EVALUATION OF SLAG FROM THE ISG-SPARROWS POINT FACILITY AS A CONSTRUCTION MATERIAL FOR DIKE BUILDING IN BALTIMORE HARBOR, MARYLAND

DRAFT

Prepared for:
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Baltimore, Maryland 21224

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Under Contract to:
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Baltimore, Maryland 21224

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EA Engineering, Science, and Technology, Inc.

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EXECUTIVE SUMMARY

This report evaluates the use of site-specific Basic Oxygen Furnace (BOF) slag from the International Steel Group (ISG) Sparrows Point (SP) Facility as potential construction material for dike building in Baltimore Harbor, Maryland. Components of this study include the chemical analyses and toxicological testing of BOF slag conducted under contract to Moffatt and Nichol, Inc. (M&N) for the Maryland Port Administration (MPA).

The results of the bulk solid slag analyses indicated that 20 of the 24 tested metals were detected at low concentrations in the fresh bulk slag sample. The bulk slag sample was comprised of 93.2 percent solids.

Results of the slag leachate analyses indicated that 16 of the 24 tested metals were detected at low concentrations in ISG-SP BOF leachate from all sources. Copper concentrations in slag leachate from two locations, ISG-BWT and ISG-W, slightly exceeded the USEPA chronic criteria. Low concentrations of di leachable sulfate were detected in all samples except ISG-FRESH.

The results of the analyses of elutriate water from chronic and acute toxicity testing indicated that of the 24 tested metals, fourteen were detected in the water from the slag elutriate chronic tests and thirteen were detected in the water from the solid phase acute tests. Two metals, chromium and hexavalent chromium, slightly exceeded the USEPA chronic criteria in water from the solid phase acute test.

The results of the 7-day chronic toxicity test conducted with *A. bahia* on elutriate prepared from the fresh slag indicated that after 48 hours of exposure, there was a minimum of 95 percent survival of test organisms in the elutriate concentrations, and 100 percent survival in the laboratory water control. The 48-hour LC50 was >100 percent elutriate. At test completion on Day 7, the 50 and 100 percent elutriate concentrations had mean biomass that was not significantly different from the control. Fecundity was 100 percent in the control and in all elutriate concentrations. The percent difference between the 50 and 100 percent elutriate concentrations and the control was 4.2 and 8.4 percent, respectively. The LOEC and ChV were >100 percent elutriate. The 7-day IC25 was >100 percent elutriate.

The results of the 7-day chronic toxicity test with *C. variegatus* conducted on elutriate prepared from the fresh slag indicated there were no statistically significant differences in survival or biomass between any elutriate concentration and the control.

The results of the 96-hour acute toxicity test with *C. variegatus* indicated that there was 100 percent survival in the site water with slag covered with sand, and in the site water with sand only. The treatment consisting of site water and slag alone had 95 percent survival, and was not significantly different from the control.

Overall, results of the analyses of bulk slag, slag leachate, and toxicity studies indicated that there is little potential for adverse affects to aquatic life from using ISG-SP slag as an in-water construction material in Baltimore Harbor. Chemical analyses of slag indicated that most of the detected concentrations of metals were generally low. Although a few metal concentrations slightly exceeded the USEPA chronic criteria for aquatic life, there were no significant adverse affects found in toxicity studies. Further, the level of dilution used in laboratory studies of slag are much less than that which would be provided in natural aquatic environments. It is expected that the waters of Baltimore Harbor would provide dilutions far greater than 1000-fold and tidal currents would allow continuous flushing and dilution.

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1.0 INTRODUCTION

This report evaluates the use of Basic Oxygen Furnace (BOF) slag as potential construction material for dike building in Baltimore Harbor, Maryland. The BOF slag under consideration for use would be available from the International Steel Group (ISG) Sparrows Point (SP) facility located in Baltimore County, Maryland. BOF slag is the most available slag type at the ISG-SP facility. The composition of BOF slag generally includes blast furnace iron and scrap steel, although the composition can be slightly different between facilities. Further, BOF slag at the ISG-SP facility can come from a variety of on-site sources including freshly produced, weathered above ground, and buried sources. The various sources of BOF slag may have different chemical characteristics that could potentially leach different concentrations of chemical compounds. Previous assessments of slag from Sparrows Point and other ISG facilities, including the results of Toxicity Characteristic Leaching Procedure (TCLP) and risk assessment analyses of BOF slag, have indicated that the risk of using slag in aquatic environments is fairly low (McLean/Hart 1998). However, the Maryland Port Administration requested that site-specific testing be conducted to characterize the use of BOF slag from the ISG-SP facility as potential dike building material in Baltimore Harbor.

This study includes the analytical and toxicological results of BOF slag collected from the ISG-SP facility in November 2004. This study was conducted by EA Engineering, Science, and Technology, Inc. (EA) under contract to Moffatt and Nichol, Inc (M&N) for the Maryland Port Administration (MPA). Components of this study included the following:

- Chemical analyses of bulk solid slag
- Chemical analyses of slag leachate
- Chemical analyses of leachate from toxicological testing
- 7-day chronic toxicity testing with *Americamysis bahia* and *Cyprinodon variegatus*
- 96-hour acute toxicity testing with *C. variegates*

In addition to the data provided in this report, several appendices are also included that provide detailed summaries of data for individual components of this study. Analytical data reports from the chemical analyses of bulk solid slag and leachate testing are provided in Appendix A; the laboratory toxicity testing report is provided in Appendix B; the physical analyses of slag that was conducted by E2CR, Inc, not discussed in this report, is provided in Appendix C.

2.0 METHODS

Same area as E2CR collections?

Need site map showing collection point

2.1 FIELD METHODS

2.1.1 Bulk Slag

The bulk slag samples were collected from two locations at the ISG-SP facility on 23 November 2004. Bulk slag samples were collected on the peninsula east of the Sparrows Point Channel. Fresh bulk slag samples were collected near the center of the peninsula and weathered and buried bulk slag samples were collected from an area in the southwestern corner of the eastern peninsula at Sparrows Point. Samples were processed in the field. The fresh bulk slag samples were collected from source areas using a shovel. Each sample was transferred from the shovel to stainless steel bowl and a stainless-steel spoon was used to homogenize the slag until it was thoroughly mixed and of uniform consistency. When homogenization was complete, samples of slag were placed in appropriate laboratory containers and stored in a cooled (4°C) insulated container until submission to the laboratory for analyses. For the weathered slag and buried sources, including from 1 ft above the water table and 1ft below the water table, BOF slag was excavated using a backhoe provided by E2CR, Inc. Slag was then collected using a shovel and following the homogenization and storage procedures above.

Samples designated for analysis at Severn Trent Laboratories-Pittsburgh (STL-Pittsburgh) were shipped via overnight delivery at the end of the work day. Holding times for the slag samples began when the slag was collected and placed in the appropriate containers. Holding requirements for chemical analyses are provided in Table 2-1.

Equipment that came in direct contact with slag during sampling (i.e. shovel, stainless-steel bowl, stainless-steel spoon) was decontaminated prior to deployment in the field and between each sampling depth and location to minimize cross-contamination. The decontamination procedure is described below.

- Rinse equipment using clean tap water or site water
- Wash and scrub with non-phosphate detergent (Alconox® or other laboratory-grade detergent)
- Rinse with tap water
- Rinse with 10 percent nitric acid (HNO3)
- Rinse with distilled or de-ionized water
- Rinse with methanol followed by hexane
- Rinse with distilled or de-ionized water

- Air dry (in area not adjacent to the decontamination area)

Waste liquids were contained during decontamination procedures and transferred to a 55-gallon drum for characterization and disposal at the end of the field effort. Waste liquids were disposed from EA's warehouse facility using standard disposal procedures and licensed contractors.

2.1.2 Site Water

Site water was collected from one location near the bulk slag collection site located on the southwestern corner of the eastern peninsula of Sparrows Point on 6 December 2004. Water was collected using an ISCO peristaltic pump with dedicated tygon tubing. Water targeted for chemical analyses and toxicity test preparation was pumped and stored in 5-gallon pre-cleaned, high-density polyethylene containers. Collected site water was transported back to the EA Ecotoxicology Laboratory in Sparks, Maryland and stored in walk-in refrigerators cooled to 4°C.

2.2 LABORATORY METHODS

2.2.1 Analytical Testing of Bulk Slag, Slag Leachate, and Elutriate Water from Toxicity Tests

Chemical testing of bulk slag, slag leachates, and elutriate water from the toxicity tests was conducted by STL-Pittsburgh located in Pittsburgh, Pennsylvania. The bulk slag, slag leachates, and elutriate water from toxicity tests were tested for the following analytes:

- Total metals,
- Hexavalent chromium,
- Mercury,
- Sulfate (elutriate water only), and
- Di leachable sulfate (leachate only)

All analyses for this project followed the methods listed in Table 2-1.

2.3 TOXICITY TESTING

Toxicity testing of bulk slag was conducted by EA's Ecotoxicology Laboratory located in Sparks, Maryland. Both 7-day chronic and 96-hour acute toxicity tests were performed using fresh bulk slag and site water collected at the ISG-SP facility.

2.3.1 Chronic Toxicity Test

The chronic toxicity tests were: (1) the survival, growth and fecundity test with the opossum shrimp (*Americamysis bahia*, formerly *Mysidopsis bahia*) and (2) the survival and growth test with the sheepshead minnow (*Cyprinodon variegatus*). The test organisms in the chronic tests were exposed for seven days to 100, 50, 25, 12.5, and 6.25 percent elutriate prepared from the fresh slag, and diluted with 20 ppt artificial seawater (Forty Fathoms Bioassay Grade sea salts). To prepare the elutriate, site water collected from Sparrows Point, Baltimore Harbor, that had been salinity adjusted to 20 ppt with Forty Fathoms sea salts, was added to a pre-weighed portion of slag the day prior to use in testing and allowed to agitate in a closed container for approximately 18 hours. The site water was salinity adjusted to 20 ppt in order to provide the optimal salinity for test organism survival, growth and reproduction. The volume of site water (7,000 ml) added to the slag was 20 times the weight in grams of the slag (350 grams). After 30 minutes of settling, the elutriate was decanted from the slag and vacuum filtered through a 1 µm glass fiber filter. Fresh elutriate was prepared four times during the 7-day exposure duration (7-8, 9-10, 12-13, and 13-14 December 2004) for daily renewal of the test solutions. The chronic toxicity tests also included a 100 percent laboratory water (salinity adjusted dilution water) control.

2.3.2 Acute Toxicity Tests

The acute toxicity test was conducted with the sheepshead minnow (*C. variegatus*). The test organisms were exposed for 96 hours to site water with slag (1/4 inch), site water with slag (1/4 inch) covered with sand (1/4 inch), and site water with sand only (1/4 inch). The acute toxicity test also included a site water control and a salinity adjusted laboratory water control. Total test volume for the acute toxicity tests was 500 ml. Test solutions were not renewed during the 96-hour exposure period.

This toxicity testing was conducted following EA's standard operating procedures (EA 2003) which are in accordance with US EPA guidance (US EPA 2002a and 2002b). The results of the toxicity tests were analyzed using the ToxCalc statistical software package (Version 5.0, Tidepool Scientific Software). Statistical analyses were performed according to US EPA guidance (US EPA 2002a and 2002b) on the survival, biomass, and fecundity (*A. bahia* only) data to determine if any of the effluent concentrations were significantly (p=0.05) different from the control. The short term chronic toxicity test endpoints are expressed as the No Observed Effect Concentration (NOEC), the Lowest Observed Effect Concentration (LOEC),

and the Chronic Value (ChV). The 25 percent Inhibition Concentrations (IC25s) were also calculated. The 48-hour median lethal concentration (LC50) was calculated for each test species, if there was at least 50 percent mortality in the 100 percent effluent concentration.

TABLE 2-1 ANALYTICAL METHODS AND HOLDING TIMES FOR SLAG ANALYSES

DESCRIPTION	METHODS	HOLDING TIMES
Bulk Material		
Sulfate	375.4	28 days
Metals[a]	6010	6 months
Metals Mercury	7471	28 days
Hexavalent Chromium	7196	30 days/ 96 hours
ASTM Leachate - D3987		
Sulfate	375.4	28 days after leaching
Metals[a]	6010	6 months after leaching
Metals Mercury	7471	28 days after leaching
Hexavalent Chromium	7196	24 hours after leaching
Toxicity Testing Leachate (from EA's Tox Lab)		
Sulfate	375.4	28 days
Metals[a]	6010	6 months
Metals Mercury	7471	28 days
Hexavalent Chromium	7196	24 hours after leaching generation/ or when it is considered a sample

[a] Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Iron, Lead ,Magnesium, Manganese, Molybdenum, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, Zinc, Silicon, and Calcium

First introduction of ISG-FRESH, ISG-BWT etc Explain?

3.0 RESULTS

3.1 BULK SOLID SLAG ANALYSES

Results of the bulk solid slag analyses are provided in Table 3-1. Of the 24 tested metals, twenty were detected at low concentrations in the fresh bulk slag sample (ISG-FRESH). The four metals not detected in the fresh slag sample included beryllium, cadmium, mercury, and molybdenum. The bulk slag sample was comprised of 93.2 percent solids.

3.2 SLAG LEACHATE ANALYSES

Results of the slag leachate analyses are provided in Table 3-2. Of the 24 tested metals, sixteen were detected at low concentrations in ISG-SP slag leachate from all sources. Seven metals, aluminum, barium, chromium, manganese, molybdenum, and silicon were detected in all leachate samples. Concentrations of one metal, copper, slightly exceeded the USEPA chronic criteria for aquatic life for two slag sources (ISG-BWT and ISG-W). Low concentrations of di leachable sulfate were detected in all samples except ISG-FRESH.

3.3 ELUTRIATE WATER FROM TOXICITY TESTING

Results of the analyses of elutriate water from chronic and acute toxicity testing is provided in Table 3-3. Of the 24 tested metals, fourteen were detected in the water from the slag elutriate chronic tests and thirteen were detected in the water from the solid phase acute tests. Ten metals, including arsenic, barium, calcium, chromium, magnesium, molybdenum, selenium, silicon, vanadium, and zinc were detected in both samples. Concentrations of two metals, chromium and hexavalent chromium, slighlty exceeded the USEPA chronic criteria in water from the solid phase acute test. Concentrations of sulfate ranged from 1,030 to 1,080 mg/l in samples.

3.4 TOXICITY TESTING

The results of the *Americamysis bahia* and *Cyprinodon variegatus* chronic toxicity tests, and the *C. variegatus* acute toxicity test conducted on the fresh slag meet the current NELAC standards, except where noted in the report. In both the acute and chronic tests, the pH of the test solutions in the high test concentration rose to greater than 9.0. This was as anticipated, and no attempt to adjust the pH of the test solutions was made, in order to conservatively mimic worst-case field conditions. All reference toxicant test results fell within the acceptable control chart limits.

3.4.1 Chronic Toxicity

The results of the *A. bahia* chronic toxicity test conducted on elutriate prepared from the fresh slag are provided in Table 3-4. After 48 hours of exposure, there was a minimum of 95 percent survival of test organisms in the elutriate concentrations, and 100 percent survival in the laboratory water control. The 48-hour LC50 was >100 percent elutriate. At test completion on Day 7, there was 80 percent survival in the 12.5 and 25 percent elutriate concentrations, 93 percent survival in the 6.26 percent elutriate concentration, and a minimum of 95 percent survival in the remaining elutriate concentrations. Control survival was 98 percent. An inverted dose response was observed for the biomass endpoint for this test. Mean biomass in the three lowest elutriate concentrations ranged from 0.347 to 0.379 mg/organism, and all three treatments were significantly different (p=0.05) from the control, which had a mean biomass of 0.464 mg/organism. The 50 and 100 percent elutriate concentrations had mean biomass of 0.445 and 0.425 mg/organism, respectively, and neither treatment was significantly different from the control. The three lowest elutriate concentrations also had the lowest percent survival, and, although survival in these three concentrations was not statistically significant, reduced survival would affect the biomass endpoint. Fecundity was 100 percent in the control and in all elutriate concentrations. It is EA's best professional judgment that the NOEC for this test is 100 percent elutriate. This is based on the fact that while there appeared to be a slight adverse effect on biomass for organisms exposed to the three lowest elutriate concentrations, the 50 and 100 percent elutriate concentrations were not significantly affected. The percent difference between the 50 and 100 percent elutriate concentrations and the control was 4.2 and 8.4 percent, respectively. The LOEC and ChV were >100 percent elutriate. The 7-day IC25 was >100 percent elutriate.

The results of the *C. variegatus* chronic toxicity test conducted on elutriate prepared from the fresh slag are provided in Table 3-5. On Day 7 of the *C. variegatus* chronic toxicity test, there was a minimum of 95 percent survival in the elutriate concentrations, and 100 percent survival in the control (page 10). Mean biomass ranged from 1.163 to 1.361 mg/organism exposed to the elutriate concentrations, and 1.346 mg/organism in the control. There were no statistically significant differences in survival or biomass between any elutriate concentration and the control. The 48-hour LC50 was >100 percent elutriate. The NOEC for this test was 100 percent elutriate. The LOEC, ChV, and 7-day IC25 were >100 percent elutriate.

3.4.2 Acute Toxicity

The results from the acute toxicity test are provided in Table 3-6. After 96 hours of exposure, there was 100 percent survival in the site water with slag covered with sand, and in the site water with sand only. The site water control and the laboratory water controls also had 100 percent survival. The treatment consisting of site water and slag alone had 95 percent survival, and was not significantly different from the control.

TABLE 3-1 CONCENTRATION OF METALS (MG/KG) AND SOLIDS (%) IN FRESH BULK SOLID SLAG FROM SPARROWS POINT (NOVEMBER 2004)

ANALYTE	UNITS	RL	ISG-FRESH
ALUMINUM	MG/KG	21.5	**17600 J**
ANTIMONY	MG/KG	5.4	**3.1 B**
ARSENIC	MG/KG	1.1	**0.38 B**
BARIUM	MG/KG	21.5	**20.4 B**
BERYLLIUM	MG/KG	4.3	4.3 U
CADMIUM	MG/KG	2.7	2.7 U
CALCIUM	MG/KG	2680	**222000**
CHROMIUM	MG/KG	0.54	**929 J**
COPPER	MG/KG	2.7	**8.5**
HEXAVALENT CHROMIUM	MG/KG	0.43	**3.6**
IRON	MG/KG	53.7	**164000**
LEAD	MG/KG	1.6	**4.4**
MAGNESIUM	MG/KG	537	**59800**
MANGANESE	MG/KG	40.3	**27800 J**
MERCURY	MG/KG	0.035	0.035 U
MOLYBDENUM	MG/KG	4.3	4.3 U
NICKEL	MG/KG	4.3	**6**
SELENIUM	MG/KG	13.4	**7.6 B**
SILICON	MG/KG	53.7	**2380 J**
SILVER	MG/KG	0.54	**6.3 J**
THALLIUM	MG/KG	26.8	**60.8**
TIN	MG/KG	10.7	**4.2 B J**
VANADIUM	MG/KG	26.8	**743**
ZINC	MG/KG	10.7	**102**
PERCENT SOLIDS	%	1	93.2

NOTE: Shaded and bold values represent detected concentrations.
RL = average reporting limit
B = compound was detected, but below the reporting limit (value is estimated)
J = compound was detected in the associated method blank
U = compound was analyzed, but not detected

TABLE 3-2 CONCENTRATION OF METALS (MG/L) AND SULFATE (MG/L) IN SLAG LEACHATE FROM SPARROW POINT FACILITY (NOVEMBER 2004)

ANALYTE	UNITS	RL	USEPA ACUTE CRITERIA*	USEPA CHRONIC CRITERIA*	ISG-AWT	ISG-BWT	ISG-FRESH	ISG-W
ALUMINUM	MG/L	0.2	--	--	**0.23**	**1.1**	**1.4**	**0.16 B**
ANTIMONY	MG/L	0.02	--	--	0.01 U	0.01 U	0.05 U	0.01 U
ARSENIC	MG/L	0.01	0.069	0.036	0.01 U	0.01 U	0.01 U	0.01 U
BARIUM	MG/L	0.2	--	--	**0.01 B J**	**0.021 B J**	**0.025 B J**	**0.0014 B J**
BERYLLIUM	MG/L	0.005	--	--	0.005 U	0.005 U	0.005 U	0.005 U
CADMIUM	MG/L	0.005	0.04	0.0088	0.005 U	0.005 U	0.005 U	0.005 U
CALCIUM	MG/L	5	--	--	**141**	**98.3**	**466**	**23.4**
CHROMIUM	MG/L	0.01	1.1	0.05	**0.023**	**0.0063 B**	**0.0039 B**	**0.0072 B**
COPPER	MG/L	0.025	0.0048/0.0061**	0.0031	**0.0024 B**	**0.0034 B b**	0.025 U abc	**0.0037 B b**
HEXAVALENT CHROMIUM	MG/L	0.01	1.1	0.05	**0.019**	0.01 U	0.01 U	0.01 U
IRON	MG/L	0.1	--	--	0.1 U	0.1 U	**0.022 B**	**0.027 B**
LEAD	MG/L	0.003	0.21	0.0081	0.003 U	0.003 U	0.003 U	0.003 U
MAGNESIUM	MG/L	5	--	--	**0.038 B**	**0.058 B**	5 U	**0.39 B**
MANGANESE	MG/L	0.015	--	--	**0.00038 B**	**0.00075 B**	**0.0013 B**	**0.00077 B**
MERCURY	MG/L	0.0002	0.0018	0.00094	0.0002 U	0.0002 U	0.0002 U	0.0002 U
MOLYBDENUM	MG/L	0.08	--	--	**0.0036 B**	**0.0036 B**	**0.011 B**	**0.0026 B**
NICKEL	MG/L	0.04	0.074	0.0082	0.04 U b	0.04 U b	0.04 U b	**0.0024 B**
SELENIUM	MG/L	0.005	0.29	0.071	0.005 U	0.005 U	0.005 U	0.005 U
SILICON	MG/L	1	--	--	**3**	**4.5**	**0.47 B**	**12**
SILVER	MG/L	0.005	0.0019	--	0.005 U a	**0.00031 B**	0.005 U a	0.005 U a
THALLIUM	MG/L	0.01	--	--	0.01 U	0.01 U	**0.0047 B J**	**0.0055 B J**
TIN	MG/L	0.2	--	--	0.1 U	0.1 U	0.5 U	0.1 U
VANADIUM	MG/L	0.05	--	--	**0.025 B**	**0.15**	0.05 U	**0.082**
ZINC	MG/L	0.02	0.09	0.081	0.02 U	**0.016 B**	0.02 U	0.02 U
DI LEACHABLE SULFATE	MG/L	1	--	--	**51.2**	**36.9**	1 U	**2.5**

**Source:* USEPA. 2002. *National Recommended Water Quality Criteria* (EPA-822-R-02-047).

***The State of Maryland estuarine acute criterion for copper; there is no Maryland estuarine chronic copper criterion (COMAR 26.08.02.03-2)

NOTE: Shaded and bold values represent detected concentrations.

RL = average reporting limit

B = compound was detected, but below the reporting limit (value is estimated)

J = compound was detected in the associated method blank

U = compound was analyzed, but not detected

a = exceeds USEPA acute criteria for aquatic life

b = exceeds USEPA chronic criteria for aquatic life

TABLE 3-3 CONCENTRATION OF METALS (UG/L) AND SULFATE (MG/L) IN ELUTRIATE WATER FROM TOXICITY TESTS

					SLAG ELUTRIATE CHRONIC TESTS	SOLID PHASE ACUTE TEST
ANALYTE	UNITS	RL	USEPA ACUTE CRITERIA*	USEPA CHRONIC CRITERIA*		
ALUMINUM	UG/L	300	--	--	300 U	300 U
ANTIMONY	UG/L	20	--	--	**3.3 B**	20 U
ARSENIC	UG/L	10	69	36	**6.4 B**	**7.8 B**
BARIUM	UG/L	100	--	--	**36.8 B**	**32.2 B**
BERYLLIUM	UG/L	10	--	--	10 U	10 U
CADMIUM	UG/L	10	40	8.8	10 U b	10 U b
CALCIUM	UG/L	1000	--	--	**508,000**	**818,000**
CHROMIUM	UG/L	20	1100	50	**28.6**	**60.6 b**
COPPER	UG/L	20	4.8/6.1**	3.1	20 U abc	20 U abc
HEXAVALENT CHROMIUM	MG/L	0.01	1.1	0.05	0.01 U	**0.051 b**
IRON	UG/L	500	--	--	500 U	**1,720**
LEAD	UG/L	10	210	8.1	10 U b	10 U b
MAGNESIUM	UG/L	1000	--	--	**474,000**	**252,000**
MANGANESE	UG/L	5	--	--	5 U	**231**
MERCURY	UG/L	0.2	1.8	0.94	0.2 U	0.2 U
MOLYBDENUM	UG/L	50	--	--	**20.7 B**	**8.2 B**
NICKEL	UG/L	10	74	8.2	**4.2 B**	10 U b
SELENIUM	UG/L	50	290	71	**12.3 B**	**18.9 B**
SILICON	UG/L	5000	--	--	**1,420 B**	**2,170 B**
SILVER	UG/L	10	1.9	--	10 U a	10 U a
THALLIUM	UG/L	10	--	--	**0.74 B**	10 U
TIN	UG/L	50	--	--	**23.7 B**	50 U
VANADIUM	UG/L	10	--	--	**10.4**	**15.6**
ZINC	UG/L	50	90	81	**7.6 B**	**7.7 B**
SULFATE	MG/L	100	--	--	**1,080**	**1,030**

**Source:* USEPA. 2002. *National Recommended Water Quality Criteria* (EPA-822-R-02-047).

**The State of Maryland estuarine acute criterion for copper; there is no Maryland estuarine chronic copper criterion (COMAR 26.08.02.03-2).

NOTE: Shaded and bold values represent detected concentrations.

RL = average reporting limit

B = compound was detected, but below the reporting limit (value is estimated)

U = compound was analyzed, but not detected

a = exceeds USEPA acute criteria for aquatic life

b = exceeds USEPA chronic criteria for aquatic life

TABLE 3-4 SAMPLE SUMMARY AND RESULTS OF THE 7-DAY CHRONIC TOXICITY TEST WITH *Americamysis bahia* (OPOSSUM SHRIMP)

Test Species:	***Americamysis bahia* (opossum shrimp)**
Sample Description:	Slag elutriate
EA Test Number:	TN-04-739
Test Initiation:	1600, 8 December 2004
Test Completion:	1400, 15 December 2004

Test Concentration (% effluent)	48-Hour % Survival	7-Day % Survival	Mean Biomass as mg/organism (±S.D.)	Mean Fecundity as % Females with Eggs
Control	100	98	0.464 (±0.031)	100
6.25	98	93	0.379 (±0.058)[a]	100
12.5	95	80	0.353 (±0.090)[a]	100
25	95	80	0.347 (±0.086)[a]	100
50	100	95	0.445 (±0.067)	100
100	100	97	0.425 (±0.056)	100

Results (expressed as percent effluent)

48-Hour LC50: >100

	Survival	Biomass	Fecundity
7-Day NOEC:	100	100	100
7-Day LOEC:	>100	>100	100
7-Day ChV:	>100	>100	>100
7-Day IC25:	>100	>100	>100

TABLE 3-5 SAMPLE SUMMARY AND RESULTS OF THE 7-DAY CHRONIC TOXICITY TEST WITH *Cyprinodon variegates* (SHEEPSHEAD MINNOW)

Test Species:	***Cyprinodon variegatus*** **(sheepshead minnow)**
Sample Description:	Slag elutriate
EA Test Number:	TN-04-740
Test Initiation:	1420, 8 December 2004
Test Completion:	1430, 15 December 2004

Test Concentration (% effluent)	48-Hour % Survival	7-Day % Survival	Mean Biomass as mg/organism (±S.D.)
Control	100	100	1.346 (±0.045)
6.25	100	100	1.163 (±0.117)
12.5	98	95	1.281 (±0.081)
25	98	98	1.361 (±0.107)
50	100	98	1.249 (±0.195)
100	100	100	1.181 (±0.061)

Results (expressed as percent effluent)

		Survival	Biomass
48-Hour LC50:	>100		
7-Day NOEC:		100	100
7-Day LOEC:		>100	>100
7-Day ChV:		>100	>100
7-Day IC25:		>100	>100

TABLE 3-6 SAMPLE SUMMARY AND RESULTS OF THE 96-HOUR ACUTE TOXICITY TEST WITH *Cyprinodon variegates* (SHEEPSHEAD MINNOW)

Test Organism: ***Cyprinodon variegatus***

Test Number: TN-04-743

Test Initiation: 1110, 10 December 2004

Test Completion: 1035, 14 December 2004

Test Concentration (percent effluent)	96-Hour Percent Survival
Lab Control	100
Site Control	100
Site/Slag	95
Site/Slag/Sand	100
Site/Sand	100

4.0 CONCLUSIONS

- Results of the bulk solid slag analyses indicated that 20 of the 24 tested metals were detected at low concentrations in the fresh bulk slag sample. The bulk slag sample was comprised of 93.2 percent solids.

- Results of the slag leachate analyses indicated that 16 of the 24 tested metals were detected at low concentrations in slag leachate from all sources. Eight metals, antimony, arsenic, beryllium, cadmium, lead, mercury, selenium, and tin, were not detected in any of the leachate samples. Copper concentrations in slag leachate from two locations, ISG-BWT and ISG-W, slightly exceeded the USEPA chronic criteria.

- Results of the analyses of elutriate water from chronic and acute toxicity testing indicated that of the 24 tested metals, fourteen were detected in the water from the slag elutriate chronic tests and thirteen were detected in the water from the solid phase acute tests. Two metals, chromium and hexavalent chromium, slightly exceeded the USEPA chronic criteria in water from the solid phase acute test.

- The results of the 7-day chronic toxicity test conducted with *A. bahia* on elutriate prepared from the fresh slag indicated that after 48 hours of exposure, there was a minimum of 95 percent survival of test organisms in the elutriate concentrations, and 100 percent survival in the laboratory water control. The 48-hour LC50 was >100 percent elutriate.

- At test completion on Day 7, the 50 and 100 percent elutriate concentrations had mean biomass that was not significantly different from the control. Fecundity was 100 percent in the control and in all elutriate concentrations. The percent difference between the 50 and 100 percent elutriate concentrations and the control was 4.2 and 8.4 percent, respectively. The LOEC and ChV were >100 percent elutriate. The 7-day IC25 was >100 percent elutriate.

- The results of the 7-day chronic toxicity test with *C. variegatus* conducted on elutriate prepared from the fresh slag indicated there were no statistically significant differences in survival or biomass between any elutriate concentration and the control.

- The results of the 96-hour acute toxicity test with *C. variegatus* indicated that there was 100 percent survival in the site water with slag covered with sand, and in the site water with sand only. The treatment consisting of site water and slag alone had 95 percent survival, and was not significantly different from the control.

- Overall, results of the chemical analyses of bulk slag, slag leachate, and toxicity studies indicated that there is little potential for adverse affects to aquatic life from using ISG-SP slag as an in-water construction material in Baltimore Harbor. Chemical analyses of slag indicated that most of the detected concentrations of metals were generally low. Although a few metal concentrations slightly exceeded the USEPA chronic criteria for aquatic life, there were no significant adverse affects found in toxicity studies. Further, the level of dilution used in laboratory studies of slag are much less than that which would be provided in natural aquatic environments. It is expected that the waters of Baltimore Harbor would provide dilutions far greater than 1000-fold and tidal currents would allow continuous flushing and dilution.

5.0 REFERENCES

EA. 2003. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

McLean/Hart Inc. 1998. Human Health Risk and Ecological Risk Assessment: Basic Oxygen Furnace Slag. Prepared for Steel Slag Coalition, Washington, D.C.

US EPA. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

US EPA. 2002b. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. Third Edition. EPA-821-R-02-014. U.S. Environmental Protection Agency. Office of Water, Washington, D.C.

APPENDIX A

ANALYTICAL REPORTS OF CHEMICAL ANALYSES OF BULK SOLID SLAG, SLAG LEACHATE, AND SLAG ELUTRITAE FROM CHRONIC TESTS AND SOLID PHASE ACUTE TESTS

SEVERN TRENT STL

STL Pittsburgh
450 William Pitt Way
Pittsburgh, PA 15238

Tel: 412 820 8380 Fax: 412 820 2080
www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. EA ISG SLAG

EA Engineering ISG Slag

Lot #: C4L020381

Jane Boraczek

EA Engineering, Science and Te

SEVERN TRENT LABORATORIES, INC.

Carrie L. Gamber
Project Manager

January 6, 2005

SEVERN TRENT STL

ACCREDITED IN ACCORDANCE WITH nelac

NELAC REPORTING:

The format and content of the attached report meets NELAC standards and guidelines except as noted in the narrative. The table below presents a summary of the certifications held by STL Pittsburgh. Our primary accreditation authority for the Non-potable water and Solid & Hazardous waste programs is New York State DOH. A more detailed parameter list is available upon request. Please ask your project manager for this information when required.

Certifying State/Program	Certificate #	Program Types	STL Pittsburgh
NFESC	NA	NAVY	X
USACE	NA	Corps of Engineers	X
US Dept of Agriculture	(#S-46425)	Foreign Soil Import Permit	X
Arkansas	(#03-022-1)	WW HW	X X
California – nelac	04224CA	WW HW	X X
Connecticut	(#PH-0688)	WW HW	X X
Florida – nelac	(#E87660)	WW HW	X X
Illinois – nelac	(#200005)	WW HW	X X
Kansas – nelac	(#E-10350)	WW HW	X X
Louisiana – nelac	(#93200)	WW HW	X X
New Hampshire – nelac	(#203002)	WW –	X –
New Jersey – nelac	(PA-005)	WW HW	X X
New York – nelac	(#11182)	WW HW	X X
North Carolina	(#434)	WW HW	X X
North Dakota	R-075	WW HW	X X
Ohio Vap	(#CL0063)	WW HW	X X
South Carolina	(#89014001)	WW HW	X X
Utah – nelac	(STLP)	WW HW	X X
West Virginia	(#142)	WW HW	X X
Wisconsin	998027800	WW HW	X X

The codes utilized for program types are described below:

HW	Hazardous Waste certification
WW	Non-potable Water and/or Wastewater certification
X	Laboratory has some form of certification under the specific program. Many states certify laboratories for specific parameters or tests within a category. The Information In the table indicates the lab is certified in a general category of testing. Please contact the laboratory if parameter specific certification information is required.

PADEP Lab Registration for STL Pittsburgh is 02-416

CASE NARRATIVE

EA Engineering
ISG Slag
STL Lot #: C4L020381

Sample Receiving:
STL Pittsburgh received samples on December 2, 2004. The cooler was received within the proper temperature range.

If project specific QC was not required for samples contained in this report, when batch QC was completed on these samples, anomalous results will be discussed below.

Total Metals:
Sample ISG-FRESH was over the instruments linear range for calcium, iron, and manganese and required a dilution. This sample was also analyzed at a dilution for cadmium, lead, antimony, vanadium, zinc, selenium, and thallium due to inter-element corrections associated with iron and/or manganese.

Sample ISG-FRESH had beryllium detected at a concentration that was less than negative reporting limit. Thus the sample was analyzed at a dilution.

The method blanks had analytes detected at concentrations between the MDL and the reporting limit. The results were flagged with a "B" qualifier. Any sample associated with a method blank that had the same analyte detected had the result flagged with a "J" qualifier.

The laboratory control sample recovered below the control limit for silicon. The addition of hydrogen peroxide during sample preparation causes the formation of silicon oxides in a gaseous phase that release into the air. This causes the loss of silicon when using method 3050B for soil preparation.

For the matrix spike and matrix spike duplicate, aluminum, calcium, chromium, iron, magnesium, manganese, and vanadium recoveries were not calculated due to the concentration of analyte in the sample being >4 times the concentration of spike added.

The matrix spike and matrix spike duplicate recovered outside of the control limits for antimony, beryllium, cadmium, silicon and zinc.

The matrix spike recovered outside of the control limits for copper.

The relative percent difference between the matrix spike and the matrix spike duplicate was outside of the control limits for beryllium and zinc.

CASE NARRATIVE

EA Engineering
ISG Slag
STL Lot #: C4L020381

ASTM Metals:
The matrix spike and matrix spike duplicate were incorrectly spiked. The samples were re-digested for molybdenum, antimony, silicon, and tin.

The re-digestion of sample ISG-FRESH was done using 10 mls instead of 50 mls due to limited sample volume. The reporting limits for molybdenum, antimony, silicon, and tin were adjusted by a factor of 5X.

The method blanks had analytes detected at concentrations between the MDL and the reporting limit. The results were flagged with a "B" qualifier. Any sample associated with a method blank that had the same analyte detected had the result flagged with a "J" qualifier.

The matrix spike and matrix spike duplicate recovered outside of the control limits for mercury.

For the matrix spike and matrix spike duplicate, calcium recoveries were not calculated due to the concentration of analyte in the sample being >4 times the concentration of spike added.

General Chemistry:
There were no problems associated with the analyses.

METHODS SUMMARY

C4L020381

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
DI Leachable Sulfate	MCAWW 300.0A	ASTM D3987-85
Hexavalent Chromium	SW846 7196A	
Hexavalent Chromium	SW846 7196A	SW846 3060A/719
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A	ASTM D3987-85
Mercury in Solid Waste (Manual Cold-Vapor)	SW846 7471A	SW846 7471A
Total Residue as Percent Solids	MCAWW 160.3 MOD	MCAWW 160.3 MOD
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	ASTM D3987-85
Trace Inductively Coupled Plasma (ICP) Metals	SW846 6010B	SW846 3050B

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

C4L020381

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
GX6T0	001	ISG-FRESH	11/23/04	09:30
GX6T4	002	ISG-W	11/23/04	10:00
GX6T5	003	ISG-AWT	11/23/04	11:15
GX6T6	004	ISG-BWT	11/23/04	11:45

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

[redacted] Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL Pittsburgh

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
EA ENGINEERING	JANE BORACZEK	12/1/04	175376
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page** 1 of 1
15 LOVETON CIRCLE	410-771-4950/771-4204		
City SPARKS	**State** MD	**Zip Code** 21152	**Site Contact**	**Lab Contact**
Project Name and Location (State) ISG SLAG, BALTIMORE, MD	**Carrier/Waybill Number** 8493 9287 2573 FEDEX
Contract/Purchase Order/Quote No.	

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H_2SO_4	HNO_3	HCl	NaOH	ZnAc/NaOH	Analysis: BULK - SULFATE 375.4	METALS 6010	METALS MERC. 7471	HEX. CHROM. 7196	ASTM LEACH. D3987	SULFATE 375.4	METALS 6010	METALS MERC. 7471	HEX. CHROM. 7196	Special Instructions/ Conditions of Receipt
ISG-FRESH	11/23/04	0930				X	X						X	X	X	X	X	X	X	X	X	BULK ANAL. ON
ISG-~~WEATHERED~~ FW		1000				X	X										X	X	X	X	X	FRESH ONLY
ISG-AWT		1115				X	X										X	X	X	X	X	
ISG-BWT		1145				X	X										X	X	X	X	X	ASTM LEACHATE
																						D3987 ON ALL
																						SAMPLES
																						4 ~~2~~ BOTTLES PER
																						SAMPLE (ASTM LEACHATE)
																						EXCEPT ISG-FRESH
																						2 BOTTLES - BULK
																						2 BOTTLES - ASTM

Possible Hazard Identification

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Todd Wood	12/1/04	1230	1. Received By: John Park	12-02-04	0900
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

(1 - 78)

Cooler Receipt Form

STL Pittsburgh

Client: EA Eng. Project: _____ Quote: 61941

Cooler Rec'd & Opened for Temp. Check on: 12-02-04

Coolers Opened and Unpacked on: 12-02-04 By: JLP

(Signature)

STL Pittsburgh Lot Number: C4L020381

		Yes	No
1.	Were custody seals on the outside of the cooler?	✓	~~✓~~
	If YES, how many and where? Quantity 1 Location front		
	Were signatures and date correct?	~~✓~~	
2.	Were custody papers included inside the cooler?	✓	
3.	Were custody papers properly filled out (ink, signed, match labels)?	✓	
4.	Did you sign the custody papers in the appropriate place?	✓	
5.	Was shippers packing slip attached to this form?	✓	
6.	Were packing materials used?	✓	
	If YES, what type? Bubble bag		
7.	Were the samples chilled? (Record temperatures on reverse side.)	✓	
8.	Were the samples appropriately preserved?	NA	
9.	Were all bottles sealed in separate plastic bags?		✓
10.	Did all bottles arrive in good condition (unbroken)?	✓	
11.	Were all bottle labels complete (sample ID, preservatives, etc.)?	✓	
12.	Did all bottle labels and/or tags agree with custody papers?	✓	
13.	Were correct bottles used for tests indicated?	✓	
14.	Were all VOA vials checked for the presence of air bubbles?	NA ✓	
15.	Was a sufficient amount of sample sent in each bottle?	✓	

16. Samples received by: (FEDEX) UPS CLIENT DROP-OFF OTHER AIRBORNE

Explain any discrepancies: _____

Level 2 Review _____

Was contacted on _____ by _____ to resolve discrepancies.

Cooler Receipt Form

STL Pittsburgh

P: Preserved

UP: Unpreserved

Sample ID	TMET PH<2	DMET PH<2	HG PH<2	NUT(1) PH<2	CN PH ≥12	OG TPHC PH<2	PHEN PH<2	SULF PH ≥12	TOC PH<2	TOX PH<2	VOA P/UP	hrdnss PH<2			

(1) "NUT" could include sample bottles for ammonia, chemical oxygen demand, nitrate/nitrite, TKN, or total phosphorus

Comments: _____

_____

_____

Cooler Number	Temperature*	Thermometer
1	3.0	2

*Acceptable Temperature Range: 4°C ± 2°C

Sample	Lot Number**

**Please use an asterisk if bottle lot number was covered by the label

467

500

FedEx. US Airbill Express

FedEx Tracking Number 8493 9287 25

1 From. This portion can be retrieved for Recipient's records.

Date 12/1/04 FedEx Tracking Number 849392872573

Sender's Name TODD WARD Phone 410 771-495

Company E A ENGINEERING SCIENCE & TECH

Address 15 LOVETON CIR

City SPARKS GLENCOE State MD ZIP 21152-920

RECIPIENT: PEEL HERE

2 Your Internal Billing Reference 1424801

3 To

Recipient's Name SAMPLE RECEIVING Phone 412 820-8380

Company STL - PITTSBURGH

Recipient's Address 450 WILLIAM PITT WAY BLDG. 6

We cannot deliver to P.O. boxes or P.O. ZIP codes.

Address

To request a package be held at a specific FedEx location, print FedEx address here.

City PITTSBURGH State PA ZIP 15238

8493 9287 2573

0293384968

FedEx. PRIORITY OVERNIGHT THU

emp: 538770 01DEC04

Deliver By: 02DEC04 A2

TRK# 8493 9287 2573 FORM 0215

PIT

15238 -PA-US ES AGCA

Include FedEx address in Section 3.

SATURDAY Delivery Available ONLY for FedEx Priority Overnight, FedEx 2Day, FedEx 1Day Freight, and FedEx 2Day Freight to select ZIP codes

HOLD Weekday at FedEx Location Not available for FedEx First Overnight

HOLD Saturday at FedEx Location Available ONLY for FedEx Priority Overnight and FedEx 2Day to select locations

Does this shipment contain dangerous goods? One box must be checked.

☒ No ☐ Yes As per attached Shipper's Declaration ☐ Yes Shipper's Declaration not required ☐ Dry Ice, Dry Ice, 9, UN 1845 ____ x ____ kg

Dangerous goods (including Dry Ice) cannot be shipped in FedEx packaging. ☐ Cargo Aircraft Only

7 Payment Bill to: Enter FedEx Acct. No. or Credit Card No. below. Obtain Recip. Acct. No.

☒ Sender Acct. No. in Section 1 will be billed. ☐ Recipient ☐ Third Party ☐ Credit Card ☐ Cash/Check

Total Packages 1 Total Weight 35 lbs. Total Charges

Your liability is limited to $100 unless you declare a higher value. See the FedEx Service Guide for details.

8 Sign to Authorize Delivery Without a Signature

By signing you authorize us to deliver this shipment without obtaining a signature and agree to indemnify and hold us harmless from any resulting claims.

Questions? Visit our Web site at fedex.com or call 1-800-GoFedEx 1-800-463-3339.

466

DATA SUMMARY PACKAGE

Total

METALS SUMMARY

EA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

TOTAL Metals

Lot-Sample #...: C4L020381-001
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID
% Moisture.....: 6.8

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4349027						
Mercury	ND	0.035	mg/kg	SW846 7471A	12/14/04	GX6T01A3
		Dilution Factor: 1		Analysis Time..: 09:11	Analyst ID.....: 031043	
		Instrument ID..: PS200HG		MS Run #.....: 4349009	MDL.....: 0.013	
Prep Batch #...: 4349185						
Silver	6.3 J	0.54	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AC
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.032	
Aluminum	17600 J	21.5	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AD
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.86	
Arsenic	0.38 B	1.1	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AE
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.35	
Barium	20.4 B	21.5	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AF
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.11	
Beryllium	ND	4.3	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AG
		Dilution Factor: 10		Analysis Time..: 15:56	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.45	
Calcium	222000	2680	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AH
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 21.2	
Cadmium	ND	2.7	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AJ
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.37	
Chromium E	929 J	0.54	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AK
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.10	

(Continued on next page)

EA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

TOTAL Metals

Lot-Sample #...: C4L020381-001 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	8.5	2.7	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AL
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.12	
Iron	164000	53.7	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AM
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 9.7	
Magnesium	59800	537	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AN
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 1.1	
Manganese	27800 J	40.3	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AP
		Dilution Factor: 25		Analysis Time..: 16:18	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.31	
Molybdenum	ND	4.3	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AQ
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.23	
Nickel	6.0	4.3	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AR
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.13	
Lead	4.4	1.6	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AT
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.85	
Antimony	3.1 B	5.4	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AU
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 1.7	
Selenium	7.6 B	13.4	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01AV
		Dilution Factor: 25		Analysis Time..: 16:18	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 7.0	
Silicon	2380 J	53.7	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AW
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 1.2	

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KA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

TOTAL Metals

Lot-Sample #...: C4L020381-001 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Tin	4.2 B,J	10.7	mg/kg	SW846 6010B	12/14-12/16/04	GX6T01AX
		Dilution Factor: 1		Analysis Time..: 13:55	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.32	
Thallium	60.8	26.8	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01A0
		Dilution Factor: 25		Analysis Time..: 16:18	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 12.2	
Vanadium	743	26.8	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01A1
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.56	
Zinc	102	10.7	mg/kg	SW846 6010B	12/14-12/17/04	GX6T01A2
		Dilution Factor: 5		Analysis Time..: 15:34	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4349108	MDL.....: 0.91	

NOTE(S):

Results and reporting limits have been adjusted for dry weight.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

B Estimated result. Result is less than RL.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: C4L140000-027 Prep Batch #...: 4349027						
Mercury	ND	0.033	mg/kg	SW846 7471A	12/14/04	G0X1W1AA
		Dilution Factor: 1				
		Analysis Time..: 09:08		Analyst ID.....: 031043	Instrument ID..: PS2	
MB Lot-Sample #: C4L140000-185 Prep Batch #...: 4349185						
Aluminum	0.92 B	20.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AC
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Antimony	ND	1.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AT
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Arsenic	ND	1.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AD
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Barium	ND	20.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AE
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Beryllium	ND	0.40	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AF
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Cadmium	ND	0.50	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AH
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Calcium	ND	500	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AG
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Chromium	0.13 B	0.50	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AJ
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Copper	ND	2.5	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AK
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	ND	10.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AL
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Lead	ND	0.30	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AR
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Magnesium	ND	500	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AM
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Manganese	0.14 B	1.5	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AN
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Molybdenum	ND	4.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AP
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Nickel	ND	4.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AQ
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Selenium	ND	0.50	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AU
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Silicon	2.5 B	50.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AV
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Silver	0.049 B	0.50	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AA
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Thallium	ND	1.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AX
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Tin	2.9 B	10.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1AW
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	
Vanadium	ND	5.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1A0
		Dilution Factor: 1				
		Analysis Time..: 13:33		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc	ND	2.0	mg/kg	SW846 6010B	12/14-12/16/04	G00RJ1A1

Dilution Factor: 1

Analysis Time..: 13:33 Analyst ID.....: 022952 Instrument ID..: TRA

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L140000-027 Prep Batch #...: 4349027					
Mercury	103	(80 - 120)	SW846 7471A	12/14/04	G0X1W1AC
		Dilution Factor: 1	Analysis Time..: 09:10	Analyst ID.....: 031043	
		Instrument ID..: PS200HG			
LCS Lot-Sample#: C4L140000-185 Prep Batch #...: 4349185					
Silver	99	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A2
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Aluminum	98	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A3
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Arsenic	95	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A4
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Barium	100	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A5
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Beryllium	97	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A6
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Calcium	98	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A7
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Cadmium	95	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A8
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Chromium	99	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1A9
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Copper	102	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CA
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	99	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CC
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Magnesium	97	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CD
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Manganese	98	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CE
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Molybdenum	97	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CF
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Nickel	95	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CG
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Lead	94	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CH
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Antimony	96	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CJ
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Selenium	91	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CK
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Silicon	51 N	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CL
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Tin	97	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CM
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Thallium	94	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CN
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium	100	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CP
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Zinc	102	(80 - 120)	SW846 6010B	12/14-12/16/04	G00RJ1CQ
		Dilution Factor: 1	Analysis Time..: 13:38	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L140000-027 Prep Batch #...: 4349027							
Mercury	0.417	0.428	mg/kg	103	SW846 7471A	12/14/04	G0X1W1AC
			Dilution Factor: 1		Analysis Time..: 09:10	Analyst ID.....: 031043	
			Instrument ID..: PS200HG				
LCS Lot-Sample#: C4L140000-185 Prep Batch #...: 4349185							
Silver	5.00	4.94	mg/kg	99	SW846 6010B	12/14-12/16/04	G00RJ1A2
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Aluminum	200	195	mg/kg	98	SW846 6010B	12/14-12/16/04	G00RJ1A3
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Arsenic	200	190	mg/kg	95	SW846 6010B	12/14-12/16/04	G00RJ1A4
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Barium	200	200	mg/kg	100	SW846 6010B	12/14-12/16/04	G00RJ1A5
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Beryllium	5.00	4.85	mg/kg	97	SW846 6010B	12/14-12/16/04	G00RJ1A6
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Calcium	5000	4900	mg/kg	98	SW846 6010B	12/14-12/16/04	G00RJ1A7
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Cadmium	5.00	4.77	mg/kg	95	SW846 6010B	12/14-12/16/04	G00RJ1A8
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Chromium	20.0	19.8	mg/kg	99	SW846 6010B	12/14-12/16/04	G00RJ1A9
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Copper	25.0	25.4	mg/kg	102	SW846 6010B	12/14-12/16/04	G00RJ1CA
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	100	98.7	mg/kg	99	SW846 6010B	12/14-12/16/04	G00RJ1CC
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Magnesium	5000	4840	mg/kg	97	SW846 6010B	12/14-12/16/04	G00RJ1CD
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Manganese	50.0	48.8	mg/kg	98	SW846 6010B	12/14-12/16/04	G00RJ1CE
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Molybdenum	100	97.4	mg/kg	97	SW846 6010B	12/14-12/16/04	G00RJ1CF
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Nickel	50.0	47.6	mg/kg	95	SW846 6010B	12/14-12/16/04	G00RJ1CG
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Lead	50.0	47.1	mg/kg	94	SW846 6010B	12/14-12/16/04	G00RJ1CH
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Antimony	50.0	47.8	mg/kg	96	SW846 6010B	12/14-12/16/04	G00RJ1CJ
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Selenium	200	182	mg/kg	91	SW846 6010B	12/14-12/16/04	G00RJ1CK
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Silicon	1000	511 N	mg/kg	51	SW846 6010B	12/14-12/16/04	G00RJ1CL
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Tin	200	194	mg/kg	97	SW846 6010B	12/14-12/16/04	G00RJ1CM
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					
Thallium	200	189	mg/kg	94	SW846 6010B	12/14-12/16/04	G00RJ1CN
		Dilution Factor: 1		Analysis Time..: 13:38		Analyst ID.....: 022952	
		Instrument ID..: TRACEICP					

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381

Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium	50.0	50.0	mg/kg	100	SW846 6010B	12/14-12/16/04	G00RJ1CP
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Zinc	50.0	51.0	mg/kg	102	SW846 6010B	12/14-12/16/04	G00RJ1CQ
			Dilution Factor: 1		Analysis Time..: 13:38	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

N Spiked analyte recovery is outside stated control limits.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 12/09/04 Date Received..: 12/10/04 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L100212-001 Prep Batch #...: 4349027							
						% Moisture.....: 0.45	
Mercury	92	(75 - 125)			SW846 7471A	12/14/04	G0QF41CR
	98	(75 - 125)	3.9	(0-20)	SW846 7471A	12/14/04	G0QF41CT

Dilution Factor: 1
Analysis Time..: 09:36 Instrument ID..: PS200HG Analyst ID.....: 031043
MS Run #.....: 4349009

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 12/09/04 Date Received..: 12/10/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L100212-001 Prep Batch #...: 4349027									
% Moisture.....: 0.45									
Mercury									
	0.097	0.167	0.251	mg/kg	92		SW846 7471A	12/14/04	G0QF41CR
	0.097	0.167	0.261	mg/kg	98	3.9	SW846 7471A	12/14/04	G0QF41CT

Dilution Factor: 1
Analysis Time..: 09:36 Instrument ID..: PS200HG Analyst ID.....: 031043
MS Run #.....: 4349009

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L020381-001 Prep Batch #...: 4349185							
						% Moisture.....: 6.8	
Aluminum	NC	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01C4
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/16/04	GX6T01C5
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Antimony	68 N	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01D2
	69 N	(75 - 125)	1.3	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01D3
		Dilution Factor: 5					
		Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Arsenic	91	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01C6
	92	(75 - 125)	1.9	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01C7
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Barium	96	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01C8
	97	(75 - 125)	0.87	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01C9
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Beryllium	38 N	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01DA
	29 N,*	(75 - 125)	25	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01DC
		Dilution Factor: 10					
		Analysis Time..: 16:07		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Cadmium	50 N	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01DF
	46 N	(75 - 125)	6.9	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01DG
		Dilution Factor: 5					
		Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Calcium	NC	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01DD
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/17/04	GX6T01DE
		Dilution Factor: 5					
		Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					

(Continued on next page)

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Chromium	NC	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01DH
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/16/04	GX6T01DJ
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Copper	132 N	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01DK
	106	(75 - 125)	17	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01DL
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Iron	NC	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01DM
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/17/04	GX6T01DN
		Dilution Factor: 5					
		Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Lead	97	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01D0
	95	(75 - 125)	1.7	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01D1
		Dilution Factor: 5					
		Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Magnesium	NC	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01DP
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/16/04	GX6T01DQ
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Manganese	NC	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01DR
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/17/04	GX6T01DT
		Dilution Factor: 25					
		Analysis Time..: 16:40		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Molybdenum	83	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01DU
	84	(75 - 125)	1.2	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01DV
		Dilution Factor: 1					
		Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952	
		MS Run #.....: 4349108					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Nickel	89	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01DW
	81	(75 - 125)	8.4	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01DX
		Dilution Factor: 1					
		Analysis Time..: 14:06			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Selenium	97	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01D4
	100	(75 - 125)	2.5	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01D5
		Dilution Factor: 25					
		Analysis Time..: 16:40			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Silicon	26 N	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01D6
	22 N	(75 - 125)	1.6	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01D7
		Dilution Factor: 1					
		Analysis Time..: 14:06			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Silver	99	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01C2
	116	(75 - 125)	7.9	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01C3
		Dilution Factor: 1					
		Analysis Time..: 14:06			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Thallium	94	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01EA
	101	(75 - 125)	5.8	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01EC
		Dilution Factor: 25					
		Analysis Time..: 16:40			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Tin	84	(75 - 125)			SW846 6010B	12/14-12/16/04	GX6T01D8
	85	(75 - 125)	0.94	(0-20)	SW846 6010B	12/14-12/16/04	GX6T01D9
		Dilution Factor: 1					
		Analysis Time..: 14:06			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					
Vanadium	NC	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01ED
	NC	(75 - 125)		(0-20)	SW846 6010B	12/14-12/17/04	GX6T01EE
		Dilution Factor: 5					
		Analysis Time..: 15:45			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4349108					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc	175 N	(75 - 125)			SW846 6010B	12/14-12/17/04	GX6T01EF
	0.86 N,*	(75 - 125)	62	(0-20)	SW846 6010B	12/14-12/17/04	GX6T01EG

Dilution Factor: 5
Analysis Time..: 15:45 Instrument ID..: TRACEICP Analyst ID.....: 022952
MS Run #.....: 4349108

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

NC The recovery and/or RPD were not calculated.

N Spiked analyte recovery is outside stated control limits.

* Relative percent difference (RPD) is outside stated control limits.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L020381-001 Prep Batch #...: 4349185									
Aluminum								% Moisture.....: 6.8	
	17600	215	10200	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01C4
			Qualifiers: NC						
	17600	215	6950 NC	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01C5
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Antimony									
	3.1	53.7	39.7 N	mg/kg	68		SW846 6010B	12/14-12/17/04	GX6T01D2
	3.1	53.7	40.2 N	mg/kg	69	1.3	SW846 6010B	12/14-12/17/04	GX6T01D3
			Dilution Factor: 5						
			Analysis Time..: 15:45				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Arsenic									
	0.38	215	195	mg/kg	91		SW846 6010B	12/14-12/16/04	GX6T01C6
	0.38	215	199	mg/kg	92	1.9	SW846 6010B	12/14-12/16/04	GX6T01C7
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Barium									
	20.4	215	227	mg/kg	96		SW846 6010B	12/14-12/16/04	GX6T01C8
	20.4	215	229	mg/kg	97	0.87	SW846 6010B	12/14-12/16/04	GX6T01C9
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Beryllium									
	ND	5.37	2.02 N	mg/kg	38		SW846 6010B	12/14-12/17/04	GX6T01DA
	ND	5.37	1.57	mg/kg	29	25	SW846 6010B	12/14-12/17/04	GX6T01DC
			Qualifiers: N,*						
			Dilution Factor: 10						
			Analysis Time..: 16:07				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Cadmium									
	ND	5.37	2.67 N	mg/kg	50		SW846 6010B	12/14-12/17/04	GX6T01DF
	ND	5.37	2.49 N	mg/kg	46	6.9	SW846 6010B	12/14-12/17/04	GX6T01DG
			Dilution Factor: 5						
			Analysis Time..: 15:45				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Calcium									
	222000	5370	205000	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DD
			Qualifiers: NC						
	222000	5370	226000	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DE
			Qualifiers: NC						
			Dilution Factor: 5						
			Analysis Time..: 15:45				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Chromium									
	929	21.5	965 NC	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01DH
	929	21.5	1230 NC	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01DJ
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Copper									
	8.5	26.8	44.0 N	mg/kg	132		SW846 6010B	12/14-12/16/04	GX6T01DK
	8.5	26.8	37.1	mg/kg	106	17	SW846 6010B	12/14-12/16/04	GX6T01DL
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Iron									
	164000	107	195000	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DM
			Qualifiers: NC						
	164000	107	225000	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DN
			Qualifiers: NC						
			Dilution Factor: 5						
			Analysis Time..: 15:45				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Lead									
	4.4	53.7	56.3	mg/kg	97		SW846 6010B	12/14-12/17/04	GX6T01D0
	4.4	53.7	55.4	mg/kg	95	1.7	SW846 6010B	12/14-12/17/04	GX6T01D1
			Dilution Factor: 5						
			Analysis Time..: 15:45				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Magnesium									
	59800	5370	52400	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01DP
			Qualifiers: NC						
	59800	5370	61100	mg/kg			SW846 6010B	12/14-12/16/04	GX6T01DQ
			Qualifiers: NC						
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese									
	27800	53.7	27800	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DR
			Qualifiers: NC						
	27800	53.7	31100	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01DT
			Qualifiers: NC						
			Dilution Factor: 25						
			Analysis Time..: 16:40				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Molybdenum									
	ND	107	89.6	mg/kg	83		SW846 6010B	12/14-12/16/04	GX6T01DU
	ND	107	90.7	mg/kg	84	1.2	SW846 6010B	12/14-12/16/04	GX6T01DV
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Nickel									
	6.0	53.7	53.8	mg/kg	89		SW846 6010B	12/14-12/16/04	GX6T01DW
	6.0	53.7	49.5	mg/kg	81	8.4	SW846 6010B	12/14-12/16/04	GX6T01DX
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Selenium									
	7.6	215	217	mg/kg	97		SW846 6010B	12/14-12/17/04	GX6T01D4
	7.6	215	222	mg/kg	100	2.5	SW846 6010B	12/14-12/17/04	GX6T01D5
			Dilution Factor: 25						
			Analysis Time..: 16:40				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Silicon									
	2380	1070	2650 N	mg/kg	26		SW846 6010B	12/14-12/16/04	GX6T01D6
	2380	1070	2610 N	mg/kg	22	1.6	SW846 6010B	12/14-12/16/04	GX6T01D7
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						
Silver									
	6.3	5.37	11.6	mg/kg	99		SW846 6010B	12/14-12/16/04	GX6T01C2
	6.3	5.37	12.5	mg/kg	116	7.9	SW846 6010B	12/14-12/16/04	GX6T01C3
			Dilution Factor: 1						
			Analysis Time..: 14:06				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4349108						

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Thallium									
	60.8	215	262	mg/kg	94		SW846 6010B	12/14-12/17/04	GX6T01EA
	60.8	215	278	mg/kg	101	5.8	SW846 6010B	12/14-12/17/04	GX6T01EC
			Dilution Factor: 25						
			Analysis Time..: 16:40		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4349108						
Tin									
	4.2	215	184	mg/kg	84		SW846 6010B	12/14-12/16/04	GX6T01D8
	4.2	215	186	mg/kg	85	0.94	SW846 6010B	12/14-12/16/04	GX6T01D9
			Dilution Factor: 1						
			Analysis Time..: 14:06		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4349108						
Vanadium									
	743	53.7	820 NC	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01ED
	743	53.7	915 NC	mg/kg			SW846 6010B	12/14-12/17/04	GX6T01EE
			Dilution Factor: 5						
			Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4349108						
Zinc									
	102	53.7	196 N	mg/kg	175		SW846 6010B	12/14-12/17/04	GX6T01EF
	102	53.7	103 N,*	mg/kg	0.86	62	SW846 6010B	12/14-12/17/04	GX6T01EG
			Dilution Factor: 5						
			Analysis Time..: 15:45		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4349108						

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

NC The recovery and/or RPD were not calculated.

N Spiked analyte recovery is outside stated control limits.

* Relative percent difference (RPD) is outside stated control limits.

ASTM

METALS SUMMARY

EA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

LEACHATES Metals

Lot-Sample #...: C4L020381-001 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04
Leach Date.....: 12/14/04 Leach Batch #..: P434901

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352082						
Mercury	ND	0.00020	mg/L	SW846 7470A	12/17/04	GX6T01CW
		Dilution Factor: 1		Analysis Time..: 16:26	Analyst ID.....: 031043	
		Instrument ID..: PS200HG		MS Run #.....: 4352055	MDL.....: 0.000054	
Prep Batch #...: 4363091						
Silver	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T01A6
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00030	
Aluminum	1.4	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T01A7
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0080	
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T01A8
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0033	
Barium	0.025 B,J	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T01A9
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CA
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00042	
Calcium	466	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CC
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.040	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CD
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00070	
Chromium	0.0039 B	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CE
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00093	

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EA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

LEACHATES Metals

Lot-Sample #...: C4L020381-001 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	ND	0.025	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CF
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Iron	0.022 B	0.10	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CG
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.018	
Magnesium	ND	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CH
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.010	
Manganese	0.0013 B	0.015	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CJ
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00011	
Nickel	ND	0.040	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CL
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CM
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0016	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CP
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0026	
Thallium	0.0047 B,J	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CR
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0046	
Vanadium	ND	0.050	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CT
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Zinc	ND	0.020	mg/L	SW846 6010B	12/28-12/30/04	GX6T01CU
		Dilution Factor: 1		Analysis Time..: 14:14	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0017	

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EA Engineering, Science and Technology

Client Sample ID: ISG-FRESH

LEACHATES Metals

Lot-Sample #...: C4L020381-001 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 5004096						
Molybdenum	0.011 B	0.20	mg/L	SW846 6010B	01/04/05	GX6T01CK
		Dilution Factor: 5		Analysis Time..: 23:07	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.011	
Antimony	ND	0.050	mg/L	SW846 6010B	01/04/05	GX6T01CN
		Dilution Factor: 5		Analysis Time..: 23:07	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.016	
Silicon	0.47 B	2.5	mg/L	SW846 6010B	01/04/05	GX6T01CV
		Dilution Factor: 5		Analysis Time..: 23:07	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.054	
Tin	ND	0.50	mg/L	SW846 6010B	01/04/05	GX6T01CQ
		Dilution Factor: 5		Analysis Time..: 23:07	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.015	

NOTE(S):

Leachate testing in accordance with USEPA Manual SW846 Method 1310

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

EA Engineering, Science and Technology

Client Sample ID: ISG-W

LEACHATES Metals

Lot-Sample #...: C4L020381-002 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04
Leach Date.....: 12/14/04 Leach Batch #..: P434901

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352082						
Mercury	ND	0.00020	mg/L	SW846 7470A	12/17/04	GX6T41A2
		Dilution Factor: 1		Analysis Time..: 16:31	Analyst ID.....: 400491	
		Instrument ID..: PS200HG		MS Run #.....: 4352055	MDL.....: 0.000054	
Prep Batch #...: 4363091						
Silver	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AA
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00030	
Aluminum	0.16 B	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AC
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0080	
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AD
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0033	
Barium	0.0014 B,J	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AE
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AF
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00042	
Calcium	23.4	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AG
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.040	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AH
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00070	
Chromium	0.0072 B	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AJ
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00093	

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KA Engineering, Science and Technology

Client Sample ID: ISG-W

LEACHATES Metals

Lot-Sample #...: C4L020381-002 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	0.0037 B	0.025	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AK
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Iron	0.027 B	0.10	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AL
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.018	
Magnesium	0.39 B	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AM
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.010	
Manganese	0.00077 B	0.015	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AN
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00011	
Nickel	0.0024 B	0.040	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AQ
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AR
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0016	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AU
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0026	
Thallium	0.0055 B,J	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AW
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0046	
Vanadium	0.082	0.050	mg/L	SW846 6010B	12/28-12/30/04	GX6T41AX
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Zinc	ND	0.020	mg/L	SW846 6010B	12/28-12/30/04	GX6T41A0
		Dilution Factor: 1		Analysis Time..: 14:36	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0017	

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EA Engineering, Science and Technology

Client Sample ID: ISG-W

LEACHATES Metals

Lot-Sample #...: C4L020381-002 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 5004096						
Molybdenum	0.0026 B	0.040	mg/L	SW846 6010B	01/04/05	GX6T41AP
		Dilution Factor: 1		Analysis Time..: 23:12	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0021	
Antimony	ND	0.010	mg/L	SW846 6010B	01/04/05	GX6T41AT
		Dilution Factor: 1		Analysis Time..: 23:12	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0032	
Silicon	12.0	0.50	mg/L	SW846 6010B	01/04/05	GX6T41A1
		Dilution Factor: 1		Analysis Time..: 23:12	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.011	
Tin	ND	0.10	mg/L	SW846 6010B	01/04/05	GX6T41AV
		Dilution Factor: 1		Analysis Time..: 23:12	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0029	

NOTE(S):

Leachate testing in accordance with USEPA Manual SW846 Method 1310

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

EA Engineering, Science and Technology

Client Sample ID: ISG-AWT

LEACHATES Metals

Lot-Sample #...: C4L020381-003 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04
Leach Date.....: 12/14/04 Leach Batch #..: P434901

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352082						
Mercury	ND	0.00020	mg/L	SW846 7470A	12/17/04	GX6T51AD
		Dilution Factor: 1		Analysis Time..: 16:33	Analyst ID.....: 400491	
		Instrument ID..: PS200HG		MS Run #.....: 4352055	MDL.....: 0.000054	
Prep Batch #...: 4363091						
Silver	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AH
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00030	
Aluminum	0.23	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AJ
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0080	
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AK
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0033	
Barium	0.010 B,J	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AL
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AM
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00042	
Calcium	141	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AN
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.040	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AP
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00070	
Chromium	0.023	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AQ
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00093	

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EA Engineering, Science and Technology

Client Sample ID: ISG-AWT

LEACHATES Metals

Lot-Sample #...: C4L020381-003 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	0.0024 B	0.025	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AR
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Iron	ND	0.10	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AT
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.018	
Magnesium	0.038 B	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AU
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.010	
Manganese	0.00038 B	0.015	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AV
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00011	
Nickel	ND	0.040	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AX
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	GX6T51A0
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0016	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T51A2
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0026	
Thallium	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T51A4
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0046	
Vanadium	0.025 B	0.050	mg/L	SW846 6010B	12/28-12/30/04	GX6T51A5
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Zinc	ND	0.020	mg/L	SW846 6010B	12/28-12/30/04	GX6T51AA
		Dilution Factor: 1		Analysis Time..: 14:41	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0017	

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EA Engineering, Science and Technology

Client Sample ID: ISG-AWT

LEACHATES Metals

Lot-Sample #...: C4L020381-003 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 5004096						
Molybdenum	0.0036 B	0.040	mg/L	SW846 6010B	01/04/05	GX6T51AW
		Dilution Factor: 1		Analysis Time..: 23:23	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0021	
Antimony	ND	0.010	mg/L	SW846 6010B	01/04/05	GX6T51A1
		Dilution Factor: 1		Analysis Time..: 23:23	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0032	
Silicon	3.0	0.50	mg/L	SW846 6010B	01/04/05	GX6T51AC
		Dilution Factor: 1		Analysis Time..: 23:23	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.011	
Tin	ND	0.10	mg/L	SW846 6010B	01/04/05	GX6T51A3
		Dilution Factor: 1		Analysis Time..: 23:23	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0029	

NOTE(S):

Leachate testing in accordance with USEPA Manual SW846 Method 1310

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

EA Engineering, Science and Technology

Client Sample ID: ISG-BWT

LEACHATES Metals

Lot-Sample #...: C4L020381-004 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04
Leach Date.....: 12/14/04 Leach Batch #..: P434901

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352082						
Mercury	ND	0.00020	mg/L	SW846 7470A	12/17/04	GX6T61AD
		Dilution Factor: 1		Analysis Time..: 16:34	Analyst ID.....: 400491	
		Instrument ID..: PS200HG		MS Run #.....: 4352055	MDL.....: 0.000054	
Prep Batch #...: 4363091						
Silver	0.00031 B	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AH
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00030	
Aluminum	1.1	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AJ
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0080	
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AK
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0033	
Barium	0.021 B,J	0.20	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AL
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AM
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00042	
Calcium	98.3	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AN
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.040	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AP
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00070	
Chromium	0.0063 B	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AQ
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00093	

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EA Engineering, Science and Technology

Client Sample ID: ISG-BWT

LEACHATES Metals

Lot-Sample #...: C4L020381-004 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	0.0034 B	0.025	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AR
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Iron	ND	0.10	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AT
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.018	
Magnesium	0.058 B	5.0	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AU
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.010	
Manganese	0.00075 B	0.015	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AV
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.00011	
Nickel	ND	0.040	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AX
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0012	
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	GX6T61A0
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0016	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	GX6T61A2
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0026	
Thallium	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	GX6T61A4
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0046	
Vanadium	0.15	0.050	mg/L	SW846 6010B	12/28-12/30/04	GX6T61A5
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0010	
Zinc	0.016 B	0.020	mg/L	SW846 6010B	12/28-12/30/04	GX6T61AA
		Dilution Factor: 1		Analysis Time..: 14:47	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....: 4363044	MDL.....: 0.0017	

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EA Engineering, Science and Technology

Client Sample ID: ISG-BWT

LEACHATES Metals

Lot-Sample #...: C4L020381-004 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 5004096						
Molybdenum	0.0036 B	0.040	mg/L	SW846 6010B	01/04/05	GX6T61AW
		Dilution Factor: 1		Analysis Time..: 23:29	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0021	
Antimony	ND	0.010	mg/L	SW846 6010B	01/04/05	GX6T61A1
		Dilution Factor: 1		Analysis Time..: 23:29	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0032	
Silicon	4.5	0.50	mg/L	SW846 6010B	01/04/05	GX6T61AC
		Dilution Factor: 1		Analysis Time..: 23:29	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.011	
Tin	ND	0.10	mg/L	SW846 6010B	01/04/05	GX6T61A3
		Dilution Factor: 1		Analysis Time..: 23:29	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP		MS Run #.....:	MDL.....: 0.0029	

NOTE(S):

Leachate testing in accordance with USEPA Manual SW846 Method 1310

B Estimated result. Result is less than RL.

J Method blank contamination. The associated method blank contains the target analyte at a reportable level.

METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....: SOLID**

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: C4L140000-048				**Prep Batch #...: 4363091**		
Leach Date.....: 12/14/04				**Leach Batch #..: P434901**		
Aluminum	ND	0.20	mg/L	SW846 6010B	12/28-12/30/04	G0X281AC
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
MB Lot-Sample #: C4L140000-048				**Prep Batch #...: 5004096**		
Leach Date.....: 12/14/04				**Leach Batch #..: P434901**		
Antimony	ND	0.010	mg/L	SW846 6010B	01/04/05	G0X281A6
		Dilution Factor: 1				
		Analysis Time..: 22:50		Analyst ID.....: 022952	Instrument ID..: TRA	
MB Lot-Sample #: C4L140000-048				**Prep Batch #...: 4363091**		
Leach Date.....: 12/14/04				**Leach Batch #..: P434901**		
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	G0X281AD
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Barium	ND	0.20	mg/L	SW846 6010B	12/28-12/30/04	G0X281AE
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G0X281AF
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G0X281AH
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Calcium	**0.090 B**	**5.0**	**mg/L**	**SW846 6010B**	**12/28-12/30/04**	**G0X281AG**
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Chromium	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	G0X281AJ
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Copper	ND	0.025	mg/L	SW846 6010B	12/28-12/30/04	G0X281AK
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	ND	0.10	mg/L	SW846 6010B	12/28-12/30/04	G0X281AL
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	G0X281AR
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Magnesium	ND	5.0	mg/L	SW846 6010B	12/28-12/30/04	G0X281AM
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Manganese	0.00049 B	0.015	mg/L	SW846 6010B	12/28-12/30/04	G0X281AN
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	

MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 5004096
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901

Molybdenum	ND	0.040	mg/L	SW846 6010B	01/04/05	G0X281A5
		Dilution Factor: 1				
		Analysis Time..: 22:50		Analyst ID.....: 022952	Instrument ID..: TRA	

MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 4363091
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901

Nickel	0.0021 B	0.040	mg/L	SW846 6010B	12/28-12/30/04	G0X281AQ
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G0X281AU
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	

MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 5004096
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901

Silicon	ND	0.50	mg/L	SW846 6010B	01/04/05	G0X281A8
		Dilution Factor: 1				
		Analysis Time..: 22:50		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 4363091						
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901						
Silver	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G0X281AA
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Thallium	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	G0X281AW
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 5004096						
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901						
Tin	ND	0.10	mg/L	SW846 6010B	01/04/05	G0X281A7
		Dilution Factor: 1				
		Analysis Time..: 22:50		Analyst ID.....: 022952	Instrument ID..: TRA	
MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 4363091						
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901						
Vanadium	ND	0.050	mg/L	SW846 6010B	12/28-12/30/04	G0X281AX
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
Zinc	0.0043 B	0.020	mg/L	SW846 6010B	12/28-12/30/04	G0X281A0
		Dilution Factor: 1				
		Analysis Time..: 14:03		Analyst ID.....: 022952	Instrument ID..: TRA	
MB Lot-Sample #: C4L140000-048 **Prep Batch #...:** 4352082						
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901						
Mercury	ND	0.00020	mg/L	SW846 7470A	12/17/04	G0X281A2
		Dilution Factor: 1				
		Analysis Time..: 16:22		Analyst ID.....: 400491	Instrument ID..: PS2	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

B Estimated result. Result is less than RL.

METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: C4L170000-082 Prep Batch #...: 4352082						
Mercury	0.000067 B	0.00020	mg/L	SW846 7470A	12/17/04	G1AV11AA
		Dilution Factor: 1				
		Analysis Time..: 16:19		Analyst ID.....: 400491	Instrument ID..: PS2	
MB Lot-Sample #: C4L280000-091 Prep Batch #...: 4363091						
Aluminum	ND	0.20	mg/L	SW846 6010B	12/28-12/30/04	G1T171AC
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Arsenic	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	G1T171AD
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Barium	0.0017 B	0.20	mg/L	SW846 6010B	12/28-12/30/04	G1T171AE
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Beryllium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G1T171AF
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Cadmium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G1T171AH
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Calcium	ND	5.0	mg/L	SW846 6010B	12/28-12/30/04	G1T171AG
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Chromium	ND	0.010	mg/L	SW846 6010B	12/28-12/30/04	G1T171AJ
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Copper	ND	0.025	mg/L	SW846 6010B	12/28-12/30/04	G1T171AK
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Iron	ND	0.10	mg/L	SW846 6010B	12/28-12/30/04	G1T171AL
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Lead	ND	0.0030	mg/L	SW846 6010B	12/28-12/30/04	G1T171AR
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Magnesium	ND	5.0	mg/L	SW846 6010B	12/28-12/30/04	G1T171AM
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Manganese	ND	0.015	mg/L	SW846 6010B	12/28-12/30/04	G1T171AN
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Nickel	ND	0.040	mg/L	SW846 6010B	12/28-12/30/04	G1T171AQ
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Selenium	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G1T171AU
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Silver	ND	0.0050	mg/L	SW846 6010B	12/28-12/30/04	G1T171AA
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Thallium	**0.0049 B**	**0.010**	**mg/L**	**SW846 6010B**	**12/28-12/30/04**	**G1T171AW**
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Vanadium	ND	0.050	mg/L	SW846 6010B	12/28-12/30/04	G1T171AX
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	
Zinc	ND	0.020	mg/L	SW846 6010B	12/28-12/30/04	G1T171A0
		Dilution Factor: 1				
		Analysis Time..: 13:58		Analyst ID.....: 022952	Instrument ID..: TRA	

MB Lot-Sample #: CSA040000-096 **Prep Batch #...:** S004096

Antimony	ND	0.010	mg/L	SW846 6010B	01/04/05	G130T1AC
		Dilution Factor: 1				
		Analysis Time..: 22:45		Analyst ID.....: 022952	Instrument ID..: TRA	
Molybdenum	ND	0.040	mg/L	SW846 6010B	01/04/05	G130T1AA
		Dilution Factor: 1				
		Analysis Time..: 22:45		Analyst ID.....: 022952	Instrument ID..: TRA	

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METHOD BLANK REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Silicon	ND	0.50	mg/L	SW846 6010B	01/04/05	G130T1AE
		Dilution Factor: 1				
		Analysis Time..: 22:45		Analyst ID.....: 022952	Instrument ID..: TRA	
Tin	ND	0.10	mg/L	SW846 6010B	01/04/05	G130T1AD
		Dilution Factor: 1				
		Analysis Time..: 22:45		Analyst ID.....: 022952	Instrument ID..: TRA	

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

B Estimated result. Result is less than RL.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

LEACHATES Metals

Lot-Sample #...: C4L020381 Matrix.....: SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP-BATCH #
Antimony	99	(80 - 120)			SW846 6010B	01/04/05	5004096
	100	(80 - 120)	1.8	(0-20)	SW846 6010B	01/04/05	5004096
		Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
		Instrument ID..: TRA					
Molybdenum	102	(80 - 120)			SW846 6010B	01/04/05	5004096
	104	(80 - 120)	2.0	(0-20)	SW846 6010B	01/04/05	5004096
		Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
		Instrument ID..: TRA					
Silicon	98	(80 - 120)			SW846 6010B	01/04/05	5004096
	99	(80 - 120)	1.4	(0-20)	SW846 6010B	01/04/05	5004096
		Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
		Instrument ID..: TRA					
Tin	101	(80 - 120)			SW846 6010B	01/04/05	5004096
	103	(80 - 120)	1.9	(0-20)	SW846 6010B	01/04/05	5004096
		Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
		Instrument ID..: TRA					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

LEACHATES Metals

Lot-Sample #...: C4L020381 **Matrix.....: SOLID**

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Antimony	0.500	0.493	mg/L	99		SW846 6010B	01/04/05	5004096
	0.500	0.502	mg/L	100	1.8	SW846 6010B	01/04/05	5004096
			Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
			Instrument ID..: TRA					
Molybdenum	1.00	1.02	mg/L	102		SW846 6010B	01/04/05	5004096
	1.00	1.04	mg/L	104	2.0	SW846 6010B	01/04/05	5004096
			Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
			Instrument ID..: TRA					
Silicon	10.0	9.76	mg/L	98		SW846 6010B	01/04/05	5004096
	10.0	9.90	mg/L	99	1.4	SW846 6010B	01/04/05	5004096
			Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
			Instrument ID..: TRA					
Tin	2.00	2.01	mg/L	101		SW846 6010B	01/04/05	5004096
	2.00	2.05	mg/L	103	1.9	SW846 6010B	01/04/05	5004096
			Dilution Factor: 1			Analysis Time..: 22:56	Analyst ID.....: 022952	
			Instrument ID..: TRA					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L170000-082 **Prep Batch #...:** 4352082					
Mercury	96	(80 - 120)	SW846 7470A	12/17/04	G1AV11AC
		Dilution Factor: 1	Analysis Time..: 16:20	Analyst ID.....: 400491	
		Instrument ID..: PS200HG			
LCS Lot-Sample#: C4L280000-091 **Prep Batch #...:** 4363091					
Silver	105	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A2
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Aluminum	103	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A3
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Arsenic	103	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A4
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Barium	102	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A5
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Beryllium	99	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A6
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Calcium	103	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A7
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Cadmium	98	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A8
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Chromium	103	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171A9
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Copper	104	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CA
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			

(Continued on next page)

LABORATORY CONTROL SAMPLE EVALUATION REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	95	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CC
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Magnesium	102	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CD
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Manganese	101	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CE
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Nickel	99	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CG
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Lead	101	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CH
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Selenium	102	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CK
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Thallium	101	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CM
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Vanadium	102	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CN
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			
Zinc	105	(80 - 120)	SW846 6010B	12/28-12/30/04	G1T171CP
		Dilution Factor: 1	Analysis Time..: 14:08	Analyst ID.....: 022952	
		Instrument ID..: TRACEICP			

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L170000-082 Prep Batch #...: 4352082							
Mercury	0.00250	0.00240	mg/L	96	SW846 7470A	12/17/04	G1AV11AC
			Dilution Factor: 1		Analysis Time..: 16:20	Analyst ID.....: 400491	
			Instrument ID..: PS200HG				
LCS Lot-Sample#: C4L280000-091 Prep Batch #...: 4363091							
Silver	0.0500	0.0523	mg/L	105	SW846 6010B	12/28-12/30/04	G1T171A2
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Aluminum	2.00	2.06	mg/L	103	SW846 6010B	12/28-12/30/04	G1T171A3
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Arsenic	2.00	2.05	mg/L	103	SW846 6010B	12/28-12/30/04	G1T171A4
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Barium	2.00	2.03	mg/L	102	SW846 6010B	12/28-12/30/04	G1T171A5
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Beryllium	0.0500	0.0494	mg/L	99	SW846 6010B	12/28-12/30/04	G1T171A6
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Calcium	50.0	51.4	mg/L	103	SW846 6010B	12/28-12/30/04	G1T171A7
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Cadmium	0.0500	0.0491	mg/L	98	SW846 6010B	12/28-12/30/04	G1T171A8
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Chromium	0.200	0.207	mg/L	103	SW846 6010B	12/28-12/30/04	G1T171A9
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Copper	0.250	0.260	mg/L	104	SW846 6010B	12/28-12/30/04	G1T171CA
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				

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LABORATORY CONTROL SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	1.00	0.947	mg/L	95	SW846 6010B	12/28-12/30/04	G1T171CC
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Magnesium	50.0	51.2	mg/L	102	SW846 6010B	12/28-12/30/04	G1T171CD
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Manganese	0.500	0.506	mg/L	101	SW846 6010B	12/28-12/30/04	G1T171CE
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Nickel	0.500	0.496	mg/L	99	SW846 6010B	12/28-12/30/04	G1T171CG
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Lead	0.500	0.504	mg/L	101	SW846 6010B	12/28-12/30/04	G1T171CH
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Selenium	2.00	2.04	mg/L	102	SW846 6010B	12/28-12/30/04	G1T171CK
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Thallium	2.00	2.01	mg/L	101	SW846 6010B	12/28-12/30/04	G1T171CM
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Vanadium	0.500	0.512	mg/L	102	SW846 6010B	12/28-12/30/04	G1T171CN
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				
Zinc	0.500	0.527	mg/L	105	SW846 6010B	12/28-12/30/04	G1T171CP
			Dilution Factor: 1		Analysis Time..: 14:08	Analyst ID.....: 022952	
			Instrument ID..: TRACEICP				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

LEACHATES Metals

Client Lot #...: C4L020381 **Matrix.....:** SOLID
Date Sampled...: 11/23/04 **Date Received..:** 12/02/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L020381-001 **Prep Batch #...:** 4352082							
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901 **% Moisture.....:** 6.8							
Mercury	18 N	(75 - 125)			SW846 7470A	12/17/04	GX6T01ET
	19 N	(75 - 125)	6.5	(0-20)	SW846 7470A	12/17/04	GX6T01EU
Dilution Factor: 1							
Analysis Time..: 16:28 Instrument ID..: PS200HG Analyst ID.....: 400491							
MS Run #.....: 4352055							
MS Lot-Sample #: C4L020381-001 **Prep Batch #...:** 4363091							
Leach Date.....: 12/14/04 **Leach Batch #..:** P434901 **% Moisture.....:** 6.8							
Aluminum	104	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01EX
	106	(75 - 125)	1.4	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01E0
Dilution Factor: 1							
Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952							
MS Run #.....: 4363044							
Arsenic	102	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01E1
	104	(75 - 125)	2.0	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01E2
Dilution Factor: 1							
Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952							
MS Run #.....: 4363044							
Barium	100	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01E3
	103	(75 - 125)	2.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01E4
Dilution Factor: 1							
Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952							
MS Run #.....: 4363044							
Beryllium	93	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01E5
	97	(75 - 125)	4.0	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01E6
Dilution Factor: 1							
Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952							
MS Run #.....: 4363044							
Cadmium	94	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01E9
	95	(75 - 125)	1.6	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FA
Dilution Factor: 1							
Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952							
MS Run #.....: 4363044							

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MATRIX SPIKE SAMPLE EVALUATION REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Calcium	NC	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01E7
	NC	(75 - 125)		(0-20)	SW846 6010B	12/28-12/30/04	GX6T01E8
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Chromium	99	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FC
	101	(75 - 125)	2.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FD
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Copper	105	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FE
	107	(75 - 125)	2.0	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FF
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Iron	88	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FG
	93	(75 - 125)	5.1	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FH
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Lead	97	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FT
	98	(75 - 125)	1.4	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FU
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Magnesium	99	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FJ
	101	(75 - 125)	2.0	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FK
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					
Manganese	98	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FL
	100	(75 - 125)	2.0	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FM
		Dilution Factor: 1					
		Analysis Time..: 14:25			Instrument ID..: TRACEICP	Analyst ID.....: 022952	
		MS Run #.....: 4363044					

(Continued on next page)

MATRIX SPIKE SAMPLE EVALUATION REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Nickel	95	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FQ
	96	(75 - 125)	0.91	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01FR
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					
Selenium	100	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01FX
	102	(75 - 125)	1.5	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01F0
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					
Silver	104	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01EV
	107	(75 - 125)	2.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01EW
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					
Thallium	98	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01F3
	99	(75 - 125)	1.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01F4
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					
Vanadium	99	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01F5
	102	(75 - 125)	2.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01F6
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					
Zinc	102	(75 - 125)			SW846 6010B	12/28-12/30/04	GX6T01F7
	104	(75 - 125)	2.3	(0-20)	SW846 6010B	12/28-12/30/04	GX6T01F8
		Dilution Factor: 1					
		Analysis Time..: 14:25 Instrument ID..: TRACEICP Analyst ID.....: 022952					
		MS Run #.....: 4363044					

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

N Spiked analyte recovery is outside stated control limits.

MATRIX SPIKE SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381 Matrix.....: SOLID
Date Sampled...: 11/23/04 Date Received..: 12/02/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L020381-001 Prep Batch #...: 4352082									
Leach Date.....: 12/14/04 Leach Batch #..: P434901 % Moisture.....: 6.8									
Mercury									
	ND	0.00500	0.00087	mg/L	18		SW846 7470A	12/17/04	GX6T01ET
			Qualifiers: N						
	ND	0.00500	0.00093	mg/L	19	6.5	SW846 7470A	12/17/04	GX6T01EU
			Qualifiers: N						
			Dilution Factor: 1						
			Analysis Time..: 16:28		Instrument ID..: PS200HG			Analyst ID.....: 400491	
			MS Run #.....: 4352055						
MS Lot-Sample #: C4L020381-001 Prep Batch #...: 4363091									
Leach Date.....: 12/14/04 Leach Batch #..: P434901 % Moisture.....: 6.8									
Aluminum									
	1.4	2.00	3.48	mg/L	104		SW846 6010B	12/28-12/30/04	GX6T01EX
	1.4	2.00	3.53	mg/L	106	1.4	SW846 6010B	12/28-12/30/04	GX6T01E0
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP			Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Arsenic									
	ND	2.00	2.03	mg/L	102		SW846 6010B	12/28-12/30/04	GX6T01E1
	ND	2.00	2.07	mg/L	104	2.0	SW846 6010B	12/28-12/30/04	GX6T01E2
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP			Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Barium									
	0.025	2.00	2.03	mg/L	100		SW846 6010B	12/28-12/30/04	GX6T01E3
	0.025	2.00	2.08	mg/L	103	2.3	SW846 6010B	12/28-12/30/04	GX6T01E4
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP			Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Beryllium									
	ND	0.0500	0.0464	mg/L	93		SW846 6010B	12/28-12/30/04	GX6T01E5
	ND	0.0500	0.0484	mg/L	97	4.0	SW846 6010B	12/28-12/30/04	GX6T01E6
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP			Analyst ID.....: 022952	
			MS Run #.....: 4363044						

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MATRIX SPIKE SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Cadmium									
	ND	0.0500	0.0468	mg/L	94		SW846 6010B	12/28-12/30/04	GX6T01E9
	ND	0.0500	0.0476	mg/L	95	1.6	SW846 6010B	12/28-12/30/04	GX6T01FA
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Calcium									
	466	50.0	512 NC	mg/L			SW846 6010B	12/28-12/30/04	GX6T01E7
	466	50.0	518 NC	mg/L			SW846 6010B	12/28-12/30/04	GX6T01E8
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Chromium									
	0.0039	0.200	0.202	mg/L	99		SW846 6010B	12/28-12/30/04	GX6T01FC
	0.0039	0.200	0.206	mg/L	101	2.3	SW846 6010B	12/28-12/30/04	GX6T01FD
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Copper									
	ND	0.250	0.263	mg/L	105		SW846 6010B	12/28-12/30/04	GX6T01FE
	ND	0.250	0.268	mg/L	107	2.0	SW846 6010B	12/28-12/30/04	GX6T01FF
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Iron									
	0.022	1.00	0.905	mg/L	88		SW846 6010B	12/28-12/30/04	GX6T01FG
	0.022	1.00	0.952	mg/L	93	5.1	SW846 6010B	12/28-12/30/04	GX6T01FH
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						
Lead									
	ND	0.500	0.484	mg/L	97		SW846 6010B	12/28-12/30/04	GX6T01FT
	ND	0.500	0.490	mg/L	98	1.4	SW846 6010B	12/28-12/30/04	GX6T01FU
			Dilution Factor: 1						
			Analysis Time..: 14:25				Instrument ID..: TRACEICP	Analyst ID.....: 022952	
			MS Run #.....: 4363044						

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MATRIX SPIKE SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 Date Received..: 12/02/04 Matrix.....: SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Magnesium									
	ND	50.0	49.7	mg/L	99		SW846 6010B	12/28-12/30/04	GX6T01FJ
	ND	50.0	50.7	mg/L	101	2.0	SW846 6010B	12/28-12/30/04	GX6T01FK
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Manganese									
	0.0013	0.500	0.492	mg/L	98		SW846 6010B	12/28-12/30/04	GX6T01FL
	0.0013	0.500	0.502	mg/L	100	2.0	SW846 6010B	12/28-12/30/04	GX6T01FM
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Nickel									
	ND	0.500	0.477	mg/L	95		SW846 6010B	12/28-12/30/04	GX6T01FQ
	ND	0.500	0.481	mg/L	96	0.91	SW846 6010B	12/28-12/30/04	GX6T01FR
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Selenium									
	ND	2.00	2.01	mg/L	100		SW846 6010B	12/28-12/30/04	GX6T01FX
	ND	2.00	2.04	mg/L	102	1.5	SW846 6010B	12/28-12/30/04	GX6T01F0
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Silver									
	ND	0.0500	0.0520	mg/L	104		SW846 6010B	12/28-12/30/04	GX6T01EV
	ND	0.0500	0.0533	mg/L	107	2.3	SW846 6010B	12/28-12/30/04	GX6T01EW
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Thallium									
	0.0047	2.00	1.96	mg/L	98		SW846 6010B	12/28-12/30/04	GX6T01F3
	0.0047	2.00	1.98	mg/L	99	1.3	SW846 6010B	12/28-12/30/04	GX6T01F4
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

LEACHATES Metals

Client Lot #...: C4L020381
Date Sampled...: 11/23/04 **Date Received..:** 12/02/04 **Matrix.....:** SOLID

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium									
	ND	0.500	0.497	mg/L	99		SW846 6010B	12/28-12/30/04	GX6T01F5
	ND	0.500	0.509	mg/L	102	2.3	SW846 6010B	12/28-12/30/04	GX6T01F6
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						
Zinc									
	ND	0.500	0.510	mg/L	102		SW846 6010B	12/28-12/30/04	GX6T01F7
	ND	0.500	0.522	mg/L	104	2.3	SW846 6010B	12/28-12/30/04	GX6T01F8
			Dilution Factor: 1						
			Analysis Time..: 14:25		Instrument ID..: TRACEICP		Analyst ID.....: 022952		
			MS Run #.....: 4363044						

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

N Spiked analyte recovery is outside stated control limits.

GENERAL CHEMISTRY SUMMARY

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L020381
Matrix:	SOLID		

LEACHATE, DI (ASTM D3987-85) - 18 hour

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
ISG-FRESH	C4L020381 001	GX6T01CX	ND	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:36	4349486
ISG-W	C4L020381 002	GX6T41A3	ND	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:38	4349486
ISG-AWT	C4L020381 003	GX6T51AE	0.019	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:39	4349486
ISG-BWT	C4L020381 004	GX6T61AE	ND	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:40	4349486

EA Engineering ISG Slag

DI Leachable Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L020381
Matrix:	SOLID		

DI-LEACHATE

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
ISG-FRESH	C4L020381 001	GX6T01C1	ND	mg/L	1.0	1	12/29/2004 - 12/30/2004 03:47	4365114
ISG-W	C4L020381 002	GX6T41A5	2.5	mg/L	1.0	1	12/29/2004 - 12/30/2004 04:32	4365114
ISG-AWT	C4L020381 003	GX6T51AG	51.2	mg/L	1.0	1	12/29/2004 - 12/30/2004 04:47	4365114
ISG-BWT	C4L020381 004	GX6T61AG	36.9	mg/L	1.0	1	12/29/2004 - 12/30/2004 05:02	4365114

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L020381
Matrix:	SOLID		

Alkaline digestion, Hex. Chromium

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
ISG-FRESH	C4L020381 001	GX6T01A4	3.6	mg/kg	0.43	1	12/16/2004 - 12/18/2004 10:26	4351486

EA Engineering ISG Slag

Percent Solids

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 160.3 MOD
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L020381
Matrix:	SOLID		

Total Residue as Percent Solids

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
ISG-FRESH	C4L020381 001	GX8T01AA	93.2	%	1.0	1	12/20/2004 - 12/21/2004 05:31	4355133

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L020381
Matrix:	SOLID	**Date/Time Received:**	12/2/2004 10:00:00AM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
BLK - C4L140000048B	048 MB	G0X281A3	ND	mg/L	0.010	12/14/2004 - 12/14/2004	4349486	
BLK - C4L140000486B	486 MB	G02D41AC	ND	mg/L	0.010	12/14/2004 - 12/14/2004	4349486	

EA Engineering ISG Slag

DI Leachable Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L020381
Matrix:	SOLID	**Date/Time Received:**	12/2/2004 10:00:00AM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
BLK - C4L140000048B	048 MB	G0X281A4	ND	mg/L	1.0	12/29/2004 - 12/30/2004	4365114	
BLK - C4L300000114B	114 MB	G10W41AA	ND	mg/L	1.0	12/29/2004 - 12/30/2004	4365114	

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L020381
Matrix:	SOLID	**Date/Time Received:**	12/7/2004 12:40:00PM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
BLK - C4L160000473B	473 MB	G09E71AA	ND	mg/kg	0.40	12/16/2004 - 12/18/2004	4351486	

EA Engineering ISG Slag

Percent Solids

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 160.3 MOD
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L020381
Matrix:	SOLID	**Date/Time Received:**	12/2/2004 10:00:00AM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
INTRA-LAB QC	001 DUP	GX47K1D0	54.8	%	1.0	12/20/2004 - 12/21/2004	4355133	0.53 / 20

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L140000
Matrix:	SOLID	**Date/Time Received:**	12/2/2004 10:00:00AM

Client Sample ID	QC Sample Type	Workorder	Recovery (%)	Control Limits (%)	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
CHECK SAMPLE	LCS	G02D41AA	102	75 - 125	12/14/2004 - 12/14/2004	4349486	

EA Engineering ISG Slag

DI Leachable Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L020381
Matrix:	SOLID	**Date/Time Received:**	12/2/2004 10:00:00AM

Client Sample ID	QC Sample Type	Workorder	Recovery (%)	Control Limits (%)	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
ISG-FRESH	MSD	GX6T01GD	107	75 - 125	12/29/2004 - 12/30/2004	4365114	0.18 / 20
CHECK SAMPLE	LCS	G10W41AC	97	90 - 110	12/29/2004 - 12/30/2004	4365114	
ISG-FRESH	MS	GX6T01GC	107	75 - 125	12/29/2004 - 12/30/2004	4365114	0.18 / 20

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L070237
Matrix:	SOLID	**Date/Time Received:**	12/7/2004 12:40:00PM

Client Sample ID	QC Sample Type	Workorder	Recovery (%)	Control Limits (%)	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
LAB MS/MSD	MS	G0FKR1A5	36 N	75 - 125	12/16/2004 - 12/18/2004	4351486	5.8 / 20
LAB MS/MSD	MS	G00KP1A5	104	75 - 125	12/14/2004 - 12/14/2004	4349344	1.5 / 20
LAB MS/MSD	MSD	G0FKR1A6	38 N	75 - 125	12/16/2004 - 12/18/2004	4351486	5.8 / 20
LAB MS/MSD	MSD	G00KP1A6	106	75 - 125	12/14/2004 - 12/14/2004	4349344	1.5 / 20
CHECK SAMPLE	LCS	G1FWX1AA	103	75 - 125	12/16/2004 - 12/18/2004	4351486	

SEVERN TRENT STL

STL Pittsburgh
450 William Pitt Way
Pittsburgh, PA 15238

Tel: 412 820 8380 Fax: 412 820 2080
www.stl-inc.com

ANALYTICAL REPORT

PROJECT NO. EA ISG SLAG

EA Engineering ISG Slag

Lot #: C4L140133

Jane Boraczek

EA Engineering, Science and Te

SEVERN TRENT LABORATORIES, INC.

Carrie L. Gamber
Project Manager

January 17, 2005

SEVERN TRENT STL

ACCREDITED IN ACCORDANCE WITH nelac

NELAC REPORTING:

The format and content of the attached report meets NELAC standards and guidelines except as noted in the narrative. The table below presents a summary of the certifications held by STL Pittsburgh. Our primary accreditation authority for the Non-potable water and Solid & Hazardous waste programs is New York State DOH. A more detailed parameter list is available upon request. Please ask your project manager for this information when required.

Certifying State/Program	Certificate #	Program Types	STL Pittsburgh
NFESC	NA	NAVY	X
USACE	NA	Corps of Engineers	X
US Dept of Agriculture	(#S-46425)	Foreign Soil Import Permit	X
Arkansas	(#03-022-1)	WW HW	X X
California – nelac	04224CA	WW HW	X X
Connecticut	(#PH-0688)	WW HW	X X
Florida – nelac	(#E87660)	WW HW	X X
Illinois – nelac	(#200005)	WW HW	X X
Kansas – nelac	(#E-10350)	WW HW	X X
Louisiana – nelac	(#93200)	WW HW	X X
New Hampshire – nelac	(#203002)	WW –	X –
New Jersey – nelac	(PA-005)	WW HW	X X
New York – nelac	(#11182)	WW HW	X X
North Carolina	(#434)	WW HW	X X
North Dakota	R-075	WW HW	X X
Ohio Vap	(#CL0063)	WW HW	X X
South Carolina	(#89014001)	WW HW	X X
Utah – nelac	(STLP)	WW HW	X X
West Virginia	(#142)	WW HW	X X
Wisconsin	998027800	WW HW	X X

The codes utilized for program types are described below:

HW Hazardous Waste certification
WW Non-potable Water and/or Wastewater certification
X Laboratory has some form of certification under the specific program. Many states certify laboratories for specific parameters or tests within a category. The information in the table indicates the lab is certified in a general category of testing. Please contact the laboratory if paremeter specific certification information is required.

PADEP Lab Registration for STL Pittsburgh is 02-416

CASE NARRATIVE

EA Engineering
ISG Slag
STL Lot #: C4L140133

Sample Receiving:
STL Pittsburgh received samples on December 14, 2004. The cooler was received within the proper temperature range.

If project specific QC was not required for samples contained in this report, when batch QC was completed on these samples, anomalous results will be discussed below.

Metals:
Due to matrix interference the samples were analyzed at a dilution for the ICP MS analytes.

For the matrix spike and matrix spike duplicate, calcium and magnesium recoveries were not calculated due to the concentration of analyte in the sample being >4 times the concentration of spike added.

General Chemistry:
The samples were analyzed at a dilution for sulfate.

METHODS SUMMARY

C4L140133

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
Hexavalent Chromium	SW846 7196A	SW846 7196A
ICP-MS (6020)	SW846 6020	SW846 3010
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A	SW846 7470A
Sulfate	MCAWW 300.0A	MCAWW 300.0A

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

C4L140133

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
G00KP	001	SLAG ELUTRIATE-CHRONIC TESTS	12/13/04	11:45
G00KR	002	SOLID PHASE ACUTE TEST	12/13/04	12:00

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

STL Pittsburgh

[redacted]

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

STL-4124 (0901)

Client	Project Manager	Date	Chain of Custody Number
EA ENGN.	PINE / BORACZEK	12/13/04	175218
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page ____ of ____**
15 LOVETON CIRCLE	(410) 771-4950		
City / **State** / **Zip Code**	**Site Contact**	**Lab Contact**	
SPARKS / MD / 21152	W McCulloch	KATHY GAMBER	
Project Name and Location (State)	**Carrier/Waybill Number**		
SLAG TESTING			
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: METALS	SULFATE & HEX CHROME	Special Instructions/ Conditions of Receipt
SLAG ELUTRIATE - CHRONIC TESTS	12/13/04	1145		✓			(1)		(1)				✓	✓	
SOLID PHASE ACUTE TEST	12/13/04	1200		✓			(1)		(1)				✓	✓	

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal

☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required

☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☐ Other ____

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	Wayne McCulloch	12/13/04	1410	Mark Forbes	12.13.04	14:10
2.	Mark Forbes	12.13.04	15:15			
3.				Patrick R Raust	12/14/02	1030

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

6

(1 - 45)

Cooler Receipt Form
STL Pittsburgh

Client: E.A. Engineering Project: _____ Quote: 61941

Cooler Rec'd & Opened for Temp. Check on: 12/14/04

Coolers Opened and Unpacked on: 12/14/04 By: RRF
(Signature)

STL Pittsburgh Lot Number: CGL140133

		Yes	No
1.	Were custody seals on the outside of the cooler?	✓	✓ RRF 12/14/04
	If YES, how many and where? Quantity 1 Location front		
	Were signatures and date correct?	✓	
2.	Were custody papers included inside the cooler?	✓	
3.	Were custody papers properly filled out (ink, signed, match labels)?	✓	
4.	Did you sign the custody papers in the appropriate place?	✓	
5.	Was shippers packing slip attached to this form?	✓	
6.	Were packing materials used?	✓	
	If YES, what type? Bubble Wrap		
7.	Were the samples chilled? (Record temperatures on reverse side.)	✓	
8.	Were the samples appropriately preserved?	✓	
9.	Were all bottles sealed in separate plastic bags?	✓	
10.	Did all bottles arrive in good condition (unbroken)?	✓	
11.	Were all bottle labels complete (sample ID, preservatives, etc.)?	✓	
12.	Did all bottle labels and/or tags agree with custody papers?	✓	
13.	Were correct bottles used for tests indicated?	✓	
14.	Were all VOA vials checked for the presence of air bubbles?	N/A	
15.	Was a sufficient amount of sample sent in each bottle?		

16. Samples received by: (FEDEX) UPS CLIENT DROP-OFF OTHER AIRBORNE

Explain any discrepancies: _____

Level 2 Review _____

Was contacted on _____ by _____ to resolve discrepancies.

Cooler Receipt Form

STL Pittsburgh

P: Preserved

UP: Unpreserved

Sample ID	TMET PH<2	DMET PH<2	HG PH<2	NUT(1) PH<2	CN PH ≥12	OG TPHC PH<2	PHEN PH<2	SULF PH ≥12	TOC PH<2	TOX PH<2	VOA P/UP	hrdnss PH<2			
SLAG ELUTRIATE	2														
SOLID PHASE ACLSE	2														

(1) "NUT" could include sample bottles for ammonia, chemical oxygen demand, nitrate/nitrite, TKN, or total phosphorus

Comments: _____

Cooler Number	Temperature*	Thermometer
1	2.0°	7

*Acceptable Temperature Range: 4°C ± 2°C

Sample	Lot Number**

**Please use an asterisk if bottle lot number was covered by the label

From: Origin ID: (410)869-0085
Tara Martz
STL BALTIMORE
5710 Executive Drive
Suite 106
Baltimore, MD 21228

FedEx Express

CLS0914405/06

Ship Date: 13DEC04
Actual Wgt: 25 LB
System#: 1030460/INET2000
Account#: S *********

REF: EA/COC# 175218

Delivery Address Bar Code

SHIP TO: (412)820-8380 BILL RECIPIENT
Sample Receiving
STL Pittsburgh
450 William Pitt Way
Building 6
Pittsburgh, PA 15238

PRIORITY OVERNIGHT

TUE
Deliver By:
14DEC04

TRK# 7927 9954 9775 FORM 0201

PIT A2

15238 -PA-US

ES AGCA

STL Pittsburgh

DATA SUMMARY PACKAGE

METALS SUMMARY

EA Engineering, Science and Technology

Client Sample ID: SLAG ELUTRIATE-CHRONIC TESTS

TOTAL Metals

Lot-Sample #...: C4L140133-001 Matrix.....: WATER
Date Sampled...: 12/13/04 Date Received..: 12/14/04

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352083						
Mercury	ND	0.20	ug/L	SW846 7470A	12/17/04	G00KP1A2
		Dilution Factor: 1		Analysis Time..: 16:39	Analyst ID.....: 400491	
		Instrument ID..: PS200HG		MS Run #.....: 4352056	MDL.....: 0.071	
Prep Batch #...: 5006145						
Silver	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AA
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.51	
Aluminum	ND	300	ug/L	SW846 6020	01/06-01/07/05	G00KP1AC
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 25.4	
Arsenic	6.4 B	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AD
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 2.6	
Barium	36.8 B	100	ug/L	SW846 6020	01/06-01/07/05	G00KP1AE
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 1.1	
Beryllium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AF
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.54	
Calcium	508000	1000	ug/L	SW846 6020	01/06-01/07/05	G00KP1AG
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 199	
Cadmium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AH
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.68	
Chromium	28.6	20.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AJ
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 5.6	

(Continued on next page)

EA Engineering, Science and Technology

Client Sample ID: SLAG ELUTRIATE-CHRONIC TESTS

TOTAL Metals

Lot-Sample #...: C4L140133-001 Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	ND	20.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AK
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 5.0	
Iron	ND	500	ug/L	SW846 6020	01/06-01/07/05	G00KP1AL
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 28.5	
Magnesium	474000	1000	ug/L	SW846 6020	01/06-01/07/05	G00KP1AM
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 12.6	
Manganese	ND	5.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AN
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.36	
Molybdenum	20.7 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AP
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.3	
Nickel	4.2 B	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AQ
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.63	
Lead	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AR
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.47	
Antimony	3.3 B	20.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AT
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.60	
Selenium	12.3 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AU
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.7	
Silicon	1420 B	5000	ug/L	SW846 6020	01/06-01/07/05	G00KP1AV
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 13.0	

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EA Engineering, Science and Technology

Client Sample ID: SLAG ELUTRIATE-CHRONIC TESTS

TOTAL Metals

Lot-Sample #...: C4L140133-001 Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Tin	23.7 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AW
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 22.3	
Thallium	0.74 B	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1AX
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.48	
Vanadium	10.4	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1A0
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.9	
Zinc	7.6 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KP1A1
		Dilution Factor: 10		Analysis Time..: 15:03	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 3.4	

NOTE(S):

B Estimated result. Result is less than RL.

EA Engineering, Science and Technology

Client Sample ID: SOLID PHASE ACUTE TEST

TOTAL Metals

Lot-Sample #...: C4L140133-002 Matrix.....: WATER
Date Sampled...: 12/13/04 Date Received..: 12/14/04

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 4352083						
Mercury	ND	0.20	ug/L	SW846 7470A	12/17/04	G00KR1AD
		Dilution Factor: 1		Analysis Time..: 16:41	Analyst ID.....: 400491	
		Instrument ID..: PS200HG		MS Run #.....: 4352056	MDL.....: 0.071	
Prep Batch #...: 5006145						
Silver	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AG
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.51	
Aluminum	ND	300	ug/L	SW846 6020	01/06-01/07/05	G00KR1AH
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 25.4	
Arsenic	**7.8 B**	**10.0**	**ug/L**	**SW846 6020**	**01/06-01/07/05**	**G00KR1AJ**
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 2.6	
Barium	**32.2 B**	**100**	**ug/L**	**SW846 6020**	**01/06-01/07/05**	**G00KR1AK**
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 1.1	
Beryllium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AL
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.54	
Calcium	**818000**	**1000**	**ug/L**	**SW846 6020**	**01/06-01/07/05**	**G00KR1AM**
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 199	
Cadmium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AN
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.68	
Chromium	**60.6**	**20.0**	**ug/L**	**SW846 6020**	**01/06-01/07/05**	**G00KR1AP**
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 5.6	

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EA Engineering, Science and Technology

Client Sample ID: SOLID PHASE ACUTE TEST

TOTAL Metals

Lot-Sample #...: C4L140133-002 Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Copper	ND	20.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AQ
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 5.0	
Iron	1720	500	ug/L	SW846 6020	01/06-01/07/05	G00KR1AR
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 28.5	
Magnesium	252000	1000	ug/L	SW846 6020	01/06-01/07/05	G00KR1AT
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 12.6	
Manganese	231	5.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AU
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.36	
Molybdenum	8.2 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AV
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.3	
Nickel	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AW
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.63	
Lead	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AX
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.47	
Antimony	ND	20.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1A0
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.60	
Selenium	18.9 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1A1
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.7	
Silicon	2170 B	5000	ug/L	SW846 6020	01/06-01/07/05	G00KR1A2
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 13.0	

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EA Engineering, Science and Technology

Client Sample ID: SOLID PHASE ACUTE TEST

TOTAL Metals

Lot-Sample #...: C4L140133-002 Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Tin	ND	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1A3
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 22.3	
Thallium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1A4
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 0.48	
Vanadium	15.6	10.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AA
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 4.9	
Zinc	7.7 B	50.0	ug/L	SW846 6020	01/06-01/07/05	G00KR1AC
		Dilution Factor: 10		Analysis Time..: 15:29	Analyst ID.....: 400149	
		Instrument ID..: ICPMS		MS Run #.....: 5006084	MDL.....: 3.4	

NOTE(S):

B Estimated result. Result is less than RL.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: C4L170000-083 **Prep Batch #...:** 4352083						
Mercury	ND	0.20	ug/L	SW846 7470A	12/17/04	G1AV41AA
		Dilution Factor: 1				
		Analysis Time..: 16:36		Analyst ID.....: 400491	Instrument ID..: PS2	
MB Lot-Sample #: C5A060000-145 **Prep Batch #...:** 5006145						
Aluminum	ND	30.0	ug/L	SW846 6020	01/06-01/07/05	G16221AC
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Antimony	ND	2.0	ug/L	SW846 6020	01/06-01/07/05	G16221AT
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Arsenic	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AD
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Barium	ND	10.0	ug/L	SW846 6020	01/06-01/07/05	G16221AE
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Beryllium	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AF
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Cadmium	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AH
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Calcium	ND	100	ug/L	SW846 6020	01/06-01/07/05	G16221AG
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Chromium	ND	2.0	ug/L	SW846 6020	01/06-01/07/05	G16221AJ
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Copper	ND	2.0	ug/L	SW846 6020	01/06-01/07/05	G16221AK
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	

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METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	ND	50.0	ug/L	SW846 6020	01/06-01/07/05	G16221AL
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Lead	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AR
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Magnesium	ND	100	ug/L	SW846 6020	01/06-01/07/05	G16221AM
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Manganese	ND	0.50	ug/L	SW846 6020	01/06-01/07/05	G16221AN
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Molybdenum	ND	5.0	ug/L	SW846 6020	01/06-01/07/05	G16221AP
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Nickel	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AQ
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Selenium	ND	5.0	ug/L	SW846 6020	01/06-01/07/05	G16221AU
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Silicon	ND	500	ug/L	SW846 6020	01/06-01/07/05	G16221AV
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Silver	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AA
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Thallium	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221AX
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Tin	ND	5.0	ug/L	SW846 6020	01/06-01/07/05	G16221AW
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	
Vanadium	ND	1.0	ug/L	SW846 6020	01/06-01/07/05	G16221A0
		Dilution Factor: 1				
		Analysis Time..: 14:55		Analyst ID.....: 400149	Instrument ID..: ICP	

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METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc	ND	5.0	ug/L	SW846 6020	01/06-01/07/05	G16221A1

Dilution Factor: 1

Analysis Time..: 14:55 Analyst ID.....: 400149 Instrument ID..: ICP

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L170000-083 **Prep Batch #...:** 4352083					
Mercury	92	(80 - 120)	SW846 7470A	12/17/04	G1AV41AC
		Dilution Factor: 1	Analysis Time..: 16:38	Analyst ID.....: 400491	
		Instrument ID..: PS200HG			
LCS Lot-Sample#: C5A060000-145 **Prep Batch #...:** 5006145					
Silver	99	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A2
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Aluminum	86	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A3
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Arsenic	83	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A4
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Barium	108	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A5
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Beryllium	84	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A6
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Calcium	95	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A7
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Cadmium	92	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A8
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Chromium	110	(80 - 120)	SW846 6020	01/06-01/07/05	G16221A9
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Copper	98	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CA
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	95	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CC
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Magnesium	86	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CD
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Manganese	95	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CE
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Molybdenum	115	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CF
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Nickel	98	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CG
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Lead	98	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CH
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Antimony	99	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CJ
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Selenium	81	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CK
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Silicon	88	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CL
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Tin	107	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CM
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			
Thallium	91	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CN
		Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149	
		Instrument ID..: ICPMS			

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LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium	103	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CP
	Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149		
	Instrument ID..: ICPMS				
Zinc	88	(80 - 120)	SW846 6020	01/06-01/07/05	G16221CQ
	Dilution Factor: 1	Analysis Time..: 14:59	Analyst ID.....: 400149		
	Instrument ID..: ICPMS				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: C4L170000-083 **Prep Batch #...:** 4352083							
Mercury	2.50	2.29	ug/L	92	SW846 7470A	12/17/04	G1AV41AC
			Dilution Factor: 1		Analysis Time..: 16:38	Analyst ID.....: 400491	
			Instrument ID..: PS200HG				
LCS Lot-Sample#: C5A060000-145 **Prep Batch #...:** 5006145							
Silver	50.0	49.6	ug/L	99	SW846 6020	01/06-01/07/05	G16221A2
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Aluminum	2000	1720	ug/L	86	SW846 6020	01/06-01/07/05	G16221A3
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Arsenic	40.0	33.0	ug/L	83	SW846 6020	01/06-01/07/05	G16221A4
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Barium	2000	2150	ug/L	108	SW846 6020	01/06-01/07/05	G16221A5
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Beryllium	50.0	42.2	ug/L	84	SW846 6020	01/06-01/07/05	G16221A6
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Calcium	50000	47600	ug/L	95	SW846 6020	01/06-01/07/05	G16221A7
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Cadmium	50.0	46.2	ug/L	92	SW846 6020	01/06-01/07/05	G16221A8
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Chromium	200	220	ug/L	110	SW846 6020	01/06-01/07/05	G16221A9
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Copper	250	245	ug/L	98	SW846 6020	01/06-01/07/05	G16221CA
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Iron	1000	951	ug/L	95	SW846 6020	01/06-01/07/05	G16221CC
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Magnesium	50000	42800	ug/L	86	SW846 6020	01/06-01/07/05	G16221CD
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Manganese	500	477	ug/L	95	SW846 6020	01/06-01/07/05	G16221CE
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Molybdenum	1000	1150	ug/L	115	SW846 6020	01/06-01/07/05	G16221CF
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Nickel	500	491	ug/L	98	SW846 6020	01/06-01/07/05	G16221CG
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Lead	20.0	19.5	ug/L	98	SW846 6020	01/06-01/07/05	G16221CH
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Antimony	500	494	ug/L	99	SW846 6020	01/06-01/07/05	G16221CJ
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Selenium	10.0	8.09	ug/L	81	SW846 6020	01/06-01/07/05	G16221CK
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Silicon	10000	8850	ug/L	88	SW846 6020	01/06-01/07/05	G16221CL
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Tin	2000	2130	ug/L	107	SW846 6020	01/06-01/07/05	G16221CM
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Thallium	50.0	45.4	ug/L	91	SW846 6020	01/06-01/07/05	G16221CN
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				

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LABORATORY CONTROL SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCNT RECVRY	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Vanadium	500	516	ug/L	103	SW846 6020	01/06-01/07/05	G16221CP
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				
Zinc	500	439	ug/L	88	SW846 6020	01/06-01/07/05	G16221CQ
			Dilution Factor: 1		Analysis Time..: 14:59	Analyst ID.....: 400149	
			Instrument ID..: ICPMS				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/15/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L150261-004 **Prep Batch #...:** 4352083							
Mercury	83	(75 - 125)			SW846 7470A	12/17/04	G048N1CX
	79	(75 - 125)	4.8	(0-20)	SW846 7470A	12/17/04	G048N1C0

Dilution Factor: 1
Analysis Time..: 16:53 Instrument ID..: PS200HG Analyst ID.....: 400491
MS Run #.....: 4352056

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/15/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L150261-004 **Prep Batch #...:** 4352083									
Mercury									
	ND	1.00	0.833	ug/L	83		SW846 7470A	12/17/04	G048N1CX
	ND	1.00	0.794	ug/L	79	4.8	SW846 7470A	12/17/04	G048N1C0

Dilution Factor: 1
Analysis Time..: 16:53 Instrument ID..: PS200HG Analyst ID.....: 400491
MS Run #.....: 4352056

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 Matrix.....: WATER
Date Sampled...: 12/13/04 Date Received..: 12/15/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L150280-003 Prep Batch #...: 4352083							
Mercury	83	(75 - 125)			SW846 7470A	12/17/04	G05D31A2
	79	(75 - 125)	4.8	(0-20)	SW846 7470A	12/17/04	G05D31A3

Dilution Factor: 1
Analysis Time..: 16:53 Instrument ID..: PS200HG Analyst ID.....: 400491
MS Run #.....: 4352056

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/15/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L150280-003 **Prep Batch #...:** 4352083									
Mercury									
	ND	1.00	0.833	ug/L	83		SW846 7470A	12/17/04	G05D31A2
	ND	1.00	0.794	ug/L	79	4.8	SW846 7470A	12/17/04	G05D31A3

Dilution Factor: 1
Analysis Time..: 16:53 Instrument ID..: PS200HG Analyst ID.....: 400491
MS Run #.....: 4352056

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L140133-001 **Prep Batch #...:** 5006145							
Aluminum	82	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1A9
	83	(75 - 125)	0.60	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CA
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Antimony	93	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1C7
	95	(75 - 125)	1.6	(0-20)	SW846 6020	01/06-01/07/05	G00KP1C8
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Arsenic	90	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CC
	92	(75 - 125)	1.5	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CD
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Barium	96	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CE
	97	(75 - 125)	1.3	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CF
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Beryllium	99	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CG
	100	(75 - 125)	0.88	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CH
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Cadmium	91	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CL
	94	(75 - 125)	2.2	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CM
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Calcium	NC	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CJ
	NC	(75 - 125)		(0-20)	SW846 6020	01/06-01/07/05	G00KP1CK
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Chromium	91	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CN
	94	(75 - 125)	2.4	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CP
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Copper	92	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CQ
	91	(75 - 125)	1.2	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CR
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Iron	94	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CT
	96	(75 - 125)	2.4	(0-20)	SW846 6020	01/06-01/07/05	G00KP1CU
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Lead	91	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1C5
	91	(75 - 125)	0.98	(0-20)	SW846 6020	01/06-01/07/05	G00KP1C6
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Magnesium	NC	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CV
	NC	(75 - 125)		(0-20)	SW846 6020	01/06-01/07/05	G00KP1CW
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Manganese	82	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1CX
	83	(75 - 125)	0.74	(0-20)	SW846 6020	01/06-01/07/05	G00KP1C0
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Molybdenum	93	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1C1
	95	(75 - 125)	1.7	(0-20)	SW846 6020	01/06-01/07/05	G00KP1C2
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Nickel	89	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1C3
	90	(75 - 125)	1.0	(0-20)	SW846 6020	01/06-01/07/05	G00KP1C4
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Selenium	95	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1C9
	97	(75 - 125)	1.0	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DA
		Dilution Factor: 5					
		Analysis Time..: 15:12			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Silicon	111	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1DC
	113	(75 - 125)	2.1	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DD
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Silver	91	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1A7
	92	(75 - 125)	0.74	(0-20)	SW846 6020	01/06-01/07/05	G00KP1A8
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Thallium	85	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1DG
	86	(75 - 125)	1.7	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DH
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Tin	94	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1DE
	95	(75 - 125)	1.5	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DF
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					
Vanadium	85	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1DJ
	86	(75 - 125)	1.6	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DK
		Dilution Factor: 10					
		Analysis Time..: 15:16			Instrument ID..: ICPMS	Analyst ID.....: 400149	
		MS Run #.....: 5006084					

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MATRIX SPIKE SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Zinc	88	(75 - 125)			SW846 6020	01/06-01/07/05	G00KP1DL
	89	(75 - 125)	2.0	(0-20)	SW846 6020	01/06-01/07/05	G00KP1DM

Dilution Factor: 10
Analysis Time..: 15:16 Instrument ID..: ICPMS Analyst ID.....: 400149
MS Run #.....: 5006084

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MS Lot-Sample #: C4L140133-001 **Prep Batch #...:** 5006145									
Aluminum									
	ND	2000	1650	ug/L	82		SW846 6020	01/06-01/07/05	G00KP1A9
	ND	2000	1660	ug/L	83	0.60	SW846 6020	01/06-01/07/05	G00KP1CA
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Antimony									
	3.3	500	471	ug/L	93		SW846 6020	01/06-01/07/05	G00KP1C7
	3.3	500	478	ug/L	95	1.6	SW846 6020	01/06-01/07/05	G00KP1C8
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Arsenic									
	6.4	40.0	42.4	ug/L	90		SW846 6020	01/06-01/07/05	G00KP1CC
	6.4	40.0	43.0	ug/L	92	1.5	SW846 6020	01/06-01/07/05	G00KP1CD
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Barium									
	36.8	2000	1950	ug/L	96		SW846 6020	01/06-01/07/05	G00KP1CE
	36.8	2000	1970	ug/L	97	1.3	SW846 6020	01/06-01/07/05	G00KP1CF
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Beryllium									
	ND	50.0	49.7	ug/L	99		SW846 6020	01/06-01/07/05	G00KP1CG
	ND	50.0	50.2	ug/L	100	0.88	SW846 6020	01/06-01/07/05	G00KP1CH
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Cadmium									
	ND	50.0	45.7	ug/L	91		SW846 6020	01/06-01/07/05	G00KP1CL
	ND	50.0	46.8	ug/L	94	2.2	SW846 6020	01/06-01/07/05	G00KP1CM
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Calcium									
	508000	50000	548000	ug/L			SW846 6020	01/06-01/07/05	G00KP1CJ
			Qualifiers: NC						
	508000	50000	562000	ug/L			SW846 6020	01/06-01/07/05	G00KP1CK
			Qualifiers: NC						
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Chromium									
	28.6	200	211	ug/L	91		SW846 6020	01/06-01/07/05	G00KP1CN
	28.6	200	216	ug/L	94	2.4	SW846 6020	01/06-01/07/05	G00KP1CP
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Copper									
	ND	250	235	ug/L	92		SW846 6020	01/06-01/07/05	G00KP1CQ
	ND	250	232	ug/L	91	1.2	SW846 6020	01/06-01/07/05	G00KP1CR
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Iron									
	ND	1000	936	ug/L	94		SW846 6020	01/06-01/07/05	G00KP1CT
	ND	1000	958	ug/L	96	2.4	SW846 6020	01/06-01/07/05	G00KP1CU
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Lead									
	ND	20.0	18.1	ug/L	91		SW846 6020	01/06-01/07/05	G00KP1C5
	ND	20.0	18.3	ug/L	91	0.98	SW846 6020	01/06-01/07/05	G00KP1C6
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Magnesium									
	474000	50000	517000	ug/L			SW846 6020	01/06-01/07/05	G00KP1CV
			Qualifiers: NC						
	474000	50000	528000	ug/L			SW846 6020	01/06-01/07/05	G00KP1CW
			Qualifiers: NC						
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						

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MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....: WATER**
Date Sampled...: 12/13/04 **Date Received..: 12/14/04**

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Manganese									
	ND	500	412	ug/L	82		SW846 6020	01/06-01/07/05	G00KP1CX
	ND	500	415	ug/L	83	0.74	SW846 6020	01/06-01/07/05	G00KP1C0
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Molybdenum									
	20.7	1000	955	ug/L	93		SW846 6020	01/06-01/07/05	G00KP1C1
	20.7	1000	971	ug/L	95	1.7	SW846 6020	01/06-01/07/05	G00KP1C2
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Nickel									
	4.2	500	450	ug/L	89		SW846 6020	01/06-01/07/05	G00KP1C3
	4.2	500	454	ug/L	90	1.0	SW846 6020	01/06-01/07/05	G00KP1C4
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Selenium									
	12.3	10.0	21.8	ug/L	95		SW846 6020	01/06-01/07/05	G00KP1C9
	12.3	10.0	22.0	ug/L	97	1.0	SW846 6020	01/06-01/07/05	G00KP1DA
			Dilution Factor: 5						
			Analysis Time..: 15:12		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Silicon									
	1420	10000	12500	ug/L	111		SW846 6020	01/06-01/07/05	G00KP1DC
	1420	10000	12700	ug/L	113	2.1	SW846 6020	01/06-01/07/05	G00KP1DD
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Silver									
	ND	50.0	45.7	ug/L	91		SW846 6020	01/06-01/07/05	G00KP1A7
	ND	50.0	46.0	ug/L	92	0.74	SW846 6020	01/06-01/07/05	G00KP1A8
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						

(Continued on next page)

MATRIX SPIKE SAMPLE DATA REPORT

TOTAL Metals

Client Lot #...: C4L140133 **Matrix.....:** WATER
Date Sampled...: 12/13/04 **Date Received..:** 12/14/04

PARAMETER	SAMPLE AMOUNT	SPIKE AMT	MEASRD AMOUNT	UNITS	PERCNT RECVRY	RPD	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Thallium									
	0.74	50.0	43.1	ug/L	85		SW846 6020	01/06-01/07/05	G00KP1DG
	0.74	50.0	43.8	ug/L	86	1.7	SW846 6020	01/06-01/07/05	G00KP1DH
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Tin									
	23.7	2000	1900	ug/L	94		SW846 6020	01/06-01/07/05	G00KP1DE
	23.7	2000	1930	ug/L	95	1.5	SW846 6020	01/06-01/07/05	G00KP1DF
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Vanadium									
	10.4	500	435	ug/L	85		SW846 6020	01/06-01/07/05	G00KP1DJ
	10.4	500	441	ug/L	86	1.6	SW846 6020	01/06-01/07/05	G00KP1DK
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						
Zinc									
	7.6	500	446	ug/L	88		SW846 6020	01/06-01/07/05	G00KP1DL
	7.6	500	455	ug/L	89	2.0	SW846 6020	01/06-01/07/05	G00KP1DM
			Dilution Factor: 10						
			Analysis Time..: 15:16		Instrument ID..: ICPMS			Analyst ID.....: 400149	
			MS Run #.....: 5006084						

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

NC The recovery and/or RPD were not calculated.

GENERAL CHEMISTRY SUMMARY

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L140133
Matrix:	WATER		

Hexavalent Chromium

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SLAG ELUTRIATE-CHRONIC TESTS	C4L140133 001	G00KP1A4	ND	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:31	4349344
SOLID PHASE ACUTE TEST	C4L140133 002	G00KR1AF	0.051	mg/L	0.010	1	12/14/2004 - 12/14/2004 11:35	4349344

EA Engineering ISG Slag

Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L140133
Matrix:	WATER		

Sulfate

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Dilution Factor	Prep Date - Analysis Date/Time	QC Batch
SLAG ELUTRIATE-CHRONIC TESTS	C4L140133 001	G00KP1A3	1080	mg/L	100	100	12/29/2004 - 12/30/2004 00:17	4365113
SOLID PHASE ACUTE TEST	C4L140133 002	G00KR1AE	1030	mg/L	100	100	12/29/2004 - 12/30/2004 00:32	4365113

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L140133
Matrix:	WATER	**Date/Time Received:**	12/14/2004 10:30:00AM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
BLK - C4L140000344B	344 MB	G01D41AA	ND	mg/L	0.010	12/14/2004 - 12/14/2004	4349344	

EA Engineering ISG Slag

Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Report ID:**	C4L140133
Matrix:	WATER	**Date/Time Received:**	12/8/2004 10:25:00AM

Client Sample ID	Sample Number	Workorder	Result	Units	Reporting Limit	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
BLK - C4L300000113B	113 MB	G10V21AA	ND	mg/L	1.0	12/29/2004 - 12/29/2004	4365113	

EA Engineering ISG Slag

Hexavalent Chromium

Lab Name:	STL PITTSBURGH	**Method:**	SW846 7196A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L140000
Matrix:	WATER	**Date/Time Received:**	12/14/2004 10:30:00AM

Client Sample ID	QC Sample Type	Workorder	Recovery (%)	Control Limits (%)	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
CHECK SAMPLE	LCS	G01D41AC	102	75 - 125	12/14/2004 - 12/14/2004	4349344	
SLAG ELUTRIATE-CHRON	MS	G00KP1A5	104	75 - 125	12/14/2004 - 12/14/2004	4349344	1.5 / 20
SLAG ELUTRIATE-CHRON	MSD	G00KP1A6	106	75 - 125	12/14/2004 - 12/14/2004	4349344	1.5 / 20

EA Engineering ISG Slag

Sulfate

Lab Name:	STL PITTSBURGH	**Method:**	MCAWW 300.0A
Client Name:	EA Engineering, Science and Technology	**Lot Number:**	C4L080417
Matrix:	WATER	**Date/Time Received:**	12/8/2004 10:25:00AM

Client Sample ID	QC Sample Type	Workorder	Recovery (%)	Control Limits (%)	Prep/ Analysis Date	QC Batch	RPD / Limit (%)
LAB MS/MSD	MSD	G0KN91HN	0.0 DIL N	80 - 120	12/29/2004 - 12/29/2004	4365113	0.0 / 20
CHECK SAMPLE	LCS	G10V21AC	97	90 - 110	12/29/2004 - 12/29/2004	4365113	
LAB MS/MSD	MS	G0KN91HM	0.0 DIL N	80 - 120	12/29/2004 - 12/29/2004	4365113	0.0 / 20

DIL The concentration is estimated or not reported due to dilution or the presence of interfering analytes.

NC The recovery and/or RPD were not calculated.

APPENDIX B

RESULTS OF ACUTE AND CHRONIC TOXICITY TESTING ON SLAG ELUTRIATE

RESULTS OF ACUTE AND CHRONIC TOXICITY TESTING WITH *Americamysis bahia* AND *Cyprinodon variegatus* ON SLAG ELUTRIATE

Prepared for:

Moffatt and Nichol Engineers
2700 Lighthouse Point East, Suite 501
Baltimore, MD 21224

Prepared by:

EA Engineering, Science, and Technology, Inc.
15 Loveton Circle
Sparks, Maryland 21152
ph: 410-771-4950

Results relate only to the items tested or to the samples as received by the laboratory.

This report contains 12 pages plus 3 attachments.

Wayne L. McCulloch
Laboratory Director

28 January 2005
Date

EA Project Number 70005.08

EA Report Number 4668

INTRODUCTION

At the request of Moffatt and Nichol Engineers, EA Engineering, Science, and Technology performed 7-day chronic toxicity tests and a 96-hour acute toxicity test on fresh steel slag from the ISG Sparrows Point plant, for the Maryland Port Administration (MPA). The chronic toxicity tests were the survival, growth and fecundity test with the opossum shrimp (*Americamysis bahia*, formerly *Mysidopsis bahia*) and the survival and growth test with the sheepshead minnow (*Cyprinodon variegatus*). The test organisms in the chronic tests were exposed for seven days to 100, 50, 25, 12.5, and 6.25 percent elutriate prepared from the fresh slag, and diluted with 20 ppt artificial seawater (Forty Fathoms Bioassay Grade sea salts). To prepare the elutriate, site water collected from Sparrows Point, Baltimore Harbor, that had been salinity adjusted to 20 ppt with Forty Fathoms sea salts, was added to a pre-weighed portion of slag the day prior to use in testing and allowed to agitate in a closed container for approximately 18 hours. The site water was salinity adjusted to 20 ppt in order to provide the optimal salinity for test organism survival, growth and reproduction. The volume of site water (7,000 ml) added to the slag was 20 times the weight in grams of the slag (350 grams). After 30 minutes of settling, the elutriate was decanted from the slag and vacuum filtered through a 1 µm glass fiber filter. Fresh elutriate was prepared four times during the 7-day exposure duration (7-8, 9-10, 12-13, and 13-14 December 2004) for daily renewal of the test solutions. The chronic toxicity tests also included a 100 percent laboratory water (salinity adjusted dilution water) control.

The acute toxicity test was conducted with the sheepshead minnow (*C. variegatus*). The test organisms were exposed for 96 hours to site water with slag (1/4 inch), site water with slag (1/4 inch) covered with sand (1/4 inch), and site water with sand only (1/4 inch). The acute toxicity test also included a site water control and a salinity adjusted laboratory water control. Total test volume for the acute toxicity tests was 500 ml. Test solutions were not renewed during the 96-hour exposure period.

This toxicity testing was conducted following EA's standard operating procedures (EA 2003) which are in accordance with US EPA guidance (US EPA 2002a and 2002b). The results of the toxicity tests were analyzed using the ToxCalc statistical software package (Version 5.0,

Tidepool Scientific Software). Statistical analyses were performed according to US EPA guidance (US EPA 2002a and 2002b) on the survival, biomass, and fecundity (*A. bahia* only) data to determine if any of the effluent concentrations were significantly (p=0.05) different from the control. The short term chronic toxicity test endpoints are expressed as the No Observed Effect Concentration (NOEC), the Lowest Observed Effect Concentration (LOEC), and the Chronic Value (ChV). The 25 percent Inhibition Concentrations (IC25s) were also calculated. The 48-hour median lethal concentration (LC50) was calculated for each test species, if there was at least 50 percent mortality in the 100 percent effluent concentration.

Summaries of sample and test data are presented on pages 7-12. Copies of raw data sheets and statistical analyses are included in Attachment I, and cumulative reference toxicant data are included in Attachment II. The Report Quality Assurance Record is included in Attachment III.

SUMMARY OF RESULTS

The results of the *Americamysis bahia* and *Cyprinodon variegatus* chronic toxicity tests, and the *C. variegatus* acute toxicity test conducted on the fresh slag meet the current NELAC standards, except where noted in the report. In both the acute and chronic tests, the pH of the test solutions in the high test concentration rose to greater than 9.0. This was as anticipated, and no attempt to adjust the pH of the test solutions was made, in order to conservatively mimic worst-case field conditions.

The results of the *A. bahia* chronic toxicity test conducted on elutriate prepared from the fresh slag are summarized on page 8. After 48 hours of exposure, there was a minimum of 95 percent survival of test organisms in the elutriate concentrations, and 100 percent survival in the laboratory water control. The 48-hour LC50 was >100 percent elutriate. At test completion on Day 7, there was 80 percent survival in the 12.5 and 25 percent elutriate concentrations, 93 percent survival in the 6.26 percent elutriate concentration, and a minimum of 95 percent survival in the remaining elutriate concentrations. Control survival was 98 percent. An inverted dose response was observed for the biomass endpoint for this test. Mean biomass in the three lowest elutriate concentrations ranged from 0.347 to 0.379 mg/organism, and all three treatments were significantly different ($p=0.05$) from the control, which had a mean biomass of 0.464 mg/organism. The 50 and 100 percent elutriate concentrations had mean biomass of 0.445 and 0.425 mg/organism, respectively, and neither treatment was significantly different from the control. The three lowest elutriate concentrations also had the lowest percent survival, and although survival in these three concentrations was not statistically significant, reduced survival would affect the biomass endpoint. Fecundity was 100 percent in the control and in all elutriate concentrations. It is EA's best professional judgment that the NOEC for this test is 100 percent elutriate. This is based on the fact that while there appeared to be a slight adverse effect on biomass for organisms exposed to the three lowest elutriate concentrations, the 50 and 100 percent elutriate concentrations were not significantly affected. The percent difference between the 50 and 100 percent elutriate concentrations and the control was 4.2 and 8.4 percent, respectively. The LOEC and ChV were >100 percent elutriate. The 7-day IC25 was >100 percent elutriate.

On Day 7 of the *C. variegatus* chronic toxicity test, there was a minimum of 95 percent survival in the elutriate concentrations, and 100 percent survival in the control (page 10). Mean biomas ranged from 1.163 to 1.361 mg/organism exposed to the elutriate concentrations, and 1.346 mg/organism in the control. There were no statistically significant differences in survival or biomass between any elutriate concentration and the control. The 48-hour LC50 was >100 percent elutriate. The NOEC for this test was 100 percent elutriate. The LOEC, ChV, and 7-day IC25 were >100 percent elutriate.

The results from the acute toxicity test are summarized on page 12. After 96 hours of exposure, there was 100 percent survival in the site water with slag covered with sand, and in the site water with sand only. The site water control and the laboratory water controls also had 100 percent survival. The treatment consisting of site water and slag alone had 95 percent survival, and was not significantly different from the control.

The acute and chronic reference toxicant test data (as supplied by the organism vendor) are summarized on pages 7 and 9 for the *A. bahia* and *C. variegatus* chronic toxicity tests, and on page 11 for the *C. variegatus* acute toxicity test. All reference toxicant test results fell within the acceptable control chart limits. Copies of the cumulative reference toxicant data are included as Attachment II.

REFERENCES

EA. 2003. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., Sparks, Maryland.

US EPA. 2002a. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

US EPA. 2002b. Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. Third Edition. EPA-821-R-02-014. U.S. Environmental Protection Agency. Office of Water, Washington, D.C.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: ***Americamysis bahia*** **7-day daily renewal chronic toxicity test**

Test Procedure: **EA Protocol ATS-STC-OS-08**
Survival, growth, and fecundity test with opossum shrimp (*Americamysis bahia*)

Client Name: **Moffatt and Nichol Engineers (for Maryland Port Administration)**

Sample Description: **Fresh slag**
EA Accession Number: **AT4-708**
Collection Time and Date: **0930, 23 November 2004**
Receipt Time and Date: **1425, 23 November 2004**

Elutriate Water Description: **Site Water - Sparrows Point, Baltimore Harbor**
EA Accession Number: **AT4-731**
Collection Time and Date: **1015, 6 December 2004**
Receipt Time and Date: **1140 6 December 2004**

Test Material Description: **Elutriate (prepared with fresh slag and site water)**
EA Accession Number: **AT4-750**
Preparation Dates: **7-8, 9-10, 12-13, 13-14 December 2004**

Dilution water: **20 ppt artificial sea water (Forty Fathoms Bioassay Grade sea salts)**

Test Vessel: **8-oz. bowl**

Test Volume: **150 ml**

Number of Organisms per Replicate: **5**

Number of Replicates per Concentration: **8**

Organism Lot Information
Lot Number: AB-567
Source: Aquatic BioSystems (Fort Collins, Colorado)
Age: 7 days
Acclimation: <24 hours

Reference Toxicant Test Information[(a)]
Reference Toxicant: Potassium chloride (KCl)
Acute LC50: 0.671 g/l KCl
Laboratory control chart acceptability range for LC50: 0.528-0.738 g/l KCl
Chronic NOEC: 0.5 g/L KCl
Laboratory control chart acceptability range for NOEC: 0.125-1.000 g/L KCl

(a) Reference toxicant test data supplied by the organism vendor, see Attachment II.

Test Species:	***Americamysis bahia* (opossum shrimp)**
Sample Description:	**Elutriate prepared with fresh slag and site water**
EA Test Number:	**TN-04-739**
Test Initiation:	**1600, 8 December 2004**
Test Completion:	**1400, 15 December 2004**

Test Concentration (% effluent)	48-Hour % Survival	7-Day % Survival	Mean Biomass as mg/organism (±S.D.)	Mean Fecundity as % Females with Eggs
Control	100	98	0.464 (±0.031)	100
6.25	98	93	0.379 (±0.058)[a]	100
12.5	95	80	0.353 (±0.090)[a]	100
25	95	80	0.347 (±0.086)[a]	100
50	100	95	0.445 (±0.067)	100
100	100	97	0.425 (±0.056)	100

Results (expressed as percent effluent)

48-Hour LC50: >100

	Survival	Biomass	Fecundity
7-Day NOEC:	100	100	100
7-Day LOEC:	>100	>100	100
7-Day ChV:	>100	>100	>100
7-Day IC25:	>100	>100	>100

Water Quality Parameters on Test Solutions	Range
Temperature (°C):	24.0 – 26.9
pH:	7.3 – 9.6
Dissolved Oxygen (mg/L):	3.5 – 8.0[b]
Salinity (ppt):	18.8 – 22.2[c]

Water Quality Parameters	Site Water AT4-731	Elutriate AT4-750
Temperature (°C):	8.4[d]	N/A
pH:	8.3	N/A
Conductivity (µS/cm):	3,730	31,800
Alkalinity (mg/L $CaCO_3$):	64	62
Hardness (mg/L $CaCO_3$):	424	3,360

(a) Significantly different (p=0.05) from control.
(b) Dissolved oxygen was less than the target of ≥4.0 mg/L on Day 3, prior to renewal of test solutions.
(c) Salinity exceeded target range of 20±2 ppt for limited duration.
(d) Sample was delivered to EA within 2 hours of collection.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: ***Cyprinodon variegatus* 7-day daily renewal chronic toxicity test**

Test Procedure: **EA Protocol ATS-STC-SM-05**
Survival and growth test with sheepshead minnow (*Cyprinodon variegatus*)

Client Name: **Moffatt and Nichol Engineers (for Maryland Port Administration)**

Sample Description: **Fresh slag**
EA Accession Number: **AT4-708**
Collection Time and Date: **0930, 23 November 2004**
Receipt Time and Date: **1425, 23 November 2004**

Elutriate Water Description: **Site Water - Sparrows Point, Baltimore Harbor**
EA Accession Number: **AT4-731**
Collection Time and Date: **1015, 6 December 2004**
Receipt Time and Date: **1140 6 December 2004**

Test Material Description: **Elutriate (prepared with fresh slag and site water)**
EA Accession Number: **AT4-750**
Preparation Dates: **7-8, 9-10, 12-13, 13-14 December 2004**

Dilution water: **20 ppt artificial sea water (Forty Fathoms Bioassay Grade sea salts)**

Test Vessel: **1-L beaker**

Test Volume: **250 ml**

Number of Organisms per Replicate: **10**

Number of Replicates per Concentration: **4**

Organism Lot Information
Lot Number: CV-435
Source: Aquatic BioSystems (Fort Collins, Colorado)
Age: <24 hours
Acclimation: <24 hours

Reference Toxicant Test Information[a]
Reference Toxicant: Potassium chloride (KCl)
Acute LC50: 1.414 g/L KCl
Laboratory control chart acceptability range for LC50: 1.162-1.791 g/L KCl

(a) Reference toxicant test data supplied by the organism vendor, see Attachment II.

Test Species:	***Cyprinodon variegatus* (sheepshead minnow)**
Sample Description:	**Elutriate prepared with fresh slag and site water**
EA Test Number:	**TN-04-740**
Test Initiation:	**1420, 8 December 2004**
Test Completion:	**1430, 15 December 2004**

Test Concentration (% effluent)	48-Hour % Survival	7-Day % Survival	Mean Biomass as mg/organism (±S.D.)
Control	100	100	1.346 (±0.045)
6.25	100	100	1.163 (±0.117)
12.5	98	95	1.281 (±0.081)
25	98	98	1.361 (±0.107)
50	100	98	1.249 (±0.195)
100	100	100	1.181 (±0.061)

Results (expressed as percent effluent)			
48-Hour LC50:	>100		
		Survival	Biomass
7-Day NOEC:		100	100
7-Day LOEC:		>100	>100
7-Day ChV:		>100	>100
7-Day IC25:		>100	>100

Water Quality Parameters on Test Solutions	Range
Temperature (°C):	24.0 – 26.0
pH:	7.4 – 9.6
Dissolved Oxygen (mg/L):	4.2 – 8.0
Salinity (ppt):	18.8 – 22.8[(a)]

Water Quality Parameters	Site Water AT4-731	Elutriate AT4-750
Temperature (°C):	8.4[(b)]	N/A
pH:	8.3	N/A
Conductivity (µS/cm):	3,730	31,800
Alkalinity (mg/L $CaCO_3$):	64	62
Hardness (mg/L $CaCO_3$):	424	3,360

(a) Salinity exceeded target range of 20±2 ppt for limited duration.
(b) Sample was delivered to EA within 2 hours of collection.

SUMMARY OF SAMPLE/TEST INFORMATION

Test: **48-hour *Cyprinodon variegatus* daily renewal acute toxicity test**

Test Procedure: **EA Protocol ATS-SAF-SM-08**
Acute assay with sheepshead minnow (*Cyprinodon variegatus*)

Client Name: **Moffatt and Nichol Engineers (for Maryland Port Administration)**

Sample Description: **Fresh slag**
EA Accession Number: **AT4-708**
Collection Time and Date: **0930, 23 November 2004**
Receipt Time and Date: **1425, 23 November 2004**

Site Water Description: **Sparrows Point, Baltimore Harbor**
EA Accession Number: **AT4-731**
Collection Time and Date: **1015, 6 December 2004**
Receipt Time and Date: **1140 6 December 2004**

Dilution water: **20 ppt artificial sea water (Forty Fathoms Bioassay Grade sea salts)**

Test Chamber: **1-L beaker**

Volume per Test Chamber: **250 ml**

Number of Replicates: **2**

Number of Organisms per Replicate: **10**

Organism Lot Information
Lot Number: CV-436
Source: Aquatic BioSystems (Ft. Collins, Colorado)
Age: 13 days (within 24-hour window)
Acclimation: 2 days

Reference Toxicant Test Information[(a)]
Reference Toxicant: Potassium chloride (KCl)
Test Date: December 2004
48-hour LC50: 1.414 g/L KCl
Laboratory control chart acceptability range for 48-hour LC50: 1.162-1.791 g/L KCl.

(a) Reference toxicant test data supplied by organism vendor (see Attachment III).

SUMMARY OF SAMPLE/TEST INFORMATION (continued)

Test Species:	***Cyprinodon variegatus* (sheepshead minnow)**
Sample Description:	**fresh slag and site water**
EA Test Number:	**TN-04-740**
Test Initiation:	**1110, 10 December 2004**
Test Completion:	**1035, 14 December 2004**

Test Treatment	96-Hour % Survival
LaboratoryControl	100
Site Water Control	100
Site Water/Slag	95
Site Water/Slag/Sand	100
Site Water/Sand	100

Selected Test Water Quality Parameters	Range
Temperature (°C):	18.5 – 20.6
pH:	7.8 – 9.6
Dissolved oxygen (mg/L):	7.0 – 8.3
Salinity (ppt):	19.0 – 19.6

Water Quality Parameters	Site Water AT4-731
Temperature (°C):	8.4[(a)]
pH:	8.3
Conductivity (µS/cm):	3,730
Alkalinity (mg/L $CaCO_3$):	64
Hardness (mg/L $CaCO_3$):	424

(a) Sample was delivered to EA within 2 hours of collection.

ATTACHMENT I

Data Sheets and Statistical Analyses
(38 pages)

Chain-of-Custody Recc

EA Engineering, Science, and Technology

EA Ecotoxicology Laboratory
15 Loveton Circle
Sparks (Baltimore), Maryland 21152
Telephone: (410) 771-4950
Fax: (410) 771-4204

FOR OFFICE USE ONLY
Species to be tested:

_____ *D. magna*	_____ *Menidia* sp.
_____ *D. pulex*	_____ *P. pugio*
_____ *C. dubia*	C & A *C. variegatus*
_____ *P. promelas*	1 C *M. bahia*
_____ Other	_____ Other

A = Acute C = Chronic B = Bioaccumulatior

Client: Moffit / Nichol Project No.: _____

NPDES Number: _____ Client Purchase Order Number: _____

State/City/County Collected: _____

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection Start Date/Time	Collection End Date/Time	Sample Description (including Site, Station Number, and Outfall Number)	Number/Volume of Container
AT4-708	X		11/23/04 0930	—	FRESH SLAG (ISG)	1 x 5 gallo

Sampled By: Todd Ward	Date/Time 11/23/04 0930	Received By:	Date/Time
Sampler's Printed Name: TODD WARD	Title: SCIENTIST	Relinquished By: Todd Ward	Date/Time 11/23/04 1425
Relinquished By:	Date/Time	Received By Laboratory: [signature]	Date/Time 11/23/04 1425

Was Sample Chilled During Collection? Yes/No

Comments:

Sample Shipped By: (circle)

Fed. Ex. Puro. UPS Airborne

Other: Hand Carried

White—Report Production Yellow—Laboratory Pink—Client/Sample

Chain-of-Custody Reco

EA Engineering, Science, and Technology

EA Ecotoxicology Laboratory
15 Loveton Circle
Sparks (Baltimore), Maryland 21152
Telephone: (410) 771-4950
Fax: (410) 771-4204

FOR OFFICE USE ONLY
Species to be tested:

_____ *D. magna*	_____ *Menidia* sp.
_____ *D. pulex*	_____ *P. pugio*
_____ *C. dubia*	✓ *C. variegatus*
_____ *P. promelas*	✓ *M. bahia*
_____ Other	_____ Other

A = Acute (C) = Chronic B = Bioaccumulation

Client: ISG- Project No.: 14248.01

NPDES Number: _____ Client Purchase Order Number: _____

State/City/County Collected: _____

PLEASE READ SAMPLING INSTRUCTIONS ON BACK OF FORM

Accession Number (office use only)	Grab	Composite	Collection Start Date/Time	Collection End Date/Time	Sample Description (Including Site, Station Number, and Outfall Number)	Number/Volume of Container
AT4-731	X		12/6/04 1015		ISG-SLAG SPARROWS PT. SITE WATER	3 CARBOYS

Sampled By: Todd Ward	Date/Time 12/6/04 1015	Received By:	Date/Time
Sampler's Printed Name: TODD WARD	Title: SCIENTIST	Relinquished By:	Date/Time
Relinquished By: Todd Ward	Date/Time 12/6/04 1140	Received By Laboratory: Wayne McCulloch	Date/Time 12/6/04 1140

Was Sample Chilled During Collection? Yes/No

Comments: Freshly collected sample - hand delivered w/i 2hours of collection (grab).

Sample Shipped By: (circle)

Fed. Ex. Puro. UPS Airborne

Other: Hand carried

White—Report Production Yellow—Laboratory Pink—Client/Sample

SAMPLE CHECK-IN
FOR MARYLAND TESTING

Client: Slag Testing / MPA

EA Accession Number: AT4-731

Parameter	Acceptable Range	Measurement*	Date	Time	Initials
Temperature (°C)	≤4	8.4°C (a)	12/6/04		
Is ice present?	---	NA (a)	12/6/04		
pH	6.0-9.0	8.3	12/6/04		
TRC (mg/L)	≤0.02	NA	NA		
Visual Description	---	Clear			

***If outside acceptable range, contact project manager.**

OTHER PARAMETERS (SEE STUDY PLAN):

(a) Freshly collected grab sample w/i 2 hours of collection - hand delivered

TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739

TEST ORGANISM INFORMATION

Common Name: Opposum Shrimp

Scientific Name: A. bahia

Lot Number: AB-567

Source: ABS

Adults Isolated (Time, Date): —

Neonates Pulled & Fed (Time, Date): —

Acclimation: < 24 hrs Age: 7 days

Culture Water (T/S): 24.3 °C 19.7 ppt

TEST SET-UP

TEST INITIATION

Date	Time	Initials	Activity
12/8/04	1200	CES	Dilutions Made
	1600	P6	Test Vessels Filled
	1600	P6	Organisms Transferred
	1600	DM	Head Counts

CONCENTRATION SERIES

Test Concentration (%)	Volume Test Material	Final Volume
Control	0ml	1200ml
6.25	75ml	
12.5	150ml	
25	300ml	
50	600ml	
100	1200ml	

Comments:

INTERMEDIATE DILUTION PREPARATION AND FEEDING

DILUTION PREPARATION

Day	Date	Time	Initials	Sample / Diluent
0	12/8/04	1200	CES	ATH-750 20 ppt
1	12-9-04	1145	MK	ATH-750 20ppt
2	12.10.04	925	DMM	ATH-750 20ppt
3	12.11.04	1010	[illegible]	ATH-750 20ppt
4	12-12-04	1540	P6	ATH-750 20ppt
5	12/13/04	0935	RH	ATH-750 20ppt
6	12-14-04	915	MK	ATH-750 20ppt

FEEDING

Food: 2x daily w/ artemia

Day	Time, Initials, Amount	Time, Initials, Amount	Time, Initials, Amount
0			1600 P6 5drops
1	820 CES 5drops		1700 MK 5drops
2	820 SH 5drops		1215 JB, M 5drops
3	820 MK 5drops		1730 [illegible] 5drops
4	840 P6 5drops		1630 P6 5drops
5	815 P6 5drops		1700 ARE 5drops
6	815 MK 5drops		1700 RH 5drops

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739
Test Material: Slag (AT4-708) Elutriate
Accession Number: AT4-750
Dilution Water: 20ppt FF
Accession Number:

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1600
Ending Date: 12/15/04 Time: 1400

Test Container: 4" bowl
Test Volume: 150ml
Test Duration: 7-day

Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
Control	A	5	5	5	5	5	5	5	5
	B	5	5	5	5	5	5	5	5
	C	5	5	5	5	5	5	5	5
	D	5	5	5	5	5	5	5	5
	E	5	5	5	5	5	5	5	5
	F	5	5	5	5	5	5	5	5
	G	5	5	5	5	5	5	5	4
	H	5	2*	2	2	2	2	2	(a) 2 (2/2)
Time / Initials		1600 DM	1442 MK	1108	1045	PG 1630	1245 MK	1050 MK	1400

(a) See bench sheet

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739
Test Material: Slag (AT4-708) Elutriate
Accession Number: AT4-750
Dilution Water: 20ppt FF
Accession Number:

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1600
Ending Date: 12/15/04 Time: 1400

Test Container: 4" bowl
Test Volume: 150 mℓ
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
12.5	A	5	4	4	4	4	4	3	3
	B	5	5	5	5	5	5	5	5
	C	5	5	5	5	5	3	3	3
	D	5	4	4	4	4	4	4	4
	E	5	5	5	5	5	5	4	4
	F	5	5	5	5	5	5	5	5
	G	5	5	5	5	5	5	5	5
	H	5	5	5	5	5	4	3	3
Time / Initials		1600pm	1442 MK	1108 D	1045 D	1630 PB	1245 MK	1050 MK	1400 D

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739
Test Material: Slag (ATY-708) Elutriate
Accession Number: ATY-780
Dilution Water: 20ppt-RF
Accession Number:

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1600
Ending Date: 12/15/04 Time: 1400

Test Container: 4" bowl
Test Volume: 150ml
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
25	A	5	5	5	5	5	5	5	~~5~~ (a) 4 (4/4)
	B	5	5	5	5	5	5	5	~~5~~ (a) 4 (4/4)
	C	5	6	6	6	6	6	6	5 (5/6)
	D	5	5	5	5	5	5	5	4
	E	5	4	4	4	4	4	MK 12/14 ~~3~~ 4	3
	F	5	5	5	5	5	5	5	5
	G	5	5	4	3	3	3	2	2
	H	5	5	5	5	5	4	4	4
Time / Initials		1600 DN	1442 MK	1108 D	1045 D	1630 PL	1245 MK	1550 MK	1400 D

(a) See bench sheet

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739
Test Material: Slag (AT4-~~788~~) ELUTRIATE
Accession Number: AT4-750
Dilution Water: 20ppt-FF
Accession Number:

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: ~~PM~~ PG, 12/9 1600
Ending Date: 12/15/04 Time: 1400

Test Container: 4" bowl
Test Volume: 150 ml
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
50	A	5	5	5	-	4	4	4	4
	B	5	5	5	5	5	5	5	5
	C	5	5	5	5	5	5	5	5
	D	5	5	5	5	5	5	5	5
	E	5	5	5	5	5	4	4	4
	F	5	5	5	5	5	5	5	5
	G	5	5	5	5	5	5	5	5
	H	5	5	5	5	5	5	5	5
Time / Initials		1600 PG	1442 MK	1108	1045	1630 PG	1245 MK	1650 MK	1400

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739
Test Material: Slag (AT4-708) Elutriate
Accession Number: AT4-750
Dilution Water: 20ppt-RF
Accession Number:

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1600
Ending Date: 12/15/04 Time: 1400

Test Container: 4" bowl
Test Volume: 150 ml
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
100	A	5	5	5	5	5	5	5	5
	B	5	5	5	5	5	5	4	(4) 3 (3/4)
	C	5	5	5	5	5	5	5	5
	D	5	5	5	5	5	5	5	5
	E	5	5	5	5	5	5	5	5
	F	5	5	5	5	5	5	5	5
	G	5	5	5	5	5	5	5	5
	H	5	5	5	5	5	5	5	5
Time / Initials		1600 PG	1442 MK	1108 D	1045 D	1630 PG	1245 MK	1550 MK	1400 D

(5) See bench sheet

REPRODUCTION AND WEIGHT DATA (Test Species: C. dubia)

	Date	Time	Initials
Organisms sexed:	12/15/04	1400	DMW
Loaded tins placed in oven:	12/15/04	1500	
Loaded tins removed from oven:	12-16-04	1025	MK
Loaded tins weighed:	12-21-04	1500	

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739

Tin Lot: Red 11 Oven Temp. (°C): 97 100 WLA Y1

Test Conc	Rep	Tin #	# Femeles with Eggs	# Females without Eggs	# Males	# Immatures	C # Orgs. Weighed	A Wt. of Tin (mg)	B Wt. of Tin & Dried Orgs. (mg)	B-A Total Dry Org. Weight (mg)	(B-A)/C Mean Dry Org. Weight (mg)	(if applicable) Mean Biomass (mg/exp. org.)
Control	A	44	1		IIII		5	25.42	27.79	2.37	0.474	0.474
	B	42	III		II		5	25.41	27.74	2.33	0.466	0.466
	C	99	II		III		5	24.81	27.36	2.55	0.510	0.510
	D	40	III		II		5	26.13	28.41	2.28	0.456	0.456
	E	46	II		III		5	25.38	27.68	2.30	0.460	0.460
	F	43	II		III		5	26.09	28.39	2.30	0.460	0.460
	G	34	III		I		4	24.99	26.99	2.00	0.500	0.400
	H	37			II		2 (1/2)	27.58	28.55	0.970	0.485	0.485
6.25	A	38	III		II		5	25.31	27.48	2.17	0.434	0.434
	B	92	IIII		I		5	25.69	27.63	1.94	0.388	0.388
	C	41	I		IIII		5	26.09	28.16	2.07	0.414	0.414
	D	31	I		III		4	24.08	26.09	2.01	0.503	0.402
	E	33	IIII		I		5	24.65	26.53	1.88	0.376	0.376
	F	32	II		II		4	24.43	26.05	1.62	0.405	0.324
	G	98	IIII		I		5	25.40	27.53	2.13	0.426	0.426
	H	101	I		III		4	27.21	28.53	1.32	0.330	0.264

Data entry initials: 1/6/05 MAG Biomass calculations checked (date, initials): 1/6/05 MAG

REPRODUCTION AND WEIGHT DATA (Test Species: A. bahia)

	Date	Time	Initials
Organisms sexed:	12/15/04	1400	
Loaded tins placed in oven:	12/15/04	1500	
Loaded tins removed from oven:	12-16-04	1025	MK
Loaded tins weighed:	12-21-04	1500	

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739

Tin Lot: Red 11 Oven Temp. (°C): 97 100 min 11

Test Conc	Rep	Tin #	# Females with Eggs	# Females without Eggs	# Males	# Immatures	C # Orgs. Weighed	A Wt. of Tin (mg)	B Wt. of Tin & Dried Orgs. (mg)	B-A Total Dry Org. Weight (mg)	(B-A)/C Mean Dry Org. Weight (mg)	(If applicable) Mean Biomass (mg/exp. org.)
12.5	A	30	1		11		3	25.04	26.50	1.46	0.487	0.292
	B	48	111		11		5	26.58	28.74	2.16	0.432	0.432
	C	52	111				3	26.67	28.17	1.50	0.500	0.300
	D	59	1		111		4	25.83	27.96	2.13	0.533	0.426
	E	91			1111		DM 12/15 4	24.64	26.23	1.59	0.398	0.318
	F	29	111		11 DM 12/15 ###		5	24.93	27.16	2.23	0.446	0.446
	G	96	11		111		5	25.65	27.73	2.08	0.416	0.416
	H	97			111		3	25.45	26.42	0.970	0.323	0.194
25	A	60	11		11		4 (4/4)	24.57	26.29	1.72	0.430	0.430
	B	53	11		11		4 (4/4)	26.61	28.32	1.71	0.428	0.428
	C	64			~~111~~		5 (5/6)	27.10	29.52	2.42	0.484	0.403
	D	95	111		1		4	25.01	26.75	1.74	0.435	0.348
	E	35	1		11		3	25.99	27.37	1.38	0.460	0.276
	F	61	111		11		5	27.02	28.99	1.97	0.394	0.394
	G	103	1		1		2	24.25	25.17	0.920	0.460	0.184
	H	109	1		111		4	26.98	28.55	1.57	0.393	0.314

Biomass calculations checked (date, initials): 1/7/05 MAS

ATS-T

REPRODUCTION AND WEIGHT DATA (Test Species: A. bahia)

	Date	Time	Initials
Organisms sexed:	12/15/04	1400	
Loaded tins placed in oven:	12/15/04	1500	
Loaded tins removed from oven:	12-16-04	1025	MK
Loaded tins weighed:	12-21-04	1500	

Project Number: 70005.08
Client: MPA
QC Test Number: IN-04-739
Tin Lot: Red 11 Oven Temp. (°C): 100

Test Conc	Rep	Tin #	# Females with Eggs	# Females without Eggs	# Males	# Immatures	C # Orgs. Weighed	A Wt. of Tin (mg)	B Wt. of Tin & Dried Orgs. (mg)	B-A Total Dry Org. Weight (mg)	(B-A)/C Mean Dry Org. Weight (mg)	(if applicable) Mean Biomass (mg/exp. org.)
50	A	62	II		II		4	25.14	26.87	1.73	0.433	0.346
	B	113	IIII		I		5	24.15	26.34	2.19	0.438	0.438
	C	58	IIII		I		5	24.97	27.24	2.27	0.454	0.454
	D	108	II		III		5	26.56	29.19	2.63	0.526	0.526
	E	69	II		II		4	26.68	28.39	1.71	0.428	0.342
	F	49	III		II		5	26.63	29.05	2.42	0.484	0.484
	G	56	III		II		5	25.73	28.21	2.48	0.496	0.496
	H	93	II		III		5	25.94	28.29	2.35	0.470	0.470
100	A	71	II		III		5	26.03	28.32	2.29	0.458	0.458
	B	55	III				3 (3/4)	24.90	26.11	1.21	0.403	0.303
	C	72	I		IIII		5	27.14	29.45	2.31	0.462	0.462
	D	115	II		III		5	25.34	27.55	2.21	0.442	0.442
	E	114	II		III		5	26.90	28.93	2.03	0.406	0.406
	F	54	II		IIII		5	25.21	27.56	2.35	0.470	0.470
	G	100	III		II		5	26.23	28.23	2.00	0.400	0.400
	H	50	IIII		I		5	26.06	28.36	2.30	0.460	0.460

Checked (date, initials): 1/7/05 MAS Biomass calculations checked (date, initials): 1/7/05 MAS

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-739

TEST ORGANISM
Common Name: Opposum Shrimp
Scientific Name: A. bahia

Beginning Date: 12/8/04 Time: 1600
Ending Date: 12/15/04 Time: 1400

TARGET VALUES Temp: 26 °C pH: 6.0 - 9.0 DO: 240% mg/L Salinity: 20 ppt

% Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm) Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
Control		24.6	25.1	25.4	25.9	24.0	24.2	24.2	7.9	7.9	8.0	8.0	7.5	8.1	7.9	7.0	7.2	7.0	6.9	7.2	7.8	7.5	21.0	21.1	21.4	21.7	22.1	20.1	20.1
6.25		24.7	25.2	25.5	25.9	24.1	24.4	24.3	8.1	8.0	8.1	8.1	8.0	8.2	8.0	7.0	7.2	7.0	7.0	7.3	7.9	7.5	20.6	21.0	21.4	21.7	22.2	20.1	20.1
12.5		24.7	25.3	25.5	25.9	24.1	24.3	24.3	8.2	8.1	8.2	8.1	8.1	8.3	8.1	7.0	7.2	7.0	7.1	7.2	8.0	7.4	20.5	20.9	21.2	21.5	21.7	20.0	19.9
25		24.7	25.5	25.5	25.9	24.2	24.6	24.5	8.3	8.2	8.3	8.3	8.3	8.4	8.3	7.0	7.2	7.0	7.1	7.2	7.9	7.4	20.4	20.7	20.9	21.1	21.3	19.8	19.8
50		24.6	25.6	25.6	25.9	24.4	24.4	24.5	8.6	8.4	8.6	8.5	8.3	8.6	8.5	6.9	7.2	6.9	7.1	7.1	8.0	7.2	20.1	20.4	20.4	20.6	20.6	19.5	19.5
100		24.4	25.6	25.9	26.0	25.7	25.1	24.7	9.6	9.2	9.4	9.2	8.3	9.3	9.3	6.7	7.1	6.4	7.1	7.3	7.9	6.8	19.6	19.7	19.1	19.3	20.6	18.8	19.1
Meter Number		340	340	340	6	340	340	340	340	340	340	340	340	340	340	341	341	341	341	341	341	341	340	340	340	340	340	340	340
Time		1320	1300	939	1000	1550	1135	930	1320	1300	930	1021	1550	1135	930	1320	1300	932	1023	1550	1135	930	1320	1300	937	1029	1550	1135	930
Initials		PB	MK			CES	CES	MK	PB	MK			CES	CES	MK	PB	MK			CES	CES	MK	PB	MK			CES	CES	MK

ATS-T13
03/01/00

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70005.08 | TEST ORGANISM | Beginning Date: 12/8/04 Time: 1600

Client: MPA | Common Name: Opposum Shrimp | Ending Date: 12/15/04 Time: 1400

QC Test Number: TN-04-739 | Scientific Name: A. tahia

TARGET VALUES Temp: 26 °C pH: 6.0 - 9.0 DO: ≥40% mg/L Salinity: 20 ppt

% Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm) Salinity (ppt)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control			24.9	24.7	26.2	26.4	24.8	24.5	7.7	7.8	7.6	7.7	7.7	7.6	7.3	5.2	6.6	4.7	4.5	5.4	5.4	5.3	21.0	21.1	21.7	21.6	21.6	20.9	20.9
6.25			25.3	25.0	26.0	26.1	24.6	25.0	7.6	7.8	7.6	7.7	7.7	7.6	7.5	5.3	5.7	4.4	4.0	5.1	5.0	4.7	21.1	20.8	21.4	21.6	21.9	20.7	20.8
12.5			25.7	25.2	26.8	26.4	24.9	25.1	7.7	7.8	7.6	7.7	7.7	7.6	7.5	5.1	5.4	3.6	4.0	4.7	4.9	4.7	20.9	20.8	21.1	21.3	21.8	20.6	20.7
25			25.7	25.2	26.6	26.4	25.3	25.3	7.7	7.8	7.5	7.7	7.6	7.6	7.5	5.0	5.4	3.5	4.1	4.4	5.2	4.5	20.7	20.6	20.9	21.3	21.4	20.4	20.5
50			25.2	25.4	26.9	26.5	25.4	25.3	7.8	7.7	7.5	7.7	7.5	7.5	7.4	5.9	5.1	3.6	4.3	3.8	4.8	4.0	20.5	20.3	20.5	20.6	20.6	19.9	20.1
100			26.0	26.0	26.8	26.6	25.6	25.2	7.9	7.6	7.5	7.6	7.4	7.5	7.4	5.7	5.3	4.0	4.6	4.1	5.2	4.5	20.0	19.7	19.7	19.9	19.2	19.0	19.2
Meter Number		340 →	340	6	10	340	340		340	340	340	340	340	340	340	341	340	341	341	341	341	341	340	340	340	340	340	340	340
Time		1420 →	1150	1045	1130	1330	1145		1420	1150	1136	1630	1330	1145	1500	1420	1159	1136	1630	1330	1145	1500	1420	1153	1135	1630	1330	1145	1520
Initials		MK →	DA	DA	PB	MK	MK		MK	DA	DA	PB	MK	MK	CES	MK	DA	DA	PB	MK	MK	CES	MK	DA	DA	PB	MK	MK	CES

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739 & 740

Date/Time/Initials	Comments/Activity
12/06/04 1610 wlm	Placed baking dish with slag in oven (101°C) to dry overnight AT4-708
12/07/04 1305 wlm	Elutriate prep: Weighed out 350 grams of dried slag (AT4-708) and placed in 2.5 gal cubitainer - added 7,000 ml (20 mls/gm) of 20‰ S Baltimore Harbor water (AT4-731) to cubitainer and placed on shaker table at 80 Rpm overnight at 23°C.
12/08/04 0800 wlm	Stopped shaker table, let elutriate settle ½ hour then syphoned off supernatant and filtered with 1µm glass fiber filter - Assigned sample # AT4-750
12/9 1422 wlm	Started second batch of elutriate as above
12/10 0945 wlm	Syphoned and filtered second elutriate
12/12 1640 wlm	Started third elutriate
12/13 0810 wlm	Collected third elutriate - cubitainer collapsed & only ½ of batch collected
12/13 1515 wlm	Started fourth batch of elutriate
12/14 0751 wlm	Collected and filtered fourth elutriate

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739

Date/Time/Initials	Comments/Activity
12-9-04 1620 MK	(a) - Only 2 organisms were found, there were no other remains
12-15-04 1415 [illegible]	(b) 25 A & 25 B each had one organism stuck to bowl above
MKS (b)	100 B also had one organism stuck to bowl above

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-739/740

Aliquot of sample warmed to test temperature, then aerated if supersaturated:

		ON AIR			OFF AIR		
Date	Sample #	Initial DO (mg/L)	Time	Initials	Final DO (mg/L)	Time	Initials
12-8-04	Slag Elutriate ATY-750	6.4	1015	PG			
12-9-04	ATY-750	7.0	755	PG			
12-10-04	ATY-750	7.1	850	MK	—	—	—
12-11-04	ATY-750	8.3	905	MK	8.0	935	MK
12-12-04	ATY-750	7.3	1500	PG			
12-13-04	ATY-750	7.8	750	PG	7.3	805	PG
12-14-04	ATY-750	6.6	755	PG	—	—	—

Mysid Survival, Growth and Fecundity Test-48 Hr Survival

Start Date:	12/8/2004	Test ID:	TN-04-739	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	MY-Mysidopsis bahia
Comments:					

Conc-%	1	2	3	4	5	6	7	8
CONTROL	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000
12.5	0.8000	1.0000	1.0000	0.8000	1.0000	1.0000	1.0000	1.0000
25	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000	0.8000	1.0000
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
CONTROL	1.0000	1.0000	1.3283	1.2094	1.3453	3.616	8		
6.25	0.9750	0.9750	1.3155	1.1071	1.3453	6.400	8	67.50	46.00
12.5	0.9500	0.9500	1.2857	1.1071	1.3453	8.574	8	63.00	46.00
25	0.9500	0.9500	1.2882	1.1071	1.3652	8.693	8	66.50	46.00
50	1.0000	1.0000	1.3453	1.3453	1.3453	0.000	8	72.00	46.00
100	1.0000	1.0000	1.3419	1.3181	1.3453	0.716	8	68.50	46.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.70237	0.929	-1.9036	2.80674
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Reviewed by: [signature] 1/14/05

Mysid Survival, Growth and Fecundity Test-7 Day Survival

Start Date:	12/8/2004	Test ID:	TN-04-739	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	MY-Mysidopsis bahia
Comments:					

Conc-%	1	2	3	4	5	6	7	8
CONTROL	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000
6.25	1.0000	1.0000	1.0000	0.8000	1.0000	0.8000	1.0000	0.8000
12.5	0.6000	1.0000	0.6000	0.8000	0.8000	1.0000	1.0000	0.6000
25	1.0000	1.0000	0.8333	0.8000	0.6000	1.0000	0.4000	0.8000
50	0.8000	1.0000	1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
100	1.0000	0.7500	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
CONTROL	0.9750	1.0000	1.2985	1.1071	1.3453	6.991	8		
6.25	0.9250	0.9487	1.2560	1.1071	1.3453	9.813	8	62.50	46.00
12.5	0.8000	0.8205	1.1135	0.8861	1.3453	19.093	8	52.00	46.00
25	0.8042	0.8248	1.1146	0.6847	1.3453	20.750	8	47.00	46.00
50	0.9500	0.9744	1.2857	1.1071	1.3453	8.574	8	67.00	46.00
100	0.9688	0.9936	1.3080	1.0472	1.3453	8.057	8	71.00	46.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.89841	0.929	-0.7047	0.39777
Bartlett's Test indicates equal variances (p = 0.06)	10.6128	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Reviewed by: [signature] 1/14/05

Mysid Survival, Growth and Fecundity Test-Biomass

Start Date:	12/8/2004	Test ID:	TN-04-739	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	MY-Mysidopsis bahia
Comments:					

Conc-%	1	2	3	4	5	6	7	8	S. D.
CONTROL	0.4740	0.4660	0.5100	0.4560	0.4600	0.4600	0.4000	0.4850	0.03129
6.25	0.4340	0.3880	0.4140	0.4020	0.3760	0.3240	0.4260	0.2640	0.05773
12.5	0.2920	0.4320	0.3000	0.4260	0.3180	0.4460	0.4160	0.1940	0.09041
25	0.4300	0.4275	0.4033	0.3480	0.2760	0.3940	0.1840	0.3140	0.08573
50	0.3460	0.4380	0.4540	0.5260	0.3420	0.4840	0.4960	0.4700	0.06745
100	0.4580	0.3025	0.4620	0.4420	0.4060	0.4700	0.4000	0.4600	0.05605

			Transform: Untransformed					Rank	1-Tailed	Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical	Mean	N-Mean
CONTROL	0.4639	1.0000	0.4639	0.4000	0.5100	6.745	8			0.4639	1.0000
*6.25	0.3785	0.8160	0.3785	0.2640	0.4340	15.251	8	40.00	46.00	0.3896	0.8400
*12.5	0.3530	0.7610	0.3530	0.1940	0.4460	25.613	8	40.00	46.00	0.3896	0.8400
*25	0.3471	0.7483	0.3471	0.1840	0.4300	24.700	8	39.00	46.00	0.3896	0.8400
50	0.4445	0.9582	0.4445	0.3420	0.5260	15.174	8	64.00	46.00	0.3896	0.8400
100	0.4251	0.9163	0.4251	0.3025	0.4700	13.186	8	52.50	46.00	0.3896	0.8400

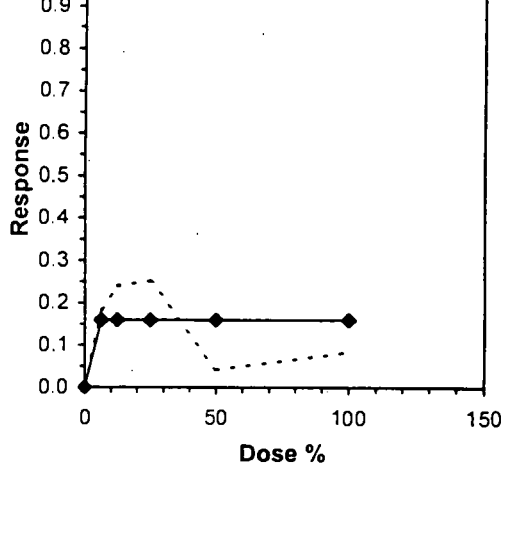
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.92395	0.929	-0.8678	0.2081
Bartlett's Test indicates equal variances (p = 0.16)	7.97523	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Steel's Many-One Rank Test	100	>100		1

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL		Skew
IC05*	1.9526	0.4860	1.4771	3.3236	1.4800
IC10*	3.9051				
IC15*	5.8577				
IC20	>100				
IC25	>100				
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration



ToxCalc v5.0.23

Reviewed by: 1/14/05

Mysid Survival, Growth and Fecundity Test-Biomass

Start Date:	12/8/2004	Test ID:	TN-04-739	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	MY-Mysidopsis bahia
Comments:					

Conc-%	1	2	3	4	5	6	7	8
CONTROL	0.4740	0.4660	0.5100	0.4560	0.4600	0.4600	0.4000	0.4850
6.25	0.4340	0.3880	0.4140	0.4020	0.3760	0.3240	0.4260	0.2640
12.5	0.2920	0.4320	0.3000	0.4260	0.3180	0.4460	0.4160	0.1940
25	0.4300	0.4275	0.4033	0.3480	0.2760	0.3940	0.1840	0.3140
50	0.3460	0.4380	0.4540	0.5260	0.3420	0.4840	0.4960	0.4700
100	0.4580	0.3025	0.4620	0.4420	0.4060	0.4700	0.4000	0.4600

			Transform: Untransformed					1-Tailed		
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
CONTROL	0.4639	1.0000	0.4639	0.4000	0.5100	6.745	8			
*6.25	0.3785	0.8160	0.3785	0.2640	0.4340	15.251	8	2.521	2.306	0.0781
*12.5	0.3530	0.7610	0.3530	0.1940	0.4460	25.613	8	3.274	2.306	0.0781
*25	0.3471	0.7483	0.3471	0.1840	0.4300	24.700	8	3.448	2.306	0.0781
50	0.4445	0.9582	0.4445	0.3420	0.5260	15.174	8	0.572	2.306	0.0781
100	0.4251	0.9163	0.4251	0.3025	0.4700	13.186	8	1.146	2.306	0.0781

PMSD = 16.8 (11-37

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.92395	0.929	-0.8678	0.2081
Bartlett's Test indicates equal variances (p = 0.16)	7.97523	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.07809	0.16834	0.01941	0.00459	0.00332	5, 42

Reviewed by: Nae 1/19/05

Mysid Survival, Growth and Fecundity Test-Fecundity

Start Date:	12/8/2004	Test ID:	TN-04-739	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	MY-Mysidopsis bahia
Comments:					

Conc-%	1	2	3	4	5	6	7	8
CONTROL	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
6.25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000		
25	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
50	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
CONTROL	1.0000	1.0000	1.2156	1.0472	1.2780	6.728	7		
6.25	1.0000	1.0000	1.1979	1.0472	1.3181	10.840	8	66.50	43.00
12.5	1.0000	1.0000	1.1896	1.0472	1.2780	9.538	6	41.00	25.00
25	1.0000	1.0000	1.1595	1.0472	1.2780	9.374	7	45.50	34.00
50	1.0000	1.0000	1.2537	1.2094	1.3181	3.967	8	71.00	43.00
100	1.0000	1.0000	1.2199	1.0472	1.3181	6.692	8	64.50	43.00

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)					0.90048	0.924	-0.5328	-0.895
Bartlett's Test indicates equal variances (p = 0.27)					6.38149	15.0863		
Hypothesis Test (1-tail, 0.05)	**NOEC**	**LOEC**	**ChV**	**TU**				
Wilcoxon Rank Sum Test	100	>100		1				

Reviewed by: 1/14/05

TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-740

TEST ORGANISM INFORMATION

Common Name: Sheepshead minnow

Scientific Name: C. variegatus

Lot Number: CV-435

Source: ABS

Adults Isolated (Time, Date): —

Neonates Pulled & Fed (Time, Date): —

Acclimation: < 24 hrs Age: < 24 hrs.

Culture Water (T/S): 24.0 °C 20.6 ppt

TEST SET-UP

TEST INITIATION

Date	Time	Initials	Activity
12/8/04	1200	CES	Dilutions Made
	1350	PG	Test Vessels Filled
	1420	PG	Organisms Transferred
	1435	CES	Head Counts

CONCENTRATION SERIES

Test Concentration	Volume Test Material	Final Volume
Control	0 ml	1000 ml
6.25	62.5 ml	
12.5	125 ml	
25	250 ml	
50	500 ml	
100	1000 ml	

Comments:

INTERMEDIATE DILUTION PREPARATION AND FEEDING

DILUTION PREPARATION

Day	Date	Time	Initials	Sample / Diluent
0	12/8/04 ~~CES~~	1200	CES	ATY-750 20 ppt
1	12-9-04	1145	MK	ATY-750 20 ppt
2	12.10.04	925	[illegible]	ATY-750 20 ppt
3	12.11.04	1010	[illegible]	ATY-750 ~~20 ppt~~
4	12-12-04	1540	PG	ATY-750 20 ppt
5	12/13/04	0935	MK	ATY-750 20 ppt
6	12-14-04	915	MK	ATY-750 20 ppt

FEEDING

Food: 2x daily w/ artemia

Day	Time, Initials, Amount	Time, Initials, Amount	Time, Initial: Amount
0	X		1700 CES 5 drops
1	820 CES 5 drops		1700 MK 5 drops
2	900 SM 5 drops		1710 MK 5 drops
3	820 MK 5 drops		1730 MK 5 drops
4	840 PG 5 drops		1630 CES/5[illegible]
5	845 PG 5 drops		1100 5 drops RSH
6	845 MK 5 drops		1700 RSH 5 drops

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-740
Test Material: Slag (AT4-708) ELUTRIATE
Accession Number: AT4-750
Dilution Water: 20ppt FF
Accession Number:

TEST ORGANISM
Common Name: Sheepshead minnow
Scientific Name: C. variegatus

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1420
Ending Date: 12/15/04 Time: 1430

Test Container: 1L beaker
Test Volume: 250ml
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
Control	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
6.25	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
12.5	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	9	9	8	8	8	8	8
Time / Initials		1435 CES	[illegible]	1020 [illegible]	1215 [illegible]	1610 CES	1400 MK	1000 MK	1430 PG

TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-740
Test Material: Slag (AT4-708) ELUTRIATE
Accession Number: AT4-750
Dilution Water: 20ppt FF
Accession Number:

TEST ORGANISM
Common Name: Sheepshead minnow
Scientific Name: C. variegatus

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal

Beginning Date: 12/8/04 Time: 1420
Ending Date: 12/15/04 Time: 1430

Test Container: 1L beaker
Test Volume: 250ml
Test Duration: 7-day

% Concentration	Rep	Number of Surviving Organisms							
		Day 0 Date	Day 1 Date	Day 2 Date	Day 3 Date	Day 4 Date	Day 5 Date	Day 6 Date	Day 7 Date
25	A	10	10	10	10	10	10	10	10
	B	10	10	9	9	9	~~9~~ MK 12-13	MK 12-14 ~~10~~ 9	9
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
50	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	MK 12-9 ~~9~~ 10	10	9	9	9	9	9
100	A	10	10	10	10	10	10	10	10
	B	10	10	10	10	10	10	10	10
	C	10	10	10	10	10	10	10	10
	D	10	10	10	10	10	10	10	10
Time / Initials		1435 CES	1335 MK	1020	1215	1615 CES	1100 MK	1000 MK	1430 PG

WEIGHT DATA (Test Species: C. variegatus)

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-740
Tin Lot: Red II Oven Temp (°C): 101

	Date	Time	Initials
Loaded tins placed in oven:	12/15/04	1430	PG
Loaded tins removed from oven:	12-16-04	1025	MK
Loaded tins weighed:	12-17-04	1645	PG

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
Control	A	57	26.12	39.15	13.03	10	1.303	1.303
	B	85	27.27	41.37	14.10	10	1.410	1.410
	C	66	27.99	41.37	13.38	10	1.338	1.338
	D	86	26.67	40.00	13.33	10	1.333	1.333
6.25	A	80	24.59	35.92	11.33	10	1.133	1.133
	B	78	26.37	39.70	13.33	10	1.333	1.333
	C	87	25.44	36.11	10.67	10	1.067	1.067
	D	89	25.32	36.50	11.18	10	1.118	1.118
12.5	A	63	26.41	39.85	13.44	10	1.344	1.344
	B	84	26.67	39.71	13.04	10	1.304	1.304
	C	77	25.85	38.97	13.12	10	1.312	1.312
	D	68	27.31	38.93	11.62	8	1.453	1.162

Dry wt. calculations checked (date, initials): 1/7/05 MAS Biomass calculations checked (date, initials): 1/7/05 MAS

EA

WEIGHT DATA (Test Species: C. variegatus)

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-740

Tin Lot: Red II Oven Temp (°C): 101

	Date	Time	Initials
Loaded tins placed in oven:	12/15/04	1430	PG
Loaded tins removed from oven:	12-16-04	1025	MK
Loaded tins weighed:	12-17-04	1645	

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
25	A	65	27.53	41.62	14.09	10	1.409	1.409
	B	83	26.05	~~36.71~~ 38.12	~~10.66~~ 12.07	9	~~1.184~~ 1.341	1.207 12-17-04
	C	76	26.46	40.24	13.78	10	1.378	1.378
	D	75	26.09	40.59	14.50	10	1.450	1.450
50	A	88	27.17	42.41	15.24	10	1.524	1.524
	B	82	25.49	37.99	12.50	10	1.250	1.250
	C	70	26.10	37.45	11.35	10	1.135	1.135
	D	73	25.43	36.31	10.88	9	1.209	1.088
100	A	90	26.70	37.93	11.23	10	1.123	1.123
	B	81	26.42	37.94	11.52	10	1.152	1.152
	C	79	25.96	38.60	12.64	10	1.264	1.264
	D	74	26.62	38.45	11.83	10	1.183	1.183

Dry wt. calculations checked (date, initials): 1/7/05 MAS Biomass calculations checked (date, initials): 1/7/05 MAS

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-740

TEST ORGANISM
Common Name: Sheepshead minnow
Scientific Name: C. variegatus

Beginning Date: 12/8/04 Time: 1420
Ending Date: 12/15/04 Time: 1430

TARGET VALUES Temp: 25 °C pH: 6.0 - 9.0 DO: ≥40% mg/L Salinity: 20 ppt

% Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (uS/cm) Salinity (ppt)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
Control		24.6	25.1	25.4	25.9	24.9	24.2	24.2	7.9	7.9	8.0	8.0	7.5	8.1	7.9	7.0	7.2	7.0	6.9	7.2	7.8	7.5	21.0	21.1	21.4	21.7	22.1	20.1	20.1
6.25		24.7	25.2	25.5	25.9	24.1	24.4	24.3	8.1	8.0	8.1	8.1	8.0	8.2	8.0	7.0	7.2	7.0	7.0	7.3	7.9	7.5	20.6	21.0	21.4	21.7	22.2	20.1	20.1
12.5		24.7	25.3	25.5	25.9	24.1	24.3	24.3	8.2	8.1	8.2	8.1	8.1	8.3	8.1	7.0	7.2	7.0	7.1	7.2	8.0	7.4	20.5	20.9	21.2	21.5	21.7	20.4	19.9
25		24.7	25.5	25.5	25.9	24.2	24.4	24.5	8.3	8.2	8.3	8.3	8.3	8.4	8.3	7.0	7.2	7.0	7.1	7.2	7.9	7.4	20.4	20.7	20.9	21.1	21.3	19.8	19.8
50		24.6	25.6	25.6	25.9	24.1	24.4	24.5	8.6	8.4	8.6	8.5	8.3	8.6	8.5	6.9	7.2	6.9	7.1	7.1	8.0	7.2	20.1	20.4	20.7	20.6	20.9	19.5	19.5
100		24.4	25.0	25.9	26.0	25.1	25.1	24.7	9.6	9.2	9.4	9.2	8.4	9.3	9.3	6.7	7.1	6.4	7.1	7.3	7.9	6.8	19.6	19.7	19.1	19.3	20.6	18.8	18.1
Meter Number		340	340	340	6	340	340	340	340	340	340	340	340	340	340	341	341	341	341	341	341	341	340	340	340	340	340	340	340
Time		1320	1350	930	1630	1550	1135	930	1320	1350	930	1021	1550	1135	930	1320	1350	930	1023	1550	1135	930	1320	1350	930	1024	1550	1135	930
Initials		PG	MK	DM	DM	CES	CES	MK	PG	MK	DM	DM	CES	CES	MK	PG	MK	DM	DM	CES	CES	MK	PG	MK	DM	DM	CES	CES	MK

ATS-T13
03/01/00

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70005.08 | TEST ORGANISM | Beginning Date: 12/8/04 Time: 1420

Client: MPA | Common Name: Sheepshead minnow | Ending Date: 12/15/04 Time: 1430

QC Test Number: TN-04-740 | Scientific Name: C. variegatus

TARGET VALUES Temp: 25 °C pH: 6.0 - 9.0 DO: 3408 mg/L Salinity: 20 ppt

% Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							~~Conductivity mS/cm~~ Salinity (ppt)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control		25.2	24.4	25.7	24.4	24.5	25.2	24.0	8.0	7.8	7.7	7.4	7.4 12/13/04 7.0	7.7	7.9	6.6	5.8	4.9	5.6	5.1	4.6	5.7	21.1	21.2	21.6	22.5	22.8	21.0	21.2
6.25		25.7	24.6	25.4	24.1	24.1	25.2	24.1	7.9	7.9	7.8	7.5	7.5	7.7	7.9	5.7	5.7	5.3	4.8	5.9	4.7	5.8	20.8	21.0	20.3	22.1	22.7	20.9	21.0
12.5		25.1	24.7	25.0	25.2	24.1	25.2	24.0	8.0	7.9	7.8	7.6	7.5	7.7	7.8	6.5	5.5	5.3	4.8	5.9	4.9	5.4	20.9	20.9	21.7	22.0	21.9	20.6	20.6
25		24.9	24.8	25.4	24.8	24.5	24.8	24.1	7.9	7.9	7.7	7.6	7.5	7.7	7.8	6.2	5.7	4.8	4.8	5.1	5.3	5.5	21.0	20.7	21.2	21.8	21.5	20.8	20.7
50		25.1	24.4	25.6	24.8	25.2	25.2	24.0	8.1	7.9	7.7	7.6	7.5	7.7	7.7	6.5	5.9	5.1	5.2	4.6	5.1	5.4	20.6	20.5	20.7	21.4	20.8	20.2	20.4
100		25.3	24.6	WK 11:12 20.7 25.4	24.9	25.4	25.4	24.0	8.2	7.9	7.7	7.6	7.6	7.6	7.6	5.7	5.5	5.4	5.6	5.3	4.9	5.4	19.9	20.0	WK 11:12 25.4 20.2	20.9	19.5	19.2	19.5
Meter Number		340	340	340	340	340	340	340	340	340	340	340	340	340	340	341	340	341	341	341	341	341	340	340	340	340	340	340	340
Time		1310	1040	1157	1545	1150	940	1405	1310	1041	1158	1545	1150	940	1405	1310	1040	1159	1546	1150	940	1406	1310	1040	1157	1545	1150	940	1405
Initials		MK			CES	CES	MK	PG	MK			CES	CES	MK	PG	MK			CES	CES	MK	PG	MK			CES	CES	MK	PG

Larval Fish Growth and Survival Test-48 Hr Survival

Start Date:	12/8/2004	Test ID:	TN-04-740	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	CV-Cyprinodon variegatus
Comments:					

Conc-%	1	2	3	4
CONTROL	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	0.9000
25	1.0000	0.9000	1.0000	1.0000
50	1.0000	1.0000	1.0000	1.0000
100	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
CONTROL	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4			
6.25	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802
12.5	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	1.225	2.410	0.0802
25	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	1.225	2.410	0.0802
50	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802
100	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.0802

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.61382	0.884	-2.1359	5.27706
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.03102	0.03181	0.00177	0.00221	0.56404	5, 18

Reviewed by: 1/14/05

Larval Fish Growth and Survival Test-7 Day Survival

Start Date:	12/8/2004	Test ID:	TN-04-740	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	CV-Cyprinodon variegatus
Comments:					

Conc-%	1	2	3	4
CONTROL	1.0000	1.0000	1.0000	1.0000
6.25	1.0000	1.0000	1.0000	1.0000
12.5	1.0000	1.0000	1.0000	0.8000
25	1.0000	0.9000	1.0000	1.0000
50	1.0000	1.0000	1.0000	0.9000
100	1.0000	1.0000	1.0000	1.0000

			Transform: Arcsin Square Root						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
CONTROL	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4			
6.25	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.1329
12.5	0.9500	0.9500	1.3358	1.1071	1.4120	11.411	4	1.382	2.410	0.1329
25	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	0.739	2.410	0.1329
50	0.9750	0.9750	1.3713	1.2490	1.4120	5.942	4	0.739	2.410	0.1329
100	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	4	0.000	2.410	0.1329

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.73444	0.884	-2.0017	4.77252
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.05772	0.0592	0.00399	0.00609	0.66162	5, 18

Reviewed by: Rae 1/14/05

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date:	12/8/2004	Test ID:	TN-04-740	Sample ID:	
End Date:	12/15/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAM 87-EPA Marine	Test Species:	CV-Cyprinodon variegatus
Comments:					

Conc-%	1	2	3	4	S. D.
CONTROL	1.3030	1.4100	1.3380	1.3330	0.04538
6.25	1.1330	1.3330	1.0670	1.1180	0.11696
12.5	1.3440	1.3040	1.3120	1.1620	0.08087
25	1.4090	1.2070	1.3780	1.4500	0.10682
50	1.5240	1.2500	1.1350	1.0880	0.1954
100	1.1230	1.1520	1.2640	1.1830	0.06082

			Transform: Untransformed					1-Tailed			Isotonic	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD	Mean	N-Mean
CONTROL	1.3460	1.0000	1.3460	1.3030	1.4100	3.371	4				1.3460	1.0000
6.25	1.1628	0.8639	1.1628	1.0670	1.3330	10.059	4	2.309	2.410	0.1912	1.2681	0.9421
12.5	1.2805	0.9513	1.2805	1.1620	1.3440	6.315	4	0.825	2.410	0.1912	1.2681	0.9421
25	1.3610	1.0111	1.3610	1.2070	1.4500	7.848	4	-0.189	2.410	0.1912	1.2681	0.9421
50	1.2493	0.9281	1.2493	1.0880	1.5240	15.641	4	1.219	2.410	0.1912	1.2493	0.9281
100	1.1805	0.8770	1.1805	1.1230	1.2640	5.152	4	2.086	2.410	0.1912	1.1805	0.8770

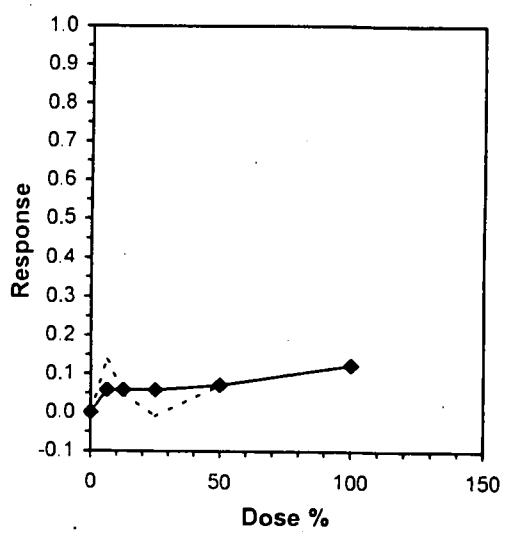
Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9538	0.884	0.744	1.44653
Bartlett's Test indicates equal variances (p = 0.23)	6.90126	15.0863		

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	100	>100		1	0.19125	0.14209	0.02708	0.01259	0.10584	5, 18

Linear Interpolation (200 Resamples)

Point	%	SD	95% CL(Exp)		Skew
IC05*	5.398	22.866	2.109	101.380	0.8552
IC10	77.527				
IC15	>100				
IC20	>100				
IC25	>100				
IC40	>100				
IC50	>100				

* indicates IC estimate less than the lowest concentration



Reviewed by: Rae
1/14/05

SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-743

TEST ORGANISM INFORMATION

Common Name: Sheepshead minnow
Scientific Name: C. variegatus
Lot Number: CV-436
Source: ABS

Adults Isolated (Time, Date): ~~X~~
Neonates Pulled (Time, Date): ~~X~~
Acclimation: —
Age: 12 days
Culture Water (T/S): 20.1 °C 19.9 ppt

TEST INITIATION

Date	Time	Initials	Activity
12/9/04	1020	PG	Sediment Added to Chambers
↓	1030	PG	Overlying Water Added to Chambers
	1110	PG	Organisms Transferred

TEST SET-UP

Sample Number(s): ATY-708

Overlying Water Number: 20ppt + ATY-731

Treatment	Volume Test Sediment	Volume Overlying Water
Lab Control	0ml	500ml Lab 20ppt
Site Control ATY-731	0ml	500ml Site Water
Site/Slag-ATY-708	1/4"	500ml
Site/Slag/Sand	1/4" of each	↓
Site/Sand	1/4"	

★ Feed once at 48 hrs. (3 drops)

ATS-T28
03/01/00

ACUTE TOXICITY TEST DATA SHEET

Project Number: 70005.08
Client: MPA
QC Test Number: TN-04-743
Test Material: Slag
Accession Number: AT4-708
Dilution Water: 20 ppt (BALT. HARBOR)
Accession Number: AT4-731

TEST ORGANISM
Common Name: Sheepshead minnow
Scientific Name: C. variegatus

TARGET VALUES
Temp: 20 °C **DO:** ≥40% mg/L
pH: 6.0 - 9.0 **Salinity:** 20 ppt

Beginning Date: 12/10/04 **Time:** 1110
Ending Date: 12/14/04 (~~12/13/04~~) **Time:** 1035
TEST TYPE: Static / Flowthrough (Static circled; wm 4/7)
Renewal / Non-renewal (Non-renewal circled)
Test Container: 1L beaker
Test Volume: 500 ml
Test Duration: 96 hr.

Concentration	Rep	Live Organisms 0	24	48	72	96	Temperature (°C) 0	24	48	72	96	pH 0	24	48	72	96	Dissolved Oxygen (mg/L) 0	24	48	72	96	~~Conductivity (µS/cm)~~ Salinity (ppt) 0	24	48	72	96
Lab Control	A	10	10	10	10	10	19.9	20.6	19.3	19.0	20.6	8.1	8.2	8.1	8.0	7.8	8.0	8.3	7.5	7.7	7.3	19.5	19.4	19.0	19.6	19.6
	B	10	10	10	10	10																				
Site Control	A	10	10	10	10	10	19.8	20.3	18.5	19.0	20.3	8.3	8.3	8.0	8.1	7.8	8.0	7.9	7.1	7.5	7.3	19.5	19.5	19.6	19.6	19.6
	B	10	10	10	10	10																				
Site/Slag	A	10	~~8~~ 9 wm 4/7	~~8~~ 9	~~8~~ 9	~~9~~ 10	19.8	20.4	19.0	19.0	20.4	9.1	9.5	9.6	9.5	9.3	8.0	7.8	7.2	7.3	7.2	19.5	19.2	19.2	19.4	19.4
	B	10	~~6~~ 10 wm	~~6~~ 10 wm 4/7	~~6~~ 10 wm	~~10~~ 10 CES 12/14/13																				
Site/Slag/Sand	A	10	10	10	10	10	19.8	20.4	19.0	19.0	20.4	8.4	~~8.0~~ 8.4 (wm 4/7)	8.4	8.5	8.3	8.0	7.7	7.0	7.4	7.2	19.5	19.3	19.3	19.6	19.3
	B	10	10	10	10	10																				
Site/Sand	A	10	10	10	10	10	19.8	20.5	19.1	19.0	20.4	8.4	8.3	8.2	8.2	8.1	8.0	7.8	7.2	7.5	7.3	19.5	19.5	19.6	19.6	19.6
	B	10	10	10	10	10																				
Meter Number							340	340	340	340	340	340	340	340	340	340	341	341	341	341	341	340	340	340	340	340
Time		1115	1105	1108	1140	1035	1030	1050	1102	1130	1030	1030	1050	1103	1130	1030	1030	1050	1104	1130	1035	1030	1050	1102	1130	1030
Initials		MM	MK	[signature]	CES/PG	CES/PG	PG	MK	[signature]	CES	CES	PG	MK	[signature]	CES	CES	PG	MK	[signature]	CES	CES	PG	MK	[signature]	CES	CES

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70005.08

Client: MPA

QC Test Number: TN-04-743

Date/Time/Initials	Comments/Activity
12-11-04 MK 0820	Fed 3 drops
12/12/04 CES 1135	White precipitate noticed on surface of site/slag replicates

Acute Fish Test-96 Hr Survival

Start Date:	12/10/2004	Test ID:	TN-04-743	Sample ID:	
End Date:	12/14/2004	Lab ID:		Sample Type:	
Sample Date:		Protocol:	EPAA 91-EPA Acute	Test Species:	CV-Cyprinodon variegatus
Comments:					

Conc-%	1	2
Lab Ctrl	1.0000	1.0000
Site Ctrl	1.0000	1.0000
Site/Slag	0.9000	1.0000
Site/Slag/sand	1.0000	1.0000
Site/Sand	1.0000	1.0000

			Transform: Arcsin Square Root						1-Tailed	
Conc-%	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Lab Ctrl	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2			
Site Ctrl	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0.000	2.850	0.1469
Site/Slag	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1.581	2.850	0.1469
Site/Slag/sand	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0.000	2.850	0.1469
Site/Sand	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0.000	2.850	0.1469

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test indicates no significant differences	0.06555	0.06723	0.00266	0.00266	0.48566	4, 5

Reviewed by: [signature] 1/14/05

ATTACHMENT II

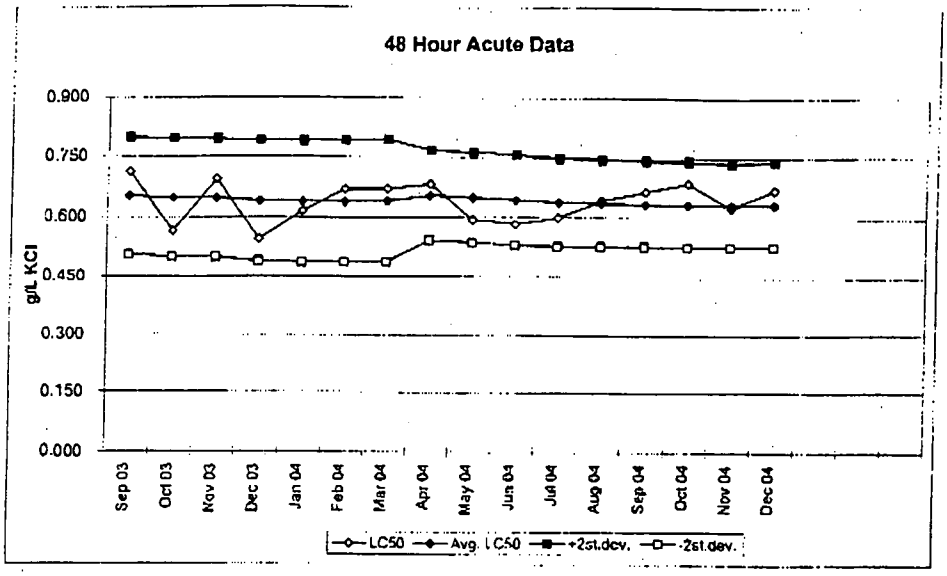
Cumulative Reference Toxicant Data
(4 pages)

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax: 970/484-2514

REFERENCE TOXICANT LC50

Mysidopsis bahia



48 HOUR ACUTE TOXICITY DATA FOR

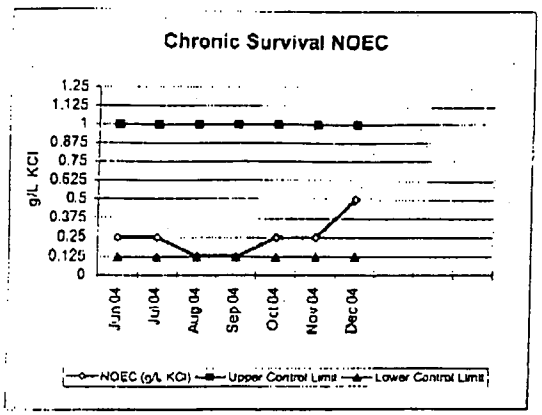
Mysidopsis bahia

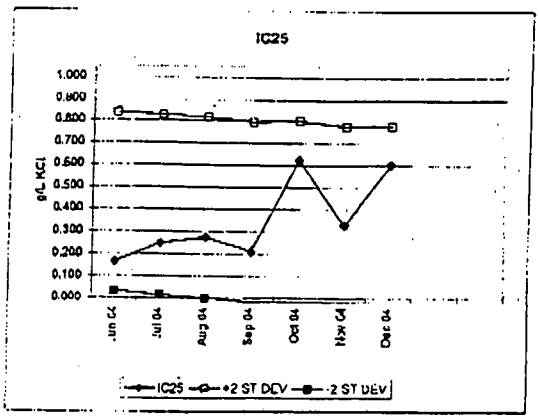
DATE	LC50 (g/L KCl)	95% CONFIDENCE (upper)	(lower)	AVG.LC50 (g/L KCl)	METHOD	+2std	-2std
Jul 04	0.600	0.675	0.533	0.638	SPKR	0.74867	0.528277
Aug 04	0.643	0.711	0.582	0.637	SPKR	0.744987	0.528149
Sep 04	0.666	0.728	0.608	0.636	SPKR	0.743023	0.528491
Oct 04	0.688	0.728	0.650	0.636	SPKR	0.74374	0.528277
Nov 04	0.626	0.682	0.576	0.633	SPKR	0.738159	0.527887
Dec 04	0.671	0.712	0.633	0.635	SPKR	0.741503	0.528857

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax: 970/484-2514

Mysidopsis bahia





Chronic 7 Day Survival Test Data

Date	NOEC (g/L KCl)	LOEC (g/L KCl)
Jun 04	0.25	0.5
Jul 04	0.25	0.5
Aug 04	0.125	0.3
Sep 04	0.125	0.3
Oct 04	0.25	0.5
Nov 04	0.25	0.5
Dec 04	0.5	1.0

IC 25 for Growth Test

Date	IC25 (g/L KCl)	95% Confidence (upper)	(lower)	Avg. IC25 (g/L KCl)	+2 ST DEV	-2 ST DEV
Jun 04	0.170	0.215	0.006	0.438	0.8381896	0.036910405
Jul 04	0.250	0.652	0.061	0.423	0.8286312	0.01737882
Aug 04	0.278	0.470	0.167	0.410	0.8159165	0.003393456
Sep 04	0.216	0.674	0.119	0.391	0.7973082	-0.014998151
Oct 04	0.625	0.625	0.576	0.393	0.803368	-0.017137987
Nov 04	0.335	0.502	0.061	0.380	0.7795089	-0.019799914
Dec 04	0.608	0.635	0.464	0.380	0.7795588	-0.019818794

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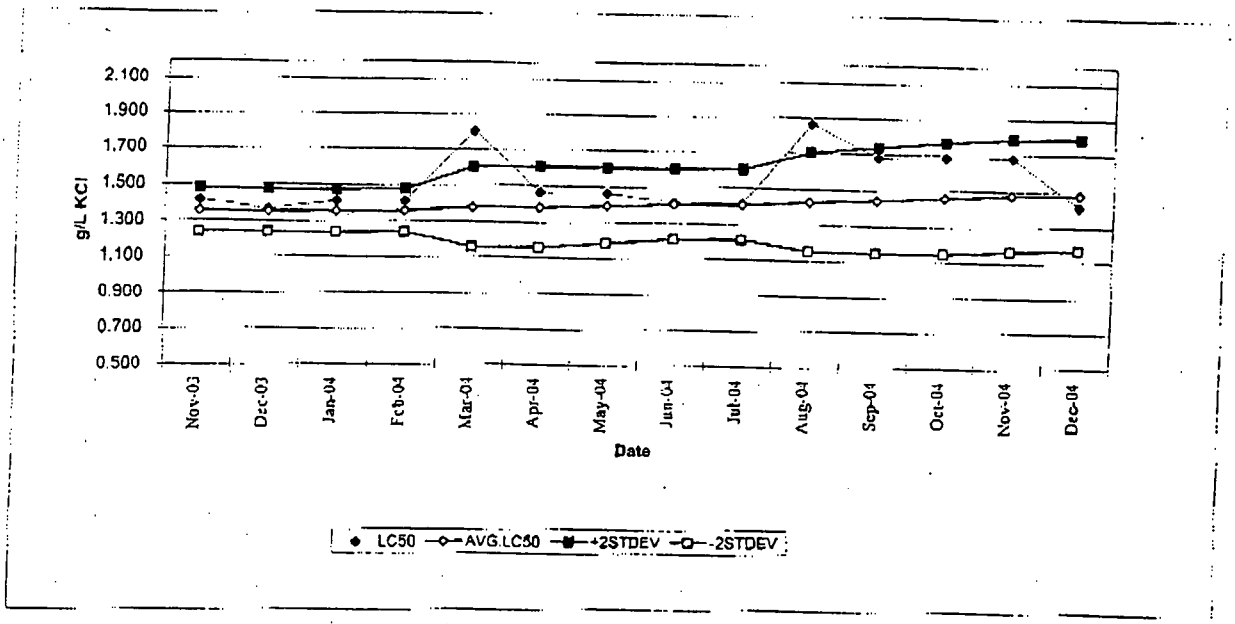
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel: 970/484-5091 Fax: 970/484-2514

REFERENCE TOXICANT LC50

Cyprinodon variegatus



48 HOUR ACUTE TOXICITY DATA FOR

Cyprinodon variegatus

DATE	LC50 (g/L KCl)	95% CONFIDENCE (upper)	(lower)	AVG.LC50 (g/L KCl)	METHOD	Avg+2std	Avg-2std
Jul 04	1.414	None	None	1.408	Graphical	1.6043267	1.211569262
Aug 04	1.866	2.181	1.597	1.429	SPKR	1.70635493	1.152568319
Sep 04	1.682	1.930	1.465	1.442	SPKR	1.73906842	1.145358296
Oct 04	1.682	1.930	1.465	1.457	SPKR	1.76881027	1.145707849
Nov 04	1.682	1.930	1.465	1.477	SPKR	1.79100062	1.16225083
Dec 04	1.414	1.414	1.414	1.479	SPKR	1.79072335	1.167099535

ATTACHMENT III

Report Quality Assurance Record
(2 pages)

REPORT QUALITY ASSURANCE RECORD

Client: Maryland Port Administration Project Number: 20005.08

Author: Virginia A. Sohn EA Report Number: 4668

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.	Virginia A. Sohn	1/12/05
2. Samples prepared and processed according to study plan requirements.	Virginia A Sohn	1/12/05
3. Data collected using calibrated instruments and equipment.	Virginia A Sohn	1/12/05
4. Calculations checked:		
- Hand calculations checked	Virginia A Sohn	1/12/05
- Documented and verified statistical procedure used.	Virginia A Sohn	1/12/05
5. Data input/statistical analyses complete and correct.	Richard A. Connelly	1/17/05
6. Reported results and facts checked against original sources.	Richard A. Connelly	1/17/05
7. Data presented in figures and tables correct and in agreement with text.	Richard A. Connelly	1/17/05
8. Results reviewed for compliance with study plan requirements.	Wayne McCulloch	1/28/05

	AUTHOR	DATE
9. Commentary reviewed and resolved.	Virginia A. Sohn	1/31/05

10. All study plan and quality assurance/control requirements have been met and the report is approved:

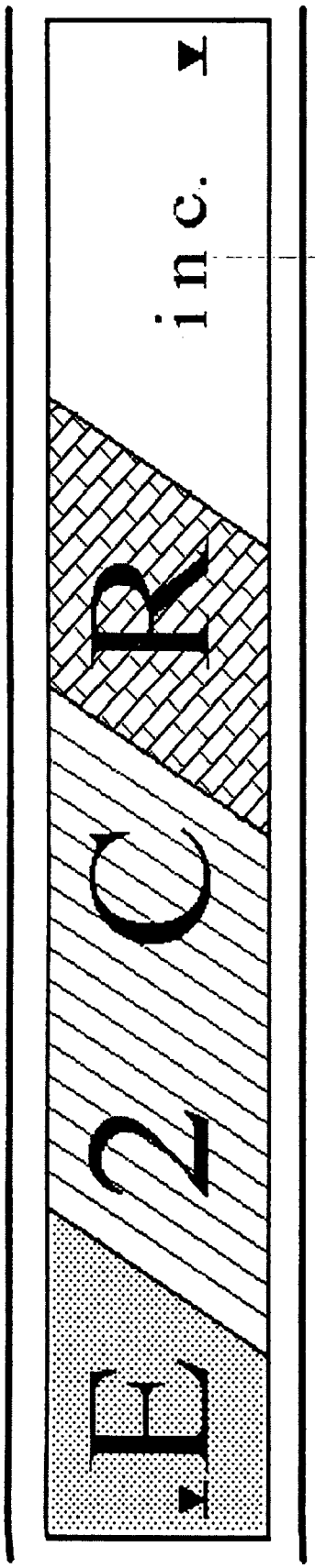
Wayne McCulloch — 1/28/05
PROJECT MANAGER — DATE

Richard A. Connelly — 1/17/05
QUALITY CONTROL OFFICER — DATE

Wayne McCulloch — 1/27/05
SENIOR TECHNICAL REVIEWER — DATE

APPENDIX C

RESULTS OF PHYSICAL CHARACTERIZATION OF SLAG



REPORT OF RESULTS OF SAMPLING AND TESTING OF SLAG

ISG PLANT SITE

SPARROWS POINT, MARYLAND

E2CR Project No. 04520-04

PREPARED FOR:

MOFFATT & NICHOL ENGINEERS

12700 Lighthouse Point East, Suite 501

Baltimore, Maryland 21224

BY:

E2CR, INC.
9004 Yellow Brick Road, Suite E
Baltimore, Maryland 21237
Phone: 410-574-4393
Fax : 410-574-7970

January 31, 2005

E2CR inc.

9004 Yellow Brick Road. Suite E
Baltimore. Maryland 21237
Phone: 410-574-4393
Fax: 410-574-7970
Email: email@e2cr.com

January 31, 2005

Mr. Tom Shafer, P.E.
Moffatt & Nichol Engineers
2700 Lighthouse Point East, Suite 501
Baltimore, Maryland 21224

Re: Sampling and Testing of Slag
ISG Plant Site
Sparrows Point, Maryland
E2CR Job No. 04520-04

Dear Mr. Shafer:

E2CR, Inc. has completed the Sampling and Testing at the International Steel Group (ISG) (formerly Bethlehem Steel) Plant Site located in Sparrows Point, Baltimore County, Maryland. This letter report contains the results of field investigation and laboratory testing of slag material at the site. This investigation was conducted in general accordance with our proposal dated October 19, 2004 and was authorized by you.

1.0 BACKGROUND

A Dredge Material Containment Facility (DMCF) is planned by the Maryland Port Administration (MPA) in the area to the south of the ISG plant at Sparrows Point, Maryland. The DMCF is to consist of Dikes constructed in water to about El +18±, to contain the dredge materials. In the area where the dikes will be constructed, the mud line is at a depth of about 20-feet below water level (i.e., near El −20±). A geotechnical study conducted recently (E2CR Report dated January 2, 2005) revealed that the subsurface conditions along the alignment of the proposed dike consist of relatively soft sediments to significant depths. In order to construct the dike, staged construction and wick drains to accelerate the settlement and strength gain of the foundation soils is being considered. The borrow material that is used to construct the dike is typically sand that is available in the Chesapeake Bay. As the source of sand borrow is not in the immediate vicinity of proposed construction, the use of Slag at the site is being considered as an option. This study was initiated to evaluate the feasibility of excavating the slag from its current location and use it in the construction of the dike.

During this evaluation, EA Engineering, Science & Technology, Inc. (EA) collected samples that were obtained from this investigation for use in their environmental testing of the Slag materials.

2.0 PURPOSE AND SCOPE

The purposes of this investigation were to determine the feasibility of excavating the Slag at the ISG property and evaluate the feasibility for its use in the construction of the proposed dike for the DMCF. The scope of our field investigation included excavating test pits for a period of 2-days and obtaining bulk samples of the excavated slag materials and conduct geotechnical laboratory tests. The slag material excavated from the test pit was also collected by representative of EA during this study for their environmental testing.

3.0 SITE DESCRIPTION

The International Steel Group (ISG) plant (formerly known as Bethlehem Steel plant) is located to the east of I-695 and north of Patapsco River, in Baltimore County, Maryland as shown on Figure 1: Site Vicinity Map, in Appendix A. The area containing slag is located on the south side of the ISG plant. Reportedly this area was reclaimed in the past (over 50+ years ago) by placing slag in this area over existing marsh and shallow waters to create land.

The area containing slag is near El +10± at the present time. There are several piles and mounds of slag and iron fragments (near El +10+) in this area that is undergoing processing and re-cycling. Stockpiles of finer slag material that is a residue from previous processing of slag for aggregate are present along the south and southwest portions of this area. The elevation of the stockpiles of slag fines at the site range from El +20± to El +60±, as shown on Figure 2: Project Location Plan.

4.0 FIELD INVESTIGATION

The field investigation was conducted on November 23 and 24, 2004. A total of 10 test pits (TP-1 to TP-10) were excavated at the approximate locations shown on Figure 3, Test Pit Location Plan in the Appendix. These Test Pits were excavated using a John Deere 892 ELC hydraulic excavator, as shown on the Photographs of Test Pits included in the Appendix. The test pits generally encountered refusal within 3-feet at most of the locations; however, the test pits excavated near (or in) the slag fines stockpile area extended to depths ranging from 7.5-feet to 11-feet below the top of the stock pile grades. Bulk samples of the slag were obtained from the test pits and were shipped to our laboratory for further testing. All samples were visually classified by a Geologist in the field and described on the test pit logs that are included in the Appendix.

5.0 LABORATORY TESTING

Selected samples were tested for their natural water content, and grain size distribution. Bulk samples from the test pits were (loosely) filled into a 1-cubic foot box to measure the bulk unit

weight of the slag materials. Bulk specific gravity tests were conducted on selected hand specimens (measuring approximately 3-inch x 4-inch x 3-inch in size, as shown on the photographs and included in the Results of Specific Gravity Tests, in the Appendix). In addition, modified proctor compaction test and swell (during soaking and upon heating in the oven for 24-hours) tests were also performed. The results of the laboratory tests are included in the Appendix. A table of Summary of Laboratory Test Results is included in the Appendix.

6.0 SUBSURFACE CONDITIONS

The area of the site where test pits were excavated is covered with slag. This slag has been placed over the past 88± years in order to reclaim land from low lying and marshy areas that were present at this location. The results of this field investigation is summarized as follows:

6.1 Hard Slag at Plant Grade (near El +10±)

- Test pits TP-1, TP-2, TP-3, TP-4, TP-6, TP-7 and TP-9 excavated from the existing plant grade (near El 10±) generally encountered refusal within 1-foot to 3-feet at majority of the locations.
- Test Pit No. TP-5, which was excavated near the edge of the site along the east side (i.e., near the shoreline) was able to extend to a depth of 9.5 feet below existing grade.
- Test Pit Nos. TP-8 and TP-10 were excavated in the area of stockpile (from near plant grade of El +10±). Test Pit TP-8 was extended to a depth of 11-feet and Test Pit TP-10 was extended to s depth of 7.5 feet below existing grade.
- The near surface material consists of significant portion of iron or its derivative mixed with slag (which was reportedly placed in a molten state that has since solidified).
- Groundwater was encountered in TP-5 (that was excavated adjacent to the water along the shoreline) at a depth of about 8-feet below existing grade and water was encountered at a depth of 10.5-feet in TP-8 (which was excavated in the southern portion of the site).

6.2 Slag Fines in Stock Pile (above El +10±)

- The slag materials were crushed, screened and processed as aggregate (such as #57, #2 and Gabion stones) in the past at the site. This processing operation resulted in material of gradation that were not used as the processed aggregate and fines, which were stockpiled in the southern portion of this area. The top of stockpile ranges from El +20± to El +60±.
- Test pits could not be excavated (i.e., extended) vertically from the top of the stockpile as the surface of these materials had hardened in-place. However, samples were obtained of this stockpiled material by excavating the exposed vertical faces. The vertical faces had been created previously by excavating into the stockpile by front-end loaders, during the slag processing operations at the site.

- The samples from the test pits indicated that these materials are very similar in composition to poorly graded Sand and Gravel.

7.0 EVALUATION

Based on the results of the field investigation and the laboratory test results, the following is summarized:

7.1 Hard Slag at Plant Grade (near El +10+)

- The slag material at the site is hard and contains significant proportions of iron or its derivative mixed with slag, and is generally encountered below the plant grade (i.e., El 10±).
- As the material is very hard, it is not possible to excavate the slag (at El +10±) with conventional earth moving equipment (such as hoes, dozers and pans, etc.). The slag will require the "rock-excavation" techniques such as "drill and blast" and with the use of rippers.
- The specific gravity of the "Hand Specimen" (which measured approximately 3-inch x 4-inch x3-inch in size) was about 6.4. The specific gravity of iron ranges from 7 to 8 and specific gravity of Quartz (which is a predominant component of sand) ranges from 2.5 to 2.8. This indicates that the slag from near the existing plant grade contains significant quantities of iron and therefore is heavier than "soil" type material.
- The use of this "heavy" slag in the stage construction of the dikes for the proposed DMCF, would require increased number of stages with thin lifts. The thickness of each lift will have to be reduced by less than half the thickness for a sand dike, as this slag material is twice as heavier. This would require additional time between stages for consolidation and strength gain, and thus increases the time for construction of the dikes by using the method of staged construction.
- Considering the fact that the Slag at the surface (and below El +10±) is very hard to dig and too heavy for use as a replacement for Sand, this slag material may not be a suitable alternative at this time.

7.2 Slag Fines in Stock Pile (above El +10+)

- The slag material contained in the stockpile in the southern portion of the site has the composition of "soil-type materials". While it was difficult to make a vertical excavation from the top of the stockpile, it is possible to excavate these materials by digging into the exposed surface of the sides. This material can be excavated with conventional earth moving equipment, with some difficult digging.
- These slag fines were noted to have a gradation similar to poorly graded sand and gravel.

- The specific gravity of the "Hand Specimen" (which measured approximately 3-inch x 4-inch x3-inch in size) of the slag fines material ranged from 2.1 to 3.1. The specific gravity of iron ranges from 7 to 8 and specific gravity of Quartz (which is a predominant component of sand) ranges from 2.5 to 2.8. This indicates that the slag fines from near the stock pile consist predominantly of "soil" type materials, with significantly less quantity of iron and therefore the weight of the slag fines is similar to that of "soil" type material.

- The bulk unit weight of the material, as determined by filling (loosely) into a 1-cubic foot container, of the slag fines material ranged from 90 pcf to 115 pcf.

- Therefore, the slag fines material from the stockpile can be used for construction of the dike for the proposed DMCF, utilizing the same number of lifts as that for a "soil" type material.

- However, as the slag fines are contained in the stockpiles above the plant grade (i.e., +10±), the quantity of material that is available for construction of the dike should be estimated. Based on preliminary approximate estimate, it appears that less than 400,000 cubic yard of slag fine is available at the site.

8.0 REMARKS

This investigation was performed to evaluate the feasibility of excavation and re-use of slag for the construction of dikes for the proposed DMCF. The evaluation presented herein is based on the limited data that was obtained from this investigation. Environmental testing of slag materials obtained during this investigation were performed by EA and is not included in this report.

We appreciate the opportunity to be of service to you on this project. If you have any questions, please call us.

Sincerely,

E2CR, Inc.

M. Surendra

M. Suri Surendra, Ph.D., P.E.
Senior Project Manager

Neeraj Singh

for Siva Balu, P.E.
CEO

E/2 C/R inc.

APPENDIX

Figure 1: Site Vicinity Map

Figure 2: Project Location Plan

Figure 3: Test Pit Location Plan

Photographs of Test Pits

Summary of Laboratory Test Results

Gradation Curves

Results of Specific Gravity Tests

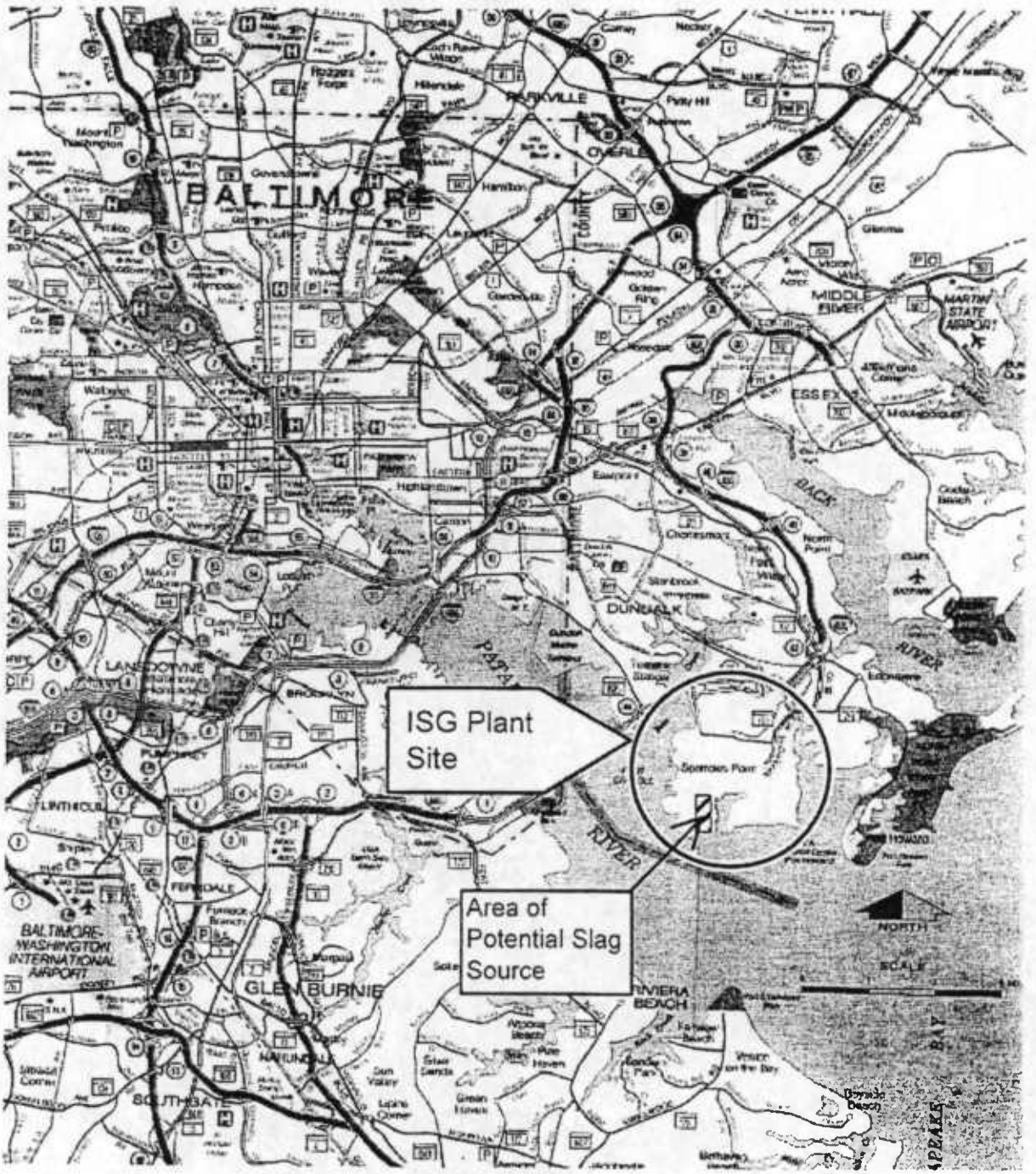
Test Pit Logs

E2CR inc.

Site Vicinity Map

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

FIGURE:	DRAWN BY:	CHECKED BY:
1		
DATE:	JOB NO.:	SCALE:
Jan-05	04520-04	Not To Scale



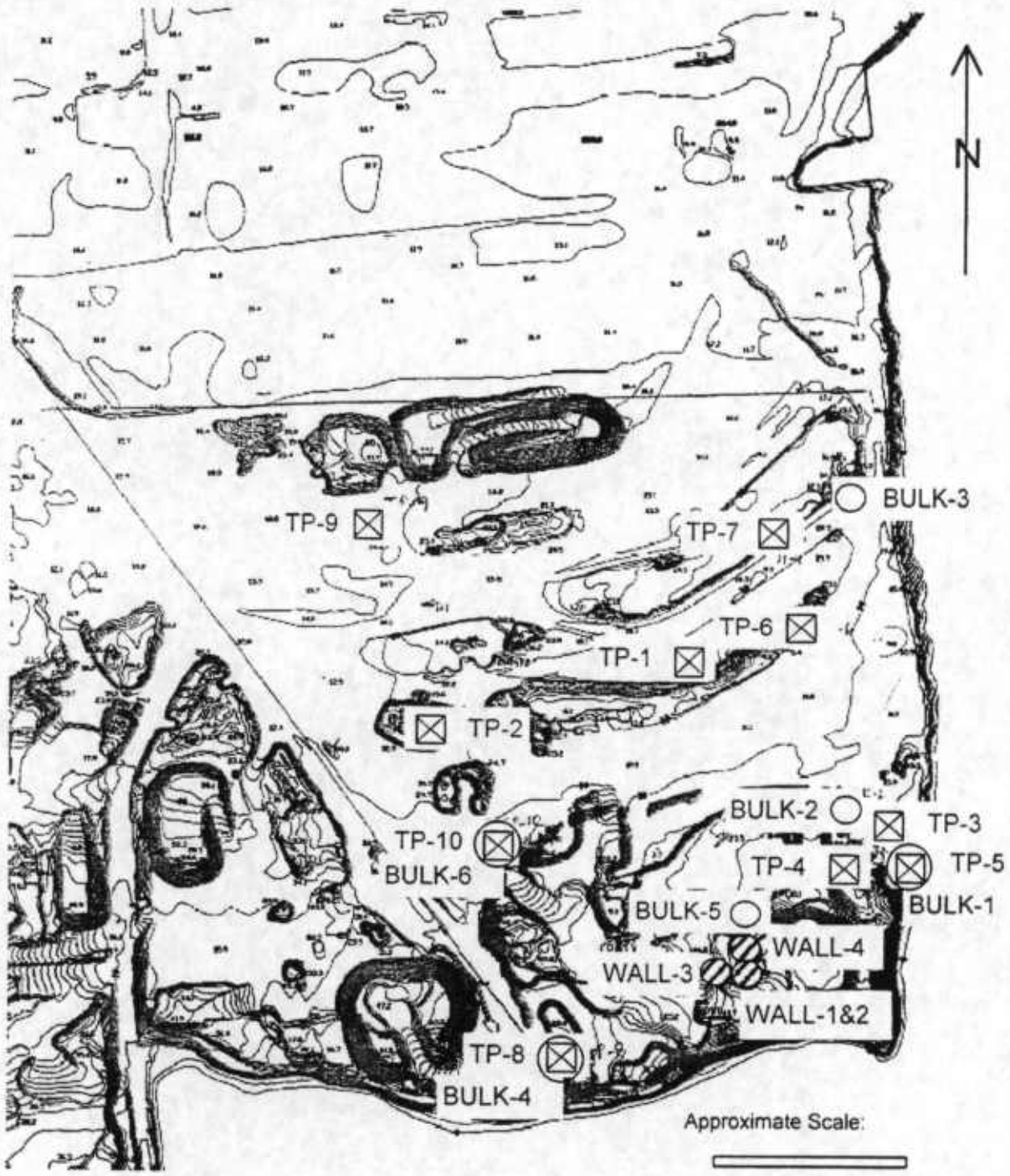
E2CR inc.

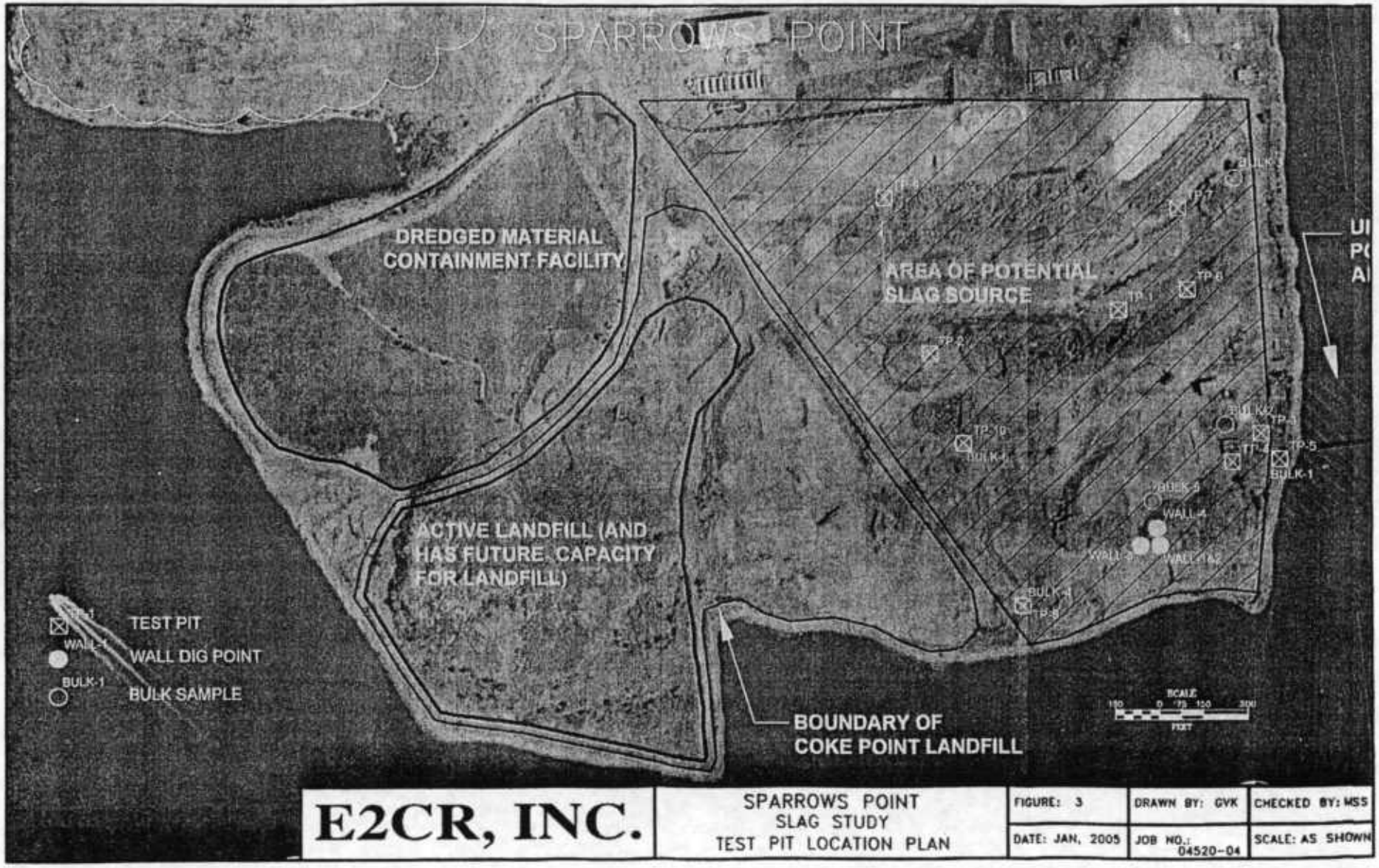
Project Location Plan

Sampling and Testing of Slag - ISG Plant Site

Sparrows Point, Maryland

FIGURE: 2	DRAWN BY:	CHECKED BY:
DATE: Jan-05	JOB NO.: 04520-04	SCALE: Not To Scale





E2CR, INC.	SPARROWS POINT SLAG STUDY TEST PIT LOCATION PLAN	FIGURE: 3	DRAWN BY: GVK	CHECKED BY: MSS
		DATE: JAN, 2005	JOB NO.: 04520-04	SCALE: AS SHOWN

E2CR inc.

Photographs of Test Pits

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
Jan-05	04520-04	

Stockpile of Slag Fines (WALL-4)

Excavatiopn of
Vertical Face

E2CR inc.

Photographs of Test Pits

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
Jan-05	04520-04	Page 2 of 4

Test Pit (TP-5) Adjacent to Water on East Side (from near El +10±)

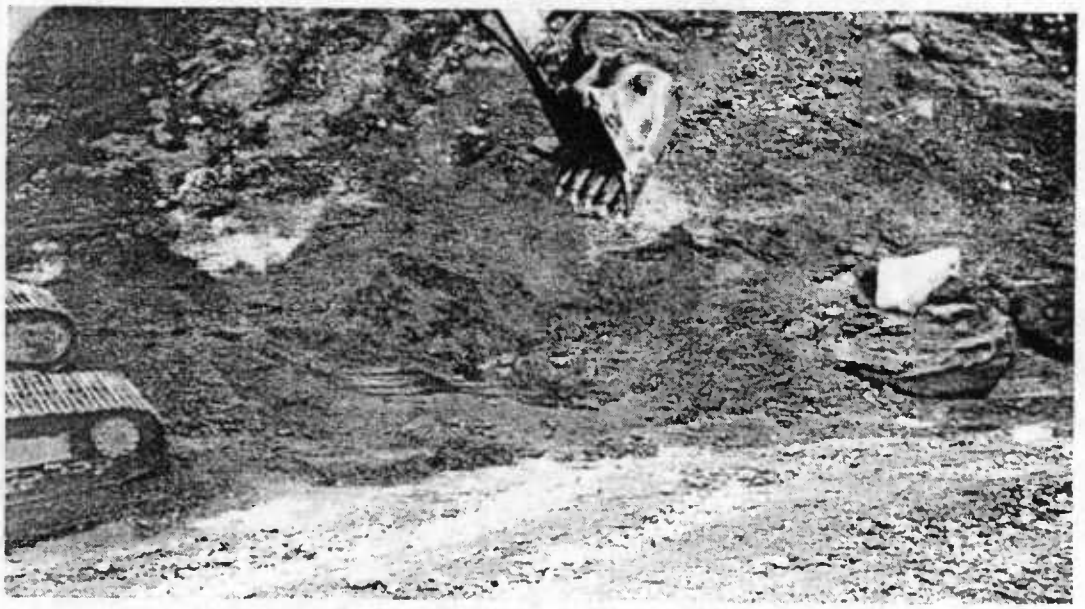
View of material from Test Pit (TP-5)

E2CR inc.

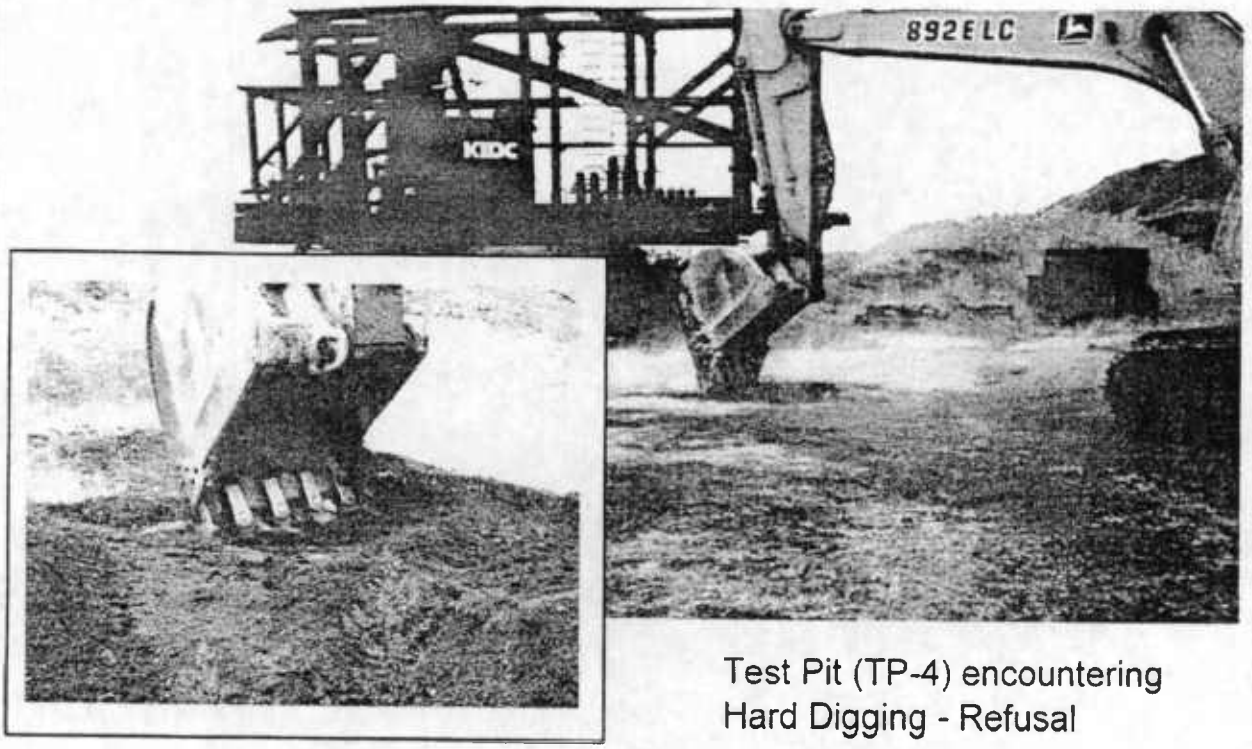
Photographs of Test Pits

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
Jan-05	04520-04	Page 3 of 4



Test Pit (TP-2) in South Central Portion from El +10+
Note - it could be extended to only about 2-feet to 3-feet



Test Pit (TP-4) encountering
Hard Digging - Refusal

E2CR inc.

Photographs of Test Pits

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
Jan-05	04520-04	Page 4 of 4

View of Slag Piles at Surface (near El +10±)
Note "SKULL" in the foreground

E/2C/R inc.

Summary of Laboratory Test Results

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

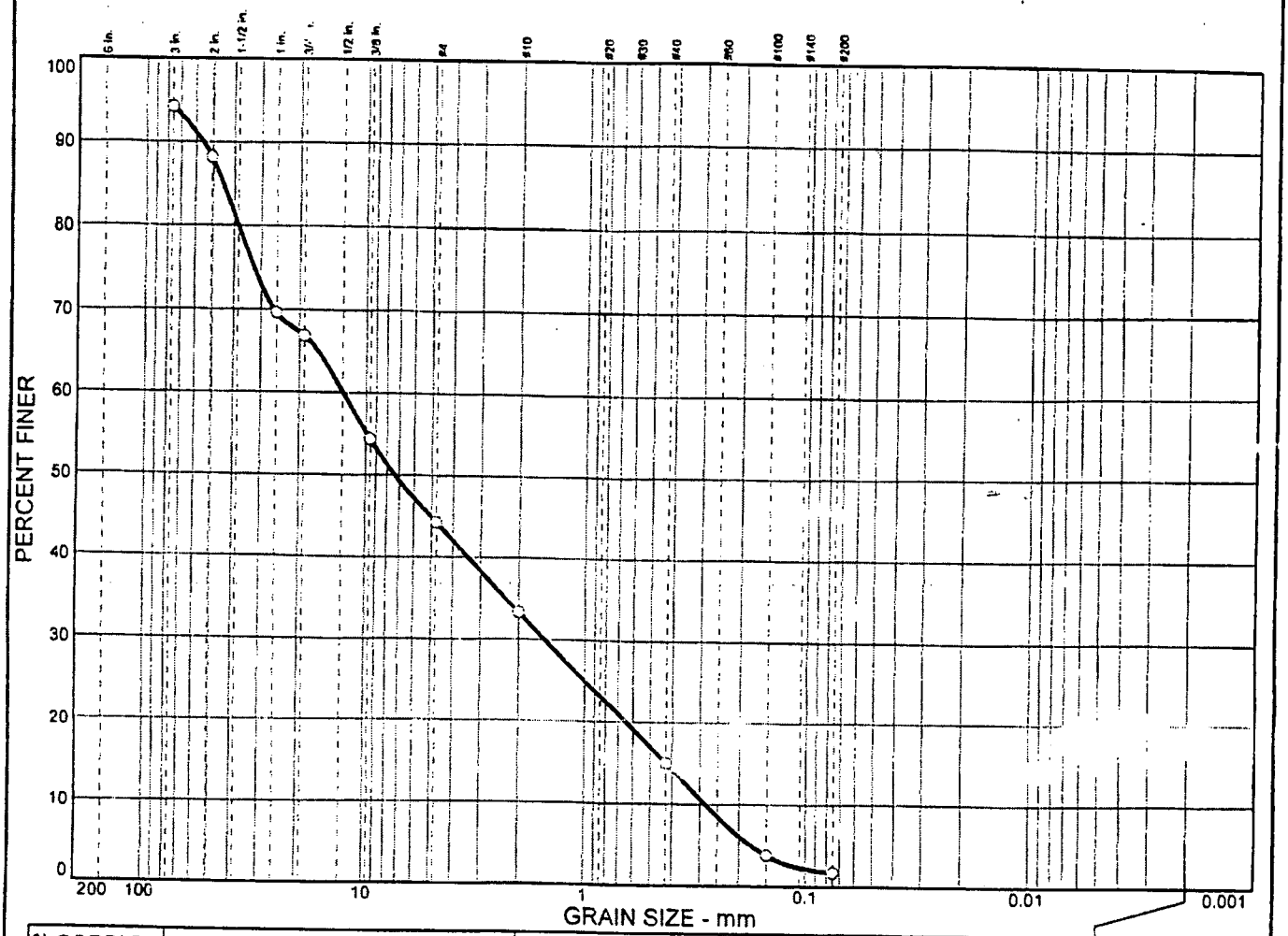
DATE:	JOB NO.:	Sheet 1 of 1
Jan-05	04520-04	

Sample	Location	Material Type	Natural Moisture Content, % 1	Specific Gravity of Slag 2	Estmated Maximum Dry Density of Slag, pcf 3	Bulk unit Weight, pcf 4	Angle of Repose, degrees 5	Specific Gravity of Slag Pieces 6	Modified Proctor Maximum Dry Density, pcf. 7	% Swell 8
BULK-1	TP-5	Slag	9.3	3.02	147	98.1	41	2.13		
BULK-2	Slag Pile @ El +10± near TP-3 and TP-4	Slag (Recent Pile)	11.6	3.40	152	114.2	41	2.94	156	0.4
BULK-3	Slag Pile @ El +10± near NE portion of site	Slag (Recent Pile)	9.2	3.04	148	102.2	43	2.45		
BULK-4	TP-8	Slag	11.5	3.24	147	104.7	40	3.13		
BULK-5	WALL-4	Slag Fines	11.4	3.05	141	89.6	39	2.00	142	0.2
BULK-6	TP-10	Slag	3.6	3.15	155	114.9	37	6.36		

Note:

1 -- Bulk Sample that contained predominantly less thatn 3" size aggregate
2 -- Slag Sample passing No. 4 Sieve (4.75 mm) size
3 -- Estimated (computed) Maximum Dry Density based on specific gravity of slag sample (-3" size)
4 -- Bulk (moist) Unit Weight measured by (loosely) filling a 1-cubic foot box (-3" size)
5 -- Angle of Repose of minus 3" material, measured in the laboratory
6 -- Specific Gravity of Slag Pieces (plus 3" size)
7 -- Modified Proctor maximum dry density
8 -- Swell measured after heating the compacted sample in the oven (at 110+50 C) for 24-hours

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	5.8	60.9	31.6	1.7	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	44.9	12.6	7.36	1.52	0.425	0.284	0.64	44.40

MATERIAL DESCRIPTION	USCS	AASHTO
○ Grayish Brown , Poorly graded Gravel, with Sand	GP	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** BULK# 1 TP-5 **Sample No.:** BULK # 1 **Elev./Depth:** 1' - 8'

Remarks:

○ Natural Moisture=9.3%

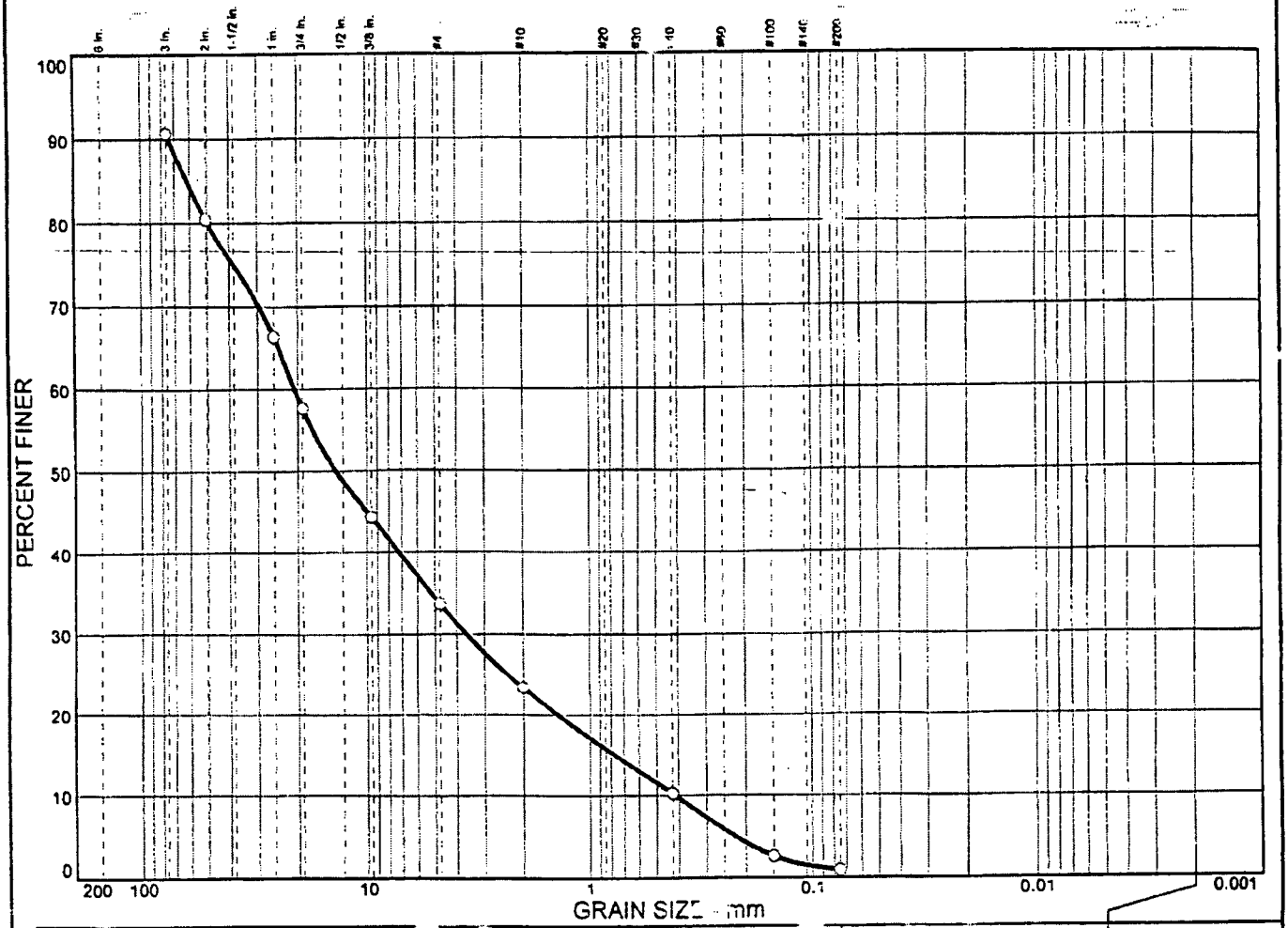
Specific gravity3.016

Particle Size Distribution Report

E2CR, Inc.

Figure No.

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	9.4	67.2	22.5	0.9	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	61.7	20.6	13.6	3.60	0.768	0.415	1.52	49.76

MATERIAL DESCRIPTION	USCS	AASHTO
○ Reddish brown, WEll graded Gravel, some Sand, trace Cobbles	GW	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** BULK # 2 **Sample No.:** BULK # 2 **Elev./Depth:** Middle Stockpile

Remarks:

○ Natural Moisture=11.6%

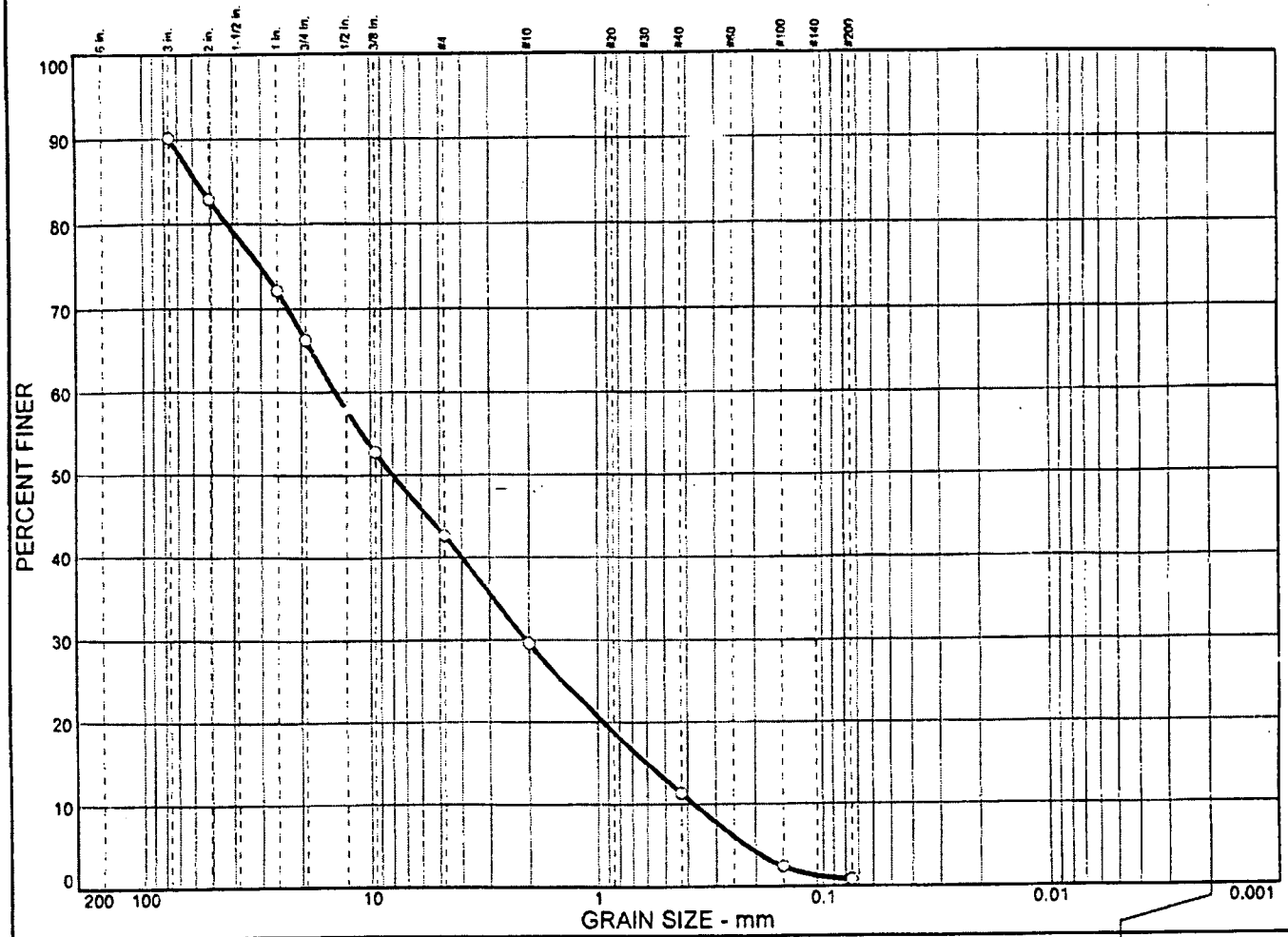
Particle Size Distribution Report

E2CR, Inc.

Specific gravity 3.404

Figure No.

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	9.9	60.5	28.8	0.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	57.8	14.1	8.02	2.06	0.603	0.375	0.80	37.67

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brownish Gray, Poorly graded Gravel, some Sand	GP	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** Bulk # 3 **Sample No.:** Bulk #3 **Elev./Depth:** NE Stockpile

Remarks:

○ Natural moisture= 9.2%

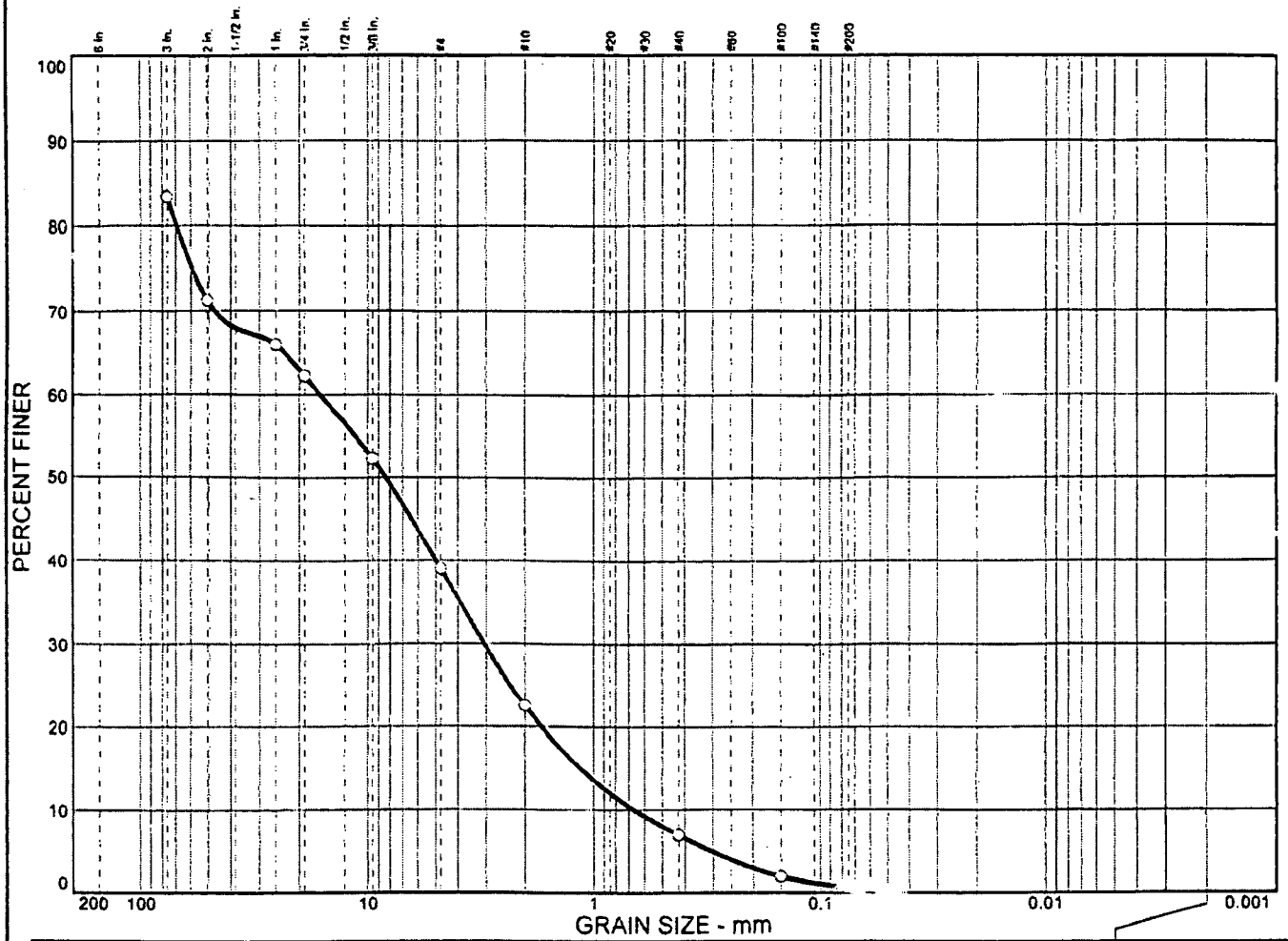
Specific gravity3.041

Particle Size Distribution Report

E2CR, Inc.

Figure No.

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	16.7	60.8	21.9	0.6	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
○	NP	NP		16.3	8.37	3.04	1.14	0.665	0.85	24.49

MATERIAL DESCRIPTION	USCS	AASHTO
○ Medium Gray, Poorly graded Gravel, some Sand, little Cobble	GP	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** BULK # 4 TP-8 **Sample No.:** BULK # 4 **Elev./Depth:** 9' - 11'

Remarks:

○ Natural Moisture=11.5%

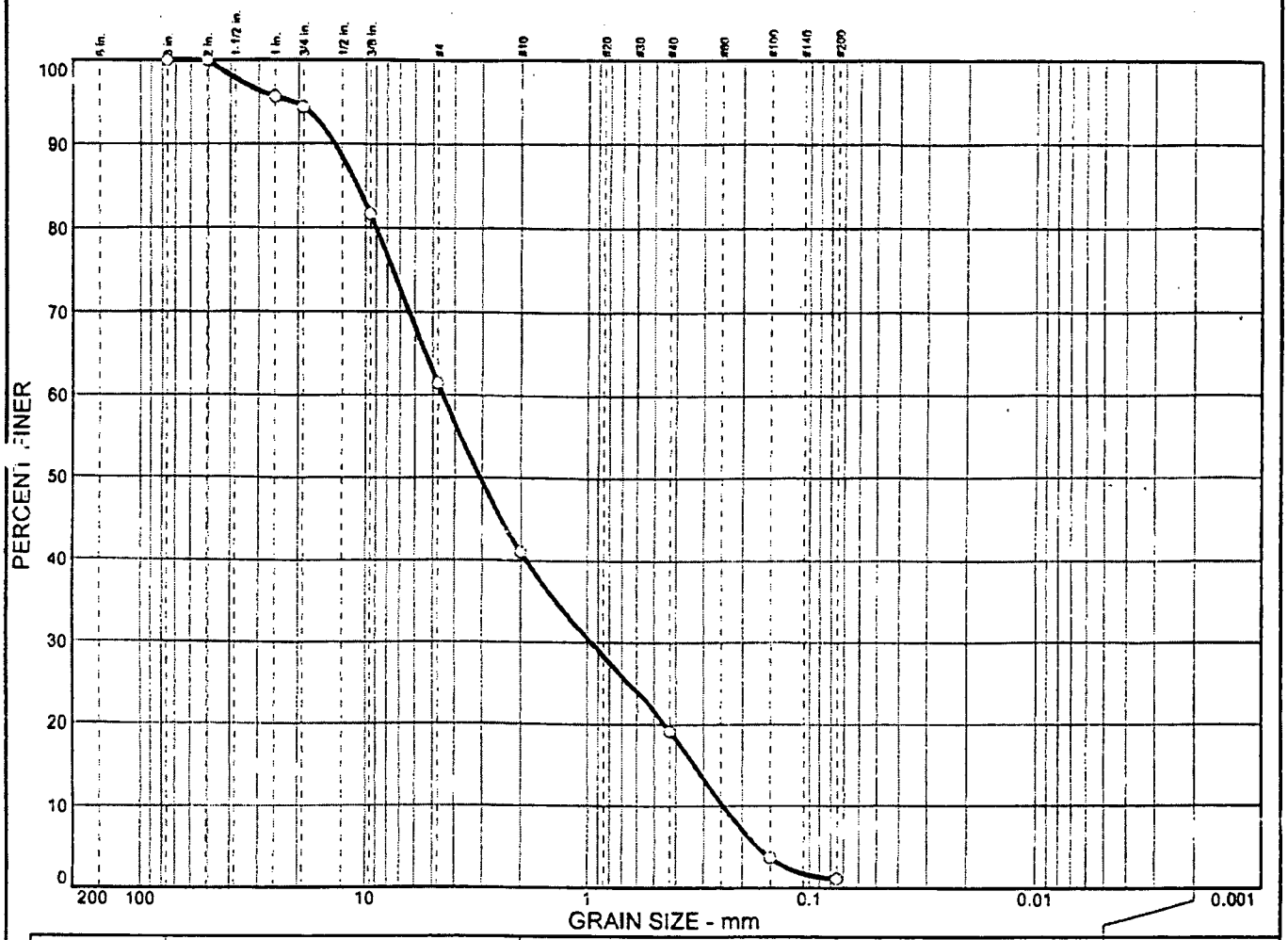
Specific gravity3.338

Particle Size Distribution Report

E2CR, Inc.

Figure No.

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	59.0	39.9	1.1	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	10.9	4.52	3.07	0.960	0.330	0.244	0.83	18.50

MATERIAL DESCRIPTION	USCS	AASHTO
○ Medium Gray, Poorly graded SAND, with Gravel	SP	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** BULK # 5 **Sample No.:** BULK # 5 **Elev./Depth:** Bottom of

Remarks:

○ Natural Moisture=11.4%

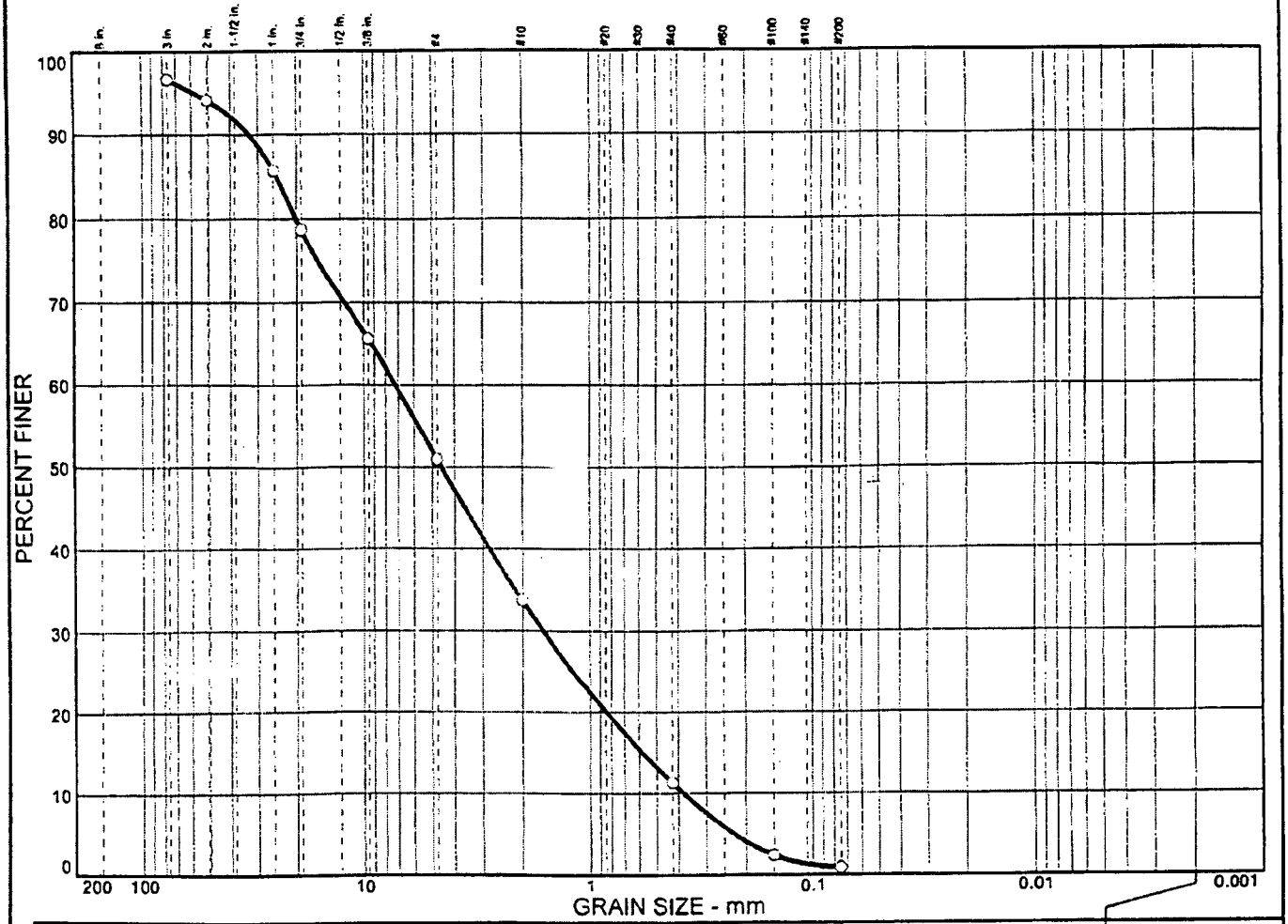
Specific gravity3.053

Particle Size Distribution Report

E2CR, Inc.

Figure No.

Particle Size Distribution Report



	% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
○	3.3	63.0	32.9	0.8	

	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	24.7	7.21	4.56	1.62	0.578	0.379	0.96	19.04

MATERIAL DESCRIPTION	USCS	AASHTO
○ Brownish Gray, Poorly graded SAND, with Gravel	SP	

Project No. 04520-04 **Client:** Phoenix

Project: Craighill Channel

○ **Source:** BULK # 6 TP- 10 **Sample No.:** BULK # 6 **Elev./Depth:** 1' - 7.5'

Remarks:

○ Natural Moistuer=8.6%

Specific gravity3.149

Particle Size Distribution Report

E2CR, Inc.

Figure No.

E2CR inc.

Results of Specific Gravity Tests

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
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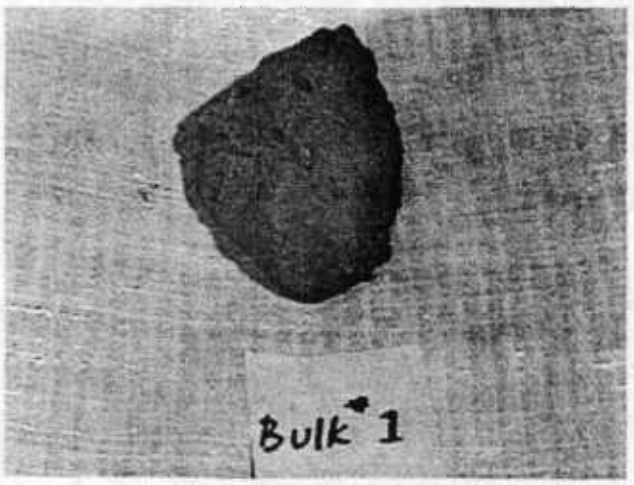
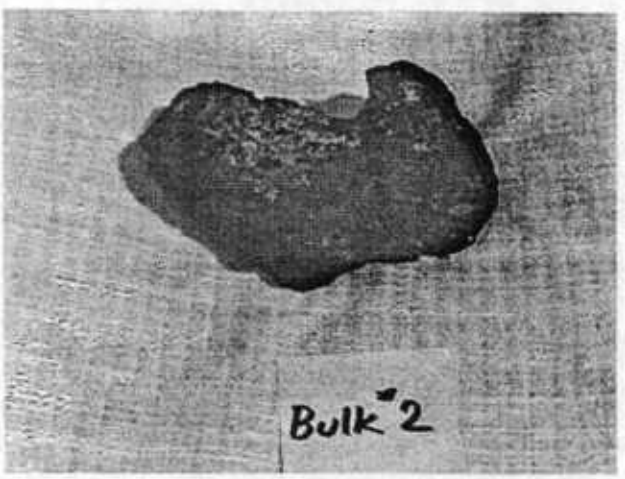
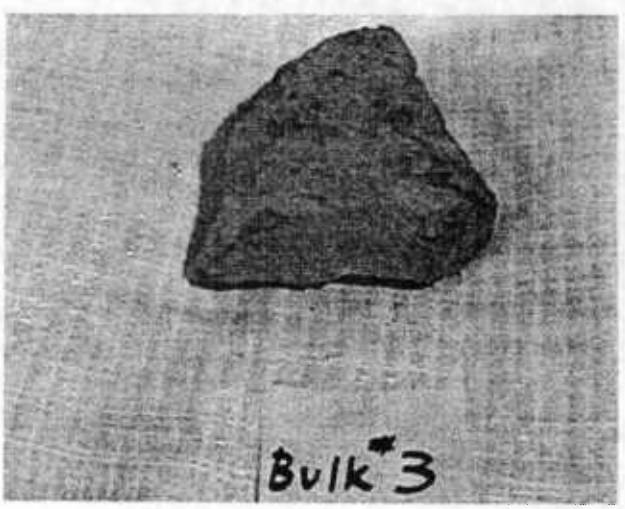


Specific Gravity of Slag Sample from BULK-1
Specific Gravity = 2.13



Specific Gravity of Slag Sample from BULK-2
Specific Gravity = 2.95



Specific Gravity of Slag Sample from BULK-3
Specific Gravity = 2.45

(Note: The size of the label is 3" x 3")

E2CR inc.

Results of Specific Gravity Tests

Sampling and Testing of Slag - ISG Plant Site
Sparrows Point, Maryland

DATE:	JOB NO.:	
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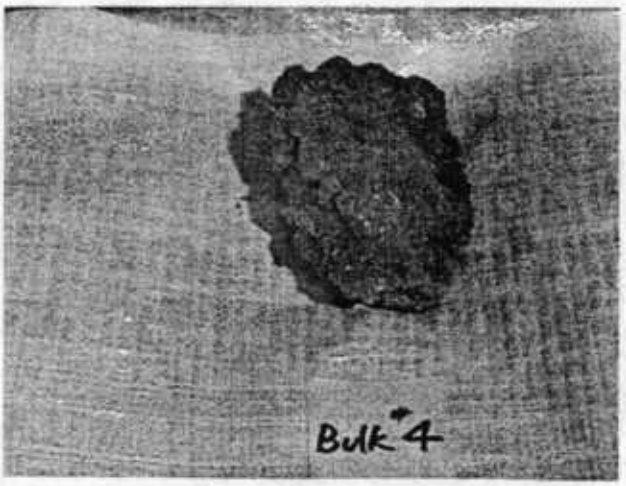
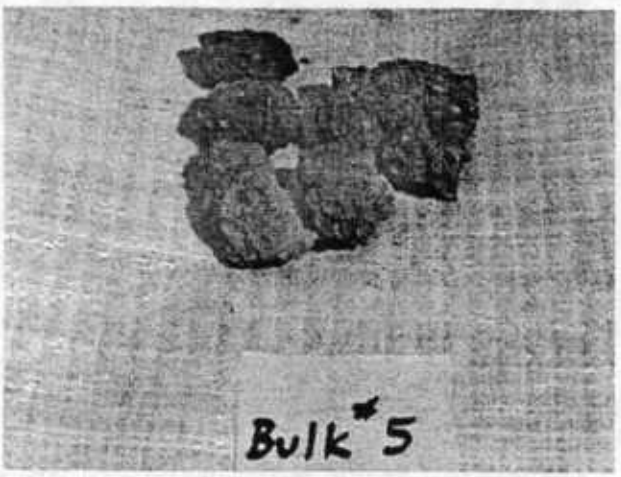
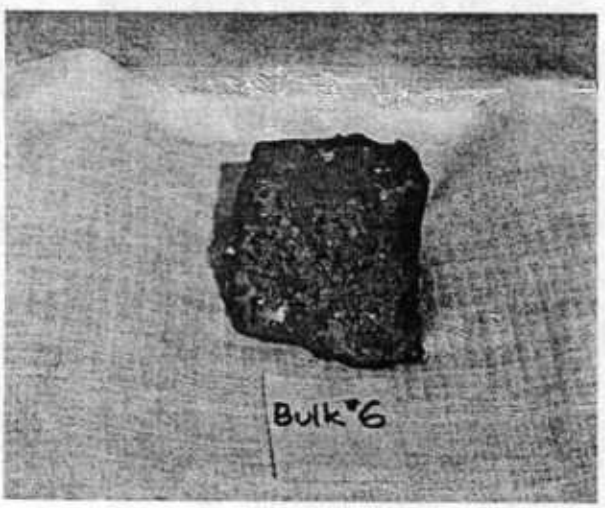


Specific Gravity of Slag Sample
from BULK-4
Specific Gravity = 3.13



Specific Gravity of Slag Sample
from BULK-5
Specific Gravity = 2.00



Specific Gravity of Slag Sample
from BULK-6
Specific Gravity = 6.36

(Note: The size of the label is 3" x 3")

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-1

Location: ISG Site, Sparrows Point, Maryland
Project No. : 04520-04

Location: N 560,938.7; E 1,457,568.7 Elev: +10± Date: 11/23/2004

Equipment: Hydraulic Excavator John Deere 892 ELC Inspector: C. Jacobs Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Dark grey Slag, with iron fragments	1.0			
	Refusal at 1' Bottom of Test Pit at 1'				
			5		
			10		
					* - Estimated from site topographic plan
					** - Not encountered with in the depth of the test pit
			15		

Remarks:

E2C/R inc.

Test Pit Log

Project:	Sampling & Testing of Slag		Test Pit No.: TP-2
Location:	ISG Site, Sparrows Point, Maryland		Project No. : 04520-04
Location:	N 560,783.3; E 1,456,924.1	Elev: +10±	Date: 11/23/2004
Equipment:	Hydraulic Excavator John Deere 892 ELC	Inspector: C. Jacobs	Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
	Reddish and dark brown, moist, Silty fine to coarse SAND and Slag fragments (SM to GM) with cobble (3" to 8") size and occasionsal boulder size (8" to <2') size Slag fragments	3.0	0		Very hard digging from 0' to 3'
	Refusal at 3' Bottom of Test Pit at 3'		5		
			10		* - Estimated from site topographic plan
			15		** - Not encountered with in the depth of the test pit

Remarks:

E2CR inc.

Test Pit Log

Project:	Sampling & Testing of Slag		Test Pit No.: TP-3
Location:	ISG Site, Sparrows Point, Maryland		Project No. : 04520-04
Location:	N 560,506.3; E 1,458,051.3	Elev: +10±	Date: 11/23/2004
Equipment:	Hydraulic Excavator John Deere 892 ELC	Inspector: C. Jacobs	Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Dark grey Slag, with iron fragments –	1.0			
	Refusal at 1' Bottom of Test Pit at 1'				
			5		
			10		
					* - Estimated from site topographic plan
			15		** - Not encountered with in the depth of the test pit

Remarks:

E2C/R inc.

Test Pit Log

Project:	Sampling & Testing of Slag		Test Pit No.: TP-4
Location:	ISG Site, Sparrows Point, Maryland		Project No. : 04520-04
Location:	N 560,404.6; E 1,457,957.4	Elev: +10±	Date: 11/23/2004
Equipment:	Hydraulic Excavator John Deere 892 ELC	Inspector: C. Jacobs	Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
	Dark grey Slag, with iron fragments	1.0	0		
	Refusal at 1' Bottom of Test Pit at 1'		5		
			10		* - Estimated from site topographic plan
			15		** - Not encountered with in the depth of the test pit

Remarks:

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-5
Location: ISG Site. Sparrows Point, Maryland
Project No. : 04520-04
Location: N 560,415.6; E 1,458,114.8
Elev: +10±
Date: 11/23/2004
Equipment: Hydraulic Excavator John Deere 892 ELC
Inspector: C. Jacobs
Groundwater: 8'

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Brown, moist, Silty fine to coarse SAND and Slag with refractory bricks and occasional boulder (8" to <2') size fragments (SM to GM)				Moderate digging from 0' to 3'-
					Very hard digging from 3' to 9'
			5		Bulk # 1 obtained from 1' to 7.5'
		7.0			
	Black and grey , moist to wet fine to coarse SAND and Slag fragments				Groundwater encountered at 8'
		9.5			Very hard digging below 9'
	Bottom of Test Pit at 9.5'		10		Test pit terminated at 9.5' due to caving of sides and very hard digging below 9.5'
					* - Estimated from site topographic plan
			15		

Remarks:

Groundwater encountered at a depth of 8' at the time of excavation
EA obtained one sample above groundwater level and one sample below groundwater level from this test pit
Bulk # 1 obtained from this test pit from 0' to 7.5'

E2CR inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-6

Location: ISG Site, Sparrows Point, Maryland
Project No. : 04520-04

Location: N 561,010.5; E 1,457,804.4 Elev: +10± Date: 11/23/2004

Equipment: Hydraulic Excavator
John Deere 892 ELC
Inspector: C. Jacobs
Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Black and brown, moist, Silty fine to fine to coarse SAND and Slag fragments (SM to GM) with cobble (3" to 8") size and occasionsal boulder size (8" to <2') size Slag fragments	3.0			Moderate digging from 0' to 2.5' Very hard digging below 2.5'
	Refusal at 3' Bottom of Test Pit at 3'				
			5		
			10		
					* - Estimated from site topographic plan
					** - Not encountered with in the depth of the test pit
			15		

Remarks:

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-7
Location: ISG Site, Sparrows Point, Maryland
Project No. : 04520-04
Location: N 561,293.9; E 1,457,771.4
Elev: +10±
Date: 11/24/2004
Equipment: Hydraulic Excavator John Deere 892 ELC
Inspector: C. Jacobs
Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Dark grey Slag, with iron fragments	1.0			
	Refusal at 1' Bottom of Test Pit at 1'				
			5		
			10		
					* - Estimated from site topographic plan
					** - Not encountered with in the depth of the test pit
			15		

Remarks:

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-8
Location: ISG Site, Sparrows Point, Maryland
Project No. [illegible]520-04
Location: N 559,894.7; E 1,457,243.9
Elev: +10±
Date: 11/24/2004
Equipment: Hydraulic Excavator John Deere 892 ELC
Inspector: C. Jacobs
Groundwater: 8'

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Reddish and dark brown, moist, Silty fine to coarse Slag fragments and Sand (GM) with cobble (3" to 8") size and occasionsal boulder size (8" to <2') size Slag fragments				Moderate digging from 0' to 9'
			5		
		9.0			Hard digging below 9'
	Greyish brown, moist to wet Silty fine to coarse SAND and Slag (SM to GM) with cobble (3" to 8") size Slag fragments	11.0	10		Bulk # 4 obtained from 9' to 11' Groundwater encountered at 10.5'
	Refusal at 11' Bottom of Test Pit at 11'				
			15		* - Estimated from site topographic plan

Remarks:

Groundwater encountered at a depth of 10.5' at the time of excavation
Bulk # 4 obtained from this test pit from 9' to 11'

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-9

Location: ISG Site, Sparrows Point, Maryland
Project No. : 04520-04

Location: N 561,328.7; E 1,456,763.6 Elev: +10± Date: [illegible]4/2004

Equipment: Hydraulic Excavator John Deere 892 ELC
Inspector: C. Jacobs
Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Dark grey Slag, with iron fragments	1.0			
	Refusal at 1' Bottom of Test Pit at 1'				
			5		
			10		
					* - Estimated from site topographic plan
			15		** - Not encountered with in the depth of the test pit

Remarks:

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag
Test Pit No.: TP-10

Location: ISG Site, Sparrows Point, Maryland
Project No. : 04520-04

Location: N 560,470.3; E 1,457,043.9 Elev: +10± Date: 11/24/2004

Equipment: Hydraulic Excavator John Deere 892 ELC Inspector: C. Jacobs Groundwater: None **

Elev.	Description	Depth feet	Scale	Sample No.	Notes
			0		
	Reddish and dark brown, moist, Silty fine to coarse SAND and Slag fragments (SM to GM) with cobble (3" to 8") size and occasionsal boulder size (8" to <2') size Slag fragments	3.0			Hard digging from 0' to 7.5'
			5		
	Refusal at 7.5' Bottom of Test Pit at 7.5'				Very hard digging below 7.5', test pit could not be extended laterally because of hard slag
			10		
					* - Estimated from site topographic plan
			15		** - Not encountered with in the depth of the test pit

Remarks:

E2C/R inc.

Test Pit Log

Project: Sampling & Testing of Slag — Wall Dig Points : WALL-1 to WALL-4

Location: ISG Site, Sparrows Point, Maryland — Project No. : 04520-04

Location: See Below — Elev: +20± to EL +60± * — Date : 11/24/2004

Equipment: Hydraulic Excavator John Deere 892 ELC — Inspector: C. Jacobs — Groundwater: None **

Elev.	Description				Notes
	Grey fine to coarse SAND, trace Gravel sized processed SLAG material in the stockpile.				While this material could not be excavted from top of the stockpile, it was possible to excavate the exposed vertical face (about 10-feet to 20-feet)
					Generally diggable with excvator with some hard digging
	LOCATIONS				
	WALL-1 N 560,109.80; E 1,457,707.18				
	WALL-2 N 560,109.80; E 1,457,707.18				
	WALL-3 N 560,109.45; E 1,457,644.20				
	WALL-4 N 560,170.46; E 1,457,698.96				Bulk # 5 obtained from 3' to10'
					* - Estimated from site topographic plan
					** - Not encountered with in the depth of the test pit

Remarks:

Bulk # 5 obtained from WALL-4 from 3' to 10' below top of stockpile

Test Pit Log

Project:	Sampling & Testing of Slag	Bulk Samplese :	BULK-1 to BULK-6
Location:	ISG Site, Sparrows Point, Maryland	Project No. :	04520-04
Location:	See Below	Elev: +10±	Date: 11/23/2004 & 11/24/04
Equipment:	Hydraulic Excavator John Deere 892 ELC	Inspector: C. Jacobs	Groundwater: None **

Sample No	From	Material Type	Location
BULK-1	TP-5	Slag	N 560,415.6; E 1,458,114.8
BULK-2	Slag Pile @ El +10± near TP-3 and TP-4	Slag (Recent Pile at the surface near El +10±)	N 560,536.0; E 1,457,933.0
BULK-3	Slag Pile @ El +10± near NE portion of site	Slag (Recent Pile at the surface near El +10±)	N 561,399.4; E 1,457,964.3
BULK-4	TP-8	Slag	N 559,894.7; E 1,457,243.9
BULK-5	WALL-4	Slag Fines	N 559,894.7; E 1,457,243.9
BULK-6	TP-10	Slag	N 560,470.3; E 1,457,043.9

Remarks:

MPA Comments: Evaluation of Slag from the ISG-Sparrows Pt Facility as a Construction Material for Dike Building in Baltimore Harbor – *February 2005*

Section	Page	Para.	Statement	Comment
Report				
1. Intro	1	First	Correct spelling of McLaren/Hart (here and in bibliography).	
"	"	bullets	Latin name for sheepshead minnow is mis-spelled in last bullet.	
2. Methods	2	First	First paragraph would be a good place to refer to a location map and sampling map, perhaps like E2CR's Figures 1, 2 and 3 in Appendix C.	
"	"	"	Were the EA samples collected in the same general vicinity as the E2CR samples? E2CR's sampling area was west of Sparrows Point Channel, rather than east of the channel as noted in line 2.	
3.1 Results	6	First	This is the first occurrence of the sample codes (e.g., ISG-FRESH, ISG-BWT, etc). Please add a sentence to explain that BWT is "Below Water Table" etc.	
3.2 Leachate	6		If we are mentioning here that two of the samples exceeded the copper chronic criteria, shouldn't we also state that one sample exceeded the copper acute criterion? Or are we skipping mention of the ISG-FRESH sample for copper because it was a non-detect?	

3.2 Leachate	6		As the text paragraph is written, I assumed the only exceedences were the two samples for chronic copper, because they were the only exceedences mentioned in text. But, Table 3-2 suggests additional possible exeedences of the chronic criteria for nickel, and exceedences of the acute criteria for nickel and silver. Exceedence of the acute criteria would appear to be more serious than exceedences of the chroinic criteria, and worthy of being discussed in text. Is this a non-detect issue? If so, may be worthy of a brief explanation in the next chapter.	
Table 3-2			The ISG-FRESH sample for copper includes a lower case "c" footnote, but I don't see a corresponding explanation for lower case "c" at the bottom of the table.	
3.3 Elutriate			Similar question on this table: several of the non-detects have been footnoted to indicate exceedence of acute or chronic criteria. Do these merit some discussion regarding how the reporting limits are higher than the criteria, so we can't really be sure we are in the clear? Could the reporting limits have been lowered?	
4 Conclusions	9	First	It would be good if we could put the results of the bulk slag analyses into some context. Perhaps a comparison with sediment criteria, where available, or with background soil concentrations?	
4 Conclusions	9		Conclusions chapter may need a bit more discussion of the above issues – ie, are we really confident that we had no exceedences of acute criteria, or are potential problems being masked by reporting limits that are high relative to the criteria.	