68% Cu 872.20/ 1.5%

e 193.031nm (calc: 193.031001nm) Offset = 0.146256nm #Steps = 148.22

esults for STDHIGH

n	213.856	89653	0.0000	0.0000	89653
		88871	0.0000	0.0000	88871
		91328	0.0000	0.0000	91328
d	214.438	9600.0	0.0000	0.0000	9600.0
		9579.5	0.0000	0.0000	9579.5
		9723.2	0.0000	0.0000	9723.2
b	220.353	4699.1	173.99	0.0000	4525.2
		4435.5	172.05	0.0000	4263.4
		4636.9	172.01	0.0000	4464.9
u	327.396	119000	0.0000	0.0000	119000
		117170	0.0000	0.0000	117170
		118210	0.0000	0.0000	118210

---- 8:36:00 8/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	89950/ 1.4%	Cd	9634.2/ 0.81%	Pb	4417.8/ 3.1%	Cu	118120/ 0.78%

ntensities for Recalibration:

El	Wave	LOW	HI
n	213.856	STDLOW: 127.9172	STDHIGH: 89950.4426
d	214.438	STDLOW: 76.2467	STDHIGH: 9634.2202
b	220.353	STDLOW: -0.4778	STDHIGH: 4417.8030
u	327.396	STDLOW: 872.2037	STDHIGH: 118123.1119

egression Results:

	Wave	Intercept	Slope	2nd Order
n	213.856	-0.00712055	0.0000556653	0.00000
d	214.438	-0.0199432	0.000261562	0.00000
b	220.353	0.00108137	0.00226332	0.00000
u	327.396	-0.0371939	0.0000426436	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
n	213.856				
	STDLOW	127.92	0.0000	0.0000	0.0
	STDHIGH	89950	5.0000	5.0000	0.0
d	214.438				
	STDLOW	76.247	0.0000	0.0000	0.0
	STDHIGH	9634.2	2.5000	2.5000	0.0
b	220.353				
	STDLOW	-0.47778	0.0000	0.0000	0.0
	STDHIGH	4417.8	10.000	10.000	0.0
u	327.396				
	STDLOW	872.20	0.0000	0.0000	0.0
	STDHIGH	118120	5.0000	5.0000	0.0

inal Regression Results for Method : WATER

Opt.	Wave	Intercept	Slope	2nd Order
Zn	213.856	-0.00712055	0.0000556653	0.00000
Cd	214.438	-0.0199432	0.000261562	0.00000
Pb	220.353	0.00108137	0.00226332	0.00000
Cu	327.396	-0.0371939	0.0000426436	0.00000

Re 193.031nm (calc: 193.031001nm) Offset = 0.147293nm #Steps = 149.27

Measurements for CTL-206890- 1

Zn	213.856	4984.7	0.0000	0.0000	4984.7	0.2704 PPM
		5041.4	0.0000	0.0000	5041.4	0.2735 PPM
		5151.3	0.0000	0.0000	5151.3	0.2796 PPM
Cd	214.438	1202.0	0.0000	0.0000	1202.0	0.2945 PPM
		1213.7	0.0000	0.0000	1213.7	0.2975 PPM
		1181.5	0.0000	0.0000	1181.5	0.2891 PPM
Pb	220.353	617.23	154.19	0.0000	463.04	1.049 PPM
		578.83	153.67	0.0000	425.16	0.9634 PPM
		577.75	152.88	0.0000	424.87	0.9627 PPM
Cu	327.396	6400.3	0.0000	0.0000	6400.3	0.2357 PPM
		6452.6	0.0000	0.0000	6452.6	0.2380 PPM
		6557.6	0.0000	0.0000	6557.6	0.2424 PPM

----- 8:52:42 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

Sample CTL-206890- 1 #MEAS.= 3

EL	CONC/	sigma
Zn	0.2745/	1.7%
Cd	0.2937/	1.5%
Pb	0.9917/	5.0%
Cu	0.2387/	1.4%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.144328nm #Steps = 146.26

easurements for BLK-209403- 1

n	213.856	148.15	0.0000	0.0000	148.15	0.00113 PPM
		148.97	0.0000	0.0000	148.97	0.00117 PPM
		150.28	0.0000	0.0000	150.28	0.00125 PPM
d	214.438	79.993	0.0000	0.0000	79.993	0.00098 PPM *
		78.293	0.0000	0.0000	78.293	0.00054 PPM *
		78.607	0.0000	0.0000	78.607	0.00062 PPM *
		Calculation around 0				
b	220.353	144.07	144.46	0.0000	-0.39333	0.00019 PPM *
		146.09	144.87	0.0000	1.2133	0.00383 PPM *
		144.97	145.27	0.0000	-0.30000	0.00040 PPM *
		Calculation around 0				
u	327.396	943.19	0.0000	0.0000	943.19	0.00303 PPM
		941.96	0.0000	0.0000	941.96	0.00298 PPM
		938.79	0.0000	0.0000	938.79	0.00284 PPM

----- 9:08:10 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

ample BLK-209403- 1 #MEAS.= 3

L	CONC/	sigma
n	0.00118/	15.1%

:d* 0.00071/ 33%

:b* 0.00147/ 140%

:u 0.00295/ 3.3%

(ef. 193.031nm (calc: 193.031001nm) Offset = 0.147069nm #Steps = 149.04

leasurements for 1-209416- 1

:n	213.856	546.85	0.0000	0.0000	546.85	0.02214	PPM	(BlK :	0.001)
		537.77	0.0000	0.0000	537.77	0.02163	PPM	(BlK :	0.001)
		535.07	0.0000	0.0000	535.07	0.02148	PPM	(BlK :	0.001)
:d	214.438	129.77	0.0000	0.0000	129.77	0.01329	PPM	(BlK :	0.001)
		127.46	0.0000	0.0000	127.46	0.01269	PPM	(BlK :	0.001)
		128.94	0.0000	0.0000	128.94	0.01307	PPM	(BlK :	0.001)
:b	220.353	295.06	199.15	0.0000	95.908	0.2167	PPM	(BlK :	0.001)
		301.66	198.36	0.0000	103.30	0.2334	PPM	(BlK :	0.001)
		298.57	197.97	0.0000	100.61	0.2273	PPM	(BlK :	0.001)
:u	327.396	1144.9	0.0000	0.0000	1144.9	0.00868	PPM	(BlK :	0.003)
		1137.8	0.0000	0.0000	1137.8	0.00838	PPM	(BlK :	0.003)
		1130.6	0.0000	0.0000	1130.6	0.00807	PPM	(BlK :	0.003)

---- 9:14:11 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

ample 1-209416- 1 #MEAS.= 3

8:10 AM
8/27

CONC/ sigma

n 0.02175/ 1.6%

d 0.01302/ 2.4%

b 0.2258/ 3.8%

u 0.00838/ 3.6%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.147560nm #Steps = 149.54

easurements for 2-209417- 1

n	213.856	417.76	0.0000	0.0000	417.76	0.01495	PPM	(BlK :	0.001)
		419.29	0.0000	0.0000	419.29	0.01504	PPM	(BlK :	0.001)
		407.85	0.0000	0.0000	407.85	0.01440	PPM	(BlK :	0.001)
d	214.438	120.85	0.0000	0.0000	120.85	0.01096	PPM	(BlK :	0.001)
		121.85	0.0000	0.0000	121.85	0.01122	PPM	(BlK :	0.001)
		123.13	0.0000	0.0000	123.13	0.01155	PPM	(BlK :	0.001)
b	220.353	440.49	205.19	0.0000	235.31	0.5322	PPM	(BlK :	0.001)
		435.45	206.31	0.0000	229.14	0.5182	PPM	(BlK :	0.001)
		440.42	204.37	0.0000	236.05	0.5339	PPM	(BlK :	0.001)
	327.396	1089.7	0.0000	0.0000	1089.7	0.00633	PPM	(BlK :	0.003)
		1096.3	0.0000	0.0000	1096.3	0.00661	PPM	(BlK :	0.003)
		1092.5	0.0000	0.0000	1092.5	0.00645	PPM	(BlK :	0.003)

---- 9:20:12 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

ample 2-209417- 1 #MEAS.= 3

	CONC/	sigma
n	0.01480/	2.3%
d	0.01124/	2.7%
b	0.5281/	1.6%
u	0.00646/	2.2%

9:00 am
8/26

ef. 193.031nm (calc: 193.031001nm) Offset = 0.148486nm #Steps = 150.48

leasurements for 3-209413- 1

n	213.856	439.42	0.0000	0.0000	439.42	0.01616	PPM	(Blk :	0.001)
		428.68	0.0000	0.0000	428.68	0.01556	PPM	(Blk :	0.001)
		447.12	0.0000	0.0000	447.12	0.01659	PPM	(Blk :	0.001)
d	214.438	119.78	0.0000	0.0000	119.78	0.01068	PPM	(Blk :	0.001)
		120.43	0.0000	0.0000	120.43	0.01085	PPM	(Blk :	0.001)
		119.65	0.0000	0.0000	119.65	0.01064	PPM	(Blk :	0.001)
b	220.353	919.95	200.28	0.0000	719.67	1.628	PPM	(Blk :	0.001)
		944.92	200.42	0.0000	744.50	1.685	PPM	(Blk :	0.001)
		930.65	202.51	0.0000	728.15	1.648	PPM	(Blk :	0.001)
u	327.396	1061.8	0.0000	0.0000	1061.8	0.00514	PPM	(Blk :	0.003)
		1052.5	0.0000	0.0000	1052.5	0.00474	PPM	(Blk :	0.003)
		1053.1	0.0000	0.0000	1053.1	0.00477	PPM	(Blk :	0.003)

---- 9:26:13 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

le 3-209413- 1 #MEAS.= 3

L	CONC/	sigma
n	0.01610/	3.2%
d	0.01072/	1.0%
b	1.654/	1.7%
u	0.00488/	4.5%

8/25 1:00 pm

ef. 193.031nm (calc: 193.031001nm) Offset = 0.149693nm #Steps = 151.70

easurements for 4-209410- 1

n	213.856	580.90	0.0000	0.0000	580.90	0.02403	PPM	(Blk :	0.001)
		592.50	0.0000	0.0000	592.50	0.02468	PPM	(Blk :	0.001)
		593.58	0.0000	0.0000	593.58	0.02474	PPM	(Blk :	0.001)
d	214.438	134.41	0.0000	0.0000	134.41	0.01450	PPM	(Blk :	0.001)
		134.44	0.0000	0.0000	134.44	0.01451	PPM	(Blk :	0.001)
		132.21	0.0000	0.0000	132.21	0.01393	PPM	(Blk :	0.001)
b	220.353	1324.9	209.81	0.0000	1115.1	2.523	PPM	(Blk :	0.001)
		1341.8	210.90	0.0000	1130.9	2.559	PPM	(Blk :	0.001)
		1318.8	208.31	0.0000	1110.5	2.513	PPM	(Blk :	0.001)
u	327.396	1248.1	0.0000	0.0000	1248.1	0.01308	PPM	(Blk :	0.003)
		1246.3	0.0000	0.0000	1246.3	0.01300	PPM	(Blk :	0.003)
		1231.4	0.0000	0.0000	1231.4	0.01237	PPM	(Blk :	0.003)

---- 9:32:14 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

Sample 4-209410- 1 #MEAS.= 3

1:30pm
8/25

EL	CONC/	sigma
In	0.02449/	1.6%
Cd	0.01431/	2.3%
Pb	2.532/	0.96%
Cu	0.01282/	3.0%

Ref. 193.031nm (calc: 193.031001nm) Offset = 0.148375nm #Steps = 150.36

Measurements for CTL-206890- 1

In	213.856	5096.3	0.0000	0.0000	5096.3	0.2766 PPM
		5206.7	0.0000	0.0000	5206.7	0.2827 PPM
		5178.1	0.0000	0.0000	5178.1	0.2811 PPM
Cd	214.438	1149.2	0.0000	0.0000	1149.2	0.2806 PPM
		996.74	0.0000	0.0000	996.74	0.2408 PPM
		1094.9	0.0000	0.0000	1094.9	0.2664 PPM
Pb	220.353	566.08	147.54	0.0000	418.54	0.9484 PPM
		557.26	148.38	0.0000	408.88	0.9265 PPM
		567.61	150.71	0.0000	416.90	0.9447 PPM
Cu	327.396	6141.6	0.0000	0.0000	6141.6	0.2247 PPM
		6047.3	0.0000	0.0000	6047.3	0.2207 PPM
		6071.8	0.0000	0.0000	6071.8	0.2217 PPM

9:38:15 8/27/93 ------ Method: D:\WATER.WITHOUT RATIO

Sample CTL-206890- 1 #MEAS.= 3

EL	CONC/	sigma
In	0.2801/	1.1%
Cd	0.2626/	7.7%
Pb	0.9398/	1.2%
Cu	0.2224/	0.94%

Ref. 193.031nm (calc: 193.031001nm) Offset = 0.149392nm #Steps = 151.40

Measurements for 5-209411- 1

In	213.856	401.89	0.0000	0.0000	401.89	0.01407 PPM	(Blk : 0.001)
		408.79	0.0000	0.0000	408.79	0.01445 PPM	(Blk : 0.001)
		406.50	0.0000	0.0000	406.50	0.01433 PPM	(Blk : 0.001)
Cd	214.438	120.26	0.0000	0.0000	120.26	0.01080 PPM	(Blk : 0.001)
		121.79	0.0000	0.0000	121.79	0.01120 PPM	(Blk : 0.001)
		122.43	0.0000	0.0000	122.43	0.01137 PPM	(Blk : 0.001)
Pb	220.353	323.37	198.63	0.0000	124.74	0.2819 PPM	(Blk : 0.001)
		321.70	197.60	0.0000	124.10	0.2805 PPM	(Blk : 0.001)
		315.81	197.76	0.0000	118.05	0.2668 PPM	(Blk : 0.001)
Cu	327.396	1034.0	0.0000	0.0000	1034.0	0.00395 PPM	(Blk : 0.003)
		1032.1	0.0000	0.0000	1032.1	0.00387 PPM	(Blk : 0.003)
		1034.5	0.0000	0.0000	1034.5	0.00398 PPM	(Blk : 0.003)

ample 5-209411- 1 #MEAS.= 3

	CONC/	sigma
n	0.01428/	1.4%
d	0.01112/	2.6%
b	0.2764/	3.0%
u	0.00393/	1.4%

2:00pm
8/26

ef. 193.031nm (calc: 193.031001nm) Offset = 0.149096nm #Steps = 151.10

easurements for 6-209415- 1

n	213.856	571.34	0.0000	0.0000	571.34	0.02350 PPM	(Blk :	0.001)
		569.64	0.0000	0.0000	569.64	0.02341 PPM	(Blk :	0.001)
		576.59	0.0000	0.0000	576.59	0.02379 PPM	(Blk :	0.001)
d	214.438	127.87	0.0000	0.0000	127.87	0.01279 PPM	(Blk :	0.001)
		127.92	0.0000	0.0000	127.92	0.01280 PPM	(Blk :	0.001)
		129.14	0.0000	0.0000	129.14	0.01312 PPM	(Blk :	0.001)
b	220.353	459.58	202.49	0.0000	257.09	0.5815 PPM	(Blk :	0.001)
		456.80	201.97	0.0000	254.84	0.5764 PPM	(Blk :	0.001)
		463.89	198.43	0.0000	265.46	0.6004 PPM	(Blk :	0.001)
u	327.396	1171.6	0.0000	0.0000	1171.6	0.00982 PPM	(Blk :	0.003)
		1180.6	0.0000	0.0000	1180.6	0.01020 PPM	(Blk :	0.003)
		1179.1	0.0000	0.0000	1179.1	0.01014 PPM	(Blk :	0.003)

---- 9:50:15 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

ample 6-209415- 1 #MEAS.= 3

	CONC/	sigma
n	0.02357/	0.86%
d	0.01291/	1.5%
b	0.5861/	2.2%
u	0.01005/	2.1%

3/25
3:00 pm

ef. 193.031nm (calc: 193.031001nm) Offset = 0.148486nm #Steps = 150.48

easurements for 7-209414- 1

n	213.856	389.34	0.0000	0.0000	389.34	0.01337 PPM	(Blk :	0.001)
		392.68	0.0000	0.0000	392.68	0.01356 PPM	(Blk :	0.001)
		394.68	0.0000	0.0000	394.68	0.01367 PPM	(Blk :	0.001)
	214.438	120.34	0.0000	0.0000	120.34	0.01082 PPM	(Blk :	0.001)
		118.93	0.0000	0.0000	118.93	0.01045 PPM	(Blk :	0.001)
		119.72	0.0000	0.0000	119.72	0.01066 PPM	(Blk :	0.001)
b	220.353	329.91	197.08	0.0000	132.83	0.3002 PPM	(Blk :	0.001)
		335.42	198.33	0.0000	137.09	0.3099 PPM	(Blk :	0.001)
		333.91	199.65	0.0000	134.26	0.3035 PPM	(Blk :	0.001)
u	327.396	1079.7	0.0000	0.0000	1079.7	0.00590 PPM	(Blk :	0.003)
		1061.4	0.0000	0.0000	1061.4	0.00512 PPM	(Blk :	0.003)

---- 9:56:16 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

mple 7-209414- 1 #MEAS.= 3

CONC/ sigma

0.01353/ 1.1%

0.01065/ 1.7%

0.3045/ 1.6%

0.00514/ 15%

3:30 pm 3/26

f. 193.031nm (calc: 193.031001nm) Offset = 0.149990nm #Steps = 152.00

easurements for 8-209412- 1

213.856	398.32	0.0000	0.0000	398.32	0.01387	PPM	(Blk :	0.001)
	397.77	0.0000	0.0000	397.77	0.01384	PPM	(Blk :	0.001)
	398.33	0.0000	0.0000	398.33	0.01387	PPM	(Blk :	0.001)
214.438	128.03	0.0000	0.0000	128.03	0.01283	PPM	(Blk :	0.001)
	127.17	0.0000	0.0000	127.17	0.01261	PPM	(Blk :	0.001)
	128.17	0.0000	0.0000	128.17	0.01287	PPM	(Blk :	0.001)
220.353	331.87	199.97	0.0000	131.91	0.2982	PPM	(Blk :	0.001)
	332.82	201.20	0.0000	131.62	0.2975	PPM	(Blk :	0.001)
	337.74	196.99	0.0000	140.75	0.3182	PPM	(Blk :	0.001)
327.396	1027.5	0.0000	0.0000	1027.5	0.00368	PPM	(Blk :	0.003)
	1020.9	0.0000	0.0000	1020.9	0.00340	PPM	(Blk :	0.003)
	1024.4	0.0000	0.0000	1024.4	0.00354	PPM	(Blk :	0.003)

---- 10:02:16 8/27/93 ----- Method: D:\WATER WITHOUT RATIO

mple 8-209412- 1 #MEAS.= 3

CONC/ sigma

0.01386/ 0.13%

0.01277/ 1.1%

0.3046/ 3.9%

0.00354/ 4.0%

8:00 pm 8/26

f. 193.031nm (calc: 193.031001nm) Offset = 0.150617nm #Steps = 152.64

asurements for CTL-206890- 1

213.856	5398.8	0.0000	0.0000	5398.8	0.2922	PPM	(Blk :	0.001)
	5313.3	0.0000	0.0000	5313.3	0.2875	PPM	(Blk :	0.001)
	5314.7	0.0000	0.0000	5314.7	0.2875	PPM	(Blk :	0.001)
214.438	1233.8	0.0000	0.0000	1233.8	0.3021	PPM	(Blk :	0.001)
	1235.1	0.0000	0.0000	1235.1	0.3024	PPM	(Blk :	0.001)
	1209.5	0.0000	0.0000	1209.5	0.2957	PPM	(Blk :	0.001)
220.353	589.99	150.68	0.0000	439.31	0.9939	PPM	(Blk :	0.001)
	592.64	152.16	0.0000	440.48	0.9966	PPM	(Blk :	0.001)
	593.94	150.85	0.0000	443.09	1.002	PPM	(Blk :	0.001)

```
          5549.2  0.0000  0.0000  5549.2  0.1965 PPM  ( BlK :    0.003)
          5560.7  0.0000  0.0000  5560.7  0.1970 PPM  ( BlK :    0.003)

---- 10:08:16  8/27/93 -----    Method:  D:\WATER WITHOUT RATIO

ample CTL-206890-                1 #MEAS.= 3

L      CONC/ sigma

n    0.2891/ 0.94%

d    0.3001/  1.3%

b    0.9976/ 0.44%

u    0.1955/  1.1%



ef. 193.031nm (calc: 193.031001nm)  Offset =  0.150590nm  #Steps =  152.61
s : 193.699nm (calc: 193.699001nm)  Offset = -0.013687nm  #Steps =  -13.87 *

ef. 193.031nm (calc: 193.031001nm)  Offset =  0.150383nm  #Steps =  152.40

esults for STDLOW

s    193.699  109.16  0.0000  102.96  6.1987
              102.84  0.0000  103.79-0.95333 *
              110.72  0.0000  103.58  7.1424
              105.48  0.0000  102.25  3.2290
             Total number of measurements : 4
             Nb of meas.  with peak found : 3

----10:39:48  8/27/93 -----

esults for STDLOW #MEAS.=3 (R)

   SIGNAL/sigma

*  5.5234/   37%



f. 193.031nm (calc: 193.031001nm)  Offset =  0.151716nm  #Steps =  153.75

esults for STDHIGH

    193.699  585.37  0.0000  129.13  456.25
             574.27  0.0000  129.70  444.57
             584.02  0.0000  130.05  453.97

---10:44:33  8/27/93 -----

esults for STDHIGH #MEAS.=3 (R)

   SIGNAL/sigma

    451.59/  1.4%


tensities for Recalibration:
l      Wave                LOW                HT
```

STDLOW: 5.5234 STDHIGH: 451.5929

egression Results :

l Wave	Intercept	Slope	2nd Order
s 193.699	-0.0123823	0.00224180	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
s 193.699					
	STDLOW	5.5234	0.0000	0.0000	0.0
	STDHIGH	451.59	1.0000	1.0000	0.0

inal Regression Results for Method : USAS

l Opt. Wave	Intercept	Slope	2nd Order
s 193.699	-0.0123823	0.00224180	0.00000

ef. 193.031nm (calc: 193.031001nm) Offset = 0.150555nm #Steps = 152.57

easurements for CTL-209284- 1

s 193.699	623.01	0.0000	136.11	486.90	1.079 PPM
	629.90	0.0000	133.75	496.15	1.100 PPM
	605.13	0.0000	137.18	467.95	1.037 PPM

---- 10:58:20 8/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-209284- 1 #MEAS.= 3

L CONC/ sigma

s 1.072/ 3.0%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.149332nm #Steps = 151.33

easurements for BLK-209284- 1

s 193.699	108.54	0.0000	103.63	4.9028	-0.00139 PPM
	106.32	0.0000	104.88	1.4420	-0.00915 PPM
	106.68	0.0000	103.89	2.7871	-0.00613 PPM

---- 11:03:29 8/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample BLK-209284- 1 #MEAS.= 3

CONC/ sigma

s -0.00556/ 70%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.150580nm #Steps = 152.60

easurements for 1-209284- 1

s 193.699	251.70	0.0000	241.00	10.695	0.01715 PPM	(B1K : -0.006)
	246.53	0.0000	237.00	9.5333	0.01455 PPM *	(B1K : -0.006)
	252.72	0.0000	240.47	12.255	0.02065 PPM	(B1K : -0.006)
	250.41	0.0000	241.33	9.0718	0.01351 PPM	(B1K : -0.006)

Total number of measurements : 4

```
----- 11:08:02  8/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 1-209284-                 1 #MEAS.= 3

L      CONC/ sigma

s  0.01711/   21%


ef. 193.031nm (calc: 193.031001nm)  Offset =  0.150942nm  #Steps =  152.97

easurements for 2-209284-                 1

s   193.699  256.96  0.0000  245.27  11.689 0.01938 PPM  ( BlK :   -0.006)
             261.02  0.0000  246.00  15.016 0.02684 PPM  ( BlK :   -0.006)
             257.01  0.0000  243.87  13.146 0.02265 PPM  ( BlK :   -0.006)

---- 11:12:48  8/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 2-209284-                 1 #MEAS.= 3

_      CONC/ sigma

s  0.02296/   16%


ef. 193.031nm (calc: 193.031001nm)  Offset =  0.151870nm  #Steps =  153.91

easurements for 3-209284-                 1

s   193.699  242.94  0.0000  235.20  7.7365 0.01052 PPM  ( BlK :   -0.006)
             248.23  0.0000  232.80  15.427 0.02776 PPM  ( BlK :   -0.006)
             243.95  0.0000  239.00  4.9464 0.00427 PPM  ( BlK :   -0.006)

---- 11:17:21  8/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 3-209284-                 1 #MEAS.= 3

_      CONC/ sigma

s  0.01418/   86%


ef. 193.031nm (calc: 193.031001nm)  Offset =  0.152326nm  #Steps =  154.37

easurements for 4-209284-                 1

s   193.699  254.02  0.0000  244.47  9.5505 0.01459 PPM  ( BlK :   -0.006)
             258.20  0.0000  244.60  13.600 0.02366 PPM  ( BlK :   -0.006)
             259.36  0.0000  248.00  11.356 0.01864 PPM  ( BlK :   -0.006)

---- 11:21:54  8/27/93 -----   Method:  D:\USAS WITHOUT RATIO

ample 4-209284-                 1 #MEAS.= 3

_      CONC/ sigma

s  0.01896/   24%
```

ef. 193.031nm (calc: 193.031001nm) Offset = 0.152074nm #Steps = 154.11

easurements for CTL-209284- 1

s 193.699 595.82 0.0000 165.13 430.69 0.9531 PPM
613.80 0.0000 161.00 452.80 1.003 PPM
610.74 0.0000 162.07 448.67 0.9935 PPM

---- 11:25:51 8/27/93 ----- Method: D:\USAS WITHOUT RATIO

ample CTL-209284- 1 #MEAS.= 3

L CONC/ sigma

s 0.9831/ 2.7%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.151673nm #Steps = 153.71

easurements for 5-209284- 1

s 193.699 254.19 0.0000 244.93 9.2517 0.01392 PPM (BlK : -0.006)
250.55 0.0000 241.67 8.8822 0.01309 PPM (BlK : -0.006)
253.90 0.0000 241.93 11.964 0.02000 PPM (BlK : -0.006)

---- 11:30:24 8/27/93 ----- Method: D:\USAS WITHOUT RATIO

a e 5-209284- 1 #MEAS.= 3

L CONC/ sigma

s 0.01567/ 24%

ef. 193.031nm (calc: 193.031001nm) Offset = 0.151946nm #Steps = 153.98

easurements for 6-209284- 1

193.699 255.06 0.0000 246.40 12.660 0.02156 PPM (BlK : -0.006)
261.33 0.0000 244.93 16.715 0.03065 PPM (BlK : -0.006)
256.26 0.0000 248.20 12.060 0.02021 PPM (BlK : -0.006)

Method: D:\USAS WITHOUT RATIO

MEAS.= 3

ef. 193.031nm (calc: 193.031001nm) Offset = 0.152366nm #Steps = 154.41

leasurements for 7-209284- 1

s 193.699 252.82 0.0000 244.53 8.2869 0.01175 PPM (BlK : -0.006)

```
                255.01   0.0000   241.13   13.874 0.02428 PPM   ( BlK :    -0.006)

------ 11:39:30  8/27/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample 7-209284-                  1 #MEAS.= 3

EL      CONC/ sigma

ns  0.01767/   36%


Ref. 193.031nm (calc: 193.031001nm)  Offset =  0.151468nm  #Steps =  153.50

Measurements for 8-209284-                  1

ns   193.699  254.05   0.0000   244.20   9.8532 0.01526 PPM   ( BlK :    -0.006)
              252.70   0.0000   241.40   11.305 0.01852 PPM   ( BlK :    -0.006)
              256.12   0.0000   244.20   11.918 0.01989 PPM   ( BlK :    -0.006)

----- 11:44:03  8/27/93 -----    Method:  D:\USAS WITHOUT RATIO

Sample 8-209284-                  1 #MEAS.= 3

L      CONC/ sigma

s  0.01789/   13%


193.031nm (calc: 193.031001nm)  Offset =  0.152202nm  #Steps =  154.24

easurements for CTL-209284-                  1

s   193.699  228.10   0.0000   186.73   41.368 0.08036 PPM
             226.20   0.0000   184.33   41.863 0.08147 PPM
             222.45   0.0000   186.93   35.514 0.06723 PPM

----- 11:48:36  8/27/93 -----    Method:  D:\USAS WITHOUT RATIO

ample CTL-209284-                  1 #MEAS.= 3

L      CONC/ sigma

s  0.07635/   10%
```

THE DOE RUN COMPANY

SMELTING DIVISION
HERCULANEUM, MISSOURI

QUALITATIVE ANALYSIS FOR PB IN WWTP SAMPLES
reported in ppm

27-AUG-93 ANALYST = MARILYN PRG = USPB

DATE	SAMPLE	PB ppm	RC pH	V NOTCH inches	GAL.	pounds per DAY
8/24	SVG	0.17				
8/24	AFTER RC	0.38				
8/24	FOREBAY	4.16				
8/25	FOREBAY	3.80				
8/25	SVG 1	.15				
8/25	RC OVERFLOW	.23				
8/25	SVG 3	.18				

(8251330)

USPB SVG

BRRP SVG 1:30 pm 8/25 — 209410 4 — Blank 209403

SVG 2:00 pm 8/26 — 209411 5

SVG 8:00 pm 8/26 — 209412 8

SVG 1:00 pm 8/25 (4" @ 337 gpm) — 209413 3

SVG 3:30 pm 8/26 — 209414 7

SVG 3:00 pm 8/25 (4" @ 337 gpm) — 209415 6

SVG 8:00 am 8/27 — 209416 1

SVG 8:00 am 8/26/93 (4" @ 337 gpm) — 209417 2

3304

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

27-AUG-93 ANALYST = MARILYN MTD=WATER4,USAS&USSB

SAMPLE	AS	ZN	CD	PB	CU	SB	
8/25 SVG 1:00 pm 4" @ 337 GPM	<.05	0.02	0.011	1.65	0.005		
8/25 SVG 1:30 PM	<.05	0.02	0.014	2.53	0.013		
8/25 SVG 3:00 PM 337 GPM	<.05	0.02	0.013	0.586	0.010		
8/26 SVG 8:00 AM 4" @ 337 GPM	<.05	0.01	0.011	0.528	0.006		
8/26 SVG 2:00 PM	<.05	0.01	0.011	0.276	0.004		
8/26 SVG 3:30 PM	<.05	0.01	0.011	0.305	0.005		
8/26 SVG 8:00 PM	<.05	0.01	0.013	0.305	0.004		
8/27 SVG 8:00 AM	<.05	0.02	0.013	0.226	0.008		

MONTHLY FLOW AND SAMPLE LOG FOR Sept 1993

DATE	OUTFALL 001 TOTAL FLOW	GPD	GPM	OUTFALL 002 TOTAL FLOW	GPD	GPM	OUTFALL 003 TOTAL FLOW	GPD	GPM	TIME	INITL
REV							918610				
1											
2				Flooded							
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27											
28											
29							918610	0.420			
30							919030				
31											

001 COMPOSITE SAMPLE DATE: _____ 1/MONTH - ⅓ LITER EVERY 2 HRS.

001 GRAB pH DATE: _____ pH_____ 1/MONTH & 001 GRAB SAMPLE DATE: _____ 1/MONTH - ONE LITER

002 SAMPLE DATES: _____ _____ _____ _____ _____ REQUIRED ONLY IF DISCHARGED

003 GRAB SAMPLE DATE: 7,6 1/MONTH - ONE LITER 9/09 D. Perry

003 pH SAMPLE TO BE TAKEN 1/WEEK WHEN THERE IS A FLOW THROUGH OUTFALL 003

DATE: _____ -- pH _____ DATE: _____ -- pH _____ DATE: _____ -- pH _____

DATE: _____ -- pH _____ DATE: _____ -- pH _____

gression Results :

Wave	Intercept	Slope	2nd Order
213.856	-577.830	2.02156	0.00000
.438	-669.232	3.52665	0.00000
.353	11.1382	36.5854	0.00000
327.396	-3596.45	1.75781	0.00000

```
f. 193.031nm (calc: 193.041739nm)  Offset =  0.141786nm  #Steps =  143.69
 : 213.856nm (calc: 214.063273nm)  Offset = -0.188637nm  #Steps = -192.43 *

f. 193.031nm (calc: 193.041739nm)  Offset =  0.142746nm  #Steps =  144.66
 : 213.856nm (calc: 214.063273nm)  Offset = -0.187499nm  #Steps = -191.27

f. 193.031nm (calc: 193.041739nm)  Offset =  0.142972nm  #Steps =  144.89
 : 214.438nm (calc: 214.638000nm)  Offset = -0.179647nm  #Steps = -183.30

f. 193.031nm (calc: 193.041739nm)  Offset =  0.142720nm  #Steps =  144.63
 : 220.353nm (calc: 220.546682nm)  Offset = -0.169050nm  #Steps = -172.84

f. 193.031nm (calc: 193.041739nm)  Offset =  0.142598nm  #Steps =  144.51
 : 327.396nm (calc: 327.567682nm)  Offset = -0.095463nm  #Steps = -102.45

f. 193.031nm (calc: 193.041739nm)  Offset =  0.142649nm  #Steps =  144.56

esults for STDLOW

   213.856  102.59  0.0000  0.0000  102.59
            112.78  0.0000  0.0000  112.78
            101.33  0.0000  0.0000  101.33
   214.438  49.333  0.0000  0.0000  49.333 *
            50.080  0.0000  0.0000  50.080 *
            48.840  0.0000  0.0000  48.840 *
           Calculation around 0
   220.353  91.553  92.113  0.0000-0.56000 *
            91.233  91.407  0.0000-0.17333 *
            91.867  91.747  0.0000 0.12000 *
           Calculation around 0
   327.396  972.63  0.0000  0.0000  972.63
            984.81  0.0000  0.0000  984.81
            973.75  0.0000  0.0000  973.75

----11:46:54  8/11/93 -----

esults for STDLOW #MEAS.=3 (R)

  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma   EL  SIGNAL/sigma

   105.57/  5.9% Cd*  49.418/  1.3% Pb*-0.20444/  170% Cu   977.06/ 0.69%


ef. 193.031nm (calc: 193.041739nm)  Offset =  0.143290nm  #Steps =  145.21

ts for STDHIGH

   213.856  46839  0.0000  0.0000  46839
            49648  0.0000  0.0000  49648
            47844  0.0000  0.0000  47844
   214.438  3398.0  0.0000  0.0000  3398.0
            3415.4  0.0000  0.0000  3415.4
            3417.3  0.0000  0.0000  3417.3
   220.353  2375.1  110.57  0.0000  2264.5
```

		2355.5	109.81	0.0000	2245.7
		2422.2	109.97	0.0000	2312.2
u	327.396	54822	0.0000	0.0000	54822
		53740	0.0000	0.0000	53740
		57185	0.0000	0.0000	57185

-11:52:53 8/11/93 -----

esults for STDHIGH #MEAS.=3 (R)

L	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma	EL	SIGNAL/sigma
n	48110/ 3.0%	Cd	3410.2/ 0.31%	Pb	2274.1/ 1.5%	Cu	55249/ 3.2%

ntensities for Recalibration:

El	Wave	LOW	HI
n	213.856	STDLOW: 105.5676	STDHIGH: 48110.2946
d	214.438	STDLOW: 49.4178	STDHIGH: 3410.2018
b	220.353	STDLOW: -0.2044	STDHIGH: 2274.1205
u	327.396	STDLOW: 977.0632	STDHIGH: 55248.7345

egression Results :

l	Wave	Intercept	Slope	2nd Order
n	213.856	-0.0109955	0.000104156	0.00000
d	214.438	-0.0367606	0.000743874	0.00000
b	220.353	0.000898924	0.00439691	0.00000
u	327.396	-0.0900160	0.0000921291	0.00000

	Standard	Intensity	Concentration	Calc. Conc.	% Error
	213.856				
	STDLOW	105.57	0.0000	0.0000	0.0
	STDHIGH	48110	5.0000	5.0000	0.0
d	214.438				
	STDLOW	49.418	0.0000	0.0000	0.0
	STDHIGH	3410.2	2.5000	2.5000	0.0
b	220.353				
	STDLOW	-0.20444	0.0000	0.0000	0.0
	STDHIGH	2274.1	10.000	10.000	0.0
u	327.396				
	STDLOW	977.06	0.0000	0.0000	0.0
	STDHIGH	55249	5.0000	5.0000	0.0

inal Regression Results for Method : WATER

l	Opt.	Wave	Intercept	Slope	2nd Order
n		213.856	-0.0109955	0.000104156	0.00000
d		214.438	-0.0367606	0.000743874	0.00000
b		220.353	0.000898924	0.00439691	0.00000
u		327.396	-0.0900160	0.0000921291	0.00000

ef. 193.031nm (calc: 193.041739nm) Offset = 0.143352nm #Steps = 145.27

urements for CTL-203405- 1

n	213.856	2174.4	0.0000	0.0000	2174.4	0.2155 PPM
		2171.8	0.0000	0.0000	2171.8	0.2152 PPM
		2231.2	0.0000	0.0000	2231.2	0.2214 PPM
d	214.438	317.09	0.0000	0.0000	317.09	0.1991 PPM
		310.01	0.0000	0.0000	310.01	0.1939 PPM
		312.34	0.0000	0.0000	312.34	0.1956 PPM
b	220.353	276.53	91.240	0.0000	185.28	0.0157 PPM

		279.75	91.733	0.0000	188.01	0.8276 PPM
Cu	327.396	4313.4	0.0000	0.0000	4313.4	0.3074 PPM
		4311.4	0.0000	0.0000	4311.4	0.3072 PPM
		4371.8	0.0000	0.0000	4371.8	0.3128 PPM

----- 12:05:42 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

Sample CTL-203405- 1 #MEAS.= 3

EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma
Zn	0.2174/ 1.6% Cd	0.1962/ 1.4% Pb	0.8253/ 1.1% Cu	0.3091/ 1.0%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.143721nm #Steps = 145.65

Measurements for RC 8/10-208384- 1

Zn	213.856	1591.6	0.0000	0.0000	1591.6	0.1548 PPM
		1629.4	0.0000	0.0000	1629.4	0.1587 PPM
		1585.5	0.0000	0.0000	1585.5	0.1541 PPM
Cd	214.438	107.31	0.0000	0.0000	107.31	0.04306 PPM
		107.36	0.0000	0.0000	107.36	0.04310 PPM
		106.51	0.0000	0.0000	106.51	0.04247 PPM
Pb	220.353	346.10	129.21	0.0000	216.90	0.9546 PPM
		344.83	129.07	0.0000	215.76	0.9496 PPM
		343.49	129.91	0.0000	213.57	0.9400 PPM
Cu	327.396	1331.1	0.0000	0.0000	1331.1	0.03261 PPM
		1338.2	0.0000	0.0000	1338.2	0.03327 PPM
		1355.8	0.0000	0.0000	1355.8	0.03490 PPM

----- 12:11:43 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

Sample RC 8/10-208384- 1 #MEAS.= 3

EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma EL	CONC/ sigma
Zn	0.1559/ 1.6% Cd	0.04288/ 0.83% Pb	0.9480/ 0.78% Cu	0.03359/ 3.5%

Ref. 193.031nm (calc: 193.041739nm) Offset = 0.144459nm #Steps = 146.40

Measurements for SVG 8/10-208385- 1

Zn	213.856	198.33	0.0000	0.0000	198.33	0.00966 PPM
		200.89	0.0000	0.0000	200.89	0.00993 PPM
		195.85	0.0000	0.0000	195.85	0.00940 PPM
Cd	214.438	76.816	0.0000	0.0000	76.816	0.02038 PPM
		78.414	0.0000	0.0000	78.414	0.02157 PPM
		76.441	0.0000	0.0000	76.441	0.02010 PPM
Pb	220.353	606.75	131.76	0.0000	474.99	2.089 PPM
		610.61	130.76	0.0000	479.85	2.111 PPM
		607.12	132.62	0.0000	474.50	2.087 PPM
	327.396	1160.0	0.0000	0.0000	1160.0	0.01686 PPM
		1153.1	0.0000	0.0000	1153.1	0.01622 PPM
		1137.8	0.0000	0.0000	1137.8	0.01481 PPM

----- 12:17:42 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

Sample SVG 8/10-208385- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

0.00967/ 2.7% Cd 0.02068/ 3.8% Pb 2.096/ 0.62% Cu 0.01596/ 6.6%

193.031nm (calc: 193.041739nm) Offset = 0.144337nm #Steps = 146.27

easurements for PONTN 8/10-208386- 1

213.856	1472.6	0.0000	0.0000	1472.6	0.1424 PPM
	1432.2	0.0000	0.0000	1432.2	0.1382 PPM
	1414.1	0.0000	0.0000	1414.1	0.1363 PPM
214.438	112.36	0.0000	0.0000	112.36	0.04682 PPM
	114.19	0.0000	0.0000	114.19	0.04818 PPM
	116.44	0.0000	0.0000	116.44	0.04986 PPM
220.353	4110.0	164.44	0.0000	3945.6	17.35 PPM
	4071.0	161.89	0.0000	3909.1	17.19 PPM
	4125.0	162.99	0.0000	3962.0	17.42 PPM
327.396	1879.3	0.0000	0.0000	1879.3	0.08312 PPM
	1906.1	0.0000	0.0000	1906.1	0.08559 PPM
	1878.1	0.0000	0.0000	1878.1	0.08301 PPM

---- 12:23:42 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

ample PONTN 8/10-208386- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

0.1389/ 2.2% Cd 0.04829/ 3.2% Pb 17.32/ 0.69% Cu 0.08391/ 1.7%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.144725nm #Steps = 146.67

easurements for 4BAY 8/10-208388- 1

213.856	2934.0	0.0000	0.0000	2934.0	0.2946 PPM
	2936.9	0.0000	0.0000	2936.9	0.2949 PPM
	2914.7	0.0000	0.0000	2914.7	0.2926 PPM
214.438	188.69	0.0000	0.0000	188.69	0.1036 PPM
	185.42	0.0000	0.0000	185.42	0.1012 PPM
	188.72	0.0000	0.0000	188.72	0.1036 PPM
220.353	1157.7	135.86	0.0000	1021.8	4.494 PPM
	1155.4	135.10	0.0000	1020.3	4.487 PPM
	1157.2	135.00	0.0000	1022.2	4.496 PPM
327.396	1828.0	0.0000	0.0000	1828.0	0.07840 PPM
	1865.3	0.0000	0.0000	1865.3	0.08183 PPM
	1875.9	0.0000	0.0000	1875.9	0.08281 PPM

---- 12:29:42 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

mple 4BAY 8/10-208388- 1 #MEAS.= 3

CONC/ sigma EL CONC/ sigma EL CONC/ sigma EL CONC/ sigma

0.2940/ 0.43% Cd 0.1028/ 1.4% Pb 4.492/ 0.10% Cu 0.08101/ 2.9%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.144844nm #Steps = 146.79

n..	213.856	9004.7	0.0000	0.0000	9004.7	0.9269 PPM
		9150.0	0.0000	0.0000	9150.0	0.9420 PPM
		9166.4	0.0000	0.0000	9166.4	0.9437 PPM
d	214.438	275.65	0.0000	0.0000	275.65	0.1683 PPM
		278.77	0.0000	0.0000	278.77	0.1706 PPM
		268.96	0.0000	0.0000	268.96	0.1633 PPM
b	220.353	1178.2	109.33	0.0000	1068.8	4.700 PPM
		1196.6	108.04	0.0000	1088.5	4.787 PPM
		1202.1	109.98	0.0000	1092.1	4.803 PPM
u	327.396	1855.9	0.0000	0.0000	1855.9	0.08097 PPM
		1882.7	0.0000	0.0000	1882.7	0.08344 PPM
		1863.0	0.0000	0.0000	1863.0	0.08162 PPM

---- 12:33:59 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

ample BF GRAN 810-208388- 1 #MEAS.= 3

L	CONC/ sigma EL		CONC/ sigma EL		CONC/ sigma EL		CONC/ sigma
n	9.376/ 0.99%	Cd	1.674/ 2.2%	Pb	47.63/ 1.2%	Cu	0.8201/ 1.6%

ef. 193.031nm (calc: 193.041739nm) Offset = 0.145243nm #Steps = 147.19

easurements for CTL-203405- 1

n	213.856	1950.7	0.0000	0.0000	1950.7	0.1922 PPM
		1934.7	0.0000	0.0000	1934.7	0.1905 PPM
		1920.7	0.0000	0.0000	1920.7	0.1891 PPM
d	214.438	320.74	0.0000	0.0000	320.74	0.2018 PPM
		312.45	0.0000	0.0000	312.45	0.1957 PPM
		292.51	0.0000	0.0000	292.51	0.1808 PPM
b	220.353	278.66	93.120	0.0000	185.54	0.8167 PPM
		276.47	93.047	0.0000	183.42	0.8074 PPM
		284.55	94.173	0.0000	190.38	0.8380 PPM
u	327.396	3997.1	0.0000	0.0000	3997.1	0.2782 PPM
		3970.7	0.0000	0.0000	3970.7	0.2758 PPM
		3994.6	0.0000	0.0000	3994.6	0.2780 PPM

---- 12:39:59 8/11/93 ----- Method: D:\WATER WITHOUT RATIO

ample CTL-203405- 1 #MEAS.= 3

L	CONC/ sigma EL		CONC/ sigma EL		CONC/ sigma EL		CONC/ sigma
n	0.1906/ 0.82%	Cd	0.1928/ 5.6%	Pb	0.8207/ 1.9%	Cu	0.2773/ 0.48%

THE DOE RUN COMPANY
SMELTING DIVISION
HERCULANEUM, MISSOURI

HEAVY METALS IN WASTE WATER TREATMENT PLANT SAMPLES
reported in ppm

10-AUG-93 ANALYST = MARILYN PRG = WATER

SAMPLE	AS	ZN	CD	PB	CU	TSS mg/L	SO_4 mg/L
8/10 RC OVERFLOW		0.16	0.04	0.95	0.03		
8/10 SVG		0.01	0.02	2.1	0.02		
8/10 BF GRAN.		9.38	1.67	47.6	.82		
8/10 PNTN PUMP		0.14	0.05	17.3	0.08		
8/10 FOREBAY		0.29	0.10	4.49	0.08		