Final
Five-Year Review Report

Pepper's Steel and Alloys Site
Medley, Dade County, Florida

Prepared Under:
Contract No. 68-W-99-043

For The
U.S.Environmental Protection Agency
Waste Management Division
Region IV

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Contents

Contents (Continued)

Tables

Figures

Attachments

1.0 Introduction

Remedial actions were implemented at the Pepper's Steel and Alloys (PSA) site between March 1987 and January 1989 as a result of the Enforcement Decision Document (HDD) [similar to the current Record of Decision (ROD) document] approved on March 12, 1986 (Attachment A, 1). An HDD was needed based on the culmination of regulatory actions which occurred at the PSA site between 1978 and 1983 including the addition of the PSA site to the National Priorities List (NPL) in September 1984 (Attachment A, 25).

The U.S. Environmental Protection Agency, Region 4, has conducted a second, policy, five-year review of the remedial actions implemented at the PSA site in Medley, Dade County, Florida. This report documents the results of the review which was initiated in July 1999. Black & Veatch Special Projects Corp. (Black & Veatch) as a contractor has provided support for this Five-Year Review Report as specified in the EPA statement of work (SOW) for the Five-Year Review at the PSA site dated July 12,1999, and the July 29,1999, scoping meeting for the site.

The purpose of the five-year reviews has been to determine whether the remedy for the site is protective of human health and the environment. The methods of determination, findings, and conclusions of the review are incorporated into a five-year review report as well as any deficiencies noted and recommendations to address the deficiencies.

Pursuant to the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), section 121(c), and Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substances Contingency Plan (NCP), a statutory five-year review is required for remedial actions selected on or after October 17, 1986. The EPA Office of Solid Waste and Emergency Response (OSWER) requires that Directive 9355.7-02 be followed which requires that a "policy five-year review" be conducted for the following: 1) for remedial actions selected before October 17,1986, which do not allow unlimited use and unrestricted exposure, 2) for post-SARA remedies, that take more than 5 years to implement, or 3) removal-only sites where hazardous substances remain onsite at levels, that will not allow unlimited use and unrestricted exposure. A "policy five-year review" has been conducted at this site because it has a pre-SARA remedy which does not allow unlimited use and unrestricted exposure. Policy reviews are due every 5 years after the site has achieved construction completion.

As indicated earlier, this is the second five-year review for the PSA site. EPA completed the first five-year review with the support of Roy F. Weston, Inc., in April 1994. The triggering action of this policy review is the date of approved remedial action construction completion in August 1989.

2.0 Site Chronology

Included in Table 2-1 is a listing of all important site events and relevant dates for the PSA site. A list of the documents reviewed in preparation of this five-year review report are included in Attachment A.

Table 2-1
Chronology of Site Events
Pepper's Steel and Alloys Site
Medley, Dade County, Florida

Event	Date(s)
Department of Environmental Resources Management (DERM) citation issuance with subsequent sampling and evaluation of nearby wells by DERM and Edward E. Clarke, Engineers and Scientists, Inc.	1978
EPA Discovery	February 1, 1980
DERM test pit exploration documenting presence of oil containing PCBs in shallow subsurface material.	1982
EPA regional attorney assigned	June 1, 1983
EPA site investigation and PCB removal through NUS Corporation.	July 18, 1983 to September 2, 1983
Proposal to NPL Listing.	September 8, 1983
EPA Combined Remedial Investigation/Feasibility Study.	February 22, 1984 to March 12, 1985
EPA Site Inspection.	June 1, 1984
EPA Preliminary Assessment.	September 1, 1984
Final listing on NPL.	September 21, 1984
EPA remedial design/remedial action (RD/RA) negotiations.	February 15, to November 15, 1986
Remedial design conducted by environmental firm retained by potentially responsible parties (PRPs) of the site.	March 1 to October 30, 1986
EPA Enforcement Decision Document (EDD) [similar to Record of Decision (ROD)].	March 12, 1986
Monitoring well program design conducted by different firm retained by the PRPs of the site.	Completed January 1987
Concern lodged by Department of Justice (DOJ).	February 11, 1987
EPA Consent Decree.	March 2, 1987
Remedial action site cleaning activities to remove all surface debris and trash prior to construction activities	Early March to May 1987
Remedial action construction activities.	May 1987 to January 1989

EPA Final inspection of remedial action construction activities.	January 12, 1989
EPA Administrative Records.	May 31, 1989
PRP "as built" construction drawing including survey information and Final Remedial Action Report.	June 26, 1989
EPA Proposed Operations and Maintenance (O&M) Plan.	July 1989
EPA notification of adequate completion of Remedial Action Work Plan remedy	August 1989
EPA Removal Assessment.	September 30, 1991
EPA Integrated Assessment	November 10, 1993
First Policy Five-Year Review.	January 31, 1992 to September 23, 1994
Agreement (lodged by DOJ) between EPA and property owners that provided limited funds for O&M at PSA site.	July 10, 1997

3.0 Background

3.1 Physical Characteristics

The PSA site is located in Medley, Dade County, Florida. The site consists of a 30-acre area located near the eastern border of Medley which is located on U.S. Highway 27 or Okeechobee Road and southwest of the Miami Canal which runs parallel to Okeechobee Road. More specifically, the site is bordered by Northwest South River Drive on the east, by formerly Miami Battery (now Millennium Battery) to the north, Northwest 109th Street to the south, and railroad tracks and limestone quarries to the west. A vicinity map showing the general location of the PSA site is presented as Figure 3-1.

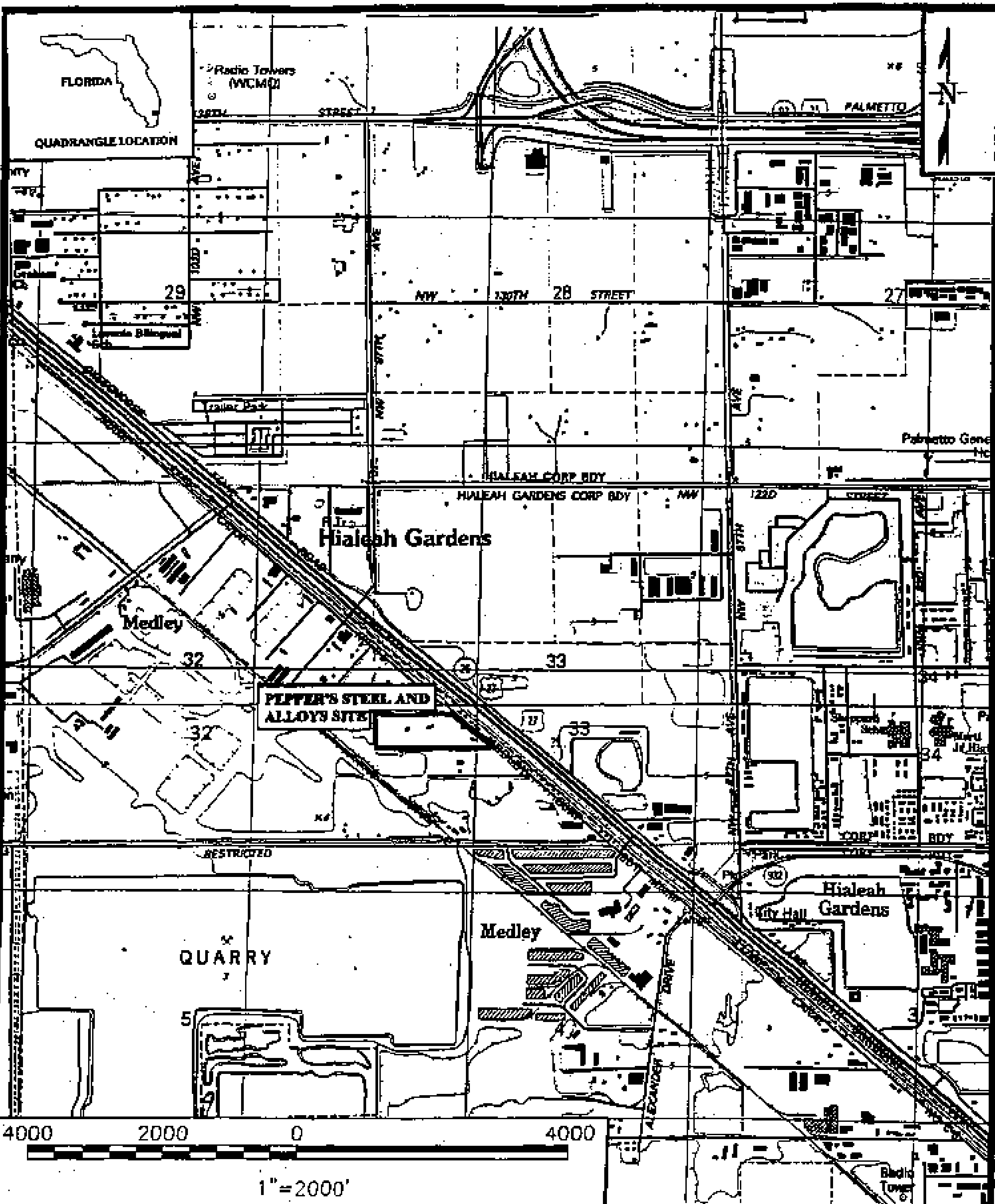
The PSA site includes an 11-acre cement-flyash monolith that has an elevation of about 13 feet above mean sea level (amsl) at its highest point, compared to natural elevations in the area of approximately 5 feet amsl. The monolith is composed of the soil remaining after contaminated soil greater than or equal to 1 part per million (ppm) PCB, 1,000 ppm lead, and 5 ppm arsenic was removed. This soil was mixed with cement/flyash and placed on site. The monolith is the only remaining source on site. The monolith is surrounded by a drainage collar, and there is a 12-inch layer of crushed limestone rock on top of the monolith. There are also several monitoring wells with stickup covers located on top and at the edges of the monolith. Additionally, during the site inspection for this five-year review, the top of the monolith was covered in vegetation consisting primarily of Australian pines of up to 30 feet in height. A site layout map, including existing monitoring well locations, is shown on Figure 3-2.

The neighborhood surrounding the PSA site is heavily comprised of industrial and commercial business properties, and therefore, is assumed to be located within a moderately populated area during business hours. Area groundwater supplies all of Dade County's water via municipal and private wells. Groundwater in the vicinity of the site is located within the Biscayne Aquifer which serves as the drinking water source for all of southeast Florida through private and municipal wells. The Miami Canal is an environmentally sensitive area with regard to benthic organisms that indirectly receives runoff from the site. The canal is located north of the site and eventually flows into the Atlantic Ocean.

3.2 Land and Resource Use

The PSA site has been used by several business since the mid-1960s. These businesses include manufacturers of batteries, precast concrete products, and fiberglass boats, a truck and heavy equipment repair business, a sandblasting and painting service, a concrete batching plant, and an automobile scrap operation. The PSA site is not active as evidenced by the vegetation on top of the monolith.

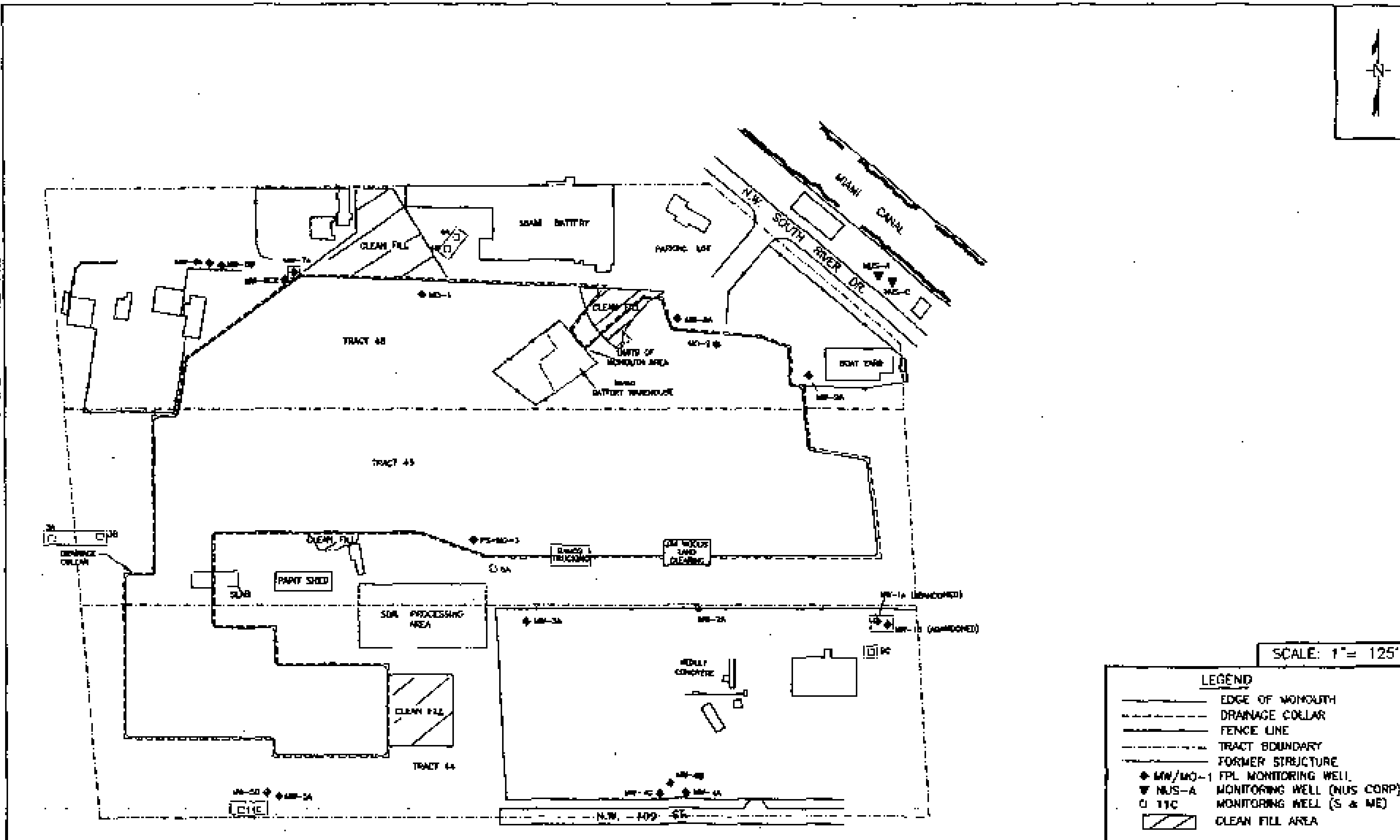
Currently, land use in the neighborhood surrounding the PSA site consists primarily of industrial and commercial business properties. Businesses near the site include dock-level warehouses and a storage facility for stackable containers used in the overseas shipping industry. Projected land use for the surrounding area most likely will include businesses similar to those currently found in the area.



SOURCE: BASE MAP IS A PORTION OF THE USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP FOR HIALEAH, FL

SITE LOCATION MAP
PEPPER'S STEEL and ALLOYS SITE
MEDLEY, DADE COUNTY, FLORIDA

FIGURE
3-1



PEPPER'S STEEL AND ALLOYS SITE
MEDLEY, DADE COUNTY, FLORIDA

SITE LAYOUT MAP

FIGURE 3-2

Natural resources in the area include groundwater and surface water. As indicated earlier, groundwater in the vicinity of the site is used for drinking water purposes via private and municipal wells. Surface water from the Miami Canal, located north of site, reportedly provides a significant amount of recharge to municipal well fields downstream of the site.

3.3 History of Contamination

As indicated earlier, the PSA site has been used by several business since the mid-1960s. Trash and waste products that have been deposited at the site are the result of past facility activities and include parts of rusted machinery, vehicles, and aircraft, oil tanks, transformers, underground storage tanks, and batteries (Attachment A,1). Subsequent to an immediate removal upon discovery of oils containing PCBs at the site in 1983 by EPA, the remaining soil and deposited waste material was remixed with cement/flyash and placed on site in the form of a monolith as part of a remedial action in 1989. This monolith, which covers approximately 11 acres of the 30-acre site, was then covered by approximately 12 inches of crushed limestone (Attachment A, 4).

The first regulatory action noted by EPA at the PSA site was a citation issued in 1978 by the Dade County Department of Environmental Resources Management (DERM) and the subsequent sampling and evaluation of nearby wells by DERM and Edward E. Clarke, Engineers and Scientists, Inc (Attachment A,1). The PSA site was placed on the EPA discovery list February 1,1980 (Attachment A, 25). Further evaluation of the site by DERM occurred in the form of test pit exploration in 1982 which documented the presence of oil containing PCBs in the shallow subsurface materials (Attachment A, 1). An EPA regional attorney was assigned to the site June 1, 1983 (Attachment A, 25). The detection of PCBs at the site precipitated a site investigation by the EPA through its contractor, NUS Corporation, and an immediate removal by EPA which were conducted from July 18 through September 2,1983. The PSA site was proposed for addition to the NPL, September 8,1983 (Attachment A, 1).

From February 22, 1984, through March 12, 1986, EPA conducted a Remedial Investigation/ Feasibility Study (RI?FS). During this time EPA conducted a site inspection at the site on June 1, 1984, and an EPA preliminary assessment of the site was conducted September 1,1984 (Attachment A, 25). Contaminants identified during the RI?FS within the soil, sediment, and groundwater in and around the site included PCBs; several other organic compounds; and several heavy metals including lead, arsenic, cadmium, chromium, copper, manganese, mercury, zinc, and antimony. PCB-contaminated oil was detected in the groundwater. Additionally, the Endangerment Assessment portion of the final RI report identified PCBs, lead, and arsenic in onsite soils at concentrations high enough to pose a significant threat to public health, welfare, and the environment (Attachment A, 1). The PSA site was included as a final listing on the NPL on September 21, 1984 (Attachment A, 25).

Between February 15, 1985, and November 15, 1986, EPA conducted remedial design/remedial action (RD/RA) negotiations with the potentially responsible parties (PRPs) at the PSA site. From March 1 through October 30,1986, an environmental firm, QualTec, Inc., retained by the PRPs conducted a remedial design for the site (Attachment A, 4, 25).

On March 12, 1986, an Enforcement Decision Document (EDD) for the PSA site was approved by the EPA Regional Administrator. The selected alternative for addressing site contamination included implementation of the following: 1) the collection of all free oil and disposal offsite according to the Toxic Substance Control Act (TSCA) regulations; 2) the excavation of soils exceeding 1 ppm PCBs. 1,000 ppm lead, and 5 ppm arsenic; 3) the solidification/stabilization of these soils with a cement-type mixture and placement on site; 4) the establishment of institutional controls to ensure future land use compatible with the remedy; and 5) monitoring of the effectiveness of the remedy (Attachment A, 1).

In January 1987, a monitoring well program design was completed by GeoTrans, Inc., retained by the PRPs (Attachment A, 2). On March 2, 1987, a consent decree was established for the PSA site between EPA and the PRPs (Attachment A, 25). In early March 1987, site cleaning activities began at the PSA site to remove all surface debris and trash prior to construction activities. Construction activities began at the site after the completion of site cleaning activities in May 1987. Construction activities included the following: 1) the excavation and stockpiling of contaminated soils; 2) the screening of contaminated soils to obtain processable soil, inorganic material (steel, concrete, etc.), which could be incorporated into the monolith, and organic material to be shipped to an approved landfill for proper disposal; 3) processing the contaminated soils with cement-flyash binder material in the mixing area; 4) backfilling the excavations with the processed material to obtain final grade for proper runoff; 5) constructing the perimeter drainage collar containing 1-inch wash rock to receive, control, and retain runoff from the monolith; 6) the construction of the monolith and perimeter wells for post-remediation monitoring; and 7) capping the monolith with a 12-inch layer of crushed limestone rock to protect it from vehicular traffic and acid rain and to provide a base for future land use (Attachment A, 4).

On January 12, 1989, EPA conducted the Final Inspection of the remedial construction in conjunction with state, county, and PRP representatives and determined that the remedial action requirements had been successfully executed by the PRPs. On June 26, 1989, the PRPs submitted an "as-built" construction drawing which included survey information and a Final Remedial Action Report (Attachment A, 14).

Although the PRPs agreed to provide groundwater monitoring as part of the agreement with EPA for performance of the remedial action remedy, no provisions were made for maintenance of the cap and drainage trench around the monolith of stabilized material. Therefore, in July 1989, a Proposed Operations & Maintenance (O&M) Plan was prepared by EPA for the PSA site (Attachment A, 5). The need for such a plan was determined by the EPA and the Florida Department of Environmental Protection (FDEP) in order to ensure, that in addition to periodic groundwater monitoring, there were site O&M efforts that contributed to the remedial action remedy remaining protective of the site. However, until 1998, there were no funds available to support the work required in the O&M Plan. In August 1989, EPA notified the PRPs that they had adequately completed the construction of the remedy described in the Remedial Action Work Plan (Attachment A, 14).

On September 30, 1991, an EPA removal assessment was completed for the PSA site. An EPA integrated assessment was completed for the site on November 10,1993 (Attachment A, 25).

From January 31, 1992, through September 23, 1994, the first Policy Five-Year Review of the remedy was conducted. During the review, the limestone cap and the monolith were sampled by EPA, and groundwater was sampled by the PRPs and split with EPA during groundwater monitoring activities. The limestone cap and monolith were sampled to determine the integrity of the monolith. The limestone cap and monolith samples were analyzed for PCBs, lead, arsenic, and percent solids. Additionally, the monolith sample was analyzed for toxicity characteristic leaching procedure (TCLP) and multiple extraction procedure (MEP) for arsenic and lead, Hardgrove grindability index, specific gravity, scanning electron microscopy (SEM), and energy dispersive x-ray analysis (EDAX). The summary of the analyses concluded that the monolith was stable, but recommended additional testing to determine the chemical and physical integrity of the monolith over time. The groundwater was analyzed for PCBs, lead and arsenic. The groundwater results indicated that the contaminants of concern within the solidified matrix appeared to be stabilized and were not currently impacting the groundwater systems beneath the site. However, it was noted that the lead concentration detected in one sample exceeded current Florida drinking water standards. The report recommended that groundwater monitoring be continued and that the O&M plan be followed to ensure the protectiveness of the remedy (Attachment A, 15).

On July 10, 1997, an agreement was finalized between EPA and PRPs that provided limited funds for O&M at the PSA site. In May 2001, EPA approached Miami-Dade Department of Environmental Resources Management (DERM) to request their assistance in performing O&M activities under a Cooperative Agreement with EPA. O&M activities will consist of, among other activities, clearing the trees from the site, add cover to bear spots after removal of trees and inspect the drainage collar for possible repairs. In July 2002, DERM submitted its Cooperative Agreement Application to EPA for review and approval. Application approval is expected before September 30, 2002. O&M activities are expected to start shortly after. A copy of the DERM O&M Work Plan is hereby included as Attachment B.

In light of EPA's recent redevelopment initiative, many parties have approached the Agency with interest in redeveloping this site. Though, no specific plans have been approved yet, by the next Five-Year Review part of the site may be redeveloped.

EPA intends to use any funds set aside for O&M to continue O&M activities as long the funds last, or another party takes over O&M as part of the redevelopment, or until it is deemed no further O&M is required." With the completion of this, the second Five-Year Review, EPA intends to use those funds to provide for O&M of the cap for as long as the funds last, or until it is determined that no further O&M is required.

3.4 Initial Response

One removal action was conducted for the PSA site prior to the issuance of the EDO by EPA. EPA, through their contractor, NUS Corporation, conducted a site investigation of the PSA site from July 18, through September 2, 1983, due to the PCB contamination detected during a DERM test pit exploration of shallow subsurface material in 1982. When the results of the investigation indicated that significant threats were present, an immediate removal action was conducted (Attachment A, 14). The volumes and contaminants other than PCBs were not indicated in available file materials.

The site was subsequently proposed to be placed on the NPL on September 8, 1983, and a RI/FS was initiated for the site in February 1984 (Attachment A, 25).

3.5 Contaminants

The PSA site was included as a final listing of the NPL on September 21,1984 (Attachment A, 25). The endangerment assessment conducted for the PSA site identified PCBs, lead, and arsenic1 as being detected in soils at the site at concentrations high enough to pose a significant threat to public health, welfare, or the environment, and thus requiring removal action. Remedy cleanup soil levels for PCBs, lead, and arsenic were established as a result of the endangerment assessment and are based on acceptable leachate concentrations, modeling of groundwater flow, regulatory requirements, and the extent of contamination detected at the site. The remedy cleanup levels established for PCBs, lead, and arsenic are 1 part per million (ppm), 1,000 ppm, and 5 ppm, respectively. These contaminants were detected in soils; however, a groundwater monitoring program was also established as part of the removal action to verify the performance of the soils left behind that were solidified/stabilized within the monolith. Remedial action levels established in the EPA Consent Decree signed March 2, 1987, were 50 µg/L for lead and arsenic based on the U.S. Environmental Protection Agency Interim Primary Drinking Water Standards at the time of the remedial action and 7 µg/L for PCBs.(under 1,000 times greater than the U.S. Environmental Protection Agency Ambient Water Quality Criteria for carcinogenicity protection of human health from ingestion of water at the 10^{-6} risk level [0.0079 parts per billion]) (Attachment A, 1, 12, 25).

4.0 Remedial Actions

4.1 Remedy Selection

The EDD is considered the source document which lists the remedial action objectives and the remedy for the PSA site. It was signed by the regional administrator of EPA, Region 4 on March 12, 1986 (Attachment A, 1).

The EDD defined the entire Pepper's Steel and Alloys site as the area in need of remedial action. It was not subdivided into different operable units as is customary at some sites where only subareas are in need of remediation.

The EDD indicated that the site-specific cleanup objectives at the PSA site are based on public health and environmental concerns and are consistent with Section 300.68 (e) (2) of the National Oil and Hazardous Substances Contingency Plan, EPA Guidance, and state and local regulations.

The following cleanup objectives were, selected based on the regulatory guidance and the level of contamination detected at the PSA site:

- Removal and/or treatment of leachable heavy metals and metalloids to prevent contamination of wells and the Biscayne Aquifer which is the sole source of potable water supply for about three million people in the southeastern Florida area.
- Removal of all PCB-contaminated soil to the lowest level below 50 ppm practicably attainable through the use of normal cleanup methods.

The EDD indicated that the principal environmental and public health concern regarding the contamination level at the PSA site was pollutant migration into the Biscayne Aquifer and into private wells. Because of the fragile nature of the aquifer and the large number of people who depend on it, the Agency was particularly careful in its evaluation and selection of a remedy for the PSA site. The EDD indicated that any selected remedial alternative must demonstrate, via leachability studies and long-term monitoring, that levels of contaminants released into drinking water sources are below the acceptable leachate concentration limits. Limits were developed in the endangerment assessment and were based on either EPA Ambient Water Quality Criteria or Primary Drinking Water Standards, as available.

Acceptable leachate concentrations were derived by considering potential exposure via hypothetical wells located in the immediate vicinity of the site. The infiltration of rainwater over a broad area of the site is assumed to generate leachate that percolates vertically to the groundwater and creates a contaminant plume that is carried along with the groundwater flow. The plume is then intercepted near the site boundary by a monitoring well to determine the amount of contamination the plume has contributed to area groundwater. Acceptable leachate concentrations for the PSA site should be equal to applicable drinking water standards, or similar criteria with consideration for dilution.

Based on the acceptable leachate concentrations, modeling of groundwater flow, regulatory requirements and the extent of contamination found at the PSA site, the endangerment assessment determined that three contaminants were found in sufficient concentrations to require action which include PCBs, lead, and arsenic.

The following cleanup levels were selected for these contaminants in order to achieve acceptable leachate concentrations:

- Store, analyze, treat, and dispose of all PCB-contaminated free oils encountered during the site excavation.
- Remove, contain, and stabilize, fix, or treat soils containing the following levels of contamination:
  - PCBs greater than or equal to 1 ppm (Approximately 48,000 cubic yards)
  - Lead greater than or equal to 1,000 ppm (Approximately 21.500 cubic yards of which substantial amounts are commonly contaminated with PCBs)
  - Arsenic greater than or equal to 5 ppm (Approximately 9,000 cubic yards are commonly contaminated with lead).

The recommended alternative (Alternative 2) for the PSA site included the following activities:

- Collection of all free oil and treatment, storage, and disposal (TSD) offsite according to Toxic Substance Control Act (TSCA) regulations.
- Excavation of soils greater than or equal to 1 ppm PCBs, 1,000 ppm lead, and 5 ppm arsenic.
- Solidification/stabilization of these soils with a cement-type mixture and placement on site.
- Institutional controls to insure future land uses compatible with the remedy.
- Monitoring of the effectiveness of this remedy.

The HDD indicated that a consent decree would address technical details to be included in the remedy that had been agreed to in principle during consent decree development. Those details were to include:

- Method to determine area to be addressed
- Design parameters and performance of fixative agent
- Post-remedy monitoring
- Institutional controls needed.

4.2 Remedy Implementation

The remedial design for the PS A site was conducted from March 1 through October 30,1986 (Attachment A, 25). The monitoring well program for the PSA site was completed in January 1987 (Attachment A, 2). A consent decree was signed by EPA and PSA site PRPs on March 2, 1987, which reportedly stipulated details not specifically addressed in the EDD (Attachment A, 25).

Remedial action site-cleaning activities were conducted at the PSA site from early March to May 1987. Remedial action construction activities began at the PSA site with the completion of the site cleaning activities in May 1987 and were completed in January 1989 at which time EPA conducted a final inspection (January 12,1989) of the remedial action construction activities. Several modifications and changes to the original EPA-approved PSA remedial action plan were made during construction, primarily due to field conditions. These site cleaning activities, construction activities, and construction activity changes are detailed in the Final Report on Remedial Action (Attachment A, 4).

Removal actions, which took place during the remedy implementation, included the removal of vegetation, tires, debris, oil, transformers, and previously processed material. Seventy-seven loads of nonhazardous material, consisting of 63 loads of surface vegetation and 14 loads of tires, were shipped to the Central Disposal Landfill in Pompano Beach, Florida. One hundred and thirteen loads of previously processed nonhazardous material was shipped to a licensed hazardous waste disposal facility in Emelle, Alabama. Four hundred and thirty-seven shipments of hazardous waste was also shipped to the licensed hazardous waste disposal facility in Emelle, Alabama. These shipments consisted of 399 shipments of debris, 24 shipments of debris in roll-off containers, 4 shipments of drummed debris, 5 shipments of drummed oil, and 8 shipments of transformers minus the shipments that were double counted because the shipments were included under 2 categories (Attachment A, 4).

Section 6 of the Final Report on Remedial Action indicates that on November 10,1988, EP A sent a letter to QualTec, Inc., the firm performing the construction for the remedy at the PSA site, expressing concern, that the increased height of the monolith (design 8.8 feet; as-built 11.9 feet) resulting in increased side slopes, would increase the velocity of water runoff such that runoff would bypass the drain and that the higher velocity might erode the cover and silt up the surface of the drain. Canonic Environmental visited the PSA site on November 22,1988, and submitted an evaluation of the drainage structure at the PSA site on January 9,1989, to a representative of the Florida Power & Light Company which was responsible for completion of the remedial action. During the site visit, it was noted that the crushed limestone monolith cover had formed a solidified mass that was not easily penetrated. It was also observed that a small berm, approximately 2 feet above the existing ground level was built between the drainage structure and the adjacent property along the north site of the monolith. Based on these observations, Canonie conservatively assumed that approximately 90 percent of the precipitation from a rainfall event would be surface runoff from the solidified mass and that the berm would act as an impediment to surface flow moving beyond the drainage structure. The evaluation indicated that the drainage structure was adequate to handle a 100-year storm with the increased slope of the monolith surface and that the factor of safety against overflowing the drain onto adjacent property for the 100-year storm was 3.1. The evaluation also indicated that the velocity of the precipitation runoff towards the drainage structure was found to be less than the velocity required for sediment transport (Attachment A, 4). In August 1989, EPA notified the PRPs that they had adequately completed the construction of the remedy described in the Remedial Action Work Plan (Attachment A, 14).

Although the PRPs agreed to provide groundwater monitoring as part of the agreement with EPA for performance of the remedial action remedy, no provisions were made for maintenance of the cap and drainage trench around the monolith of stabilized material. The EDD and consent decree O&M requirements addressed only groundwater monitoring after the completion of the remedial action. Therefore, in July 1989, a Proposed O&M Plan was prepared by EPA for the PSA site (Attachment A, 5). The need for such a plan was determined by the EPA and the FDEP in order to ensure, that in addition to periodic groundwater monitoring, there were site O&M efforts that contributed to the remedial action remedy remaining protective of the site.

The performance of the monolith since its completion has been satisfactory as of the first five-year review which was completed in 1994. The performance of groundwater monitoring since the completion of the remedial action has indicated that groundwater has been in compliance with the limits defined in the consent decree (Appendix B. 2 of Appendix B of Groundwater Monitoring, GeoTrans, 1987) as of the first five-year review. The performance of the perimeter ditch has not been an issue of concern as of the first five-year review; however, there were concerns about the presence of excessive vegetation prohibiting observations and inspections of the perimeter ditch and overall limestone cover during the first five-year review (Attachment A, 15).

On July 10, 1997, an agreement was reached between EPA and the site PRPs that provided limited funds for the O&M of vegetation at the site. In July 2002, DERM submitted its Cooperative Agreement Application to EPA to perform O&M activities using the funds provided through the PRP agreement with EPA. O&M activities will consist of, among other activities, clearing the trees form the site, add cover to bear spots after removal of trees and inspect the drainage collar for possible repairs (Attachment B). EPA intends to use any funds remaining to continue O&M activities as long the fund last, or another party takes over O&M as part of the redevelopment, or until it is deemed no further O&M is required.

4.3 System Operations/Operations and Maintenance (O&M)

There are no system operations requirements for the PS A site since there are no treatment systems operating at the site. O&M requirements for the PSA site are limited to groundwater monitoring until the second Five-Year Review is completed and EPA releases funding for the requirements specified in their Proposed Operations and Maintenance Plan for the site.

4.3.1 Groundwater Monitoring O&M

The groundwater monitoring program for the PSA site was to be performed in 3 phases: 1) baseline monitoring; 2) remediation monitoring; and 3) post remediation monitoring (Attachment A, 2). Monitoring was to be performed in existing wells where appropriate and in the wells installed during the remedial action where necessary. Groundwater quality and groundwater elevations were to be monitored in the bedrock aquifer. Analytes were to be limited to the parameters of concern including lead (1.0 µg/L detection limit), arsenic (1.0 µg/L detection limit), and PCBs (1.0 µg/L detection limit, in monolith wells only), and measurements were to be limited to those that can be made in the field including water levels, pH (measure in field, check in lab), and specific conductance (measure in field, check in lab).

Three wells were to be installed along the perimeter of the monolith and downgradient from remediation areas prior to the completion of remediation to provide a better characterization of water quality. Three additional wells were to be installed within the monolith near the downgradient perimeter after remediation to monitor PCBs at the monolith bedrock interface.

Phase I baseline monitoring was to be conducted once to provide baseline water quality data before site remediation using existing A, B, and C wells. It was also to include weekly collection of water levels on all Florida Power & Light (FPL) and NUS Corporation (NUS) wells and continuous recorders on four of the EPA wells (See Figure 3-2).

Phase II remediation monitoring was limited to measuring water levels during remediation. Water levels were to be collected weekly for FPL, NUS, and S& ME wells and continuous recorders on four of the EPA wells (See Figure 3-2).

Phase III post remediation monitoring was to be conducted: 1) to detect significant changes in groundwater quality (lead and arsenic) after remediation, should such changes occur; 2) to determine if the monolith is leaching or diffusing significant loadings of PCBs with action limits for PCBs to be based on monolith well analyses; and 3) to measure water levels for evaluation of long term changes in the groundwater flow field. Groundwater quality analyses were to be conducted semiannually the first year, annually thereafter in MW-series wells on an alternate basis [(MW-1A, MW-4B, MW-4C, MW-5A, MW-6B, MW-7A, MW-9A - odd periods) (MW-1B, MW-4A, MW-5B, MW-6A, MW-6C, MW-8A - even periods)]. The monolith wells (MO-1, MO-2, MO-3) were to be sampled quarterly during the first year and semiannually thereafter. Water levels were to be collected monthly in FPL, S&ME and NUS wells and with continuous recorders in four EPA wells the first year and quarterly thereafter in all wells with no recorders.

If action levels for PCB (7 µg/L in monolith wells), lead (50 µg/L in MW-series wells), or arsenic (50 µg/L in MW-series wells) were exceeded during routine monitoring in any well, a retest was to be conducted within 30 days after the receipt of the original analysis. If the retest analysis is above the action level, the well in which the action level was potentially exceeded was to be monitored for the specific analyte on a monthly basis until either four consecutive analyses fall below the action level (not confirmed) or four consecutive analyses fall above the action level (confirmed).

If the concentration above the action level was confirmed, then a review was to be conducted to determine which, if any, remedial measures need to be taken the address the problem. If the concentration above the action level was not confirmed, monitoring for water quality in the well with the potential elevated concentration was to be conducted on a quarterly basis for one year.

The monitoring program was also to be reassessed 3 years after remediation was completed and/or if long term changes in groundwater flow directions are determined. The HDD, posted in 1986, indicated estimated annual project O&M costs for post remedial groundwater monitoring to be $42,500.

The post remediation monitoring well program conducted by the FPL began in 1988. The monitoring well program included the sampling of the six wells that were scheduled to be installed during the remedial action in addition to other existing wells (Attachment A, 4). Analytical results from post remediation monitoring conducted in 1988,91,92,95.97,98, and 2000 indicate that the monolith is performing as designed and it does not leach into the groundwater at levels exceeding the remedial action levels established (Attachment A, 7,9,12,17,19). The results of monolith samples collected in October 1993 and analyzed by toxicity characteristic leaching procedure, multiple extraction procedure, total metals, total waste analysis for PCBs, scanning electron microscopy and x-ray diffraction, also indicated that weather and vegetation did not appear to negatively impact the monolith (Attachment A, 16). In 1993, after a reassessment of groundwater monitoring at the PS A site as provided for in the monitoring program, FPL requested termination of the groundwater monitoring obligation based on the analytical results under remedial action levels accumulated during the monitoring and the lack of change in groundwater flow direction over the same period of time (Attachment A, 13). EPA relaxed groundwater monitoring requirements for the PS A site, but did not agree to termination of the monitoring obligation based on the lead concentrations documented during the monitoring. FPL has since provided 6 years of lead concentrations that are consistently below the remedial action level of 50 µg/L.

4.3.2 Proposed O&M Plan

The purpose of the O&M plan proposed by EPA is to provide observation and maintenance procedures that are to be followed during the closure and 30-year post closure periods of the PSA site (Attachment A, 5). It identifies regularly scheduled observations and maintenance activities that are to be conducted that include observing the exposed components of the facility, determining and documenting if potential problem areas exist at the site based on these observations, correcting any problem areas observed, and sampling the site monitoring well system and surface waters to determine the effects of the facility on the shallow groundwater system. The plan assumes that the site property will not be used for commercial or residential development for the next 30 years and that it must be maintained in its present condition for that length of time.

Specific observation, measurement, and recording tasks are included for the crushed limestone monolith cover, perimeter drainage ditch system, monitoring wells, fences, and access roads. Specific maintenance tasks are identified for the following: 1) maintenance and repair of the crushed limestone monolith cover and perimeter drainage ditch; 2) erosion control of the monolith cover and perimeter ditch; 3) grass and weed control of the monolith cover, the perimeter ditch, and access roads; 4) leachate seepage detection and repair; 5) maintenance and repair of monitoring wells; 6) maintenance and repair of security fencing; and 7); maintenance and repair of access roads. The plan also identifies a 30-year post closure period water quality sampling schedule; however, a specified schedule was not found in reference indicated. Costs in 1989 dollars for O&M activities at the PSA site were estimated to be $750,000.

As indicated earlier, with the completion of this second Five-Year Review, EPA intends to use funds procured during a July 10, 1997, agreement between EPA and the PRPs of the PSA site to provide for O&M of the cap. In July 2002, DERM submitted its Cooperative Agreement Application to EPA to perform O&M activities using the funds provided through the PRP agreement with EPA. O&M activities will consist of, among other activities, clearing the trees form the site, add cover to bear spots after removal of trees and inspect the drainage collar for possible repairs (Attachment B). EPA intends to use any funds remaining to continue O&M activities as long the fund last, or another party takes over O&M as part of the redevelopment, or until it is deemed no further O&M is required.

4.4 Progress Since the Last Five-Year Review

Protectiveness statements from the first five-year review indicated that based upon the groundwater sampling results, the remedial action appears to be performing as intended. None of the contaminants of concern appeared to be leaching from the monolith and parameter levels were below the action levels specified in the consent decree. However, it also indicated that the lead levels may need revision based on a review of state primary drinking water standards established at the time of the review. There was a concern that lead concentrations in monitoring well MW-6A observed during the review were equal to the Florida standard of 15 parts per billion (ppb); however, groundwater analytical results for this five-year review were non-detect. There was also the concern for the protection of human health of individuals entering the property through holes in the fence. This was a particular concern due to the unknown contents of the drums and compressed gas cylinders found in the abandoned Jim Woods building.

Recommendations included in the first five-year review generally included the implementation of the proposed O&M Plan developed by EPA, continued groundwater monitoring, and action to minimize the safety threat at the Jim Woods building. The implementation of the proposed O&M Plan would allow a proper evaluation of the monolith and cap regarding settlement and erosion which was not possible at the time of the review due to the amount of heavy vegetation located on the property. Continued groundwater monitoring was recommended although the results of the groundwater sampling showed no levels above action levels. However, it was recommended that the frequency of monitoring may be reduced to possibly once per year which would still be protective of the remedy. The first five-year review also expressed a significant concern with regard to the drums and compressed gas cylinders with unknown contents located within the Jim Woods building. The recommendations to alleviate this concern included maintenance of the fence, although not required under the consent decree, a possible removal action as specified in Section 300.415, or at least a removal site evaluation under Section 300.410 of the NCP.

No O&M has been conducted at the PSA site except for groundwater monitoring since the remedial action. However, an agreement finalized between EPA and property owners on July 10,1997, provided limited funds for O&M at the PSA site per the proposed EPA O&M Plan. In July 2002, DERM submitted its Cooperative Agreement Application to EPA to perform O&M activities using the funds provided through the PRP agreement with EPA.

O&M activities will consist of, among other activities, clearing the trees form the site, add cover to bear spots after removal of trees and inspect the drainage collar for possible repairs. EPA intends to use any funds remaining to continue O&M activities as long the fund last, or another party takes over O&M as part of the redevelopment, or until it is deemed no further O&M is required. Maintenance of the perimeter fence is included in the plan. However, during the September 29, 1999, site visit for this five-year plan, no drums or compressed cylinders were observed in the vicinity of the Jim Woods building. Materials that were observed included diesel engine parts, oil cans, trash, and a small aboveground storage tank.

EPA revised the groundwater monitoring plan in 1993 to lessen the frequency at which groundwater monitoring occurred to every 2.5 years and to analyze only for lead. FPL sampled the groundwater July 25,1995, January 20,1997, and February 3,1998, and no lead concentrations were detected above the remedial action limits. The January 20, 1997, groundwater sampling was not required per the revised monitoring plan but was conducted to emphasize that the groundwater sampled was consistently meeting the remedial action limits. Therefore, the reduction in required groundwater monitoring has not affected the PSA site remedy.

5.0 Five-Year Review Findings

5.1 Five-Year Review Process

The second five-year review for the PSA site was conducted by EPA, Region 4, with support from its contractor Black & Veatch. Ms. Pamela J. Langston Scully of EPA, served as the remedial project manager for the PSA site from July 1999 until she was replaced in December 2000 by Ms. Julie Santiago-Ocasio. Black & Veatch personnel, who have served in a major capacity as five year review team members for the PSA site include: Robert Mangum (original project manager); Carol King (current project manager); Chris Alien (conducted PSA fieldwork); and Kevin Brown (conducted PSA fieldwork).

Black & Veatch was tasked by EPA to conduct the following activities for the five-year review at the PSA site: 1) provide project planning and support; 2) conduct a document review; 3) conduct a standards review of applicable or relevant and appropriate requirements; 4) conduct site visit/interviews; 5) conduct a site inspection?technology review with sampling; 6) prepare a five-year review report; and 7) closeout the work assignment when completed.

Prior to the site inspection visit, an advertisement was published on September 19, 1999, in the classified section of the *Miami Herald* announcing the five-year review and the date on which the site visit would take place. The site visit was conducted on September 29, 1999.

5.2 Site Inspection

A site inspection visit was conducted on September 29, 1999, at the PSA site. The purpose of the site inspection was to observe site conditions and interview, where appropriate, previous site staff/ management, nearest residents to the site, PRPs, state and local government personnel, facility operating staff, O& M contractors, or other personnel associated with selection and implementation of the action.

Parties in attendance at the site inspection included: Ms. Pamela Scully, EPA; Mr. Lee Martin and Mr. James Bussey, FDEP; Mr. Jim Lindsay and Ms. Kathy Salvador, FPL; Chief Arley Nieto, Code Enforcement, Medley Police Department; Mr. Bill Payne, formerly Miami Battery; and Mr. Robert Mangum, Black & Veatch.

Mr. Mangum met Ms. Scully at the PSA site at approximately 10: 00 a. m. At approximately 10:45 a. m., the remainder of the attendees arrived and proceeded to Mr. Payne's office at formerly Miami Battery to discuss the purpose of this site visit and the five-year review. It was noted that approximately 2 to 8 inches of standing water covered the entrance to formerly Miami Battery, adjacent to the site. Chief Nieto and Mr. Payne stated that the standing water was runoff from the PSA site. Mr. Payne went on to say that street drains exist on the former Miami Battery property, but that silt from the PSA site has clogged them. Mr. Payne stated that he has had the silt pumped out at least twice in the past.

Mr. Lindsay and Ms. Salvador led a walking tour of the site, concentrating on the northern, western, and eastern perimeter areas of the monolith. Other participants included Ms. Scully, Mr. Lee Martin, and Mr. Mangum. Well locations and conditions were noted on the monitoring wells that could be located. Photographs were taken of the Australian pine trees, the crushed limestone drainage collar, trash observed on site, trees which had fallen over, and erosion areas in the limestone cover.

The PSA site is covered by Australian pine trees, some 20 to 30 feet in height, and decaying pine tree needles and is fenced, but breached in numerous areas. The drainage collar appears to be intact, with some erosion and breaching noted throughout. The site is accessible by foot in several areas. The Jim Woods Land Clearing building remains standing near the site. It was unsecured and filled with diesel engine parts, oil cans, trash, and a small aboveground storage tank. A five-year review site inspection checklist was completed as a result of the site inspection and is included as Attachment C. A photograph log of photographs taken during the site inspection are included in Attachment D.

5.3 Site Monitoring

During the week of January 9, 2000, a field investigation was conducted at the PSA site by Black & Veatch and FPL. The purpose of the Black & Veatch portion of the field investigation was to provide oversight for its subcontractor in the extraction of monolith core samples at three locations on the site (PS-MS-1, PS-MS-2, PS-MS-3); collect drainage materials from three locations on the site (PS-DM-1, PS-DM-2, PS-DM-3); provide groundwater sampling oversight in the collection of nine groundwater monitoring well samples by FPL (PS-MW-4A, PS-MW-4B, PS-MW-5A, PS-MW-5B, PS-MW-6A, PS-MW-6B, PS-MW-9A, PS-MO-2, PS-MO-3), and to split two of the groundwater samples (PS-MO-2, PS-MO-3) collected by FPL. Two of the original nine monitoring wells selected, MW-1A and MW-1B, could not be located and subsequently were substituted with monitoring wells MW-4A and MW-4B. An adjacent property owner later informed the FPL personnel that the wells had been removed several years ago. The substitutions were made with the approval of Ms. Scully. The locations sampled are identified on Figure 5-1. Sampling was conducted in accordance with procedures established in the U.S. EPA, Region IV, Environmental Services Division, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996 (Revised 1997), (EISOPQAM) and as set forth the Final Sampling and Analysis Plan submitted to EPA by Black & Veatch January 11, 2000.

The monolith core samples were analyzed by a non-Contract Laboratory Program (CLP) laboratory (Kiber Environmental Services, Inc., Norcross, Georgia) for the following analytes by the following methods: total metals (EPA Methods 200.7, 245.5 for mercury, and 3113b for confirmation); lead and arsenic (Toxicity Characteristic Leaching Procedure, EPA Methods 1311 and 200.7); and lead and arsenic (Multiple Extraction Procedure, EPA Methods 1320 and 200.7). The monolith core samples were also analyzed by a non-CLP laboratory (Kiber Environmental Services, Inc., Norcross, Georgia) for the following characteristics using the following methods: unconfined compressive strength [American Society for Testing and Materials (ASTM) D2166a]; permeability (ASTM D4525-90el); Hardgrove grindability index (ASTM D409-97); acid/neutralization capacity (ASTM C1318-95); and wet/dry weathering (ASTM 4843 Modified). These analyses were recommended during the first five-year review to help in establishing a baseline to determine the chemical and physical integrity of the monolith over time.

The drainage material samples were analyzed by a non-CLP laboratory (Kiber Environmental Services, Inc.) for the following characteristics using the following methods: permeability (ASTM D4525-90el); and minimum/maximum density (ASTM D4254/D4253). The purpose of the drainage material testing was to determine whether the material used is comparable to material designed to be used in the perimeter ditch.

The two split groundwater samples were analyzed by the EPA Science and Ecosystem Support Division laboratory in Athens, Georgia, for the following analytes by the following CLP-established analytical methods: arsenic and lead (Modified EPA Method 200 series); and PCBs (Modified EPA Method 608). The groundwater was sampled to determine compliance with remedial action levels. The analytical results are summarized in Section 5.6. A complete set of the analytical data is presented in Attachment E.

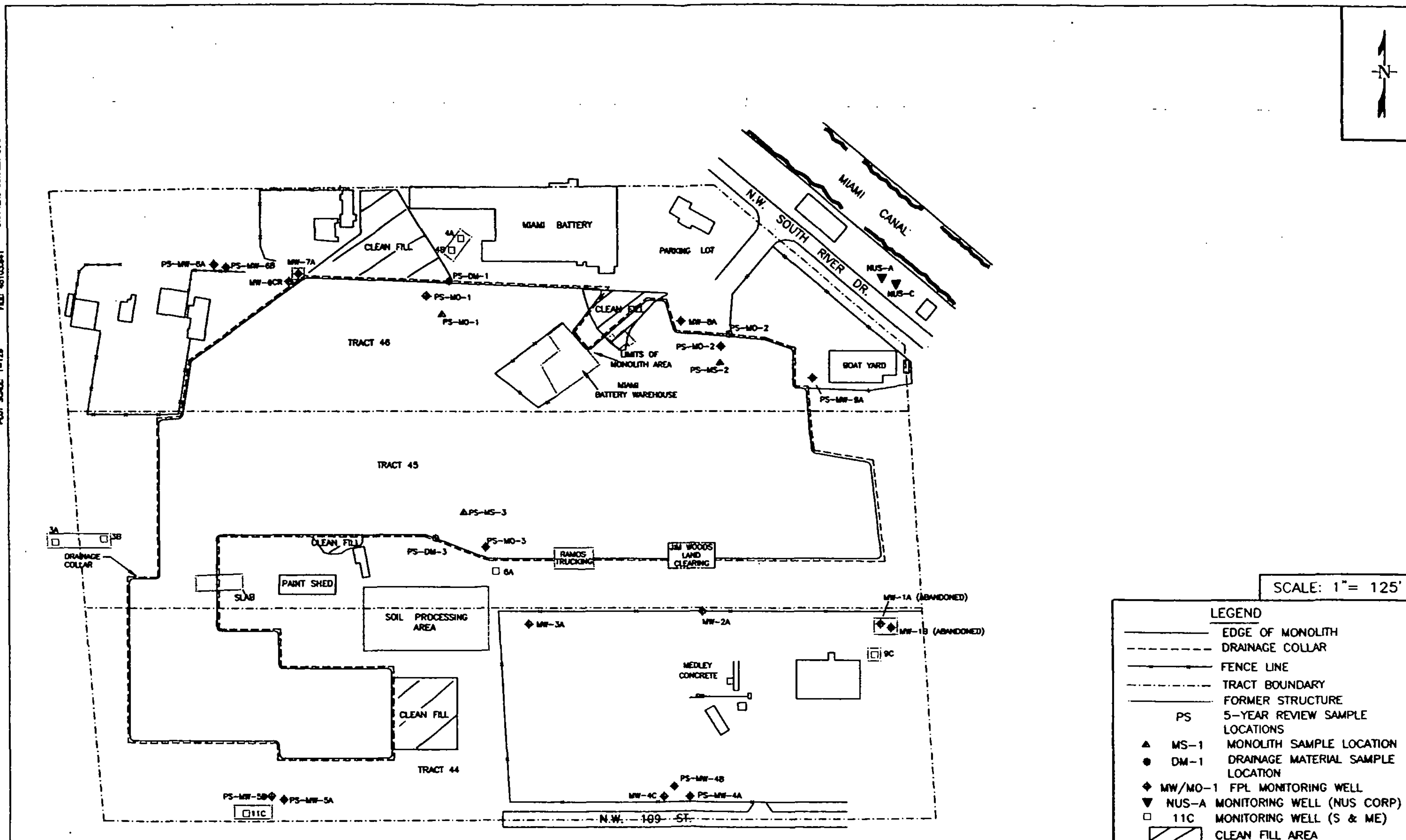
The purpose of the FPL portion of the field investigation was to collect groundwater samples from nine monitoring wells (PS-MW-4A, PS-MW-4B, PS-MW-5A, PS-MW-5B, PS-MW-6A, PS-MW6B, PS-MW-9A, PS-MO-2, PS-MO-3) and have them analyzed for arsenic, lead, and PCBs to determine compliance with remedial action levels. As indicated previously within this section, two of the original nine monitoring wells selected (MW-1A, MW-1B) were substituted with monitoring wells MW-4A and MW-4B with the approval of Ms. Scully, because they could not be located. All sampling and analyses were conducted in accordance with FPL's approved Comprehensive Quality Assurance Plan (CompQAP No. 92-0041). The analytical results are summarized in Section 5.6. A copy of the FPL data sent to EPA is included in Attachment F. The sampling locations are indicated on Figure 5-1.

Additionally, groundwater samples collected from two of the monitoring wells by FPL were split with the Department of Environmental Resources Management Miami-Dade County (DERM). The groundwater samples split were MW-5A and MW-5B. A copy of the DERM data sent to EPA is included in Attachment G.

5.4 Interviews

The Five-Year Review process requires that key individuals involved with the site be contacted for interviews. The interview process is intended to gather any new applicable information regarding the selected remedy, site history, and other site-specific issues. Individuals interviewed were chosen based on their involvement with the site since the first Five-Year Review. Among those interviewed include: Ms. Kathy Salvador, FPL; Mr. Tom Kux, DERM; Mr. Lee Martin, Mr. James Bussey, and Mr. Marvin Collins of FDEP, Mr. Phil Randall, owner of Millennium Battery, formerly Miami Battery, and Chief Arley Nieto, Code Enforcement, Medley Police Department.

Ms. Kathy Salvador, P. E., a senior environmental engineer, was the FPL representative interviewed concerning the PSA site. She indicated that FPL had three main concerns with the Pepper's Steel and Alloys site monitoring wells and strongly recommends that EPA properly abandon the monitoring wells around the site given FPL's concerns and the limited use that they serve. The first concern is with the lack of security of the monitoring wells given the industrial nature of the surrounding area where the potential is great for the misuse of the wells including vandalism, physical damage, or other inappropriate activities. Furthermore, the majority of the wells are not included in the current



PEPPER'S STEEL AND ALLOYS SITE MEDLEY, DADE COUNTY, FLORIDA	SAMPLE LOCATION MAP	FIGURE 5-1

groundwater monitoring program (3 monitoring wells every 2.5 years) and are only of use to be checked and sampled by EPA every 5 years during the five-year reviews. The second concern is with the current condition and questionable integrity of the monitoring wells with the exception of monitoring wells MO-1, MO-2, MO-3, and MW-9A, which will worsen if EPA allows them to remain as is for another 5 years. She indicated that none of the wells had expansion seals or well caps, several of the wells had corroded above grade well casings (monitoring well MW-5B had a severely corroded to almost disintegrated well casing), and monitoring well MW-4A was partially open to the atmosphere due to a bent cover over the outer casing. The third concern was that current property owners may abandon the monitoring wells on their property without proper authorization or using proper abandonment procedures. During the January field investigation, it was determined that monitoring wells MW-lA and MW-1B were abandoned without proper authorization to allow for business expansion, and the current site owner of another property expressed a strong desire to have three of the existing wells (located within three separate large concrete casings) on his property abandoned so that he could expand his business.

Other observations made by Ms. Salvador during the January field investigation include the fence around the site which is in disrepair or completely missing in several locations and that the site is completely overgrown making access to the site difficult. Ms. Salvador also indicated that FPL supports the termination of the present groundwater monitoring program, the proper abandonment of all site-associated monitoring wells, and the delisting of the Pepper's Steel and Alloys site from the National Priority List (NPL) given that groundwater data submitted by FPL from 1988 through 1998 demonstrates that the remedy at the site has been effective in eliminating constituents of concern from the groundwater at the site.

Mr. Tom Kux was the DERM representative interviewed concerning the PSA site. He indicated that initially DERM was concerned with the root systems of the trees on the site compromising the integrity of the monolith. However, observations of the uprooted trees at the site indicated that the root systems remained in the limestone cover and did not infiltrate the monolith itself, thereby eliminating the concern for vegetative growth over the monolith. Mr. Kux indicated that DERM's position was to recommend the continuation of groundwater monitoring and to be included in any future site-associated events such as split sampling. He also indicated that it was DERM's position to allow future commercial development on the site similar to the surrounding area provided that the appropriate authorities (EPA, FDEP, DERM, etc.) have given their authorization, the proposed construction will not compromise the integrity of the monolith, and any waste originating from the site is disposed of properly. Mr. Kux was not aware of any complaints regarding the PSA site since the previous five-year review.

Lee Martin was the area FDEP representative interviewed with regard to the PSA site. His observations and concerns resulting during the September 29,1999, site visit of the PSA site were the result of the lack of O&M at the site with regard to the vegetation in the perimeter ditch area and on the monolith and fencing that was in disrepair. His concern with the presence of vegetation was two-fold. One concern was that the obstructions that the vegetation caused in the perimeter ditch may prevent the ditch from operating properly. The second concern was the fact that the blown over vegetation may ultimately expose the monolith itself by removing the limestone cover, thereby preventing the cover from protecting the monolith from acidic rains as was the intent of its design. Mr. Martin also indicated that the inadequate fencing may be responsible for what looked like a temporary parking lot on a portion of the PSA site. He indicated that a secured fence would help prevent adjacent businesses from encroaching on the site and would help deter the illegal dumping of materials on the site which is a common occurrence on vacant lots in the area.

Additionally, Mr. Martin indicated, that from his observations during the PSA site visit, stormwater flooding conditions experienced by Millennium Battery and attributed to the PSA site should also have been experienced to some degree by the adjacent boatyard; however such flooding or past evidence of was not evident. Mr. Martin was under the impression that part of Millennium Battery's drainage problem was the lack of necessary onsite facilities to treat their stormwater prior to discharge, which was necessary before being granted permission to discharge to the public stormwater system. Mr. Martin indicated that groundwater monitoring at the site has indicated that the remedy is in compliance with the remedial action levels established, but it is the position of FDEP to continue monitoring at the site. He was not aware of any actions against or new complaints regarding the site since the last five-year review with the exception of the drainage problem at Millennium Battery.

He did, however, indicate a concern with regard to the deed restrictions included in the first consent decree, whereby FDEP is to respond within 30 days to development requests regarding the site property. The problem is that if FDEP does not respond within 30 days, the default is to allow the request. Mr. Martin is concerned that the request may not be sent to the appropriate authorities; therefore, the 30-day period may elapse implying authorization of the request without FDEP even being aware of the request.

Mr. James Bussey of FDEP was interviewed because of his oversight of the Millennium Battery site from a Resource Conservation and Recovery Act (RCRA) compliance standpoint. He indicated that the concern with the Millennium Battery site was the possibility of lead discharges from the site. He indicated that the PSA site may contribute overland flow to the Millenium Battery site. However, he also indicated that the present drainage system of the battery site does not appear to be adequate for that site's own stormwater flow, much less the additional overland flow that it may receive from the PSA site.

Dr. Marvin Collins out of the Tallahassee FDEP office was interviewed because he was previously the FDEP project manager for the site. He, like Mr. Martin, indicated that FDEP was concerned about the lack of O&M at the site. He also indicated that it was the position of FDEP that long term groundwater monitoring should continue at the PSA site.

Mr. Phil Randall was interviewed because he became the current owner of Millennium Battery in January 2000. He reiterated Mr. Bill Payne's complaints, stated during the September 29. 1999, site visit, about the stormwater flow from the PSA site inundating the Millennium Battery property. Mr. Randall indicated the flooding prevents his 17 employees from being able to park on the property. He indicated that he has looked into determining what it would take to correct the situation, but it would be costly to build. Furthermore, he indicated that if the PSA site is contributing to the problem, he does not see why he should invest in correcting it himself. Mr. Randall estimated based on conversations with Mr. Payne and others that the drainage problem had been occurring approximately 10 years.

Chief Arley Nieto with Code Enforcement of the Medley Police Department was interviewed to determine what he may be able to add to information previously gathered on the stormwater flooding of the Millennium Battery site and how drainage from the PSA site may be contributing to the flooding. Chief Nieto indicated that stormwater from the PSA site does contribute to the Millennium Battery property flooding. When asked if the flooding had been occurring since the monolith had been built or later, he indicated that he did not know exactly how long, but that it had gotten progressively worse over time.

5.5 ARARs Review

Section 121 (d) (2) (A) of CERCLA specifies that Superfund remedial actions must meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). It also requires that state ARARs must be met if they are more stringent than federal requirements.

ARARs identified and considered in the Feasibility Study and HDD for the solidification process included:

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Sections 104, 121, 122
- Hazardous Waste Regulations Resources Conservation and Recovery Act (RCRA) Subtitle C, 40 Code of Federal Regulations (CFR) Part 864
- PCB Requirement for Disposal, 40 CFR Subpart D761.60. "Note"
- National Pollutant Discharge Elimination System (NPDES) 40 CFR Parts 122 and 125
- National Pretreatment Standards 40 CFR Part 403
- National Primary Drinking Water Standards 40 CFR Part 141, Subparts B and G.

ARARs identified and considered for this five-year review for continued groundwater monitoring of the site include:

Chemical-Specific
- Federal Groundwater Classification 55 Federal Register (FR) Part 8733
- National Primary Drinking Water Standards 40CFR Part 141, Subparts B and G
- Ambient Water Quality Criteria 40 CFR Part 131 1
- RCRA Groundwater Protection 40 CFR Part 264
- CERCLA Sections 104,121, 122
- Florida Drinking Water Standards
- Florida Administrative Code (FAC) 62-550

Action-Specific
- Florida Water Management District Regulations, FAC 40

Location-Specific
- Florida Groundwater Classification FAC 62-520
- Florida Potable Well Delineation Areas FAC 62-524

Two changes were noted between the chemical-specific ARARs resulting from the consent decree established remedial action levels and present chemical-specific ARARs. EPA and state primary drinking water standards or maximum contaminant levels (MCLs) of 0.5 µg/L and 15 µg/L were established for PCBs and lead, respectively. The previous and new ARARs are listed with changes shaded in Table 5-1.

Table 5-1
Changes in Chemical-Specific ARARs
Pepper's Steel and Alloys Five-Year Review
Medley, Dade County, Florida

Contaminant	Media	ARARs	
		Previous[1]	New[2,3]
PCBs	Groundwater	7 µg/L	0.5 µg/L
Arsenic	Groundwater	50 µg/L[4]	50 µg/L
Lead	Groundwater	50 µg/L[4]	15 µg/L

Notes:
1 - Remedial Action Levels established in the EPA Consent Decree signed March 2, 1987.
2 - U.S. Environmental Protection Agency Drinking Water Regulations and Health Advisories, Primary Drinking Water Standards, October 1996.
3 - Florida Department of Environmental Protection Florida Administrative Code 62-550 Drinking
Water Standards, Monitoring, and Reporting, Effective December 9, 1996.
4 - U.S. Environmental Protection Agency Interim Primary Drinking Water Standards (In effect at time of remedial action at PSA). Shading indicates changes in new ARARs compared to previous ARARS.

These two changes are more stringent than those established in the consent decree. The change in the PCB ARARs does not affect protective cleanup levels and/or the protectiveness of the remedy. No PCBs have been detected in the groundwater since monitoring as required by the consent decree was initiated at the PSA site. The change in the lead ARARs may affect protective cleanup levels pending further groundwater sampling of location MO-2. The current lead ARAR is more stringent that the previous one thereby, theoretically, improving the protectiveness of the remedy. The current lead ARAR has been exceeded at the PSA site based historical monitoring well data and may have been exceeded at the PSA site based on current monitoring well data pending further groundwater sampling of location MO-2. More detailed information on current and historical monitoring well data is included in Section 5.6.

5.6 Sampling Data Review

Sampling data reviewed in preparation for this five-year review includes data that has been generated since the first five-year review report and data concerning the integrity of the monolith, which was generated prior to the submittal of the first five-year review report. Sampling data generated before the first five-year report were not reviewed in detail because all contaminants levels were reportedly below the remedial action levels defined in the consent decree and because groundwater flow in the vicinity of the site has been observed to be to the north or north-northeast for at least a decade. Data reviewed include:

- Monolith sample analyses for the November 9 and 23, 1993, monolith sampling events.
- Groundwater sample analyses for the July 25, 1995, groundwater sampling event.
- Groundwater sample analyses for the January 20, 1997, groundwater sampling event.
- Groundwater sample analyses for the February 3, 1998, groundwater sampling event.
- Groundwater, monolith core, and drainage material sample analyses for the week of January 9, 2000, five-year review sampling event.

On November 9 and 23, 1993, the limestone cap (3 samples) and monolith (1 sample) were sampled to determine the integrity of the monolith. The limestone cap and monolith samples were analyzed for PCBs, lead, arsenic, and percent solids. Additionally the monolith sample was analyzed for TCLP and MEP for arsenic and lead, Hardgrove grindability index, specific gravity, SEM, and EDAX. The PCB analyses indicated no detections of PCBs in the cap samples and a detection of 9.91 mg/kg of Aroclor 1260 in the monolith sample. Arsenic concentrations were all 1 mg/kg for the 3 cap samples and 33 mg?kg for the monolith sample. Lead concentrations for the 3 cap samples included a concentration of 94 mg/kg and 2 nondetect samples. The lead concentration detected in the monolith sample was 640 mg/kg. No lead or arsenic was detected in the TCLP and MEP analysis of the monolith sample. The Hardgrove grindability index value for the monolith sample was 52, and the specific gravity was 2.452. The SEM and EDAX indicated that the monolith sample consisted of a calcium-silica-iron-aluminum-potassium-sulfur-oxygen matrix in which were imbedded iron oxide particles ranging from 5 to 50 µm and copper oxide particles ranging from 1 to 5 µm. The lead appeared to be diffused into the treated matrix, implying that the metal is chemically bound versus mechanically. The summary of the analyses concluded that the monolith was stable, but recommended additional testing to determine the chemical and physical integrity of the monolith over time.

The groundwater monitoring data collected from 1995 to 2000 are summarized in Table 5-2. Trends of no detections of PCBs and detected concentrations of lead and arsenic below consent decree remedial action levels continued after the first five-year review report.

However, lead was detected in MW-6A (July 25, 1995, February 3, 1998) at concentrations exceeding the current EPA and FDEP lead MCL. Re-sampling of MO-2 is necessary to determine whether this well contains groundwater concentrations exceeding the current EPA and FDEP lead MCLs due to discrepancies between FPE and EPA lead analytical data from the January 11-12, 2000. sampling. A complete set of the analytical data for the January 2000 sampling event is included in Attachment E.

Copies of the FPL and DERM analytical data generated during the same sampling event are included in Attachments F and G, respectively.

The chemical testing results of the monolith samples collected and analyzed as part of the second five-year review are presented in Table 5-3. A complete set of the analytical data for the monolith sampling event is included in Attachment E. As indicated earlier, the monolith core samples were chemically analyzed for total metals, TCLP for arsenic and lead, and MEP for arsenic and lead. These analyses were recommended during the first five-year review to help in establishing a baseline to determine the chemical and physical integrity of the monolith over time.

For total metal analyses, barium, calcium, chromium, and lead were detected at concentrations of 5.4 mg/kg, 0.3 mg/kg, 5.1 mg/kg, and 0.7 mg/kg, respectively, in monolith core sample PS-MS-1 collected from the north central portion of the site near monitoring well PS-MO-1. The metals and the concentrations detected in monolith core sample PS-MS-2, collected near monitoring well PS-MO-2 near the northeast corner of the site, include: arsenic (24 mg/kg), barium (153 mg/kg), calcium (1.6), chromium (18 mg/kg), lead (1,200), selenium (3.5), and silver (0.5 mg/kg). The metals and the concentrations detected in monolith core sample PS-MS-3, collected near monitoring well PS-MO-3 near the south central portion of the site, include: arsenic (26.8 mg/kg), barium (243 mg/kg), calcium (1.6 mg/kg), chromium (18.6 mg/kg), lead (796 mg/kg), selenium (1.7mg/kg), and silver (0.3 mg/kg). During the previous sampling of the monolith, arsenic was detected at a concentration of 33 mg/kg, and lead was detected at a concentration of 640 mg/kg.

For TCLP analyses, no arsenic was detected in any of the monolith core samples. Lead was only detected in sample PS-MS-2 at a concentration of 1.6 mg/L. No arsenic or lead was detected in the TCLP analyses during the previous monolith sampling.

For MEP analyses of the PS-MS-1 monolith core sample, arsenic was not detected during the nine days of extractions, and lead was detected during the first four days of extractions at concentrations of 33 µg/L, 64 µg/L, 152 µg/L, and 129 µg/L, respectively. For MEP analyses of the PS-MS-2 monolith core sample, arsenic was detected during day 2 and day 3 of the nine days of extractions at concentrations of 16 µg/L and 37 µg/L, respectively, and lead was not detected during the nine days of extractions. For MEP analyses of the PS-MS-3 monolith core sample, arsenic was detected during the first four days, on day 7 and on day 9 of the nine days of extractions at concentrations of 44.0 µg/L, 48.0 µg/L, 86.0 µg/L, 41.0 µg/L, 27.0 µg/L, and 18.0 µg/L, respectively. Lead was detected only on day 3 in the PS-MS-3 monolith core sample at a concentration of 11.0 µg/L during the nine days of extractions. No arsenic or lead was detected in the MEP analyses during the previous monolith sampling.

The physical testing results of the monolith and drainage material samples collected and analyzed as part of the second five-year review are presented in Table 5-4. A complete set of the analytical data for the monolith and drainage material sampling event is included in Attachment E. As indicated earlier, the monolith core and drainage material samples were physically analyzed for permeability. The monolith core samples were also physically analyzed for unconfined compressive strength, Hardgrove grindability index, acid neutralization capacity, and wet/dry weathering. The drainage material samples were also physically analyzed for minimum/maximum density. The purpose of the drainage material testing was to determine whether the material used is comparable to material designed to be used in the perimeter ditch. Of the analyses conducted on the monolith core samples, only the determination of the Hardgrove grindability index was performed during the previous sampling of the monolith. The rest of the analyses were recommended during the first

Table 5-2
Comparison of Historial Groundwater Results (1995 through 2000)
Peppers Steel and Alloys Five-Year Review
Medley, Dade County, Florida

Parameter (µg/L)	Consent Decree Remedial Action Levels (µg/L)	MO-1	MW-6A	MW-6CR	MO-2		MO-3		MW-4A	MW-4B	MW-5A		MW-5B		MW-6B	MW-9A
		FPL	FPL	FPL	FPL	SESD	FPL	SESD	FPL	FPL	FPL	DERM	FPL	DERM	FPL	FPL
July 25, 1995																
Lead	50	4.6	***38.5***	0.48U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
January 20, 1997																
Lead	50	3U	9.2	3U	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
February 3, 1998																
Lead	50	10.9	***15.4***	2.0	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
January 11-12, 2000																
Lead	50	NS	12U	NS	12U	***20 / 22D***	12U	2.9	***30***	12U	12U	2U	12U	2.3	12U	12U
Arsenic	50	NS	12U	NS	12U	5.0U / 5.0UD	12U	5.0U	12U	12U	12U	NS	12U	NS	12U	12U
PCBs	7	NS	ND	NS	ND	ND / NDD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

NOTES:

- µg/L Micrograms per liter.
- MO Monolith monitoring well.
- MW Monitoring well.
- U Material was analyzed for but not detected. The number shown is the sample quantitation limit (SQL).
- NS Not sampled.
- ND Not detected above SQLs for all PCBs analyzed (PCB/Aroclor -1016, -1221, -1232, -1242, -1248, -1254, -1260).
- DERM Results as analyzed by Department of Environmental Resources Management Miami-Dade County.
- SESD Results as analyzed by EPA Science and Ecosystem Services Division Laboratory, Athens, Georgia.
- D Results of duplicate sample as analyzed by EPA Science and Ecosystem Services Division Laboratory, Athens, Georgia.

Boldface italized values indicate values greater than current EPA and/or FDEP primary drinking water standard (MCL) indicated for that analyte.

Table 5-3
Second Five-Year Review Chemical Testing Monolith Results
Peppers Steel and Alloys Five-Year Review
Medley, Dade County, Florida

Analytical Parameters	PS-MS-1	PS-MS-2	PS-MS-3
Total Metals (mg/kg) (EPA Method 6010B: EPA Method 7471)			
Arsenic	0.9U	24	26.8
Barium	5.4	153	243
Calcium	0.3	1.6	1.6
Chromium	5.1	18	18.6
Lead	0.7	1,200	796
Mercury	0.3U	0.3U	0.3U
Selenium	0.5U	3.5	1.7
Silver	0.2U	0.5	0.3
TCLP (mg/L) (EPA Method 1311/6010B)			
Arsenic	0.5U	0.5U	0.5U
Lead	0.5U	1.6	0.5U
MEP (µg/L) (EPA Method 1320/6010B)			
Arsenic Day 1	15U	15U	44.0
2	15U	16	48.0
3	15U	37	86.0
4	15U	15U	41.0
5	15U	15U	15U
6	15U	15U	15U
7	15U	15U	27.0
8	15U	15U	15U
9	15U	15U	18.0
Lead Day 1	33	13	10U
2	64	10U	10U
3	152	10U	11
4	129	10U	11U
5	10U	10U	10U
6	10U	10U	10U
7	10U	10U	10U
8	10U	10U	10U
9	10U	10U	10U

NOTES:

mg/kg Milligrams per kilogram.
mg/L Milligrams per liter.
µg/L Micrograms per liter.
PS Pepper's Steel and Alloys site
MS Monolith core sample.
U Material was analyzed for but not detected. The number shown is the sample quantitation limit (SQL).

Table 5-4
Second Five-Year Review Physical Testing Monolith and Drainage Material Results
Peppers Steel and Alloys Five-Year Review
Medley, Dade County, Florida

Physical Parameters	PS-MS-1	PS-MS-2	PS-MS-3	PS-DM-1	PS-DM-2	PS-DM-3
Unconfined Compressive Strength (lbs/sq in) (ASTM D2166a)						
Unconfined Compressive Strength	NA*	NA*	778	NA	NA	NA
Permeability (ASTM D4525-90e1)						
Porosity (%)	21.1	57.8	47.7	99.9	99.9	99.9
Permeability (square meters)	2.33E-016	4.67E-012	4.57E-018	2.6E-011**	2.40E-11**	4.00E-11**
Hardgrove Grindability Index (ASTM D409-97)						
Hardgrove Grindability Index	76	98	80	NA	NA	NA
Acid Neutralization Capacity (%) (ASTM C1318-95)						
Total Neutralizing Capacity	3.42	2.98	2.18	NA	NA	NA
Dissolved Magnesium	0.06	0.03	0.02	NA	NA	NA
Total Dissolved Oxides	3.74	3.05	2.27	NA	NA	NA
Wet/Dry Weathering (ASTM 4843 Modified)						
Total Arsenic - First Leachate (µg/L)	NA***	15U	15U	NA	NA	NA
Total Arsenic - Final Leachate (µg/L)	NA***	15U	15U	NA	NA	NA
Total Arsenic - Residual (mg/kg)	NA***	41	37	NA	NA	NA
Total Lead - First Leachate (µg/L)	NA***	10U	10U	NA	NA	NA
Total Lead - Final Leachate (µg/L)	NA***	30	10U	NA	NA	NA
Total Lead - Residual (mg/kg)	NA***	2,000	1,530	NA	NA	NA
Minimum/Maximum Density (lbs/cu ft) (ASTM D4254/D4253)						
Minimum Density	NA	NA	NA	69.9	68.9	74.11
Maximum Density	NA	NA	NA	76.7	76.0	81.88

NOTES:

lbs/sq in	Pounds per square inch.
mg/L	Milligrams per liter.
mg/kg	Micrograms per liter.
lbs/cu ft	Pounds per cubic foot.
PS	Pepper's Steel and Alloys site
MS	Monolith core sample.
DM	Drainage material sample.
U	Material was analyzed for but not detected. The number shown is the sample quantitation limit (SQL).
*	Samples PS-MS-1 and PS-MS-2 could not be tested since the cored samples were not intact upon arrival at the laboratory.
**	Permeability values may be greater than those presented since the system flow rate capacity was reached during testing.
***	Not analyzed due to condition of monolith core sample received.
NA	Not analyzed.

five-year review to establish a baseline to determine the chemical and physical integrity of the monolith over time.

The Hardgrove grindability indices for monolith core samples PS-MS-1, PS-MS-2, and PS-MS-3 are 76, 98, and 80, respectively. The index for the monolith sample collected previously is 52. The higher the index number is, the softer the material. Therefore, the monolith core samples collected for this five-year review were softer than the monolith core material sample collected in 1993. However, the unconfined compressive strength results of monolith core sample PS-MS-3, was 778 pounds per square inch (psi). This value is much higher than the design basis strength of 20.8 psi which was chosen because it was adequate to support medium construction as is needed to support existing business/commercial structures in the area of the site. Core samples PS-MS-1 and PS-MS-2 were not analyzed because the cores were not intact (structural integrity compromised during core extraction) upon submittal, and therefore, were not intact upon arrival at the laboratory.

The porosity and permeability as determined by air analysis of the monolith core samples and drainage material samples were determined as part of the permeability analyses process. The porosity/permeability analytical results of monolith core samples PS-MS-1, PS-MS-2, and PS-MS-3 are 21.1 %/2.33E-016 square meters (m^2), 57.8 %/4.67E-012 m^2, and 47.7%/4.57E-018 m^2, respectively. The porosity/permeability analytical results of drainage material samples PS-DM-1, PS-DM-2, and PS-DM-3 are 99.9 %/2.6E-011 m^2), 99.9 %/2.40E-011 m^2, and 99.9 %/4.00E-011 m^2, respectively. However, the actual permeabilities of the drainage materials are apt to be much higher due to the limitations of the air system flow rate capacity used to analyze the materials sampled.

The total neutralization capacity, dissolved magnesium, and total dissolved oxides were determined as parts of the acid neutralization capacity analyses of the monolith core samples. The total neutralization capacity/dissolved magnesium/total dissolved oxides results for monolith core samples PS-MS-1, PS-MS-2, and PS-MS-3 are as follows: 3.42 %/0.06 %?3.74 %; 2.98 %/0.03 %/3.05 %; and 2.18 %/0.02 %?2.27 %, respectively.

Wet?dry weathering analyses in the interest of time and costs for analysis consisted of 12-24 hour cycles of wetting and drying and analyzing for total lead and arsenic in the leachate from the first and last leaching intervals and the total lead and arsenic in the monolith core sample after the completion of the cycles. No analyses were conducted on monolith sample PS-MS-1 due to the condition in which it arrived at the laboratory. The analytical results of the total arsenic-first leachate for the PS-MS-2 and PS-MS-3 monolith core samples were both below detection limits. The analytical results of the total arsenic-last leachate for the PS-MS-2 and PS-MS-3 monolith core samples were also below detection limits. The analytical results of the total arsenic-residual for the PS-MS-2 and PS-MS-3 monolith core samples were 41 mg/kg and 37 mg/kg, respectively. The analytical results of the total lead-first leachate for the PS-MS-2 and PS-MS-3 monolith core samples were both below detection limits. The analytical results of the total lead-last leachate for the PS-MS-2 and PS-MS-3 monolith core samples were 30 µg/L and below detection limits, respectively. The analytical results of the total lead-residual for the PS-MS-2 and PS-MS-3 monolith core samples were 2.00 mg/kg and 1,530 mg/kg, respectively.

In addition to the porosity and permeability analyses, the minimum/maximum densities were also determined for the drainage material samples. The results of the minimum/maximum densities of the PS-DM-1, PS-DM-2, and PS-DM-3 drainage material samples are as follows: 69.9 pounds per cu ft (lbs/cu ft)/76.71bs/cu ft; 68.9 lbs/cu ft/76.0 lbs/cu ft; and 74.11 lbs/cu ft/81.881bs/cu ft, respectively. The average density of the stone (ASTM #4; Department of Transportation Code #06) reportedly used in the perimeter ditch of the monolith is 81.2 lbs/cu ft. The maximum density of the drainage material sampled is slightly smaller than the average density of the stone reportedly used; however, it is considered close enough to indicate that the stone used was the same as that specified in the remedial action design.

5.7 Technology Review

The calculations that Canonic Environmental generated for their evaluation of the perimeter ditch design were also reviewed to determine whether drainage problems reportedly attributed to the PSA site were due to the design of the perimeter ditch. After a review of the calculations, it was speculated that the major reason for the questionable effectiveness of the drainage ditch is because it does not have the proper permeability to handle the flow into it. Furthermore, it was speculated that the permeability originally available at the completion of the monolith, has reduced significantly over time due to the erosion of fines (No. 4 down to No. 200 sieve material) from the original unwashed limestone cover into the ditch, the partial solidification of the limestone in the drainage ditch as well as on the monolith, and the introduction of organic or other particles into the void spaces of the drainage ditch from onsite vegetation and?or from winds associated with storms or hurricanes. There were no previous calculations available that determined the ability of runoff to enter the drainage ditch or information as to the value of the original permeability of the limestone material. An investigation and/or study will be necessary to determine whether the speculations derived from review of the perimeter ditch design and evaluations are correct and what efforts will be needed to provide proper drainage for the PSA site.

The Proposed EPA O&M Plan addresses the maintenance of settlement in the drainage ditch with the removal of the ditch contents and replacement with crushed limestone. Similar procedures were also suggested by Mr. Jesse Hicks, PE, for the PSA site in a document prepared for Peterson and Bernard representing the PSA site and Norton Bloom (Attachment A, 11). This solution, while effective, would be a temporary one which would require repeated use over the duration of the project. Another solution for the PSA proposed by another consultant (Tenera) on behalf of Norton Bloom (PSA site), Thomas Curtis (Miami Battery Manufacturing), and William, Flora, and Lowell Payne was the establishment of several drainage channels around the perimeter and routing the flows to drainage fields (Attachment A, 6, 18). The drainage fields would serve as detention ponds which would detain the runoff of a storm event and release it through absorption into the soil or evaporation. The advantage of the drainage fields is that they would allow frequent and cheap maintenance of the bottom of the fields to overcome the effects of plugging of the pore spaces. Additionally, they would be easier to visually inspect. Information regarding the evaluation of the drainage ditch calculations is included in Attachment H.

6.0 Assessment

6.1 Changes in Conditions External to the Remedy

Current land use and projected land use in the vicinity of the PSA site has not changed significantly since the remedial action occurred. Industrial and commercial businesses still predominate in the area.

No new sources, or pathways have been observed at the PSA site since the last five-year review. There continues to be a concern of runoff from the PSA site onto the neighboring site of Millennium Battery. This hydrologic condition has apparently been a problem at the PSA site since shortly after the monolith construction was completed. No other hydrologic or hydrogeologic site conditions are known to have changed since the remedial action for the PSA site was initiated.

6.2 Remedy Implementation Versus EDO Requirements

The EDD indicates that after the completion of the remedy the only continuing need will be monitoring to verify that the remedy is performing as designed. Therefore, items typically associated with remedial action remedy implementations such as access and institutional controls, the need for an onsite health and safety plan (HASP), and documentation of O&M costs are not applicable to the PSA site.

Access controls in the form offences and signs for the site were required only during the remedial action for safety purposes. Institutional controls to insure future land uses for the site compatible with the remedy have not been found in the documents reviewed, but are inferred in other documents to not be needed. The stability of the monolith was reportedly designed to withstand construction similar to that already in the area, thus, eliminating the need for such controls. Because the O&M currently in place is limited to groundwater monitoring every 2.5 years, there is no onsite HASP. It is assumed that all groundwater monitoring since the last five-year review was conducted under a FPL-approved HASP. Black & Veatch was operating under a company and EPA-approved HASP during its five-year review field activities at the PSA site. Most, if not all, O&M costs incurred since the last five-year review have been incurred by FPL; therefore, the documentation of these costs for the purpose of repayment by EPA, has not been necessary. The EDD estimated a $42,500 annual O&M cost for the site, but no documentation as to what costs have been incurred against the site for O&M purposes was observed within the materials reviewed. An Agreement concerning the site allotted $557,869 for O&M use as specified in the Proposed O&M Plan (completed 1989) and is scheduled to be implemented with the completion of this second five-year review. The Proposed O&M Plan assumes institutional control over the site whereby the property will not be used for commercial or residential development for 30 years after the closure of the site. The plan also provides access control to and within the site by requiring the maintenance and repairing all security fencing, access roads, and monitoring wells and associated security structures at the site.

A sufficient groundwater monitoring well contingency plan is in place for the PSA site which addresses actions to be completed in the event of groundwater flow changes, damage to a monitoring well during periodic inspections, and unexpected or conflicting sampling results. The contingency plan has not been properly implemented in that the periodic inspections and notifications to EPA of monitoring well repairs should have occurred on a more frequent basis.

The remedy appears to be operating and functioning as designed with regard to the monolith as evidenced by the groundwater monitoring results that have all been under the remedial action levels established for the site. No PCBs have been detected in the groundwater since monitoring began. The monolith appears to be effectively containing the PCB, lead, and arsenic contamination.

The remedy docs not appear to be operating and functioning as designed with regard to the drainage around the monolith. The drainage ditch around the monolith may not effectively contain runoff water from the monolith as indicated during interviews with key personnel associated with the site and as speculated from the review on the drainage ditch design and evaluations of the design. Vegetation and other organic materials have been observed within the drainage ditch, and the absence of O&M to keep the ditch clear of such material, is speculated to be the major cause of its ineffectiveness. An investigation and/or study will be necessary to determine the current effectiveness of the drainage ditch.

The O&M currently in place for the PSA site, which consists of groundwater monitoring of lead every 2.5 years in monitoring wells MO-1, MW-6A, and MW-6CR, appears to be adequate in documenting the compliance of the groundwater with remedial action levels. The groundwater monitoring frequency and the number of parameters analyzed was reduced to the current levels by EPA after a reassessment of the groundwater was conducted in June 1992 and submitted to EPA in June 1993. The reassessment recommended discontinuing all parameter and groundwater level monitoring given that groundwater flow directions had not changed since monitoring began and parameters consistently met remedial action levels. However, EPA approved lead monitoring every 2.5 years for monitoring wells MO-1, MW-6A, and MW-CR. The reassessment was scheduled to be conducted 3 years after the completion of the remedial action as a requirement of the groundwater monitoring program. The fact that the groundwater has been meeting remedial action levels and the fact that the groundwater monitoring that has been conducted by FPL since the first five-year review has been occurring on a more frequent basis than required indicate that the scheduled groundwater monitoring O&M is being properly implemented.

6.3 Changes in ARARs

Since the completion of the first five-year review, the EPA primary drinking water standard or MCL, for lead has changed from 50 µg?L to 15 µg/L, and the MCL for PCBs has changed from 7 µg/L to 0.5 µg/L. While the analytical results of the monitoring wells sampled at the PSA site have consistently met remedial action levels, the results have not consistently met the current EPA MCL for lead. In sampling conducted for this five-year review, the groundwater analytical results from well MW-4A indicate that the current EPA MCL for lead was exceeded. Analysis of groundwater by FPL and EPA of well MO-2 for lead indicate discrepancies in analytical results as to whether the groundwater in this well exceeds the current EPA MCL for lead.

7.0 Deficiencies

Two deficiencies were noted during this five-year review. One deficiency noted was the ineffectiveness of the drainage ditch surrounding the monolith to contain all the runoff from the monolith on a consistent basis. The drainage ditch was designed to contain runoff from the monolith in order to prevent it from discharging onto nearby properties. Another deficiency noted was the inability to determine the effectiveness of the remedy through the proper inspection of the limestone cover of the monolith and the drainage ditch due to the excessive amount of vegetation located on the site. The lack of O&M with regard to the maintenance of the drainage ditch as specified in the EPA Proposed O&M Plan for the PSA site might be attributing to the ineffectiveness of the drainage ditch; however, tests performed on the monolith do not indicate that this deficiency is compromising the integrity of the monolith.

8.0 Recommendations

One recommendation is the immediate implementation of the EPA Proposed O&M Plan with regards to: 1) checking the cover for settlement, erosion, leachate seepage, ponded water, and vegetation at the sides of the perimeter ditch; 2) checking the perimeter drainage ditch drainage system for sloughing, vegetation, and ponding; 3) checking the integrity of the monitoring wells; 4) checking the condition of the perimeter fence; 5) repairing major settlement noted in cover; 6) eliminating vegetation and settlement in the perimeter drainage ditch; 7) addressing leachate seepage; 8) repairing or abandoning monitoring wells than cannot be repaired; and 9) repairing the perimeter fence. Additionally, at least one topographic survey is recommended during the 30-year post closure period. Other items addressed in the O&M plan such as additional topographic surveys, access roads, and removal of all vegetation on the monolith would enhance the maintenance of the monolith but would not necessarily add to the protectiveness of the remedy. More controlled vegetation on the monolith may prove more effective at maintaining the limestone cover that the removal of all vegetation.

It is also recommended that groundwater monitoring continue every 2.5 years for the monitoring wells currently sampled and that monitoring well MO-2 be re-sampled by EPA and FPL during this five-year review to determine whether this well meets the current ARAR for lead. If the groundwater analytical results for the re-sampling of well location MO-2 remain above the current MCL, then it is recommended that this location continue to be sampled in addition to the other wells currently sampled, and the consideration of implementation of the current lead MCL be addressed in the next five-year review. Additionally, it is recommended that all monitoring wells sampled during this five-year review also be sampled during the next five-year review, at which time the groundwater monitoring plan may be reassessed to determine future groundwater monitoring needs. It is also recommended that the monolith be sampled and analyzed for total metals, TCLP-lead and arsenic, MEP-lead and arsenic, unconfined compressive strength, permeability, Hardgrove grindability index, acid neutralization capacity, and wet/dry weathering, and the results compared to the baseline results generated during this five-year review.

If runoff continues to inundate nearby properties after DERM conducts O&M activities and possible restoration of the perimeter drainage ditch, then an investigation or further study of the drainage collar should be conducted. Such an investigation or further study should be conducted to determine the drainage collar's effectiveness, the possibility of restoration to its initial condition, or the need to design additional or other means of drainage for the monolith.

9.0 Protectiveness Statements

The remedy at the PSA site is protective of human health when comparing analytical results to the remedial action levels specified in the consent decree. However, further sampling of monolith monitoring well MO-2 is needed to determine whether it is protective of human health with regard to the current EPA and state MCLs for lead.

The remedy at the PSA site is protective of the environment with regards to the monolith as evidenced by the groundwater monitoring results that have been under the remedial action levels established for the site and the apparent consistent chemical and physical integrity of the monolith over time. The lack of O&M at the PSA site may be affecting the performance of the drainage ditch surrounding the monolith such that water runoff containment may be failing this portion of the remedy. However, this failure is not affecting the overall purpose of the remedy, which is to contain PCBs, lead, and arsenic contamination within the monolith below the remedial action levels for which the remedy was designed.

10.0 Next Review

Another five-year review is recommended five years after the finalization of this five-year review report. A similar format but increased level of effort is recommended for the review. The effort should include sampling for lead, arsenic, and PCBs at the same locations as sampled for this five-year review, and the groundwater monitoring plan should be reassessed to determine future groundwater monitoring needs. Additionally, the monolith should be sampled and analyzed for total metals, TCLP-lead and arsenic, MEP-lead and arsenic, unconfined compressive strength, permeability, Hardgrove grindability index, acid neutralization capacity, and wet/dry weathering, and the results compared to the baseline results generated during this five-year review. The next five-year review should also evaluate via an investigation and/or study the effectiveness of the containment of the perimeter ditch and/or any changes that may have been constructed to replace or supplement the ditch if such improvements were shown to be needed and are implemented prior to the next five-year review.

Attachment A

List of Documents Reviewed

Attachment A
List of Documents Reviewed

1. Enforcement Decision Document Remedial Alternative Selection, Pepper's Steel and Alloys Site, Medley, Florida, Jack E. Ravan, EPA Regional Administrator, March 12, 1986.

2. Appendix B Groundwater Monitoring, Pepper's Steel and Alloy Site, Medley, Florida, GeoTrans, Inc., January 1987.

3. Pepper's Steel and Alloys Site, Medley, Florida, "Evaluation of Drainage Structure", Canonie Environmental Services Corp., January 1989.

4. Pepper's Steel and Alloys Superfund Site, Medley, Florida, Final Report on Remedial Action, Florida Power & Light Company, June 1989.

5. "Proposed Operations and Maintenance Plan, Pepper's Steel and Alloys Site, Medley, Florida", Superfund Branch, Waste Management Division, U.S. Environmental Protection Agency, Region 4, July 1989.

6. Letter correspondence to U.S. Environmental Protection Agency Regional Administrator from John W. Wilcox, Mesiror, Gelman, Jaffe, Cramer & Jamieson, July 25,1989. Subject: Miami Battery-Medley, Florida.

7. Letter correspondence to Diane Scott, South Site Management Section, Superfund Branch. U.S. Environmental Protection Agency from Charles P. Spalding, Hydrogeologist, GeoTrans, Inc., January 30, 1990. Subject: Printout of Pepper's Steel and Alloy Site spreadsheet of sampling results.

8. "Operation and Maintenance Guidelines for Drain Collar, Pepper's Steel and Alloys Site, Medley, Florida", Prepared for Peterson and Bernard, 707 Southeast Third Avenue, Suite 500, Blackstone Building, Ft. Lauderdale, Florida 33302, Prepared by Jesse L. Hicks, P. E., February 1990.

9. Transmittal of Florida Power & Light Company - Pepper's Steel and Alloy Analytical Data (Monolith Wells and Groundwater Monitor Wells) 1st Semiannual, 1990, from GeoTrans, Inc., to U.S. Environmental Protection Agency Environmental Services Division. May 17, 1990.

10. "Proposed Drainage Design, Drainage Via Open Channels to Drainage Fields", Tenera, handwritten date of October 12, 1990.

11. Letter Correspondence to Black & Veatch, Asheboro, North Carolina, from Derek B. Spilman, Law Offices Rutnik& Wolfe, October 24,1991. Subject: U.S. versus Pepper's Steel and Alloys, Inc., et al.

12. Letter correspondence to John Zimmerman, U.S. Environmental Protection Agency from Douglas C. Pasley, Jr., P.O., Florida Power & Light Company, March 5,1993. Subject: Analytical data from ground water monitor well sampling (December 1992) at the Pepper's Steel and Alloy Site, Medley, Florida.

13. Letter correspondence to Douglas C. Pasley, Jr., P. O., Florida Power & Light Company from Charles P. Spalding, Senior Hydrogeologist, GeoTrans, Inc., June 2,1993. Subject: A summary of Reassessment of Groundwater Monitoring at the Pepper s Steel and Alloy Site provided to Florida Power & Light Company by GeoTrans, Inc., June 1992.

14. Superfund Preliminary Site Closeout Report, Pepper's Steel and Alloys Superfund Site, Medley, Dade County, Florida. Joseph R. Franzmathes, Director, Waste Management Division, U.S.Environmental Protection Agency, September 28, 1993.

15. Five-Year Review Final Report Pepper's Steel and Alloys. Inc.. Site. Medley. Dade County. Florida. prepared by Roy F. Weston, Inc., April 1994.

16. Final Report, General Treatability Studies, Pepper's Steel and Alloys, Inc., Site, Mouat Industries Site. Brunswick Wood Preserving Site, prepared by, January 1994.

17. Letter correspondence to John Zimmerman, Remedial Project Manager. U.S.Environmental Protection Agency, Region 4, from Charles P. Spalding. Senior Hydrogeologist. GeoTrans, Inc.. August 30,1995. Subject: Analytical data from July 25,1995. groundwater sampling event at the Pepper's Steel and Alloy.

18. Consent Decree Agreement, Civil Action No. 85-0571-CV-EDB-Davis, United States of America. Plaintiff v. Pepper's Steel and Alloys, Inc.; et al., defendants, October 16, 1997.

19. Letter correspondence to Pam Scully, U.S. Environmental Protection Agency, Region 4, from Kathryn S. Salvador, Environmental Specialist, Florida Power & Light Company, January 5,1999. Subject: Pepper's Steel & Alloy NPL Site, Medley, Dade County, Florida, groundwater monitoring results.

20. Letter correspondence to Pam Scully, U.S. Environmental Protection Agency, Region 4. from Diana Davis, Attorney for the Florida Power & Light Company, September 29,1999. Subject: Florida Power & Light Company's request to terminate ground water monitoring obligation at Pepper's Steel & Alloy NPL Site, Medley, Dade County, Florida.

21. Letter correspondence from Pam Scully, U.S. Environmental Protection Agency, Region 4, to Diana Davis, Attorney for the Florida Power & Light Company, October 8,1999. Subject: response to Florida Power & Light Company's request to terminate ground water monitoring obligation at Pepper's Steel & Alloy NPL Site, Medley, Dade County, Florida.

22. Letter correspondence from Pam Scully, U.S. Environmental Protection Agency, Region 4, to Diana Davis, Attorney for the Florida Power & Light Company, November 19,1999. Subject: response to Florida Power & Light Company's response to request by EPA for Florida Power & Light Company to assist in ground water sampling for the Five-Year Review.

23. Letter correspondence to Pam Scully, U.S. Environmental Protection Agency, Region 4, from Kathryn S. Salvador, P. E., Senior Environmental Engineer, Florida Power & Light Company, February 23, 2000. Subject: Analytical results of Five-Year Review groundwater sampling at Pepper's Steel & Alloy Site, Medley, Dade County, Florida.

24. Facsimiled information from Axel Salis of Department of Environmental Resources Management - Miami/Dade County, to Carol W. King, Black & Veatch Special Projects Corp., March 14,2000: Subject: Analytical results from split samples from Pepper's Steel and Alloys Site collected January 12,2000.

25. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System (CERCLIS) Site Information retrieved from website www.epa.gov?superfund/sites/cursites/c3fl/a0400599.htm on June 6, 2000.

Attachment B

Department of Environmental Resources Management Work Plan for the Pepper's Steel and Alloys Site

MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

ENVIRONMENTAL RESOURCES MANAGEMENT
POLLUTION CONTROL DIVISION
33 S.W. 2nd AVENUE
SUITE 800
MIAMI, FLORIDA 33130-1540
(305) 372-6817

July 3, 2002

Carmen J. Santiago-Ocasio, Project Manager
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, GA 30303

Re: Work Plan for the Pepper Steel and Alloys Site located in Medley, Florida.

Dear Ms. Santiago-Ocasio:

The Department of Environmental Resources Management (DERM) is pleased to submit this Work Plan for the Pepper Steel and Alloys Site located in Medley, Florida. This Work Plan is submitted in the form of a Budgetary Cost Estimate given the difficulty of adequately evaluating the condition of the crushed limestone cover and drainage collar due to the extent and density of existing vegetation and expected damage to said cover during clearing and grubbing activities (i.e. trunk removal). Subsequent to clearing and grubbing, a thorough survey of the condition of the limestone cover and drainage collar can be completed and the level of effort to recondition both better assessed.

The scope of work proposed herein includes:

1. Clearing approximately 385 Australian Pines and/or like trees with 6-inch to 12-inch diameter trunks using a dozer.
2. Removing tree stumps using a backhoe.
3. Cutting trees into five-foot or smaller sections.
4. Loading and transporting trees and stumps for disposal at a wood recycling facility.
5. Post demolition surveying.
6. Post demolition regrading and repair/reconstruction of collar drainage.
7. Post demolition repair/reconstruction of fence to restrict Site access.
8. Post regarding survey.

The 1-year O&M phase proposed herein includes:

1. Regularly scheduled site observations activities,
2. Evaluate and document potential problem areas of site based on site observations,
3. Correct problem areas observed, and
4. Sample the site monitoring well system and surface waters to determine effects of facility on shallow groundwater system.

Phase I: Scope of Work

Task IA – Project Coordination, HASP, and SWPPP

This task will involve the following activities:

- Coordination for access to the site and coordination of Work Plan activities. This will include site visits to verify site accessibility, equipment staging, and tree cutting area designation and layout.
- Preparation of a Site Specific Health and Safety Plan (HASP) for clearing and grubbing activities. The HASP will follow all applicable health and safety standards and appropriate OSHA standards. All firms participating in the project will adhere to the project HASP.
- Preparation of a site specific Stormwater Pollution Prevention Plan (SWPPP) to address clearing and grubbing activities, equipment and cutting/loading staging areas, and equipment maintenance and fueling activities. The plan will include Best Management Practices (BMP) required.
- Obtain required underground clearances for the proposed grubbing/tree stump removal.

Task IB – Clearing and Grubbing

This task will involve the following activities:

- Implement stormwater pollution prevention BMPs in accordance with the site specific SWPPP.
- Mobilize equipment to site.
- Prepare equipment and tree cutting and loading staging area.
- Clear approximately 11 acres of land containing approximately 385 Australian Pines and/or like trees with trunks ranging from 6 to 12-inches in diameter using a dozer.
- Transfer downed trees to cutting/loading staging area utilizing a loader.
- Cut trees into 5-foot sections for loading and disposal.
- Remove tree stumps using backhoe and transfer to cutting/loading staging area.
- Load cut trees and stumps for disposal at wood recycling facility.
- Cut cane and grass cover using a bushhog. Cane and grass cover cuttings will be left on-site to naturally decompose.
- Breakdown staging areas and demobilize all equipment.
- Collect and dispose of all BMP materials.
- Disposal of solid waste, fill, existing debris, structures, and materials abandoned on site is not included in this proposal.
- Filling or leveling of tree excavations/holes or damage to the cover resulting from clearing and grubbing activities is not included in this proposal. Care will be taken, to the extent possible and practical, to minimize damage to the cover during clearing and grubbing activities.
- Post demolition surveying.
- Post demolition regrading and repair/reconstruction of collar drainage.
- Post demolition repair/reconstruction of fence to restrict Site access.
- Post regrading survey.

Task IC – Summary Report

DERM will prepare a letter report for submittal to the EPA summarizing preliminary activities. The report will include a summary of quantities (i.e. number of trees removed), disposal manifest and site pictures depicting pre-and post conditions. In addition, the report will include findings regarding the condition of the existing cover, drainage collar, monitoring wells, and fence.

Phase II: 1-Year O&M Scope of Work

This phase will involve the following activities performed for a period of 1-year:

- Facility Observations and sampling analysis
  - Field observations: 2 trips
  - Observation reports: 2 trips
  - Monitoring well sampling: 4 MWs sampled once
- Routine Maintenance Activities
  - Weed and tree control: 1 event
  - Topographic survey: 1 event
- Non-Routine Maintenance
  - Major/Minor repair of ditch and cover settlement: 1 event
  - Erosion control: 2 events
  - Monitoring wells: 1 event
  - Security fence: 1 event
  - Access road: 1 event

Schedule and Budget

The following schedule was developed for the Phase I activities proposed herein:

Task	Duration
NTP Issued & Pre-mobilization	2 Weeks
Initial Activities/Project Coordination	1 Week
Prepare HASP & SWPPP	1 Week
SWPPP Approval	2 Weeks [(1)]
Implement SWPPP	½ Week
Mobilize Equipment and Personnel to Site and setup staging areas	½ Week
Clearing and Grubbing and Loading/Disposal	2 Week
Post demolition surveying	1 Week
Post demolition regrading and repair/reconstruction of collar drainage	4 Weeks
Post demolition repair/reconstruction of fence to restrict Site access	1 Week
Post regrading survey.	1 Week
RA Summary Report	2 Week
(1) Estimated	18 Weeks

The activities listed above can be completed within 18 weeks of DERM receiving a Notice to Proceed (NTP).

Phase II tasks will be completed over the course of one year.

We estimate the above-described scope of services can be completed for [redacted] The attached **Cost Table 1** provides a detailed breakdown of labor and expenses estimated for each of the project tasks [redacted] estimated for engineering and consulting services). DERM supervisory and project management costs [redacted] are broken down in the "Object Class Categories Worksheet/pages 1 and 3" of the attached application.

We trust that this Work Plan and projects costs are satisfactory to you and we look forward to working with you on this project. If you have any questions concerning the above, please contact Victor Mendez of the DERM Airports & Contracts Section or me at (305) 372-6885.

Sincerely,

M. Paul Voight

M. Paul Voight, PG, Chief
DERM Airports & Contracts Section

VM
Pc: Victor Mendez - DERM

Attachment C

Site Inspection Checklist

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be filled in by hand and attached to the five-year review report as supporting documentation of site status.)

I. SITE INFORMATION

Site name: Pepper Steel and Alloys Inc. Date of inspection: 9-29-99 10:00A.M.
Location and region: Medley, Dade County FL - IV EPA ID: FLD 032544587
Agency, office or company leading the Five-Year Review: USEPA IV BVSPC Weather/temperature: Partly Cloudy, humid Upper 80's °F
Remedy Includes (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other ______

☑ Inspection team roster attached ☑ Site map attached

II. INTERVIEWS (Check all that apply)

1. O&M site manager No O+M Performed, No Onsite Personnel
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ______
   Problems, suggestions; ☐ Report attached ______

2. O&M staff No O+M Performed
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. ______
   Problems, suggestions; ☐ Report attached ______

3. Local regulatory authorities and response agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

   Agency Medley Code Enforcement
   Contact Arley Nieto Chief 9/29/99 (305) 883-2048
   Name Title Date Phone no.
   Problems; suggestions; ☐ Report attached Drainage at Miami Battery entrance is poor, states runoff from Peppers has clogged drain lines.

   Agency FDEP - Palm Beach
   Contact Lee Martin ______ 9/29/99 ______
   Name Title Date Phone no.
   Problems; suggestions; ☐ Report attached Accompanied Robert Mangum, Pam Scully, Jim Lindsey, and Kathy Salvador on a "walk-over" of the Peppers site.

   Agency FDEP - Palm Beach - RCRA Enforcement
   Contact James Bussey ______ ______ ______
   Name Title Date Phone no.
   Problems; suggestions; ☐ Report attached Led Robert Mangum, Pam Scully, and Lee Martin

on a tour of Miami Battery, pointing out an area of improper discharge on the west side of Miami Battery

Agency ______________________

Contact ____________ ____________ ____________ ____________

Name Title Date Phone no.

Problems; suggestions; ☐ Report attached ______________________

4. Other interviews (optional) ☐ Report attached.

III. ONSITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Manual and As-Builts** ☐ Readily available ☐ Up to date ☒ N/A
   ☐ As-builts ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Maintenance Logs ☐ Readily available ☐ Up to date ☒ N/A
   Remarks No O+M performed.

2. **Site Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A
   Remarks No on-site presence, no documents posted.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks No on-site presence, no documents posted.

4. **Permits and Service Agreements**
   ☐ Air discharge permit ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Effluent discharge ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Other permits__________ ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

9. **Discharge Compliance Records**
   ☐ Air ☐ Readily available ☐ Up to date ☒ N/A
   ☐ Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A
   Remarks______________________

10. **Daily Access/Security Logs**
☐ Readily available ☐ Up to date ☑ N/A
Remarks____

____

IV. O&M COSTS

No O+M performed, no costs.

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Other ____

____

2. **O&M Cost Records**
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____N/A_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From________To________ (Dates) ________ (Total cost) ☐ Breakdown attached
From________To________ (Dates) ________ (Total cost) ☐ Breakdown attached
From________To________ (Dates) ________ (Total cost) ☐ Breakdown attached
From________To________ (Dates) ________ (Total cost) ☐ Breakdown attached
From________To________ (Dates) ________ (Total cost) ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: _____N/A_____

____

____

____

V. GENERAL SITE CONDITIONS

Whenever possible, actual site conditions should be documented with photographs.

A. Fencing
1. Fencing damaged ☐ Location shown on site map ☐ Gates secured ☐ N/A
Remarks Fence is in place, but with large areas missing around the entire perimeter. Too numerous to fully describe.

B. Site Access
1. Access restrictions, signs, other security measures ☐ Location shown on map ☐ N/A
Remarks None noted anywhere.

____

C. Perimeter Roads
1. Roads damaged ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks *No perimeter road, covered by Australian Pine trees.*

D. General

1. Vandalism/trespassing ☑ Location shown on site map ☐ No vandalism evident
   Remarks *Paint rollers, fluorescent light tubes, liquor bottles, truck tires noted closest to Miami Battery and Boat Yard (inside monolith fence).*
2. Land use changes onsite ☑ N/A
   Remarks
3. Land use changes offsite ☐ N/A
   Remarks *Surrounding the site to the north and east are small, poorly constructed "garage stalls" that appear to be used for maintenance of privately owned dump trucks.*
4. Institutional controls (site conditions imply institutional controls not being enforced) ☑ N/A
   Agency
   Contact
   Name Title Date Phone no.
   Problems; suggestions; ☐ Report attached

VI. LANDFILL COVER ☑ Applicable ☐ Not applicable

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☑ Settlement not evident
   Areal extent Depth
   Remarks
2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident ☑ *N/A*
   Lengths Widths Depths
   Remarks *Cover material is crushed limestone, impossible to assess cracks in this material (≅12" thick).*
3. **Erosion** ☑ Location shown on site map ☐ Erosion not evident
   Areal extent Depth
   Remarks *Evident that drainage collar cannot hold surface water runoff.*
4. **Holes** ☐ Location shown on site map ☑ Holes not evident
   Areal extent Depth
   Remarks
5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☑ Trees/Shrubs (indicate size and locations on a diagram) *— trees est. up to 4" thick and 30' tall.*
   Remarks *Australian pines abundant throughout, ½" to 1½" decomposing pine needle mat on the cover.*
6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks *Crushed limestone beneath ½" to 1½" decomposing pine needles.*

7. **Bulges** ☐ Location shown on site map ☑ Bulges not evident
Areal extent________ Height________
Remarks________

8. **Wet Areas/Water Damage** ☑ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent________
☐ Ponding ☐ Location shown on site map Areal extent________
☐ Seeps ☐ Location shown on site map Areal extent________
☐ Soft subgrade ☐ Location shown on site map Areal extent________
Remarks________

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☑ No evidence of slope instability
Areal extent________
Remarks________

B. **Benches** ☐ Applicable ☑ Not applicable
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☑ N/A or okay
Remarks________

2. **Bench Breached** ☐ Location shown on site map ☑ N/A or okay
Remarks________

3. **Bench Overtopped** ☐ Location shown on site map ☑ N/A or okay
Remarks________

C. **Letdown Channels** ☐ Applicable ☑ Not applicable
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descends down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent________ Depth________
Remarks________

2. **Material Degradation** ☐ Location shown on site map
☐ No evidence of degradation
Material type________ Areal extent________
Remarks________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent________ Depth________
Remarks________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent________ Depth________

Remarks____

5. **Obstructions** Type__________________ ☐ No obstructions
☐ Location shown on site map Areal extent__________
Size__________
Remarks____

6. **Excessive Vegetative Growth** Type__________
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent__________
Remarks____

D. Cover Penetrations ☑ Applicable ☐ Not applicable

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked ☐ Functioning
☐ Routinely sampled ☐ Good condition ☐ Needs O&M ☐ Evidence of leakage at penetration
☑ N/A
Remarks____

2. **Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning
☐ Routinely sampled ☐ Good condition ☐ Needs O&M ☐ Evidence of leakage at penetration
☑ N/A
Remarks____

3. **Monitoring Wells** (within surface area of landfill) ☑ Properly secured/locked
☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Needs O&M
☐ Evidence of leakage at penetration ☐ N/A
Remarks Unable to locate PS-MW-7A, possibly destroyed.

4. **Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning
☐ Routinely sampled ☐ Good condition ☐ Needs O&M
☐ Evidence of leakage at penetration ☑ N/A
Remarks____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☑ N/A
Remarks____

E. Gas Collection and Treatment

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs O&M ☑ N/A
Remarks____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs O&M ☑ N/A

Remarks____

F. Cover Drainage Layer ☐ Applicable ☐ Not applicable
1. **Outlet Pipes Inspected** ☐ Functioning ☑ N/A
Remarks____

2. **Outlet Rock Inspected** ☐ Functioning ☑ N/A
Remarks____

G. Detention/Sedimentation Ponds ☐ Applicable ☑ Not applicable
1. **Siltation** Areal extent__________ Depth__________ ☑ N/A
☐ Siltation not evident
Remarks____

2. **Erosion** Areal extent__________ Depth__________
☐ Erosion not evident
Remarks____

3. **Outlet Works** ☐ Functioning ☑ N/A
Remarks____

4. **Dam** ☐ Functioning ☑ N/A
Remarks____

H. Retaining Walls ☐ Applicable ☑ Not applicable
1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement__________ Vertical displacement__________
Rotational displacement__________
Remarks____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks____

I. Perimeter Ditches/Off-Site Discharge ☑ Applicable ☐ Not applicable
1. **Siltation** ☐ Location shown on site map ☑ Siltation not evident
Areal extent__________ Depth__________
Remarks____

2. **Vegetative Growth** ☑ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent__________ Type__________
Remarks Possibly 1/2 of the site collar (drainage) has dead trees, limbs, and pine straw in it.

3. **Erosion** ☑ Location shown on site map ☐ Erosion not evident
Areal extent Unmeasured Depth ≅ 1"–6"
Remarks

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks

VII. VERTICAL BARRIER WALLS ☐ Applicable ☑ Not applicable

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent Depth
Remarks

2. **Performance Monitoring** Type of monitoring
☐ Performance not monitored
Frequency ☐ Evidence of breaching
Remarks

VIII. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☑ Not applicable

A. **Groundwater Extraction Wells, Pumps, and Pipelines**
☐ Applicable ☑ Not applicable

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition ☐ All required wells located ☐ Needs O&M ☑ N/A
Remarks

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs O&M
Remarks

B. **Surface Water Collection Structures, Pumps, and Pipelines**
☐ Applicable ☑ Not applicable

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition ☐ Needs O&M
Remarks

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs O&M
Remarks

C. **Treatment System** ☐ Applicable ☑ Not applicable

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation

☐ Air stripping ☐ Carbon adsorbers
☐ Filters________ ☐ Others________________________________
☐ Good condition ☐ Needs O&M
☐ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
☐ Equipment properly identified
☐ Quantity of groundwater treated annually____________________
☐ Quantity of surface water treated annually____________________
Remarks____

____

2. **Electrical Enclosures and Panels** (properly rated and functional) ☑ N/A
☐ Good condition ☐ Needs O&M
Remarks____

____

3. **Tanks, Vaults, Storage Vessels** ☑ N/A
☐ Good condition ☐ Proper secondary containment ☐ Needs O&M
Remarks____

____

4. **Discharge Structure and Appurtenances** ☑ N/A
☐ Good condition ☐ Needs O&M
Remarks____

____

5. **Treatment Building(s)** ☑ N/A
☐ Good condition ☐ Needs repair
☐ Chemicals and equipment properly stored
Remarks____

____

6. **Monitoring Wells** (pump and treatment remedy) ☐ Properly secured/locked
☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located
☐ Needs O&M ☑ N/A
Remarks____

____

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked
☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ All required wells located ☐ Needs O&M ☑ N/A
Remarks____

____

Attachment D

Photograph Log

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)
INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View while standing west of the boat yard. This is an Australian pine tree probably uprooted by the wind. Limestone cover is in the root mass.

Frame Nº: 1

Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View looking south while standing on the south side of PS-MO-2. Australian pine trees and pine needles covering crushed limestone rock.

Frame Nº: 2

BVSPC-ATLANTA

PHOTOGRAPHIC DOCUMENTATION FORM

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View of an upturned Australian pine tree while standing west of the boat yard.

Frame Nº: 3

Date: 9/29/99

Day: Wednesday

Direction: Facing southwest.

Object: View while standing at the southeast corner of Miami Battery. The indention in the fence is shown in the background. The site boundary is the chain link fence shown.

Frame Nº: 4

BVSPC-ATLANTA

PHOTOGRAPHIC DOCUMENTATION FORM

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View of pine needles intermixed with crushed limestone cover. Taken while standing north of Jim Woods Land Clearing building.

Frame Nº: 5

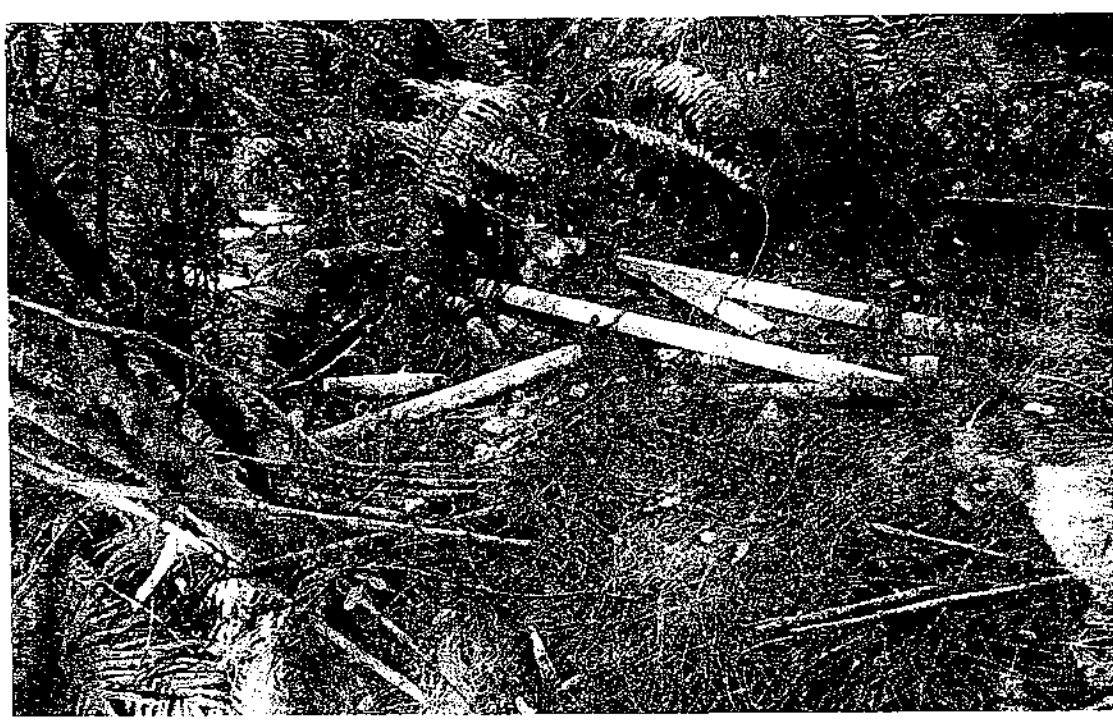
Date: 9/29/99

Day: Wednesday

Direction: Facing north

Object: View while standing northeast of PS-MW-2. Appears to be used (waste) fluorescent light tubes thrown over the site boundary fence. Drainage collar is located within the pine straw mass in the background.

Frame Nº: 6



BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View looking south into the Jim Woods Land Clearing build- located along the southern boundary of the site. Building was unsecured and contained several diesel paint cans, solvent cans, etc.

Frame Nº: 7

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

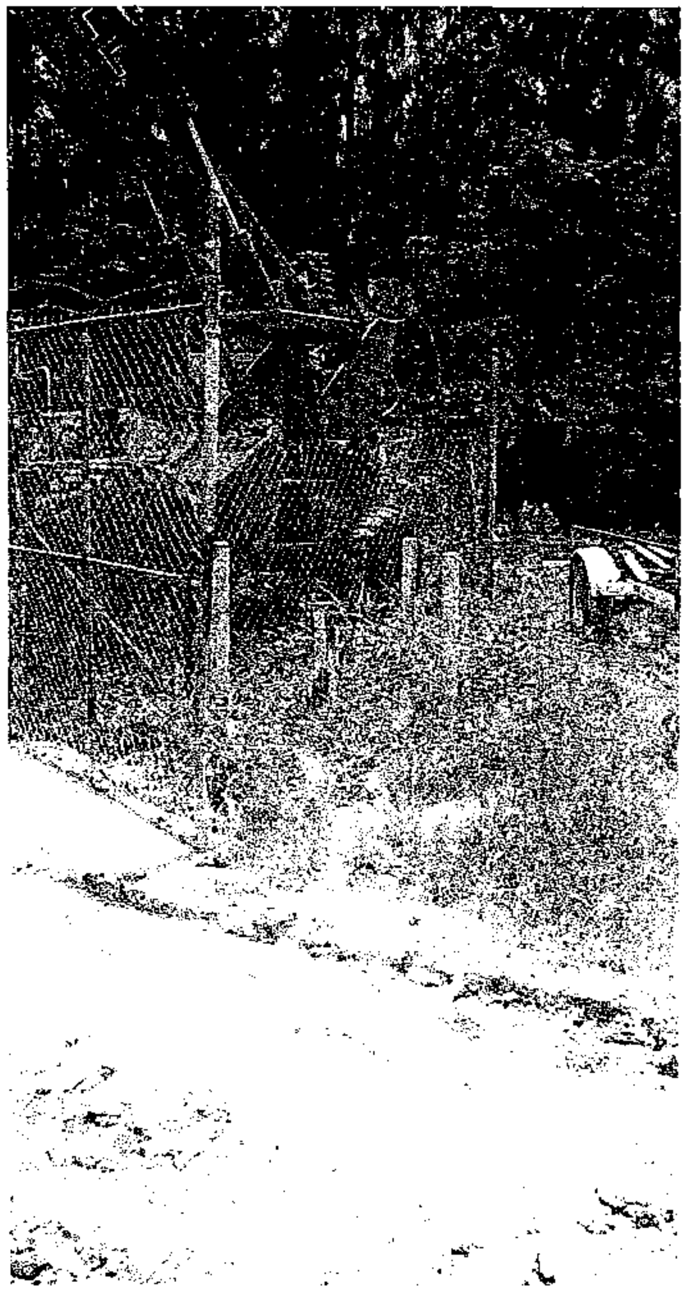
Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View of PS-MW-6CR while standing outside the north perimeter fence. Well appeared secure and intact.

Frame Nº: 8



BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View looking along east wall of Jim Woods Land Clearing building. Building appears abandoned.

Frame Nº: 9

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View of PS-MW-6A on the right, PS-MW-6B on the left. Concrete pipe used as a well protector. Site is located in the background - left side.

Frame Nº: 10

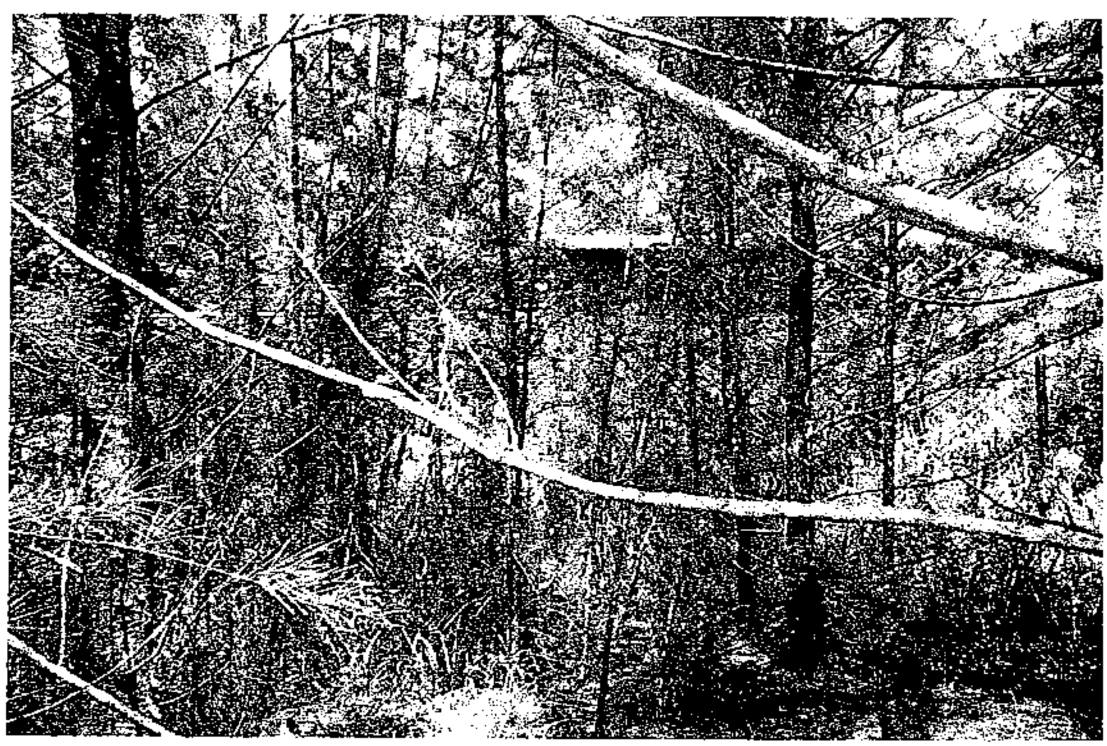
Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View of shed structure, which is located west of soil processing area.

Frame Nº: 11



BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)
INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing Southeast.

Object: View of crushed limestone collar which runs east-west, west of the soil processing area.

Frame Nº: 12

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View of PS-MW-8A. Sheet metal top covers pipe/well protector.

Frame Nº: 13

PHOTOGRAPHIC DOCUMENTATION FORM

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View looking down at pine straw and organic matter mixed in with crushed limestone cover.

Frame Nº: 14

Date: 9/29/99

Day: Wednesday

Direction: Facing east.

Object: View of crushed limestone drainage collar while standing west of the boat yard.

Frame Nº: 15

PHOTOGRAPHIC DOCUMENTATION FORM

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View looking north while standing near PS-MO-2. Vegetative growth is covering the crushed limestone drainage collar.

Frame Nº: 16

BVSPC-ATLANTA

PHOTOGRAPHIC DOCUMENTATION FORM

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing north.

Object: View looking north while standing northeast of the PS-MW-5A location. Drainage collar runs near to far on the left side of the photo.

Frame Nº: 17

BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)

INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

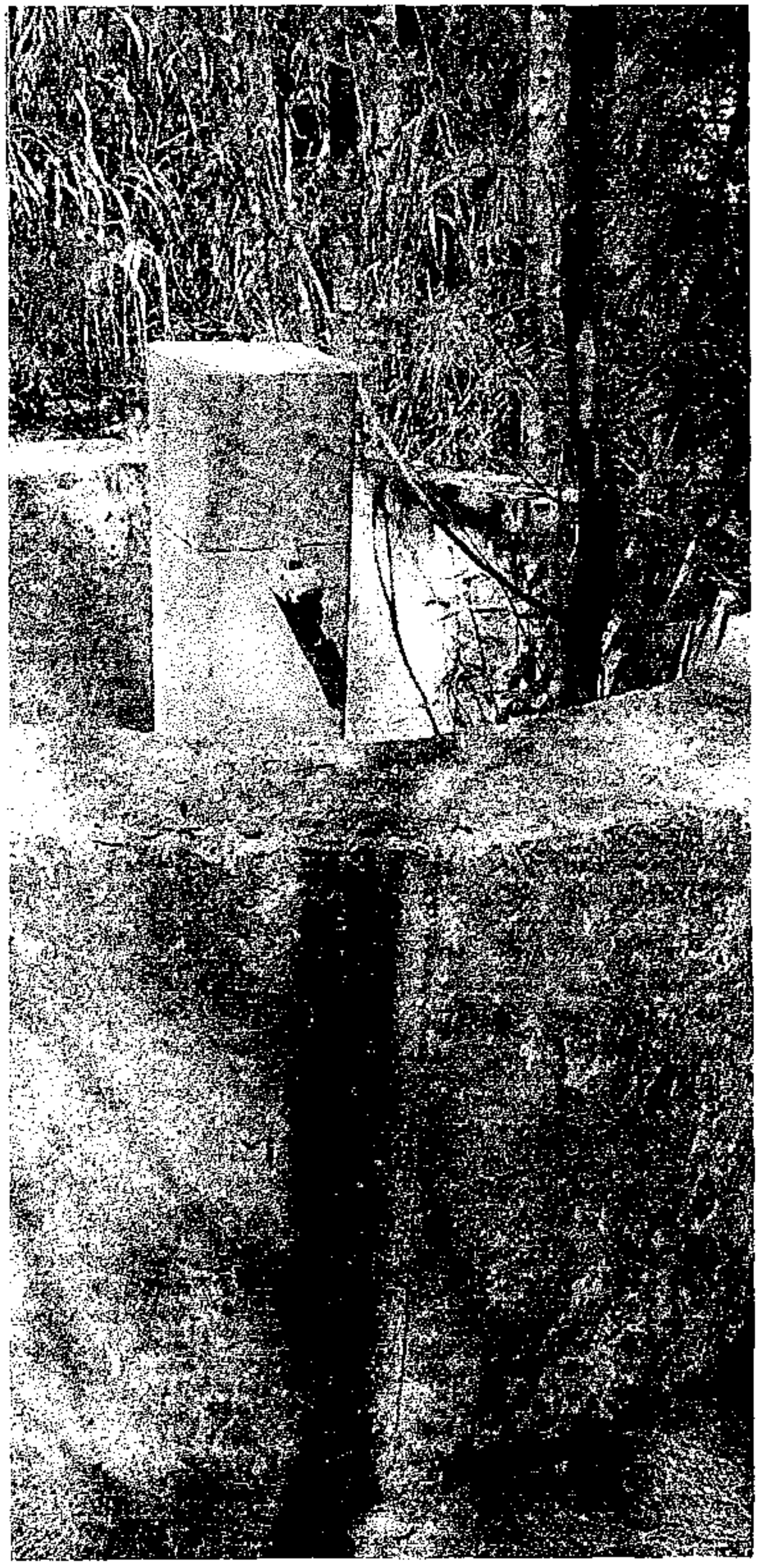
Date: 9/29/99

Day: Wednesday

Direction: Facing northwest.

Object: View of PS-MO-2 protector.

Frame Nº: 18



BLACK & VEATCH Special Projects Corp.

FILM Nº 1
(Roll Nº)
INITIALS: RLM

SITE: Pepper's Steel and Alloys
Medley, Dade County, Florida

Date: 9/29/99

Day: Wednesday

Direction: Facing south.

Object: View looking south into a bay on the west side of the Jim Woods Land Clearing building. Apparent erosion in the crushed limestone cover under the vegetation.

Frame Nº: 19

Attachment E

Five-Year Review Data

EPA Science and Ecosystem Support Division Laboratory
Athens, Georgia

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4

Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

MEMORANDUM

Date: 01/28/2000

Subject: Results of METALS Sample Analysis
00-0212 Pepper Steel & Alloys, Inc.
Medley, FL

From: Wasko, Mike *Michael Wasko*

To: Scully, Pam

CC: Carol King
RACS/B&V

Thru: Scifres, Jenny *J Scifres*
Chief, Inorganic Chemistry Section
Analytical Support Branch

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

METALS SAMPLE ANALYSIS | EPA - REGION IV SESD, ATHENS, GA | Production Date: 01/28/2000 12:52

Sample 1876 FY 2000 Project: 00-0212

SPECIFIED TESTS

Facility: Pepper Steel & Alloys, Inc. Medley, FL

Program: SSF

Id/Station: PSMO2 /

Media: GROUNDWATER

Produced by: Wasko, Mike

Requestor:

Project Leader: PSCULLY

Beginning: 01/11/2000 13:40

Ending:

RESULTS	UNITS	ANALYTE
5.0U	UG/L	ARSENIC
20	UG/L	LEAD

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Sample **1877** FY **2000** Project: **00-0212**

SPECIFIED TESTS

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSMO92 /
Media: GROUNDWATER

Produced by: Wasko, Mike
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 13:40
Ending:

RESULTS	UNITS	ANALYTE
5.0U	UG/L	ARSENIC
22	UG/L	LEAD

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Sample 1878 FY 2000 Project: 00-0212

SPECIFIED TESTS

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSMO3 /
Media: GROUNDWATER

Produced by: Wasko, Mike
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 16:00
Ending:

RESULTS	UNITS	ANALYTE
5.0U	UG/L	ARSENIC
2.9	UG/L	LEAD

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Sample **1879** FY **2000** Project: **00-0212**

SPECIFIED TESTS

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSPB01 /
Media: PRESERVATIVE BLANK

Produced by: Wasko, Mike
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 17:00
Ending:

RESULTS	UNITS	ANALYTE
5.0U	UG/L	ARSENIC
1.0U	UG/L	LEAD

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4

Science and Ecosystem Support Division
980 College Station Road
Athens, Georgia 30605-2720

MEMORANDUM

Date: 02/01/2000

Subject: Results of PESTICIDES/PCB Sample Analysis
00-0212 Pepper Steel & Alloys, Inc.
Medley, FL

From: Melendez, Lilia

To: Scully, Pam

CC: Carol King
RACS/B&V

Thru: Stephenson, Myron
QA Officer
Analytical Support Branch

Attached are the results of analysis of samples collected as part of the subject project. If you have any questions, please contact me.

ATTACHMENT

Sample **1876** FY **2000** Project: **00-0212**

PCB SCAN

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSMO2 /
Media: GROUNDWATER

Produced by: Melendez, Lilia
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 13:40
Ending:

RESULTS	UNITS	ANALYTE
2.0U	UG/L	PCB-1242 (AROCLOR 1242)
2.0U	UG/L	PCB-1254 (AROCLOR 1254)
2.0U	UG/L	PCB-1221 (AROCLOR 1221)
2.0U	UG/L	PCB-1232 (AROCLOR 1232)
2.0U	UG/L	PCB-1248 (AROCLOR 1248)
2.0U	UG/L	PCB-1260 (AROCLOR 1260)
2.0U	UG/L	PCB-1016 (AROCLOR 1016)

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Sample **1877** FY **2000** Project: **00-0212**

PCB SCAN

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSMO92 /
Media: GROUNDWATER

Produced by: Melendez, Lilia
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 13:40
Ending:

RESULTS	UNITS	ANALYTE
2.0U	UG/L	PCB-1242 (AROCLOR 1242)
2.0U	UG/L	PCB-1254 (AROCLOR 1254)
2.0U	UG/L	PCB-1221 (AROCLOR 1221)
2.0U	UG/L	PCB-1232 (AROCLOR 1232)
2.0U	UG/L	PCB-1248 (AROCLOR 1248)
2.0U	UG/L	PCB-1260 (AROCLOR 1260)
2.0U	UG/L	PCB-1016 (AROCLOR 1016)

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Sample **1878** FY **2000** Project: **00-0212**

PCB SCAN

Facility: Pepper Steel & Alloys, Inc. Medley, FL
Program: SSF
Id/Station: PSMO3 /
Media: GROUNDWATER

Produced by: Melendez, Lilia
Requestor:
Project Leader: PSCULLY
Beginning: 01/11/2000 16:00
Ending:

RESULTS	UNITS	ANALYTE
2.0U	UG/L	PCB-1242 (AROCLOR 1242)
2.0U	UG/L	PCB-1254 (AROCLOR 1254)
2.0U	UG/L	PCB-1221 (AROCLOR 1221)
2.0U	UG/L	PCB-1232 (AROCLOR 1232)
2.0U	UG/L	PCB-1248 (AROCLOR 1248)
2.0U	UG/L	PCB-1260 (AROCLOR 1260)
2.0U	UG/L	PCB-1016 (AROCLOR 1016)

A-average value. NA-not analyzed. NAI-interferences. J-estimated value. N-presumptive evidence of presence of material.
K-actual value is known to be less than value given. L-actual value is known to be greater than value given. U-material was analyzed for but not detected. the number is the minimum quantitation limit.
R-qc indicates that data unusable. compound may or may not be present. resampling and reanalysis is necessary for verification.
C-confirmed by gcms: 1.when no value is reported, see chlordane constituents 2.constituents or metabolites of technical chlordane

Kiber Environmental Services
Norcross, Georgia

DATA VALIDATION REPORT

DATE: July 12, 2000

SUBJECT: Pepper's Steel and Alloys
Medley, Dade County, Florida
Laboratory Package Number 33948

FROM: Gina Kelly, Chemist
Black & Veatch Special Projects Corp.

TO: Pamela Scully, Remedial Project Manager
U.S. Environmental Protection Agency

THRU: Carol King, Project Manager
Black & Veatch Special Projects Corp.

SAMPLE IDs: **Soil**
PS-MS-2
PS-MS-3

OVERVIEW

During the week of January 10, 2000, three monolith core were collected from the Pepper's Steel and Alloys site. Due to the integrity of sample PS-MS-1, only samples PS-MS-2 and PS-MS-3 and their respective leachates were analyzed by the wet/dry testing procedure. The samples were analyzed for arsenic and lead (SW-846 Methods 601 OB/200.7). Hygeia Laboratories Inc. analyzed the samples in accordance with the methods specified by the Contract Laboratory Program (CLP) Routine Analytical Service (RAS) protocol.

The samples were evaluated based on holding times, method blanks, duplicate sample, laboratory control samples (LCS), matrix spike/matrix spike duplicate (MS/MSD), and initial and continuing calibrations as specified in the *United States Environmental Protection Agency (EPA) Contract Laboratory Program for Inorganic Data Review, February, 1994, and the United States Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Office of Quality Assurance, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services*, *Revision 2.1, July 1999.*

The attachments presents documentation of the review conducted and includes the quality control (QC) requirements and the criteria, the analytes that failed the criteria, analysis result flags, the data to which the flag is applied, and support documentation, if necessary.

SUMMARY

The water MS/MSD result for lead was outside quality control limits. However, after considering this data in conjunction with other quality control criteria, the need for qualification of the sample results has been deemed unnecessary.

The soil laboratory control sample and MS/MSD results were outside quality control limits for several metals. However, the results for arsenic and lead were acceptable, therefore, no data were qualified based on these results.

All samples were successfully analyzed for all target compounds. The analytical data included in Laboratory Package Number 33948, are of sufficient quality and deemed acceptable for their intended use.

ATTACHMENTS

Attachment I -	Inorganic Data Review Document
Attachment II -	Data Qualifier Flags and Remarks
Attachment III -	Data Qualifier Report

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33948

Report Date: 6/12/00

Metals by ICP

Units: **ug/L (ppb)** Method: **EPA 200.7**

Matrix: Water Analysis Date: 6/9/00 Prep. Date: 6/2/00 Analyst: MP

Lab ID:	252371		252372		252373		252374	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	BRL	15	BRL	15	BRL	15	BRL	15
Lead	30	10	BRL	10	BRL	10	BRL	10

Metals by ICP

Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 6010B**

Matrix: Soil Analysis Date: 6/9/00 Prep. Date: 6/5/00 Analyst: MP

Lab ID:	252367		252368		252369		252370	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	41	0.8	41	0.8	37	0.8	39	0.8
Lead	2,000	0.5	1,380	0.5	1,530	0.5	700	0.5

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- BRL = "Below Reporting Limit"
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

Alabama - Lab ID 40970; Arkansas; Connecticut - No. PH 0208Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kentucky - Lab ID 90053; Maryland - No. 293; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Accreditations

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 100649

ATTACHMENT I

INORGANIC DATA REVIEW DOCUMENT

ATTACHMENT I

INORGANIC DATA REVIEW DOCUMENT

United States Environmental Protection Agency
Region IV
Science and Ecosystem Support Division
980 College Station Road, Athens, GA 30605

Date: July 12, 2000

Subject: Review of Organic Data: Package No. 33948
Contract Lab Name: Hygeia Laboratories, Inc
Region IV Project No: 48103.0845
SMO Traffic Nos.:

Region IV SAD Nos.:

Level: Low __X___ Med _____ High ____

Matrix Types: Water ___X___ Soil/Sed __X__ Waste ____

Reviewed performed by: Gina Kelly, Chemist, Black & Veatch Special Projects Corp.

Review Codes

A - Acceptable: All QC criteria met. No data qualified based on these items.

P - Provisional: Some QC criteria were exceeded resulting in data qualifiers being assigned based on these items.

U - Unacceptable: The QC criteria were exceeded to such an extent that the associated data was rejected based upon these items.

N/A - Not Applicable: This item does not apply to the case being reviewed.

I. SAMPLE HOLDING TIMES AND PRESERVATION (Technical holding times; waters only)

Metals (6 months) __A__
Mercury (28 days) __NA__
Cyanide (14 days) __NA__

REMARKS: None.

II. CALIBRATION

	AA/ICP	Furnace	Mercury	CN
Initial Cal	__A__	_NA__	__NA__	__NA__
Initial Cal Verif	__A__	_NA__	__NA__	__NA__
Cont Cal Verif	__A__	__NA__	__NA__	__NA__

REMARKS: None.

III. BLANKS

Cal Blanks (CB) __A__
Preparation Blanks (PB) __NA__
Blind Blanks (BB) __NA__

REMARKS: None

IV. ICP INTERFERENCE CHECK SAMPLE

False Positives __NA__
False Negatives __NA__

REMARKS: None.

V. SPIKED SAMPLE RESULTS

	Water	Soil
Matrix Spike	__A__	__A__

REMARKS: The water MS/MSD result for lead was outside quality control limits. However, after considering this data in conjunction with other quality control criteria, the need for qualification of the sample results has been deemed unnecessary.

The soil MS/MSD results were outside quality control limits for several metals. However, the results for arsenic and lead were acceptable, therefore, no data were qualified based on these results.

VI. OTHER QC

Matrix Duplicate __A__
LCS __A__

REMARKS: The soil laboratory control sample results were outside quality control limits for several metals. However, the results for arsenic and lead were acceptable, therefore, no data were qualified based on these results.

VII. DELIVERABLES

Cover Page
Form I __A__
QC Summaries __A__
Raw Data __A__
Traffic Reports __A__
Digestion Logs __A__
Preparation Logs __A__
Run Logs __A__

REMARKS: None.

VIII. CONTACT WITH CONTRACT LAB REQUIRED DURING DATA REVIEW?

Yes _____ No __X__

REMARKS: None.

IX. DATA QUALIFIERS SUMMARY

Element	Flag	Samples Affected	Reason

None.

ATTACHMENT II

DATA QUALIFIER FLAGS AND REMARKS

ATTACHMENT II

DATA QUALIFIERS (FLAGS) AND REMARKS - Inorganics

Data qualifier flags are used as an effort to best describe the quality of each piece of data to the data user. These flags are letter codes appended to the numeric data (or in some instances used alone). In addition, a series of standard remarks is used to give a more detailed explanation of the data.

STANDARD REMARKS - To use standard remarks simply choose the appropriate number of the remark and place it on the data sheet. It is not necessary to write the verbiage.

DEFINITIONS OF DATA QUALIFIERS

U	=	The analyte was analyzed for but not detected. The value preceding the U is the Contract Required Quantitation Limit (CRQL).
J	=	The identification of the analyte is acceptable, but quality assurance criteria indicate that the quantitative values may be outside the normal expected range, i.e., the quantitative value is considered estimated.
N	=	There is presumptive evidence that the analyte is present, but it has not been confirmed. The analyte is "tentatively identified". There is an indication that the reported analyte is present, however, all quality control requirements necessary for confirmation were not met.
R	=	Data is considered to be rejected and shall not be used. This flag denotes the failure of quality control criteria such that it can not be determined if the analyte is present or absent from the sample. Resampling and analysis are necessary to confirm or deny the presence of the analyte.
C	=	This flag is most often used in conjunction with pesticides/PCB data. The analyte is determined to be present and the presence has been confirmed by GC/MS.
UJ	=	This is a combination of the U and J flags. The analyte is not present. The reported value is considered to be an estimated CRQL.
NJ	=	A combination of the J and N flags. The analyte is tentatively identified and the value preceding the IN is estimated.

KIBER
ENVIRONMENTAL
SERVICES

3145 Medlock Bridge Rd.
Norcross, Georgia 30071
tel 770-242-4090
fax 770-242-9198
www.kiber.com

19 June 2000

Ms. Carol W. King
Black & Veatch Special Projects Corp.
1145 Sanctuary Parkway
Suite 475
Alpharetta, Georgia 30004
(770) 751-7517

Subject: Pepper's Steel and Alloys

Dear Ms. King:

Kiber Environmental Services, Inc. (Kiber) has developed this letter to present Black & Veatch Special Projects Corporation (BVSPC) with supplemental results of testing performed as a part of the Pepper's Steel and Alloys project. This data package includes complete analytical and physical data reports for wet/dry durability testing. These data reports have been developed as a supplement to the data package presented to Black & Veatch on 6 June 2000.

Kiber Environmental Services, Inc. appreciates the opportunity to provide laboratory testing services to Black & Veatch and looks forward to working with you in the future. If you have any questions, please contact either of the undersigned at (770) 242-4090.

Sincerely,

KIBER ENVIRONMENTAL SERVICES, INC.

George M. Zaharchak
Project Manager
(Ext. 250)
george@kiber.com

Robert K. Semenak
Treatability Department Manager
Associate
(Ext. 235)
robert@kiber.com

WET / DRY TESTING

SUMMARY OF TEST RESULTS

PROJECT: PSA STUDY
PROJECT No.: 3216
START DATE: 10 APRIL 2000
TRACKING CODE: 0482_W1

SAMPLE No. (Test): PS-MS-2 (TEST)
SAMPLE No. (Control): PS-MS-2 (CONTROL)
SAMPLE DESCRIPTION: CORE SAMPLE

INITIAL SPECIMEN CONDITIONS	TEST		CONTROL	
1. BULK UNIT WEIGHT	95.8	pcf	92.7	pcf
2. DRY UNIT WEIGHT	59.5	pcf	71.2	pcf
3. MOISTURE CONTENT	60.83	%	30.21	%

TEST RESULTS	TEST		CONTROL	
1. MAX VOLUMETRIC CHANGE*	5.1	%	8.6	%
3. TOTAL MASS LOSS	0.28	%	0.13	%
4. RELATIVE MASS LOSS	0.15	%		

* A positive value denotes expansion and a negative value denotes shrinkage.

WET / DRY DURABILITY TESTING

REPORT FORMAT

PROJECT:	PSA STUDY	SAMPLE No. (Specimen No. 1):	PS-MS-2 (TEST)
PROJECT No.:	3216	SAMPLE No. (Specimen No. 2)	PS-MS-2 (CONTROL)
START DATE:	10 APRIL 2000	SAMPLE DESCRIPTION:	CORE SAMPLE
TRACKING CODE:	0482_W1		

SPECIMEN NO. 1
Wet / Dry Specimen

TESTED BY: MAC

MOISTURE CONTENT (Dry Basis)		
Specimen No. 1	INITIAL	FINAL
1. MOISTURE TIN NO.	PS-MS-2 (Test)	PS-MS-2 (Test)
2. WT MOISTURE TIN (tare weight)	0.00 g	447.37 g
3. WT WET SOIL + TARE	339.15 g	782.38 g
4. WT DRY SOIL + TARE	210.87 g	658.24 g
5. WT WATER, Ww	128.28 g	124.14 g
6. WT DRY SOIL, Ws	210.87 g	210.87 g
7. MOISTURE CONTENT, W	60.83 %	58.87 %

SOIL SPECIMEN DIMENSIONS		
Specimen No. 1	DIAMETER	LENGTH
No. 1	2.74 in.	2.08 in.
No. 2	2.75 in.	2.21 in.
No. 3	2.83 in.	2.41 in.
Average	2.77 in.	2.23 in.

SPECIMEN No. 1 CONDITIONS	
Initial Specimen WT, Wo	339.15 g
Initial Dry Specimen WT, Wd	210.87 g
Initial Area, Ao	6.04 in²
Initial Volume, Vo	13.49 in³
Initial Bulk Unit Weight,	95.8 pcf
Initial Dry Unit Weight,	59.5 pcf

SPECIMEN NO. 2
Control Specimen

TESTED BY: MAC

MOISTURE CONTENT (Dry Basis)		
Specimen No. 2	INITIAL	FINAL
1. MOISTURE TIN NO.	PS-MS-2 (Control)	PS-MS-2 (Control)
2. WT MOISTURE TIN (tare weight)	0.00 g	378.44 g
3. WT WET SOIL + TARE	387.99 g	782.33 g
4. WT DRY SOIL + TARE	297.97 g	676.41 g
5. WT WATER, Ww	90.02 g	105.92 g
6. WT DRY SOIL, Ws	297.97 g	297.97 g
7. MOISTURE CONTENT, W	30.21 %	35.55 %

SOIL SPECIMEN DIMENSIONS		
Specimen No. 2	DIAMETER	LENGTH
No. 1	2.78 in.	2.70 in.
No. 2	2.80 in.	2.65 in.
No. 3	2.75 in.	2.55 in.
Average	2.78 in.	2.63 in.

SPECIMEN No. 2 CONDITIONS	
Initial Specimen WT, Wo	387.99 g
Initial Dry Specimen WT, Wd	297.97 g
Initial Area, Ao	6.06 in²
Initial Volume, Vo	15.95 in³
Initial Bulk Unit Weight,	92.7 pcf
Initial Dry Unit Weight,	71.2 pcf

WET / DRY TESTING

REPORT FORMAT

PROJECT:	PSA STUDY	INITIAL MOISTURE CONTENT	60.83	%
PROJECT No.:	3216	INITIAL VOLUME:	13.43	in^3
SAMPLE No.:	PS-MS-2 (TEST)	INITIAL TOTAL WEIGHT:	339.15	grams
TESTING SEQUENCE:	WET / DRY	INITIAL DRY SOIL WEIGHT:	210.87	grams
TRACKING CODE:	0482_W1			

	SPECIMEN CONDITIONS					MASS LOSS				CUMULATIVE
CYCLE	HEIGHT (in)	DIAMETER (in)	VOLUME (in^3)	VOLUME CHANGE (%)	SPECIMEN WEIGHT (grams)	TARE WEIGHT (grams)	DRY SOIL + TARE (grams)	MASS LOSS (grams)	MASS LOSS (%)	MASS LOSS (%)
INITIAL	2.23	2.77	13.43		339.15					0.00
1	2.21	2.77	13.33	0.72	337.40	1.36	1.59	0.23	0.11	0.11
2	2.16	2.78	13.11	2.35	333.68	1.36	1.41	0.05	0.02	0.13
3	2.16	2.76	12.95	3.52	332.55	1.36	1.43	0.07	0.03	0.17
4	2.22	2.77	13.36	0.51	335.61	1.36	1.42	0.06	0.03	0.19
5	2.21	2.78	13.41	0.09	333.69	1.36	1.39	0.03	0.01	0.21
6	2.24	2.83	14.11	5.10	334.91	1.36	1.37	0.01	0.00	0.21
7	2.16	2.78	13.16	1.96	335.06	1.35	1.41	0.06	0.03	0.24
8	2.23	2.77	13.41	0.15	335.41	1.36	1.37	0.01	0.00	0.25
9	2.15	2.77	13.01	3.12	336.10	1.36	1.38	0.02	0.01	0.26
10	2.16	2.79	13.24	1.41	335.72	1.37	1.38	0.01	0.00	0.26
11	2.23	2.81	13.83	3.00	335.09	1.38	1.40	0.02	0.01	0.27
12	2.15	2.79	13.11	2.33	335.01	1.36	1.39	0.03	0.01	0.28

CONTROL TESTING

REPORT FORMAT

PAGE 3 OF 4

PROJECT:	PSA STUDY		INITIAL MOISTURE CONTENT:	30.21 %
PROJECT No.:	3216		INITIAL VOLUME:	15.95 in³
SAMPLE No.:	PS-MS-2 (CONTROL)		INITIAL TOTAL WEIGHT:	387.99 grams
TESTING SEQUENCE:	CONTROL		INITIAL DRY SOIL WEIGHT:	297.97 grams
TRACKING CODE:	0482_W1			

	SPECIMEN CONDITIONS					MASS LOSS				CUMULATIVE
CYCLE	HEIGHT (in)	DIAMETER (in)	VOLUME (in^3)	VOLUME CHANGE (%)	SPECIMEN WEIGHT (grams)	TARE WEIGHT (grams)	DRY SOIL + TARE (grams)	MASS LOSS (grams)	MASS LOSS (%)	MASS LOSS (%)
INITIAL	2.63	2.78	15.95	[redacted]	387.99	[redacted]				0.00
1	2.42	2.77	14.57	8.64	337.66	1.36	1.50	0.14	0.05	0.05
2	2.63	2.77	15.87	0.48	398.96	1.36	1.43	0.07	0.02	0.07
3	2.66	2.78	16.09	0.89	400.67	1.36	1.40	0.04	0.01	0.08
4	2.59	2.77	15.61	2.12	401.17	1.36	1.39	0.03	0.01	0.09
5	2.60	2.78	15.76	1.14	401.20	1.36	1.38	0.02	0.01	0.10
6	2.61	2.77	15.73	1.36	401.86	1.36	1.37	0.01	0.00	0.10
7	2.64	2.78	16.01	0.38	402.68	1.34	1.38	0.04	0.01	0.12
8	2.61	2.78	15.82	0.77	402.76	1.36	1.36	0.00	0.00	0.12
9	2.58	2.78	15.68	1.66	403.09	1.36	1.37	0.01	0.00	0.12
10	2.69	2.79	16.42	3.00	402.94	1.38	1.39	0.01	0.00	0.12
11	2.57	2.78	15.58	2.30	403.12	1.36	1.37	0.01	0.00	0.13
12	2.63	2.76	15.71	1.45	403.89	1.36	1.38	0.02	0.01	0.13

WET / DRY TESTING

SUMMARY OF TEST RESULTS

PROJECT:	PSA STUDY	SAMPLE No. (Test):	PS-MS-3 (TEST)
PROJECT No.:	3216	SAMPLE No. (Control):	PS-MS-3 (CONTROL)
START DATE:	10 APRIL 2000	SAMPLE DESCRIPTION:	CORE SAMPLE
TRACKING CODE:	0481_W1		

INITIAL SPECIMEN CONDITIONS	TEST		CONTROL	
1. BULK UNIT WEIGHT	96.2	pcf	103.3	pcf
2. DRY UNIT WEIGHT	80.9	pcf	78.2	pcf
3. MOISTURE CONTENT	18.89	%	32.24	%

TEST RESULTS	TEST		CONTROL	
1. MAX VOLUMETRIC CHANGE*	5.7	%	2.6	%
3. TOTAL MASS LOSS	0.11	%	0.04	%
4. RELATIVE MASS LOSS	0.07	%		

* A positive value denotes expansion and a negative value denotes shrinkage.

WET / DRY DURABILITY TESTING

REPORT FORMAT

PROJECT:	PSA STUDY
PROJECT No.:	3216
START DATE:	10 APRIL 2000
TRACKING CODE:	0481_W1
SAMPLE No. (Specimen No. 1):	PS-MS-3 (TEST)
SAMPLE No. (Specimen No. 2)	PS-MS-3 (CONTROL)
SAMPLE DESCRIPTION:	CORE SAMPLE

SPECIMEN NO. 1
Wet / Dry Specimen

TESTED BY: MAC

MOISTURE CONTENT (Dry Basis)		
Specimen No. 1	INITIAL	FINAL
1. MOISTURE TIN NO.	PS-MS-3 (Test)	PS-MS-3 (Test)
2. WT MOISTURE TIN (tare weight)	0.00 g	318.70 g
3. WT WET SOIL + TARE	812.80 g	1137.90 g
4. WT DRY SOIL + TARE	683.64 g	1002.34 g
5. WT WATER, Ww	129.16 g	135.56 g
6. WT DRY SOIL, Ws	683.64 g	683.64 g
7. MOISTURE CONTENT, W	18.89 %	19.83 %

SOIL SPECIMEN DIMENSIONS		
Specimen No. 1	DIAMETER	LENGTH
No. 1	2.94 in.	5.32 in.
No. 2	2.72 in.	5.22 in.
No. 3	2.70 in.	5.30 in.
Average	2.79 in.	5.28 in.

SPECIMEN No. 1 CONDITIONS	
Initial Specimen WT, Wo	812.80 g
Initial Dry Specimen WT, Wd	683.64 g
Initial Area, Ao	6.10 in²
Initial Volume, Vo	32.20 in³
Initial Bulk Unit Weight,	96.2 pcf
Initial Dry Unit Weight,	80.9 pcf

SPECIMEN NO. 2
Control Specimen

TESTED BY: MAC

MOISTURE CONTENT (Dry Basis)		
Specimen No. 2	INITIAL	FINAL
1. MOISTURE TIN NO.	PS-MS-3 (Control)	PS-MS-3 (Control)
2. WT MOISTURE TIN (tare weight)	0.00 g	404.92 g
3. WT WET SOIL + TARE	858.60 g	1278.20 g
4. WT DRY SOIL + TARE	649.27 g	1054.19 g
5. WT WATER, Ww	209.33 g	224.01 g
6. WT DRY SOIL, Ws	649.27 g	649.27 g
7. MOISTURE CONTENT, W	32.24 %	34.50 %

SOIL SPECIMEN DIMENSIONS		
Specimen No. 2	DIAMETER	LENGTH
No. 1	2.72 in.	5.40 in.
No. 2	2.72 in.	5.42 in.
No. 3	2.73 in.	5.48 in.
Average	2.72 in.	5.43 in.

SPECIMEN No. 2 CONDITIONS	
Initial Specimen WT, Wo	858.60 g
Initial Dry Specimen WT, Wd	649.27 g
Initial Area, Ao	5.82 in²
Initial Volume, Vo	31.65 in³
Initial Bulk Unit Weight,	103.3 pcf
Initial Dry Unit Weight,	78.2 pcf

WET / DRY TESTING

REPORT FORMAT

PROJECT:	PSA STUDY	INITIAL MOISTURE CONTENT	18.89 %
PROJECT No.:	3216	INITIAL VOLUME:	32.20 in^3
SAMPLE No.:	PS-MS-3 (TEST)	INITIAL TOTAL WEIGHT:	812.80 grams
TESTING SEQUENCE:	WET / DRY	INITIAL DRY SOIL WEIGHT:	683.64 grams
TRACKING CODE:	0481_W1		

	SPECIMEN CONDITIONS					MASS LOSS				CUMULATIVE
CYCLE	HEIGHT (in)	DIAMETER (in)	VOLUME (in^3)	VOLUME CHANGE (%)	SPECIMEN WEIGHT (grams)	TARE WEIGHT (grams)	DRY SOIL + TARE (grams)	MASS LOSS (grams)	MASS LOSS (%)	MASS LOSS (%)
INITIAL	5.28	2.79	32.20		812.80					0.00
1	5.30	2.72	30.74	4.54	825.30	1.35	1.72	0.37	0.05	0.05
2	5.34	2.71	30.86	4.18	819.20	1.36	1.42	0.06	0.01	0.06
3	5.32	2.72	30.84	4.24	815.80	1.36	1.46	0.10	0.01	0.08
4	5.30	2.71	30.59	5.01	822.10	1.36	1.39	0.03	0.00	0.08
5	5.28	2.71	30.51	5.25	818.08	1.36	1.39	0.03	0.00	0.09
6	5.32	2.72	30.86	4.18	820.49	1.36	1.41	0.05	0.01	0.09
7	5.31	2.73	31.16	3.24	822.25	1.36	1.39	0.03	0.00	0.10
8	5.32	2.70	30.44	5.47	820.73	1.36	1.36	0.00	0.00	0.10
9	5.31	2.72	30.84	4.25	821.92	1.36	1.38	0.02	0.00	0.10
10	5.31	2.71	30.72	4.60	820.94	1.36	1.38	0.02	0.00	0.10
11	5.31	2.72	30.87	4.13	820.80	1.36	1.37	0.01	0.00	0.11
12	5.30	2.70	30.36	5.71	819.20	1.36	1.36	0.00	0.00	0.11

CONTROL TESTING

REPORT FORMAT

PROJECT:	PSA STUDY	INITIAL MOISTURE CONTENT:	32.24	%
PROJECT No.:	3216	INITIAL VOLUME:	31.65	in^3
SAMPLE No.:	PS-MS-3 (CONTROL)	INITIAL TOTAL WEIGHT:	858.60	grams
TESTING SEQUENCE:	CONTROL	INITIAL DRY SOIL WEIGHT:	649.27	grams
TRACKING CODE:	0481_W1			

	SPECIMEN CONDITIONS					MASS LOSS				CUMULATIVE
CYCLE	HEIGHT (in)	DIAMETER (in)	VOLUME (in^3)	VOLUME CHANGE (%)	SPECIMEN WEIGHT (grams)	TARE WEIGHT (grams)	DRY SOIL + TARE (grams)	MASS LOSS (grams)	MASS LOSS (%)	MASS LOSS (%)
INITIAL	5.43	2.72	31.65		858.60					0.00
1	5.49	2.73	32.19	1.72	864.60	1.34	1.46	0.12	0.02	0.02
2	5.47	2.74	32.16	1.60	866.90	1.36	1.39	0.03	0.00	0.02
3	5.46	2.74	32.10	1.42	868.40	1.35	1.37	0.02	0.00	0.03
4	5.52	2.73	32.23	1.84	869.30	1.36	1.38	0.02	0.00	0.03
5	5.45	2.72	31.67	0.06	869.90	1.36	1.36	0.00	0.00	0.03
6	5.51	2.74	32.47	2.59	870.93	1.36	1.36	0.00	0.00	0.03
7	5.49	2.74	32.39	2.35	873.80	1.36	1.38	0.02	0.00	0.03
8	5.50	2.73	32.25	1.91	872.40	1.36	1.36	0.00	0.00	0.03
9	5.49	2.74	32.47	2.59	874.55	1.36	1.39	0.03	0.00	0.04
10	5.51	2.73	32.17	1.66	873.14	1.36	1.37	0.01	0.00	0.04
11	5.50	2.72	32.04	1.23	872.80	1.34	1.35	0.01	0.00	0.04
12	5.52	2.73	32.29	2.03	873.80	1.36	1.38	0.02	0.00	0.04

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client:	**Kiber Environmental Services, Inc** 3145 Medlock Bridge Road Norcross, GA 30071
Attention:	**George Zaharchak**
Project Name:	**PSA**
Project ID:	3216-8925
Received:	5/31/00
Lab Project No.	33948

Report Date: 6/12/00

CASE NARRATIVE

1 The holding times for each sample were met.

2 Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.

Reviewed by: ______

Respectfully Submitted,

Hygeia Laboratories, Inc.

LAB ID	CLIENT ID	MATRIX	COLLECTED
252367	PS-MS-2 Test	SOIL	5/25/00
252368	PS-MS-2 Control	SOIL	5/25/00
252369	PS-MS-3 Test	SOIL	5/25/00
252370	PS-MS-3 Control	SOIL	5/25/00
252371	PS-MS-2 Test	WATER	5/25/00
252372	PS-MS-2 Control	WATER	5/25/00
252373	PS-MS-3 Test	WATER	5/25/00
252374	PS-MS-3 Control	WATER	5/25/00

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33948 Report Date: 6/12/00

Metals by ICP Units: **ug/L (ppb)** Method: **EPA 200.7**

Matrix: Water Analysis Date: 6/9/00 Prep. Date: 6/2/00 Analyst: MP

Lab ID:	252371		252372		252373		252374	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	BRL	15	BRL	15	BRL	15	BRL	15
Lead	30	10	BRL	10	BRL	10	BRL	10

Metals by ICP Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 6010B**

Matrix: Soil Analysis Date: 6/9/00 Prep. Date: 6/5/00 Analyst: MP

Lab ID:	252367		252368		252369		252370	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	41	0.8	41	0.8	37	0.8	39	0.8
Lead	2,000	0.5	1,380	0.5	1,530	0.5	700	0.5

NOTES:
- Results relate only to the samples tested as received (see chain-of-custody).
- BRL = "Below Reporting Limit"
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

Alabama - Lab ID 40970; Arkansas; Connecticut - No. PH 0208Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kentucky - Lab ID 90053; Maryland - No. 293; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Accreditations

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 100649

Hygeia Laboratories, Inc.

CORRECTIVE ACTION REPORT

Please complete this report in full (down to double line) and return to QA Manager.

CORRECTIVE ACTION REPORT MUST BE FILLED OUT & COMPLETED BEFORE DATA GOES INTO PROJECT FILE

Project No(s). 33948　　Report Date: 6-9-00

Sample(s) affected: 252 371 . . . 374　　Analyst: mp

Department: Inorganics - Metals - Semivol. Orgs - Volatile Orgs. - Subcontract - Other: ______

Method: 6010 B / 200.7　　**Matrix:** water

Description of Non-Conformance (check all that apply):　　Project Manager(s) : Aili

- [ ] Method Blank contamination
- [ ] LCS/LCSD recovery outside limits
- [x] MS/MSD recovery outside limits
- [ ] Duplicate precision outside limits
- [ ] Surrogate recovery outside limits
- [ ] Internal Standard area outside limits
- [ ] Hold Time exceeded
- [ ] Other (explain)

Explanation: LCS LCSD, ~~MS~~ MSD of lead are within the limits. But the MS of lead recovery is 129 %.

(Stop Here)

Corrective Action Taken:

- [ ] None possible (explain below)
- [ ] Re-analyze (Note effectiveness, below)
- [x] None needed (explain below)
- [ ] Other (explain below)

Explanation: ______

Effectiveness ______

Note in Case Narrative? YES NO

COMMENTS: ______

Approved: R Brown　　Dana B. [illegible]

Lab Director / Operations Mgr.　　QA Manager

6/12/00　　6/9/00

Date　　Date

Distribution: Original report goes to QA Mgr
QA Mgr puts copy into Project File(s)

Hygeia Laboratories, Inc.

CORRECTIVE ACTION REPORT

Please complete this report in full (down to double line) and return to QA Manager.

CORRECTIVE ACTION REPORT MUST BE FILLED OUT & COMPLETED BEFORE DATA GOES INTO PROJECT FILE

Project No(s). 33948; 33972 Report Date: 6-9-00

Sample(s) affected: 252367 ... 252502 Analyst: mp

Department: Inorganics. - Metals - Semivol. Orgs - Volatile Orgs. - Subcontract - Other: ______

Method: 6010 B **Matrix:** Soil

Description of Non-Conformance (check all that apply): Project Manager(s): Aili, Jason

- [ ] Method Blank contamination
- [x] LCS/LCSD recovery outside limits
- [x] MS/MSD recovery outside limits
- [ ] Duplicate precision outside limits
- [ ] Surrogate recovery outside limits
- [ ] Internal Standard area outside limits
- [ ] Hold Time exceeded
- [ ] Other (explain)

Explanation: LCS LCSD MS MSD of most of the metals passed. MS/MSD of Ag OK but LCS/LCSD not: 53%; 67%
LCS/LCSD of Tl OK but MS MSD not 70% 73%

(Stop Here)

Corrective Action Taken:

- [ ] None possible (explain below)
- [ ] Re-analyze (Note effectiveness, below)
- [x] None needed (explain below)
- [ ] Other (explain below)

Explanation: ______

Effectiveness: ______

Note in Case Narrative? YES NO

COMMENTS: ______

Approved: R Brown
Lab Director / Operations Mgr.
6/12/00
Date

Dana B. Tell
QA Manager
6/12/00
Date

Distribution: Original report goes to QA Mgr
QA Mgr puts copy into Project File(s)

Percent Solids / Percent Moisture

PROJECT	SAMPLE#	PAN WT.(g)	WET WT.(g)	DRY WT.(g)	% SOLIDS	%MOISTURE	A	B	%RPD
33833	251730	1.3	30.7127	24.9463	**80.39**	19.61	86.53	86.61	0.10
	251731	1.3	32.4853	28.7014	**87.87**	12.13			
	251732	1.3	30.2794	26.4185	**86.68**	13.32			
	251733	1.3	30.2374	25.5875	**83.93**	16.07			
	251734	1.3	34.4937	29.4672	**84.86**	15.14			
	251735	1.3	31.2382	26.4325	**83.95**	16.05			
	251736	1.3	30.5871	25.6264	**83.06**	16.94			
	251737	1.3	38.8850	33.8221	**86.53**	13.47			
33948	252367	1.3	29.3453	29.3186	**99.90**	0.10			
	252368	1.3	17.7151	17.6992	**99.90**	0.10			
	252369	1.3	20.0250	20.0133	**99.94**	0.06			
	252370	1.3	22.9425	22.9004	**99.81**	0.19			
Dup	251737	1.3	40.6304	35.3650	**86.61**	13.39			

Rev [signature] 6-5-00

Batch ID: IPS000602A

Analyst: b henry
6/5/00 10:43 AM

Hygeia Laboratories, Inc.

Marietta, GA

ANALYSIS LOG: PERCENT SOLIDS/PERCENT MOISTURE

LOGBOOK NO. 030200-02

BATCH ID: 1PS000[illegible]

SOP NO.: 168   BALANCE ID: C81609   METHOD: ASTM D2216-92

BALANCE CALIB. EXP. DATE: 0101   OVEN ID: 20800001

	DATE (m/d/y)	TIME (hh:mm)	OVEN TEMP (°C) [a]	PERFORMED BY
START:	260200	1441	105	DB
STOP 1:	200500	0823	103	DB
STOP 2:	060500	1009	104	DB

	Project Number	Lab Sample Number	Pan Weight [b] (g)	Wet Weight [b] (g)	Dry Weight [b] # 1 (g)	Dry Weight [b] # 2 (g)	Calculated % Solids [c]	Calculated % Moisture [c]
1	33833	251730	1.3	30.7127	24.9505	24.9463	80.39	19.61
2		251731	↓	32.4853	28.7068	28.7014	87.87	12.13
3		251732		30.2794	26.4184	26.4185	86.68	13.32
4		251733		30.2374	25.58[illegible]	25.5875	83.93	16.07
5		251734		34.4937	29.4712	29.4672	84.86	15.14
6		251735		31.2382	26.4293	26.4375	83.95	16.05
7		251736		30.5871	25.6249	25.6264	83.06	16.94
8		251737	↓	38.8850	33.8284	33.8021	86.53	13.47
9	33948	252367	1.3	29.3453	29.3038	29.3186	99.90	0.10
10		252368	↓	17.7151	17.6974	17.6992	99.90	0.10
11		252369		20.0250	20.0182	20.0133	99.94	0.06
12		252370	↓	22.9425	22.9058	22.9004	99.81	0.19
13								
14								
15								
16								
17								
18								
19								
20								
Dup	Dup	251737	1.3	40.6304	35.3670	35.3650	86.61	13.39

PERCENT SOLIDS CALCULATION

$$\% \text{ SOLIDS} = \frac{\text{DRY WEIGHT - PAN WEIGHT}}{\text{WET WEIGHT - PAN WEIGHT}} \times 100$$

PERCENT MOISTURE CALCULATION

% MOISTURE = 100 - % SOLIDS

NOTE: To reduce the decomposition of highly organic soils or gypsum (calcium sulfate dihydrate) reduce the oven temperature to 60°C or place in a dessicator at room temperature

[a] Oven temperature criteria = 105 ± 2 °C

[b] weigh to 2 decimal places

[c] calculate to 1 decimal place

Rev [illegible] 6-5-00

Matrix: Soil Project: 33948 Analyst: MP Date: 06|09|00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		mg/Kg	252367	252368	252369	252370					
Al	6010B	5									
Sb	6010B	0.75									
As	6010B	0.75	40.90	40.68	36.44	39.29					
Ba	6010B	0.15	41.3 / 0.8	40.7 / 0.8	36.5 / 0.8	39.4 / 0.8	Dry Wt.				
Be	6010B	0.05									
Cd	6010B	0.1									
Ca	6010B	2.5									
Cr	6010B	0.2									
Co	6010B	0.15									
Cu	6010B	0.2									
Fe	6010B	2.5									
Pb	6010B	0.5	1989.4	1377.0	1525.7	695.5					
Mg	6010B	1	1991 / 0.5	1378 / 0.5	1530 / 0.5	700 / 0.5	Dry Wt.				
Mn	6010B	0.1									
Mo	6010B	0.5									
Ni	6010B	0.3									
K	6010B	5									
Se	6010B	0.5									
Ag	6010B	0.15									
Na	6010B	50									
Si	6010B	20									
Tl	6010B	1.2									
Sn	6010B	1									
Ti	6010B	0.15									
V	6010B	0.2									
Zn	6010B	0.5									
Other											
Other											

CAR-8

SOP NO: M02 (All preparation methods are EPA SW-846 except NIOSH) BATCH ID: MDg000608E 5A

Prep. Method (circle 1): 3005A 3010A 3020A 3050B 3030C   Analysis Method (circle 1): ICP(EPA SW-846 6010B) GFAA (EPA 200.9) FLAA-lead (EPA SW-846 7420A) NIOSH 7082

PERFORMED BY: S.S   DATE(m/d/y): 6-5-00   MATRIX (circle 1): COMP FILTER SOIL/SLUDGE FILTER WIPE PAINT CHIP WATER TCLP SPLP Other:

	REAGENT	ID	Exp. Date
R1	HNO_3	200209	—
R2	HCl	200039	—
R3	H_2O_2	200185	—

	SPIKE	ID	CONC (µg/mL)	Exp. Date
S1	A	m100040301	20.0	10-3-00
S2	~~B~~ s.s. D	m10005150J	20.0	11-15-00
S3				

Describe Procedural Deviations/Modifications
NONE

	Project Number	Lab Sample Number	Sample Amount (mL or g)	pH	Reagent ID	Amt (mL)	Reagent ID	Amt (mL)	Reagent ID	Amt (mL)	Spike ID	Amt (µL)	Spike ID	Amt (µL)	Spike ID	Amt (µL)	Final Volume (mL)	Comments
MB	NA	BLK	2.0	NA	R1	10.0	R2	5.0	R3	3.0	NA		NA		NA		100.0	
LCS	NA	LCS									S1	2000	S2	2000				
1	33948	~~252367~~ 252367																
2		252368																
3		252369																
4		252370																
5	33970	252502																
6		252503																
7		252506																
8		252507																
9		252508																
10		252509																
11	34012 ss.	~~249078~~ 252814																
12		252815																
13		252816																
14		252817																
15		252818																
16		252819																
17		252820																
18		252821																
19		252822																
20		252823																
MS		249078									S1	2000	S2	2000				
MSD		249078									S1	2000	S2	2000				
DUP		249078																
LCSD	NA	LCSD									S1	2000	S2	2000				

SPIKE A (20 ppm each)	SPIKE B	SPIKE D (20 ppm)
Sb	Mg - 100 ppm	Ag
As	Na - 1000 ppm	
Se	Ca - 300 ppm	
B	K - 80 ppm	
Mo	Al - 80 ppm	
Ba	Sn - 50 ppm	
Be	Fe - 40 ppm	
Cd		
Cr		
Co		
Cu		
Pb		
Mn		
Ni		
Tl		
V		
Zn		

BALANCE ID: PE 1600   EXP DATE: 01/01

Abbreviations: NA = not applicable
Y = Yes N = No

SOP's
M01 Digestion of Water Samples for Metals Analysis
M02 Digestion of Soil, Sludge and Sediment Samples for Total Metals Analysis
M03 Digestion of Paint Chip Samples for Total Metals Analysis
M04 Digestion of Wipe Samples for Total Metals Analysis
M05 Digestion of Composite Filter Samples for Total Metals Analysis

File = Lbpmet

Analysis Report 06/09/00 08:36:54 PM

Method: XP2 Sample Name: 252367 Operator: mp
Run Time: 06/09/00 20:30:45
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	12.293	268630.	818.08	4953.0	69.005	1551100.	42.817
SDev	.664	312.	1.89	5.5	.023	1325.	.309
%RSD	5.3983	.11626	.23066	.11086	.03384	.08541	.72166
#1	12.973	268830.	820.25	4959.0	69.012	1552200.	43.171
#2	11.647	268790.	817.05	4951.9	68.979	1551500.	42.606
#3	12.259	268270.	816.93	4948.2	69.024	1549600.	42.673

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	392.26	3731.9	196580.	33935.	5442.5	492.49	39788.
SDev	.78	2.7	207.	113.	566.5	2.01	85.
%RSD	.19827	.07316	.10543	.33280	10.409	.40771	.21345
#1	392.99	3732.6	196340.	34059.	6048.8	494.34	39691.
#2	391.44	3734.2	196670.	33838.	5352.2	492.78	39828.
#3	392.36	3728.9	196720.	33909.	4926.5	490.36	39846.

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	237.86	52.768	-.33017	3354.5
SDev	1.80	5.857	11.8491	9.9
%RSD	.75871	11.100	3588.7	.29562
#1	239.50	57.950	5.9364	3344.2
#2	235.93	53.942	-13.997	3355.4
#3	238.15	46.413	7.0697	3364.0

DF:50

Analysis Report 06/09/00 08:43:08 PM page 1

Method: XP2 Sample Name: 252368 Operator: mp
Run Time: 06/09/00 20:36:59
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	10.431	282310.	813.62	5540.2	72.391	1635600.	159.35
SDev	1.434	228.	3.70	4.4	.294	5906.	1.08
%RSD	13.744	.08067	.45424	.07891	.40675	.36110	.67879
#1	11.092	282300.	814.86	5536.3	72.723	1642300.	160.58
#2	11.415	282540.	816.54	5544.9	72.288	1633600.	158.54
#3	8.7861	282080.	809.47	5539.4	72.162	1631000.	158.94

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	404.09	3409.1	258990.	38501.	5015.3	600.62	27540.
SDev	3.44	2.6	523.	59.	268.9	3.45	63.
%RSD	.85098	.07771	.20195	.15267	5.3623	.57502	.22863
#1	408.04	3406.6	259590.	38557.	4886.8	604.51	27607.
#2	402.50	3411.9	258610.	38506.	5324.4	599.46	27531.
#3	401.74	3408.8	258780.	38440.	4834.7	597.90	27482.

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	118.48	48.099	2.9306	3724.3
SDev	1.15	7.253	7.8218	15.9
%RSD	.96808	15.079	266.90	.42582
#1	118.81	41.469	10.866	3742.5
#2	119.42	55.846	2.6979	3717.1
#3	117.20	46.982	-4.7722	3713.3

DF: 50

Analysis Report 06/09/00 08:49:22 PM

Method: XP2 Sample Name: 252369 Operator: mp
Run Time: 06/09/00 20:43:13
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	5.8681	314510.	728.93	6505.7	69.617	1881200.	31.979
SDev	1.6696	349.	2.57	6.7	.110	1820.	.514
%RSD	28.452	.11085	.35271	.10334	.15836	.09674	1.6088
#1	6.4998	314170.	730.71	6509.0	69.503	1879300.	31.399
#2	7.1297	314870.	730.09	6510.2	69.625	1881300.	32.382
#3	3.9748	314500.	725.98	6498.0	69.723	1882900.	32.155

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	421.09	2013.5	200950.	64447.	7828.9	535.07	30574.
SDev	2.08	1.2	442.	235.	574.4	4.23	76.
%RSD	.49486	.06101	.21997	.36416	7.3373	.79081	.24756
#1	418.79	2012.4	200510.	64186.	7913.1	530.95	30495.
#2	421.62	2014.8	200950.	64515.	8356.6	534.86	30581.
#3	422.86	2013.3	201390.	64641.	7217.0	539.41	30646.

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	177.08	43.128	13.278	1841.2
SDev	2.82	10.520	6.413	8.3
%RSD	1.5927	24.392	48.300	.44875
#1	176.48	32.069	15.598	1832.7
#2	180.15	53.009	18.208	1841.9
#3	174.61	44.307	6.0275	1849.2

DF: 50

Analysis Report 06/09/00 08:55:34 PM page 1

Method: XP2 Sample Name: CCV Operator: mp
Run Time: 06/09/00 20:49:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1029.2	5711.6	1048.8	1155.8	1054.6	5175.0	1112.6
SDev	.5	19.1	4.9	3.8	1.7	60.9	1.5
%RSD	.04544	.33395	.46988	.33078	.16229	1.1765	.13791
#1	1029.5	5689.6	1049.1	1151.6	1052.7	5241.6	1110.9
#2	1028.6	5723.4	1043.7	1159.0	1055.9	5161.5	1113.8
#3	1029.4	5721.9	1053.6	1156.9	1055.4	5122.1	1113.0

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	998.01	945.15	5222.4	5806.7	10041.	1087.3	881.73
SDev	.71	3.48	48.2	41.4	483.	1.8	9.59
%RSD	.07160	.36811	.92300	.71215	4.8090	.16804	1.0882
#1	997.21	941.81	5275.1	5845.6	10255.	1085.4	890.10
#2	998.24	948.76	5211.6	5811.2	9487.9	1089.0	871.26
#3	998.58	944.87	5180.6	5763.2	10379.	1087.6	883.83

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	1034.4	976.32	862.11	806.81
SDev	102.8	7.40	8.77	.39
%RSD	9.9425	.75758	1.0174	.04824
#1	916.41	973.55	870.62	806.88
#2	1081.4	984.70	862.62	806.39
#3	1105.2	970.71	853.10	807.16

Analysis Report 06/09/00 09:01:45 PM page 1

Method: XP2 Sample Name: 252370 Operator: mp
Run Time: 06/09/00 20:55:38
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	6.4576	304020.	785.78	6123.5	66.988	1984700.	50.203
SDev	1.3468	2600.	7.89	44.5	.514	17908.	.371
%RSD	20.857	.85517	1.0044	.72662	.76715	.90228	.73935
#1	7.0828	302190.	780.88	6102.2	66.766	1972500.	50.586
#2	7.3783	302880.	781.57	6093.6	66.621	1976400.	50.179
#3	4.9118	307000.	794.88	6174.6	67.575	2005300.	49.845

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	394.47	2227.3	194140.	65874.	8941.7	501.19	13970.
SDev	2.14	14.5	1851.	268.	273.2	4.90	69.
%RSD	.54237	.65302	.95344	.40668	3.0554	.97859	.49635
#1	393.87	2219.5	192840.	65737.	9209.2	500.13	13945.
#2	392.70	2218.3	193320.	65703.	8952.8	496.89	13916.
#3	396.85	2244.1	196260.	66183.	8663.2	506.53	14048.

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	163.22	51.064	9.0668	2095.2
SDev	43.80	14.395	3.7244	25.6
%RSD	26.836	28.189	41.077	1.2206
#1	212.20	67.610	11.248	2075.4
#2	149.63	44.163	4.7664	2086.1
#3	127.82	41.420	11.186	2124.1

DF:50

Matrix: Soil Project: 33948 Analyst: mp Date: 6-9-00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		mg/kg	MB A 615	lcs A 615			lcsD A 615		
Al	6010B	5			80				
Sb	6010B	0.75	ND	20.65	20	103	20.69	103	0
As	6010B	0.75	ND	20.56	20	103	20.66	103	0
Ba	6010B	0.15			20				
Be	6010B	0.05	0.18	20.85	20	103	21.11	105	2
Cd	6010B	0.1	ND	21.78	20	109	21.99	110	1
Ca	6010B	2.5			300				
Cr	6010B	0.2	ND	19.5	20	97	19.74	99	2
Co	6010B	0.15			20				
Cu	6010B	0.2	ND	97.7	~~20~~ 100	98	99.75	100	2
Fe	6010B	2.5			40				
Pb	6010B	0.5	ND	16.66	20	83	16.61	83	0
Mg	6010B	1			100				
Mn	6010B	0.1			20				
Mo	6010B	0.5			20				
Ni	6010B	0.3	ND	21.13	20	106	21.45	107	1
K	6010B	5			80				
Se	6010B	0.5	0.63	18.75	20	91	18.49	89	2
Ag	6010B	0.15	ND	10.62	20	53	13.42	67	14
Na	6010B	50			500				
Si	6010B								
Tl	6010B	1.2	ND	15.55	20	78	15.95	80	2
Sn	6010B								
Ti	6010B								
V	6010B	0.2			20				
Zn	6010B	0.2	ND	16.51	20	82	16.70	83	1
Other									
Other									

Matrix: Soil Project: 33948 Analyst: mp Date: 6-9-00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		mg/kg	249078	078			078		
Al	6010B	5			80				
Sb	6010B	0.75	ND	18.74	20	94	19.04	95	1
As	6010B	0.75	1.22	19.72	20	92	20.03	94	2
Ba	6010B	0.15			20				
Be	6010B	0.05	0.23	19.61	20	97	20.00	99	2
Cd	6010B	0.1	ND	20.46	20	102	20.84	104	2
Ca	6010B	2.5			300				
Cr	6010B	0.2	2.70	20.57	20	89	21.15	92	3
Co	6010B	0.15			20				
Cu	6010B	0.2	0.78	95.7	~~20~~ 100	96	98.59	98	2
Fe	6010B	2.5			40				
Pb	6010B	0.5	1.56	17.36	20	79	17.19	78	1
Mg	6010B	1			100				
Mn	6010B	0.1			20				
Mo	6010B	0.5			20				
Ni	6010B	0.3	0.50	20.46	20	100	20.92	102	2
K	6010B	5			80				
Se	6010B	0.5	ND	16.91	20	82	16.97	85	1
Ag	6010B	0.15	ND	18.45	20	92	18.90	94	2
Na	6010B	50			500				
Si	6010B								
Tl	6010B	1.2	ND	14.03	20	70	14.54	73	3
Sn	6010B								
Ti	6010B								
V	6010B	0.2			20				
Zn	6010B	0.2	2.27	17.36	20	75	17.27	75	0
Other									
Other									

Method: XP2 Sample Name: MB A 6/5 Operator: mp
Run Time: 06/09/00 19:53:26
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.66560	1074.1	1.3374	.26774	3.7276	14.949	.25426
SDev	1.6132	6.9	5.1143	.05821	.0132	3.897	.51084
%RSD	242.37	.64272	382.42	21.742	.35509	26.069	200.91
#1	1.4038	1073.6	7.0297	.23413	3.7390	19.319	.76349
#2	-1.1846	1067.5	-.14732	.33496	3.7131	13.694	.25746
#3	1.7777	1081.3	-2.8703	.23413	3.7308	11.834	-.25817

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-1.6230	-6.5034	-21.863	56.382	-881.68	-.93501	2.2453
SDev	1.0020	.4632	19.095	50.995	59.83	.67797	5.0759
%RSD	61.737	7.1219	87.339	90.445	6.7858	72.509	226.07
#1	-.92067	-6.7958	-.06855	112.94	-821.73	-.49085	2.1441
#2	-1.1779	-6.7451	-29.868	42.305	-881.92	-.59880	-2.7793
#3	-2.7704	-5.9694	-35.653	13.904	-941.39	-1.7154	7.3711

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	7.0584	12.724	2.3539	.43307
SDev	5.7820	10.740	7.3758	.89694
%RSD	81.915	84.406	313.35	207.11
#1	9.8873	24.906	2.6170	.45392
#2	.40673	4.6214	-5.1500	-.47412
#3	10.881	8.6451	9.5946	1.3194

DF = 5?

Analysis Report 06/09/00 08:05:47 PM page 1

Method: XP2 Sample Name: LCS A 6/5 Operator: mp
Run Time: 06/09/00 19:59:39
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	212.39	2566.3	411.25	457.06	416.98	8092.5	435.56
SDev	84.68	3.0	4.20	1.44	.62	12.6	.70
%RSD	39.870	.11615	1.0223	.31415	.14939	.15609	.16152
#1	306.85	2569.5	408.35	455.96	416.49	8082.5	434.85
#2	187.05	2565.7	409.33	456.54	416.76	8088.1	435.57
#3	143.27	2563.6	416.07	458.68	417.68	8106.7	436.25

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	390.85	1954.2	868.49	1917.8	22486.	422.58	333.22
SDev	1.94	4.0	17.15	177.9	210.	2.93	10.63
%RSD	.49570	.20467	1.9746	9.2744	.93199	.69245	3.1887
#1	392.97	1951.5	873.20	2093.3	22577.	424.29	335.19
#2	390.41	1952.3	882.80	1922.6	22246.	424.25	342.72
#3	389.16	1958.8	849.48	1737.6	22635.	419.20	321.75

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	413.09	375.03	310.98	330.29
SDev	16.05	.21	2.60	.25
%RSD	3.8863	.05631	.83465	.07485
#1	430.78	375.26	307.99	330.28
#2	409.02	374.98	312.38	330.05
#3	399.46	374.85	312.58	330.54

DF = 50

Analysis Report 06/09/00 08:12:00 PM page 1

Method: XP2 Sample Name: LCSD A 6/5 Operator: mp
Run Time: 06/09/00 20:05:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	268.49	2615.0	413.14	465.81	422.30	8214.6	439.73
SDev	46.02	3.0	3.72	2.24	.43	14.4	.37
%RSD	17.142	.11493	.90121	.48152	.10099	.17570	.08356
#1	220.43	2611.5	415.28	463.45	421.82	8199.8	439.31
#2	272.85	2616.6	415.30	466.08	422.43	8215.3	439.89
#3	312.17	2616.8	408.84	467.91	422.65	8228.6	439.98

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	394.88	1995.1	840.99	1837.4	22850.	428.99	332.27
SDev	1.78	8.4	16.70	49.1	381.	1.48	8.40
%RSD	.45003	.42248	1.9863	2.6709	1.6664	.34407	2.5285
#1	393.48	1985.9	831.30	1865.7	23267.	427.59	340.38
#2	394.27	1996.9	860.28	1780.7	22760.	428.85	332.84
#3	396.88	2002.5	831.40	1865.7	22522.	430.53	323.60

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	413.76	369.90	319.06	334.09
SDev	4.13	8.73	12.86	.92
%RSD	.99892	2.3592	4.0310	.27565
#1	413.22	365.34	317.03	333.37
#2	418.13	379.96	332.82	333.77
#3	409.92	364.40	307.34	335.13

DF = 50

Analysis Report 06/09/00 08:18:13 PM page 1

Method: XP2 Sample Name: 249078 DUP Operator: mp
Run Time: 06/09/00 20:12:05
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.8828	7744.0	24.346	56.703	4.6710	938.91	1.8879
SDev	.3297	20.3	2.391	.338	.1598	13.33	.3793
%RSD	17.511	.26211	9.8205	.59624	3.4208	1.4197	20.093
#1	1.9804	7721.3	23.883	56.347	4.8443	924.20	1.6205
#2	2.1528	7750.3	26.934	56.741	4.6391	950.20	2.3220
#3	1.5154	7760.4	22.220	57.020	4.5295	942.33	1.7212

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	53.976	15.626	23898.	1150.3	6894.3	10.112	31.270
SDev	2.556	2.123	195.	183.2	338.7	.690	7.447
%RSD	4.7355	13.586	.81421	15.928	4.9125	6.8259	23.816
#1	54.989	17.403	23674.	1295.3	6550.0	10.609	23.339
#2	55.869	16.201	24010.	1211.3	6905.8	10.404	38.114
#3	51.068	13.275	24012.	944.38	7227.1	9.3242	32.357

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	11.725	-5.1901	-3.5759	45.511
SDev	3.990	6.4169	5.3379	.882
%RSD	34.027	123.64	149.28	1.9387
#1	13.222	-11.312	-8.0375	44.584
#2	14.749	1.4862	-5.0280	45.607
#3	7.2032	-5.7448	2.3378	46.341

DF = 50

Analysis Report 06/09/00 08:24:26 PM

Method: XP2 Sample Name: 249078 MS Operator: mp
Run Time: 06/09/00 20:18:18
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	368.76	11937.	394.37	507.44	392.30	8256.2	409.16
SDev	4.78	153.	5.31	7.32	4.19	100.7	4.06
%RSD	1.2973	1.2785	1.3465	1.4422	1.0677	1.2194	.99228
#1	363.26	11761.	389.69	499.04	387.49	8140.3	404.75
#2	371.07	12017.	400.14	510.86	394.23	8306.2	409.98
#3	371.95	12033.	393.28	512.43	395.18	8322.2	412.75

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	411.47	1914.4	23306.	2709.1	29361.	409.25	347.28
SDev	6.36	26.3	285.	163.2	433.	6.73	1.38
%RSD	1.5448	1.3749	1.2207	6.0248	1.4757	1.6436	.39724
#1	404.91	1884.2	22992.	2636.5	29132.	401.75	347.17
#2	411.89	1926.8	23380.	2594.7	29090.	411.29	345.96
#3	417.60	1932.2	23547.	2896.0	29860.	414.73	348.72

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	374.86	338.17	280.63	347.15
SDev	13.31	4.79	13.50	3.49
%RSD	3.5504	1.4152	4.8099	1.0055
#1	360.53	333.49	265.16	343.14
#2	377.21	337.97	286.78	348.85
#3	386.84	343.05	289.97	349.47

DF = 5

Analysis Report 06/09/00 08:30:40 PM

Method: XP2 Sample Name: 249078 MSD Operator: mp
Run Time: 06/09/00 20:24:32
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	Ba4934	Be3130	Ca3158	Cd2265
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	377.99	10352.	400.56	509.42	400.03	8537.8	416.82
SDev	6.18	195.	6.79	8.59	7.63	164.9	8.53
%RSD	1.6348	1.8847	1.6954	1.6853	1.9085	1.9309	2.0470
#1	377.79	10318.	399.58	506.94	399.07	8515.3	415.21
#2	371.91	10177.	394.32	502.35	392.93	8385.3	409.20
#3	384.26	10562.	407.79	518.98	408.11	8712.7	426.04

Elem	Cr2677	Cu3247	Fe2714	K_7664	Na3302	Ni2316	Pb2203
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	423.90	1971.9	27268.	2762.3	29367.	418.37	343.85
SDev	9.44	35.8	578.	129.6	897.	8.76	5.33
%RSD	2.2270	1.8160	2.1190	4.6929	3.0561	2.0930	1.5489
#1	423.87	1963.6	27175.	2814.7	29945.	416.31	349.89
#2	414.47	1940.9	26742.	2614.7	28333.	410.82	339.83
#3	433.35	2011.1	27886.	2857.6	29822.	427.97	341.83

Elem	Sb2068	Se1960	Tl1908	Zn2062
Units	ppb	ppb	ppb	ppb
Avge	380.73	339.58	290.75	345.37
SDev	7.82	3.44	8.70	7.87
%RSD	2.0533	1.0127	2.9920	2.2775
#1	383.17	335.84	294.61	344.59
#2	371.98	342.59	280.79	337.92
#3	387.04	340.32	296.85	353.60

DF = 50

Matrix: ______ Project: 33948 Analyst: mp Date: 6-9-00

Metal	QC # 19	True Value	% Recovery	QC # ICP - 2	True Value	% Recovery	CCV	True Value	% Recovery
Al					1000			5000	
Sb	2342	2000	117				1188	1000	119
As	2046	2000	102				1057	1000	106
Ba				1022	1000	102	1054	1000	105
Be	2051	2000	102				1069	1000	107
Cd	2050	2000	102				1068	1000	107
Ca	2046	2000	102				5261	5000	105
Cr	2047	2000	102				1065	1000	106
Co		2000						1000	
Cu	1978	2000	99				1034	1000	103
Fe		2000						5000	
Pb	1935	2000	97				1030	1000	103
Mg	2021	2000	101				5236	5000	105
Mn		2000						1000	
Mo		2000						2500	
Ni	2049	2000	102				1074	1000	107
K					10000			5000	
Se	2065	2000	103				1062	1000	106
Ag				491	500	98	1029	1000	103
Na					1000			10000 1EC	
Si					5000				
Tl	2124	2000	106				1054	1000	105
Sn								2500	
Ti		2000						2500	
V		2000						1000	
Zn	2066	2000	103				1059	1000	106
Other									
Other									

tandardization Rpt. 06/09/00 09:13:16 AM

ethod: XP2 Standard: BLANK
un`Time: 06/09/00 09:07:40

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Avge	-.00119	.03516	.02565	.01481	-.00013	.01287	-.00072
SDev	.00127	.00048	.00881	.00041	.00003	.00011	.00012
%RSD	107.00	1.3547	34.331	2.7546	24.881	.88389	17.360
#1	.00011	.03544	.03582	.01435	-.00011	.01300	-.00086
#2	-.00243	.03542	.02068	.01496	-.00016	.01280	-.00065
#3	-.00124	.03461	.02045	.01512	-.00011	.01281	-.00065

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Avge	-.00248	.00081	.00126	.03954	.00113	.07374	.00084
SDev	.00302	.00030	.00076	.00154	.00090	.00258	.00037
%RSD	121.51	37.017	60.245	3.8888	79.404	3.5036	43.476
#1	-.00113	.00049	.00205	.03981	.00097	.07401	.00043
#2	-.00594	.00086	.00119	.04093	.00032	.07619	.00113
#3	-.00038	.00108	.00054	.03789	.00210	.07104	.00097

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Avge	.00041	.00076	.00214	-.00333	.00945	.00293	.01673
SDev	.00028	.00062	.00347	.00185	.00987	.00210	.00276
%RSD	66.991	82.489	162.75	55.592	104.50	71.828	16.480
#1	.00011	.00016	.00264	-.00243	.01802	.00534	.01963
#2	.00065	.00140	-.00157	-.00545	-.00135	.00146	.01415
#3	.00048	.00070	.00533	-.00210	.01168	.00199	.01641

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Avge	.00590	.00174	-.00304	-.01026	.00009	.00261
SDev	.00008	.00052	.00016	.00303	.00011	.00078
%RSD	1.3880	29.815	5.2701	29.542	124.79	29.977
#1	.00599	.00221	-.00307	-.00895	.00000	.00205
#2	.00583	.00184	-.00286	-.00810	.00005	.00227
#3	.00587	.00118	-.00318	-.01372	.00022	.00350

Standardization Rpt. 06/09/00 09:18:09 AM page 1

Method: XP2 Standard: stdM1L
Run Time: 06/09/00 09:13:21

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	.30229	.55345	.11513	.88206	1.0972	.12461	.22582
SDev	.00274	.01067	.00144	.01031	.0097	.00177	.00243
%RSD	.90575	1.9286	1.2541	1.1692	.88757	1.4170	1.0751
#1	.30255	.56197	.11550	.88321	1.0962	.12409	.22654
#2	.29943	.54147	.11354	.87122	1.0880	.12316	.22311
#3	.30488	.55690	.11635	.89175	1.1074	.12658	.22781

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	.28356	.26983	.53116	.58965	.09388	.21186	.10443
SDev	.00211	.00287	.00734	.00741	.02440	.00274	.00096
%RSD	.74514	1.0641	1.3812	1.2571	25.987	1.2925	.91874
#1	.28364	.27016	.53629	.59581	.06779	.20881	.10465
#2	.28141	.26681	.52276	.58142	.09771	.21269	.10337
#3	.28563	.27252	.53443	.59171	.11613	.21410	.10525

Elem	V_2924	Zn2062
Avge	.04952	.20354
SDev	.00077	.00196
%RSD	1.5606	.96222
#1	.04958	.20414
#2	.04872	.20135
#3	.05026	.20512

Standardization Rpt. 06/09/00 09:23:03 AM

Method: XP2 Standard: stdM1M
Run Time: 06/09/00 09:18:14

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	1.6312	2.7114	.58181	4.4132	5.5556	.63176	1.1424
SDev	.0005	.0200	.00024	.0043	.0127	.00066	.0010
%RSD	.03196	.73854	.04212	.09724	.22866	.10476	.08382
#1	1.6308	2.6887	.58195	4.4087	5.5419	.63103	1.1419
#2	1.6318	2.7263	.58196	4.4137	5.5581	.63232	1.1435
#3	1.6309	2.7194	.58153	4.4173	5.5669	.63193	1.1418

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	1.2671	1.3618	2.7264	2.7200	.70562	1.0205	.58359
SDev	.0016	.0013	.0055	.0234	.04257	.0070	.00284
%RSD	.12996	.09720	.20201	.85998	6.0334	.68410	.48687
#1	1.2660	1.3605	2.7255	2.7160	.65692	1.0132	.58626
#2	1.2690	1.3618	2.7214	2.7451	.72410	1.0271	.58392
#3	1.2662	1.3631	2.7323	2.6988	.73582	1.0211	.58060

Elem	V_2924	Zn2062
Avge	.25034	1.0115
SDev	.00069	.0023
%RSD	.27673	.23140
#1	.24956	1.0091
#2	.25059	1.0116
#3	.25089	1.0138

Standardization Rpt. 06/09/00 09:27:57 AM page 1

Method: XP2 Standard: stdM1H
Run Time: 06/09/00 09:23:08

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	3.0857	5.4647	1.1760	8.9243	11.285	1.2832	2.3182
SDev	.0010	.0095	.0016	.0091	.016	.0008	.0042
%RSD	.03129	.17353	.13558	.10205	.14297	.06278	.18057
#1	3.0847	5.4540	1.1766	8.9294	11.301	1.2824	2.3198
#2	3.0859	5.4719	1.1772	8.9298	11.284	1.2840	2.3214
#3	3.0866	5.4684	1.1742	8.9138	11.269	1.2831	2.3135

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	2.5259	2.7539	5.5328	5.4528	1.5093	2.0453	1.1922
SDev	.0010	.0022	.0085	.0106	.0182	.0074	.0035
%RSD	.04047	.07986	.15313	.19419	1.2083	.36246	.29092
#1	2.5268	2.7555	5.5381	5.4427	1.4885	2.0384	1.1949
#2	2.5260	2.7548	5.5373	5.4520	1.5165	2.0443	1.1934
#3	2.5248	2.7514	5.5230	5.4638	1.5228	2.0531	1.1883

Elem	V_2924	Zn2062
Avge	.50905	2.0444
SDev	.00070	.0004
%RSD	.13798	.01997
#1	.50927	2.0440
#2	.50961	2.0444
#3	.50826	2.0449

Method: XP2 Standard: stdM2L
Run Time: 06/09/00 09:28:02

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.10855	.27764	.03019	.08060	.14980	.06176	.36345
SDev	.00157	.00146	.00022	.00131	.00027	.00043	.01197
%RSD	1.4437	.52677	.73196	1.6305	.18178	.69312	3.2947
#1	.10997	.27926	.03039	.08200	.14975	.06224	.35041
#2	.10687	.27726	.03022	.07939	.15010	.06142	.36599
#3	.10881	.27641	.02995	.08042	.14956	.06163	.37395

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.01148	.01703	.03515	.34217
SDev	.00041	.00008	.00102	.00124
%RSD	3.5522	.45586	2.9074	.36233
#1	.01177	.01711	.03412	.34350
#2	.01101	.01700	.03616	.34197
#3	.01165	.01696	.03516	.34105

Standardization Rpt. 06/09/00 09:39:19 AM page 1

Method: XP2 Standard: stdM2M
Run Time: 06/09/00 09:33:43

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.40739	1.3928	.15738	.40825	.43927	.30955	2.2856
SDev	.00032	.0035	.00034	.00050	.00204	.00051	.0127
%RSD	.07888	.24903	.21299	.12234	.46466	.16537	.55735
#1	.40714	1.3888	.15701	.40868	.43804	.30897	2.2710
#2	.40728	1.3950	.15765	.40838	.44163	.30973	2.2940
#3	.40776	1.3947	.15748	.40770	.43814	.30995	2.2918

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.05106	.06213	.64653	1.7953
SDev	.00221	.00019	.00226	.0032
%RSD	4.3322	.30792	.35001	.17559
#1	.05073	.06190	.64391	1.7920
#2	.05343	.06223	.64784	1.7983
#3	.04904	.06224	.64783	1.7956

Standardization Rpt. 06/09/00 09:45:00 AM page 1

Method: XP2 Standard: stdM2H
Run Time: 06/09/00 09:39:24

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.77375	2.7924	.31309	.81449	.79692	.61804	4.5958
SDev	.00106	.0080	.00083	.00445	.00396	.00206	.0102
%RSD	.13738	.28779	.26526	.54578	.49671	.33321	.22142
#1	.77254	2.7832	.31217	.80950	.79347	.61643	4.5849
#2	.77420	2.7958	.31378	.81598	.79605	.62036	4.6051
#3	.77452	2.7982	.31332	.81800	.80124	.61734	4.5973

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.10356	.11580	1.3302	3.5921
SDev	.00083	.00026	.0031	.0079
%RSD	.80109	.22507	.23232	.22116
#1	.10422	.11550	1.3266	3.5831
#2	.10263	.11598	1.3321	3.5980
#3	.10384	.11592	1.3318	3.5952

Standardization Report 06/09/00 09:45:02 AM page 1

Method: XP2 Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	Multiple	Standards	639.161	.803611	06/09/00 09:23:08
Al3082	308.215	Multiple	Standards	13531.4	-475.644	06/09/00 09:39:24
As1890	189.042	Multiple	Standards	372.912	-9.53687	06/09/00 09:23:08
B_2496	249.678	Multiple	Standards	1837.55	-27.0674	06/09/00 09:39:24
Ba4934	493.409	Multiple	Standards	1717.88	.234133	06/09/00 09:23:08
Be3130	313.042	Multiple	Standards	227.226	-2.90177	06/09/00 09:23:08
Ca3158	315.887	Multiple	Standards	31943.9	23.0683	06/09/00 09:39:24
Cd2265	226.502	Multiple	Standards	179.632	.468316	06/09/00 09:23:08
Co2286	228.616	Multiple	Standards	1586.23	-1.25049	06/09/00 09:23:08
Cr2677	267.716	Multiple	Standards	876.519	-1.07498	06/09/00 09:23:08
Cu3247	324.753	Multiple	Standards	812.806	-32.1244	06/09/00 09:23:08
Fe2714	271.441	Multiple	Standards	12384.1	-13.8771	06/09/00 09:39:24
K_7664	766.491	Multiple	Standards	13546.8	-999.263	06/09/00 09:39:24
Mg2790	279.078	Multiple	Standards	16270.2	-13.6695	06/09/00 09:39:24
Mn2576	257.610	Multiple	Standards	734.326	-.284228	06/09/00 09:23:08
Mo2020	202.030	Multiple	Standards	1172.00	-.252074	06/09/00 09:39:24
Na3302	330.232	Multiple	Standards	204956.	-436.839	06/09/00 09:39:24
Ni2316	231.604	Multiple	Standards	367.162	1.25446	06/09/00 09:23:08
Pb2203	220.351	Multiple	Standards	360.064	-3.47667	06/09/00 09:23:08
Sb2068	206.838	Multiple	Standards	1568.52	-4.10421	06/09/00 09:23:08
Se1960	196.261	Multiple	Standards	1002.02	-16.7270	06/09/00 09:23:08
Si2881	288.158	Multiple	Standards	44954.2	-265.015	06/09/00 09:39:24
Sn1899	189.989	Multiple	Standards	5068.94	-6.04251	06/09/00 09:39:24
Ti3372	337.280	Multiple	Standards	1409.12	4.39398	06/09/00 09:39:24
Tl1908	190.864	Multiple	Standards	1696.19	17.4487	06/09/00 09:23:08
V_2924	292.402	Multiple	Standards	3989.72	-.332984	06/09/00 09:23:08
Zn2062	206.200	Multiple	Standards	988.619	-2.56299	06/09/00 09:23:08

Method: XP2   Sample Name: M100050108 ICP-2   Operator:
Run Time: 06/09/00 09:45:06
Comment:
Mode: CONC   Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	491.36	1008.8	.67451	1057.2	1021.9	.13598	8.5823
SDev	3.66	2.3	2.9947	12.3	8.4	.01099	5.6630
%RSD	.74387	.22626	443.99	1.1668	.81926	8.0859	65.984
#1	491.75	1006.9	4.1234	1063.7	1023.7	.14526	10.879
#2	494.81	1011.3	-1.2676	1064.9	1029.1	.13884	2.1318
#3	487.53	1008.1	-.83224	1043.0	1012.7	.12383	12.736
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value	500.00	1000.0		1000.0	1000.0		
Range	10.000	10.000		10.000	10.000		

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.09627	-.21407	-.42540	.82810	1.3819	9708.3	.48178
SDev	.35653	.91885	.42834	.33575	1.4656	51.7	.97582
%RSD	370.34	429.23	100.69	40.544	106.05	.53305	202.55
#1	-.17795	-.90462	-.88386	.61823	2.9995	9704.5	.52090
#2	-.40487	.82880	-.35688	1.2153	1.0036	9761.8	1.4374
#3	.29401	-.56640	-.03545	.65074	.14262	9658.5	-.51302
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value						10000.	
Range						10.000	

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.64659	24.919	Q799.91	-.96819	2.6002	4.4401	-9.4662
SDev	.14838	13.027	206.51	.38655	5.4379	2.0233	2.6808
%RSD	22.948	52.277	25.817	39.925	209.13	45.568	28.320
#1	.75652	39.613	1037.9	-1.3874	3.7462	4.8734	-6.5675
#2	.47781	20.360	Q693.78	-.89128	-3.3193	2.2353	-11.856
#3	.70543	14.785	Q668.04	-.62588	7.3738	6.2116	-9.9748
Errors	NOCHECK	NOCHECK	QC Fail	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			1000.0				
Range			10.000				

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4888.3	16.656	2.5876	-4.4679	-.18597	2.0218
SDev	48.2	10.018	1.3961	4.5675	.54537	.6314
%RSD	.98608	60.143	53.955	102.23	293.26	31.230
#1	4905.5	28.220	3.7795	-.85854	-.11550	2.7183
#2	4925.5	11.122	2.9317	-9.6029	.32075	1.4867
#3	4833.8	10.626	1.0516	-2.9422	-.76314	1.8605
Errors	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK

Value	5000.0
Range	10.000

Analysis Report QC Standard 06/09/00 09:56:23 AM page 1

Method: XP2 Sample Name: M100050107 QC-19 Operator:
Run Time: 06/09/00 09:50:47
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.5557	181.92	2046.4	119.44	1.2299	2050.9	2046.3
SDev	.3697	9.07	4.6	1.44	.1101	5.1	5.1
%RSD	23.767	4.9859	.22322	1.2092	8.9538	.24985	.25080
#1	1.3242	185.68	2043.2	121.01	1.1670	2051.7	2042.2
#2	1.3607	188.51	2051.7	118.18	1.3571	2055.7	2052.1
#3	1.9821	171.57	2044.4	119.12	1.1657	2045.5	2044.7
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value			2000.0			2000.0	2000.0
Range			10.000			10.000	10.000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2049.8	2077.8	2046.7	1977.6	1961.5	54.006	2020.8
SDev	5.9	6.2	7.0	6.0	15.9	68.788	3.8
%RSD	.28908	.29861	.34100	.30532	.80959	127.37	.18591
#1	2049.2	2076.6	2047.4	1981.0	1966.0	-2.4754	2016.7
#2	2056.0	2084.5	2053.3	1981.1	1943.9	33.882	2024.0
#3	2044.2	2072.3	2039.4	1970.6	1974.7	130.61	2021.9
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Pass	NOCHECK	QC Pass
Value	2000.0	2000.0	2000.0	2000.0	2000.0		2000.0
Range	10.000	10.000	10.000	10.000	10.000		10.000

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2066.3	2184.7	432.35	2048.7	1934.7	Q2342.2	2065.4
SDev	6.5	13.2	361.36	6.9	13.1	57.6	4.8
%RSD	.31541	.60271	83.580	.33899	.67712	2.4583	.23450
#1	2066.4	2169.9	264.34	2049.6	1938.9	Q2275.8	2064.5
#2	2072.8	2195.3	847.14	2055.1	1945.2	Q2378.1	2070.6
#3	2059.8	2188.7	185.59	2041.3	1920.1	Q2372.7	2061.1
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Fail	QC Pass
Value	2000.0	2000.0		2000.0	2000.0	2000.0	2000.0
Range	10.000	10.000		10.000	10.000	10.000	10.000

lem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
nits	ppb	ppb	ppb	ppb	ppb	ppb
vge	1056.5	2742.5	2014.2	2123.9	2038.1	2066.0
Dev	6.5	10.5	6.3	7.3	7.4	4.0
RSD	.61266	.38179	.31064	.34531	.36480	.19368
1	1060.5	2742.4	2014.1	2126.8	2039.7	2064.5
2	1059.8	2753.1	2020.5	2129.3	2044.6	2070.5
3	1049.0	2732.1	2008.0	2115.5	2030.0	2062.9
rrors	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass

Analysis Report 06/09/00 10:02:36 AM page 1

Method: XP2 Sample Name: IEC Operator: mp
Run Time: 06/09/00 09:56:28
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.00730	12528.	.24906	9.4950	1.0555	.68761	62770.
SDev	.71301	43.	.78365	.7557	.1447	.13018	176.
%RSD	9769.6	.34147	314.64	7.9588	13.711	18.932	.28086
#1	-.28945	12565.	.87265	10.237	.89752	.83373	62961.
#2	-.53605	12538.	-.63059	9.5215	1.1817	.64512	62736.
#3	.80361	12481.	.50512	8.7265	1.0873	.58399	62613.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4.9773	-.37534	-.49483	-6.4603	49549.	-63.331	30924.
SDev	1.1581	.87507	.92637	.8803	146.	7.281	93.
%RSD	23.268	233.14	187.21	13.626	.29563	11.497	.30016
#1	6.3051	.49965	.13387	-5.4449	49711.	-60.624	31031.
#2	4.4513	-1.2505	-.05971	-6.9288	49509.	-57.790	30872.
#3	4.1755	-.37518	-1.5587	-7.0073	49426.	-71.578	30869.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.4443	22.399	9875.3	-.20392	7.2369	76.599	.15177
SDev	.0939	14.435	609.2	2.17512	.9772	58.285	6.3099
%RSD	6.4981	64.448	6.1691	1066.6	13.503	76.092	4157.4
#1	1.4982	38.670	9637.4	2.2470	6.6735	142.30	7.3741
#2	1.3359	17.396	9420.9	-1.9048	6.6719	56.370	-4.2915
#3	1.4987	11.130	10568.	-.95394	8.3652	31.123	-2.6273

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb
Avge	136.75	21.922	3.1502	.26175	2.8954	4.2000
SDev	4.21	3.491	.2057	4.9178	1.4328	.6826
%RSD	3.0808	15.923	6.5283	1878.8	49.485	16.253
#1	139.22	25.836	3.3834	5.9392	2.9685	4.9088
#2	139.15	20.798	2.9950	-2.4790	1.4275	4.1441
#3	131.89	19.132	3.0721	-2.6750	4.2903	3.5470

Analysis Report 06/09/00 10:08:48 AM

Method: XP2 Sample Name: CCV Operator: mp
Run Time: 06/09/00 10:02:41
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1029.2	5393.2	1057.3	2789.2	1053.8	1069.8	5260.8
SDev	4.2	18.5	10.6	11.2	1.3	3.2	20.9
%RSD	.41010	.34298	1.0072	.40014	.11928	.29944	.39693
#1	1024.4	5385.4	1046.2	2776.4	1052.4	1066.2	5237.5
#2	1031.0	5414.3	1058.3	2794.7	1054.1	1070.6	5277.9
#3	1032.3	5379.8	1067.5	2796.6	1054.8	1072.5	5266.9

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1068.0	1069.5	1064.8	1034.1	5254.5	5195.6	5236.0
SDev	3.5	3.5	2.3	1.3	16.0	73.7	19.2
%RSD	.32689	.32713	.21921	.12373	.30372	1.4193	.36709
#1	1064.1	1065.5	1062.1	1032.7	5240.1	5128.6	5215.1
#2	1069.5	1071.2	1065.8	1035.2	5271.7	5274.6	5239.9
#3	1070.6	1071.8	1066.5	1034.4	5251.9	5183.7	5253.0

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1061.1	2805.1	10767.	1073.6	1030.5	1187.8	1062.0
SDev	2.3	19.6	272.	5.2	11.9	53.0	2.3
%RSD	.22009	.69897	2.5248	.48210	1.1499	4.4609	.21759
#1	1058.4	2782.5	10595.	1067.7	1017.2	1126.9	1059.8
#2	1062.3	2816.9	11080.	1075.9	1039.8	1213.6	1064.4
#3	1062.5	2816.0	10624.	1077.3	1034.6	1223.0	1061.6

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb
Avge	3705.8	3497.3	2652.2	1053.7	1060.0	1059.3
SDev	6.1	5.4	5.5	12.4	2.8	4.8
%RSD	.16358	.15376	.20673	1.1732	.26568	.45022
#1	3698.8	3493.4	2646.1	1040.8	1057.2	1054.1
#2	3708.4	3495.1	2653.5	1065.5	1060.0	1060.6
#3	3710.1	3503.4	2656.8	1054.7	1062.9	1063.4

Matrix: Water Project: 33948 Analyst: mp Date: 6-9-00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		ug/L	252371	372	373	374					
Al	200.7	100									
Sb	200.7	15									
As	200.7	15	ND	ND	ND	ND					
Ba	200.7	3									
Be	200.7	1									
Cd	200.7	2									
Ca	200.7	50									
Cr	200.7	4									
Co	200.7	3									
Cu	200.7	4									
Fe	200.7	50									
Pb	200.7	10	30	ND	ND	ND					
Mg	200.7	20									
Mn	200.7	2									
Mo	200.7	10									
Ni	200.7	6									
K	200.7	100									
e	200.7	10									
g	200.7	3									
a	200.7	1000									
i	200.7	400									
l	200.7	25									
n	200.7	20									
	200.7	3									
	200.7	4									
	200.7	10									
er											
er											

CAR-P

DATA VALIDATION REPORT

DATE: July 12, 2000

SUBJECT: Pepper's Steel and Alloys
Medley, Dade County, Florida
Laboratory Package Numbers 33099 and 33336

FROM: Gina Kelly, Chemist
Black & Veatch Special Projects Corp.

TO: Pamela Scully, Remedial Project Manager
U.S. Environmental Protection Agency

THRU: Carol King, Project Manager
Black & Veatch Special Projects Corp.

SAMPLE IDs: **Soil**
PS-MS-1
PS-MS-2
PS-MS-3

OVERVIEW

During the week of January 10, 2000, three monolith core samples were collected from the Pepper's Steel and Alloys site. These samples and the leachates from these samples, where applicable, were analyzed for metals (SW-846 Method 601 OB), MEP arsenic and lead (SW-846 Methods 1320/6010B). TCLP metals (SW-846 Methods 1311/601 OB), and mercury (SW-846 Method 7471). Hygeia Laboratories Inc. analyzed the samples in accordance with the methods specified by the Contract Laboratory Program (CLP) Routine Analytical Service (RAS) protocol.

The samples were evaluated based on holding times, method blanks, laboratory control samples (LCS), matrix spike/matrix spike duplicate (MS/MSD), and initial and continuing calibrations as specified in the United States Environmental Protection Agency (EPA) Contract Laboratory Program for Inorganic Data Review, February, 1994, and the *United States Environmental Protection Agency, Region 4, Science and Ecosystem Support Division, Office of Quality Assurance, Data Validation Standard Operating Procedures for Contract Laboratory Program Routine Analytical Services, Revision 2.1, July 1999.*

The attachments presents documentation of the review conducted and includes the quality control (QC) requirements and the criteria, the analytes that failed the criteria, analysis result flags, the data to which the flag is applied, and support documentation, if necessary.

SUMMARY

All samples were successfully analyzed for all target compounds. The analytical data included in Laboratory Package Numbers 33099 and 33336, are of sufficient quality and deemed acceptable for their intended use.

ATTACHMENTS

Attachment I - Inorganic Data Review Document
Attachment II - Data Qualifier Flags and Remarks
Attachment III - Data Qualifier Report

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 1
Treated Characterization Analyses
Summary of Additional Chemical and Physical Analyses

ANALYTICAL PARAMETER	RESULTS (mg/kg)					
	PS-MS-1		PS-MS-2		PS-MS-3	
	Conc.	DL	~~DL~~ Conc.	DL	~~DL~~ Conc.	DL
I. TOTAL RCRA METALS						
Arsenic	-	0.9	24	1.0	26.8	0.9
Barium	5.4	0.2	153	0.2	243	0.2
Cadmium	0.3	0.1	1.6	0.1	1.6	0.1
Chromium	5.1	0.2	18.0	0.3	18.6	0.2
Lead	0.7	0.5	1,200	0.7	798	0.6
Mercury	-	0.3	-	0.3	-	0.3
Selenium	-	0.5	3.5	0.7	1.7	0.6
Silver	-	0.2	0.5	0.2	0.3	0.2

DL Detection Limit

\- Non Detectable Concentrations

3216_204

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 2
Treated Characterization Analyses
Summary of MEP Lead and Arsenic Analyses - EPA Methods 1320/6010B

ANALYTICAL PARAMETER	RESULTS (mg/L)					
	PS-MS-1		PS-MS-2		PS-MS-3	
	Conc.	DL	DL	DL	DL	DL
I. MEP ARSENIC INTERVAL						
Interval 1	-	0.015	-	0.015	0.044	0.015
Interval 2	-	0.015	0.016	0.015	0.048	0.015
Interval 3	-	0.015	0.037	0.015	0.086	0.015
Interval 4	-	0.015	-	0.015	0.041	0.015
Interval 5	-	0.015	-	0.015	-	0.015
Interval 6	-	0.015	-	0.015	-	0.015
Interval 7	-	0.015	-	0.015	0.027	0.015
Interval 8	-	0.015	-	0.015	-	0.015
Interval 9	-	0.015	-	0.015	0.018	0.015
II. MEP LEAD INTERVAL						
Interval 1	0.033	0.010	0.013	0.010	-	0.010
Interval 2	0.064	0.010	-	0.010	-	0.010
Interval 3	0.152	0.010	-	0.010	0.011	0.010
Interval 4	0.129	0.010	-	0.010	0.011	0.010
Interval 5	-	0.010	-	0.010	-	0.010
Interval 6	-	0.010	-	0.010	-	0.010
Interval 7	-	0.010	-	0.010	-	0.010
Interval 8	-	0.010	-	0.010	-	0.010
Interval 9	-	0.010	-	0.010	-	0.010

DL Detection Limit
\- Non Detectable Concentrations

3216_205

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 3
Treated Characterization Analyses
Summary of Unconfined Compressive Strength Testing - ASTM D 2166

KIBER SAMPLE No.	UNCONFINED COMPRESSIVE STRENGTH (UCS) RESULTS			
	Moisture Content (%)	Bulk Unit Weight (lbs/ft^3)	Dry Unit Weight (lbs/ft^3)	UCS (lbs/in^2)
PS-MS-1	NA	NA	NA	NA
PS-MS-2	NA	NA	NA	NA
PS-MS-3	26	120	95	778

NA Samples PS-MS-1 and PS-MS-2 could not be tested since the cored samples were not intact upon arrival at Kiber's facilities.

3216_202

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOY FIVE YEAR REVIEW

TABLE 4
Treated Characterization Analyses
Summary of Wet/Dry Durability Testing - ASTM D 4843 Modified

TESTING PARAMETER	UNIT	DURABILITY RESULTS			
		PS-MS-2		PS-MS-3	
		Control (1)	Test (2)	Control (1)	Test (2)
I. INITIAL CONDITIONS					
Bulk Unit Weight	lbs/ft^3	*	*	*	*
Dry Unit Weight	lbs/ft^3	*	*	*	*
Initial Moisture Content	%	*	*	*	*
II. PHYSICAL RESULTS					
Maximum Volumetric Change*	%	*	*	*	*
Mass Loss	%	*	*	*	*
Relative Mass Loss (3)	%	*	*	*	*
II. ANALYTICAL ANALYSES					
Total Arsenic - First Leachate	mg/L	**0.016**	<0.015	**0.032**	<0.015
Total Arsenic - Final Leachate	mg/L	*	*	*	*
Total Arsenic - Residual	mg/kg	*	*	*	*
Total Lead - First Leachate	mg/L	<0.010	<0.010	<0.010	<0.010
Total Lead - Final Leachate	mg/L	*	*	*	*
Total Lead - Residual	mg/kg	*	*	*	*

- Not applicable.
* A positive value denotes expansion and a negative value denotes shrinkage
(1) Control specimen is not heated during the testing.
(2) Test specimen goes through 12 cycles of wetting and drying.
(3) Note that the specimen loss is relative to the control specimen.

3216_206

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 5
Treated Characterization Analyses
Summary of Additional Chemical and Physical Analyses

ANALYTICAL PARAMETER	UNIT	RESULTS					
		PS-MS-1	PS-MS-2	PS-MS-3	PS-DM-1	PS-DM-2	PS-DM-3
I. CHEMICAL ANALYSES							
TCLP Arsenic	mg/L	< 0.5	< 0.5	< 0.5	-	-	-
TCLP Lead	mg/L	< 0.5	1.6	< 0.5	-	-	-
Acid Neutralization Capacity							
- Total Neutralizing Capacity	%	3.42	2.98	2.18	-	-	-
- Dissolved Magnesium	%	0.06	0.03	0.02	-	-	-
- Total Dissolved Oxides	%	3.74	3.05	2.27	-	-	-
II. PHYSICAL PROPERTIES							
Air Permeability	m^2	2.33E-16	4.67E-12	4.57E-18	2.60E-11 (1)	2.40E-11 (1)	4.00E-11 (1)
Maximum Density	lbs/ft^3	-	-	-	69.9	68.9	74.1
Minimum Density	lbs/ft^3	-	-	-	76.7	76.0	81.9

(1) Permeability values may be greater than those presented since the system flow rate capacity was reached during testing.

\- Not Applicable or Not Analyzed

3216_203

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33336

Report Date: 04/26/00

Metals by ICP

Units: **ug/L (ppb)** Method: **EPA 200.7**

Matrix: Water Analysis Date: 04/21/00 Prep. Date: 04/21/00 Analyst: MP

Lab ID:	248634		248635		248636		248637	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	BRL	15	16	15	BRL	15	22	15
Lead	BRL	10	BRL	10	BRL	10	BRL	10

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- BRL = "Below Reporting Limit"
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

Alabama - Lab ID 40970; Arkansas; Connecticut - No. PH 0208Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kentucky - Lab ID 90053; Maryland - No. 293; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Accreditations

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 100649

ATTACHMENT I

INORGANIC DATA REVIEW DOCUMENT

United States Environmental Protection Agency
Region IV
Science and Ecosystem Support Division
980 College Station Road, Athens, GA 30605

Date:	July 12, 2000			
Subject:	Review of Organic Data:	Package No. 33099 and 33336		
	Contract Lab Name:	Hygeia Laboratories, Inc		
	Region IV Project No:	48103.0845		
	SMO Traffic Nos.:			
	Region IV SAD Nos.:			
	Level:	Low __X___	Med _____	High ____
	Matrix Types:	Water ___X___	Soil/Sed __X__	Waste ____

Reviewed performed by: Gina Kelly, Chemist, Black & Veatch Special Projects Corp.

Review Codes

A - Acceptable: All QC criteria met. No data qualified based on these items.

P - Provisional: Some QC criteria were exceeded resulting in data qualifiers being assigned based on these items.

U - Unacceptable: The QC criteria were exceeded to such an extent that the associated data was rejected based upon these items.

N/A - Not Applicable: This item does not apply to the case being reviewed.

I. SAMPLE HOLDING TIMES AND PRESERVATION (Technical holding times; waters only)

Metals (6 months)	__A__
Mercury (28 days)	__A__
Cyanide (14 days)	__NA__

REMARKS: None.

II. CALIBRATION

	AA/ICP	Furnace	Mercury	CN
Initial Cal	__A__	_NA__	__A__	__NA__
Initial Cal Verif	__A__	_NA__	__A__	__NA__
Cont Cal Verif	__A__	__NA__	__A__	__NA__

REMARKS: None.

III. BLANKS

Cal Blanks (CB) __A__
Preparation Blanks (PB) __NA__
Blind Blanks (BB) __NA__

REMARKS: None

IV. ICP INTERFERENCE CHECK SAMPLE

False Positives __NA__
False Negatives __NA__

REMARKS: None.

V. SPIKED SAMPLE RESULTS

	Water	Soil
Matrix Spike	__A__	__A__

REMARKS: None.

VI. OTHER QC

Matrix Duplicate __A__
LCS __A__

REMARKS: None.

VII. DELIVERABLES

Cover Page
Form I __A_
QC Summaries __A__
Raw Data __A__

Traffic Reports __A__
Digestion Logs __A__
Preparation Logs __A__
Run Logs __A__

REMARKS: None.

VIII. CONTACT WITH CONTRACT LAB REQUIRED DURING DATA REVIEW?

Yes _____ No __X__

REMARKS: None.

IX. DATA QUALIFIERS SUMMARY

Element	Flag	Samples Affected	Reason

None.

ATTACHMENT II

DATA QUALIFIERS (FLAGS) AND REMARKS - Inorganics

Data qualifier flags are used as an effort to best describe the quality of each piece of data to the data user. These flags are letter codes appended to the numeric data (or in some instances used alone). In addition, a series of standard remarks is used to give a more detailed explanation of the data.

STANDARD REMARKS - To use standard remarks simply choose the appropriate number of the remark and place it on the data sheet. It is not necessary to write the verbiage.

DEFINITIONS OF DATA QUALIFIERS

U = The analyte was analyzed for but not detected. The value preceding the U is the Contract Required Quantitation Limit (CRQL).

J = The identification of the analyte is acceptable, but quality assurance criteria indicate that the quantitative values may be outside the normal expected range, i.e., the quantitative value is considered estimated.

N = There is presumptive evidence that the analyte is present, but it has not been confirmed. The analyte is "tentatively identified". There is an indication that the reported analyte is present, however, all quality control requirements necessary for confirmation were not met.

R = Data is considered to be rejected and shall not be used. This flag denotes the failure of quality control criteria such that it can not be determined if the analyte is present or absent from the sample. Resampling and analysis are necessary to confirm or deny the presence of the analyte.

C = This flag is most often used in conjunction with pesticides/PCB data. The analyte is determined to be present and the presence has been confirmed by GC/MS.

UJ = This is a combination of the U and J flags. The analyte is not present. The reported value is considered to be an estimated CRQL.

NJ = A combination of the J and N flags. The analyte is tentatively identified and the value preceding the IN is estimated.

ATTACHMENT III

DATA QUALIFIER REPORT

ATTACHMENT III

DATA QUALIFIER REPORT

Package Nos. 33099 and 33336 Project No. 048103.0845

Site Name/Location: Pepper's Steel and Alloy/Medley, Dade County, Florida

Affected Samples	Compound/Fraction	Used	Reason

None.

KIBER
ENVIRONMENTAL
SERVICES

3145 Medlock Bridge Rd.
Norcross, Georgia 30071
tel 770-242-4090
fax 770-242-9198
www.kiber.com

6 June 2000

Ms. Carol W. King
Black & Veatch Special Projects Corp.
1145 Sanctuary Parkway
Suite 475
Alpharetta, Georgia 30004
(770) 751-7517

Subject: Pepper's Steel and Alloys

Dear Ms. King:

Kiber Environmental Services, Inc. (Kiber) has developed this letter to present Black & Veatch Special Projects Corporation (BVSPC) with the results of testing performed on materials sampled from the Pepper's Steel and Alloys site. Summary tables are included presenting the results of analytical and physical analyses finalized to date. The final results of wet/dry durability testing will be finalized and forwarded in a supplemental report upon completion. Kiber has also included complete analytical and physical data reports for all testing performed.

Kiber Environmental Services, Inc. appreciates the opportunity to provide a proposal for this project and looks forward to working with you in the future. If you have any questions, please contact either of the undersigned at (770) 242-4090.

Sincerely,

KIBER ENVIRONMENTAL SERVICES, INC.

George M. Zaharchak
Project Manager
(Ext. 250)
george@kiber.com

Robert K. Semenak
Treatability Department Manager
Associate
(Ext. 235)
robert@kiber.com

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client:	**Kiber Environmental Services, Inc** 3145 Medlock Bridge Road Norcross, GA 30071
Attention:	**George Zaharchak**
Project Name:	**PSA**
Project ID:	3216-8901
Received:	4/6/00
Lab Project No.	33099

Report Date: 4/27/00

CASE NARRATIVE

The holding times for each sample were met.

Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.

Reviewed by

Respectfully Submitted,

Randy Brown

Hygeia Laboratories, Inc.

LAB ID	CLIENT ID	MATRIX	COLLECTED
247041	PS-MS-1	SOIL	4/5/00
247042	PS-MS-2	SOIL	4/5/00
247043	PS-MS-3	SOIL	4/5/00

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 1
Treated Characterization Analyses
Summary of Additional Chemical and Physical Analyses

ANALYTICAL PARAMETER	RESULTS (mg/kg)					
	PS-MS-1		PS-MS-2		PS-MS-3	
	Conc.	DL	~~DL~~ Conc.	DL	~~DL~~ Conc.	DL
I. TOTAL RCRA METALS						
Arsenic	-	0.9	24	1.0	26.8	0.9
Barium	5.4	0.2	153	0.2	243	0.2
Cadmium	0.3	0.1	1.6	0.1	1.6	0.1
Chromium	5.1	0.2	18.0	0.3	18.6	0.2
Lead	0.7	0.5	1,200	0.7	798	0.6
Mercury	-	0.3	-	0.3	-	0.3
Selenium	-	0.5	3.5	0.7	1.7	0.6
Silver	-	0.2	0.5	0.2	0.3	0.2

DL Detection Limit
\- Non Detectable Concentrations

3216_204

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 2
Treated Characterization Analyses
Summary of MEP Lead and Arsenic Analyses - EPA Methods 1320/6010B

ANALYTICAL PARAMETER	RESULTS (mg/L)					
	PS-MS-1		PS-MS-2		PS-MS-3	
	Conc.	DL	DL	DL	DL	DL
I. MEP ARSENIC INTERVAL						
Interval 1	-	0.015	-	0.015	0.044	0.015
Interval 2	-	0.015	0.016	0.015	0.048	0.015
Interval 3	-	0.015	0.037	0.015	0.086	0.015
Interval 4	-	0.015	-	0.015	0.041	0.015
Interval 5	-	0.015	-	0.015	-	0.015
Interval 6	-	0.015	-	0.015	-	0.015
Interval 7	-	0.015	-	0.015	0.027	0.015
Interval 8	-	0.015	-	0.015	-	0.015
Interval 9	-	0.015	-	0.015	0.018	0.015
II. MEP LEAD INTERVAL						
Interval 1	0.033	0.010	0.013	0.010	-	0.010
Interval 2	0.064	0.010	-	0.010	-	0.010
Interval 3	0.152	0.010	-	0.010	0.011	0.010
Interval 4	0.129	0.010	-	0.010	0.011	0.010
Interval 5	-	0.010	-	0.010	-	0.010
Interval 6	-	0.010	-	0.010	-	0.010
Interval 7	-	0.010	-	0.010	-	0.010
Interval 8	-	0.010	-	0.010	-	0.010
Interval 9	-	0.010	-	0.010	-	0.010

DL Detection Limit
\- Non Detectable Concentrations

3216_205

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 3
Treated Characterization Analyses
Summary of Unconfined Compressive Strength Testing - ASTM D 2166

KIBER SAMPLE No.	UNCONFINED COMPRESSIVE STRENGTH (UCS) RESULTS			
	Moisture Content (%)	Bulk Unit Weight (lbs/ft^3)	Dry Unit Weight (lbs/ft^3)	UCS (lbs/in^2)
PS-MS-1	NA	NA	NA	NA
PS-MS-2	NA	NA	NA	NA
PS-MS-3	26	120	95	778

NA Samples PS-MS-1 and PS-MS-2 could not be tested since the cored samples were not intact upon arrival at Kiber's facilities.

3216_202

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOY FIVE YEAR REVIEW

TABLE 4
Treated Characterization Analyses
Summary of Wet/Dry Durability Testing - ASTM D 4843 Modified

TESTING PARAMETER	UNIT	DURABILITY RESULTS			
		PS-MS-2		PS-MS-3	
		Control (1)	Test (2)	Control (1)	Test (2)
I. INITIAL CONDITIONS					
Bulk Unit Weight	lbs/ft^3	*	*	*	*
Dry Unit Weight	lbs/ft^3	*	*	*	*
Initial Moisture Content	%	*	*	*	*
II. PHYSICAL RESULTS					
Maximum Volumetric Change*	%	*	*	*	*
Mass Loss	%	*	*	*	*
Relative Mass Loss (3)	%	*	*	*	*
II. ANALYTICAL ANALYSES					
Total Arsenic - First Leachate	mg/L	**0.016**	<0.015	**0.032**	<0.015
Total Arsenic - Final Leachate	mg/L	*	*	*	*
Total Arsenic - Residual	mg/kg	*	*	*	*
Total Lead - First Leachate	mg/L	<0.010	<0.010	<0.010	<0.010
Total Lead - Final Leachate	mg/L	*	*	*	*
Total Lead - Residual	mg/kg	*	*	*	*

- Not applicable.
* A positive value denotes expansion and a negative value denotes shrinkage
(1) Control specimen is not heated during the testing.
(2) Test specimen goes through 12 cycles of wetting and drying.
(3) Note that the specimen loss is relative to the control specimen.

3216_206

KIBER ENVIRONMENTAL SERVICES, INC.
BLACK AND VEATCH SPECIAL PROJECTS CORPORATION
PEPPER'S STEEL AND ALLOYS FIVE YEAR REVIEW

TABLE 5
Treated Characterization Analyses
Summary of Additional Chemical and Physical Analyses

ANALYTICAL PARAMETER	UNIT	RESULTS					
		PS-MS-1	PS-MS-2	PS-MS-3	PS-DM-1	PS-DM-2	PS-DM-3
I. CHEMICAL ANALYSES							
TCLP Arsenic	mg/L	< 0.5	< 0.5	< 0.5	-	-	-
TCLP Lead	mg/L	< 0.5	1.6	< 0.5	-	-	-
Acid Neutralization Capacity							
- Total Neutralizing Capacity	%	3.42	2.98	2.18	-	-	-
- Dissolved Magnesium	%	0.06	0.03	0.02	-	-	-
- Total Dissolved Oxides	%	3.74	3.05	2.27	-	-	-
II. PHYSICAL PROPERTIES							
Air Permeability	m^2	2.33E-16	4.67E-12	4.57E-18	2.60E-11 (1)	2.40E-11 (1)	4.00E-11 (1)
Maximum Density	lbs/ft^3	-	-	-	69.9	68.9	74.1
Minimum Density	lbs/ft^3	-	-	-	76.7	76.0	81.9

(1) Permeability values may be greater than those presented since the system flow rate capacity was reached during testing.

\- Not Applicable or Not Analyzed

3216_203

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

Metals by ICP

Units: mg/Kg (ppm) by Dry Weight Method: EPA 6010B

Matrix: Soil Analysis Date: 4/12/00 Prep. Date: 4/12/00 Analyst: MP

Lab ID: 247041
Client ID: PS-MS-1

Analyte	Result	RL
Arsenic	BRL	0.9
Barium	5.4	0.2
Calcium	0.3	0.1
Chromium	5.1	0.2
Lead	0.7	0.5
Selenium	BRL	0.5
Silver	BRL	0.2

Mercury by Cold Vapor Atomic Absorption

Units: mg/Kg (ppm) by Dry Weight Method: EPA 7471

Matrix: Soil Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: SR

Lab ID: 247041
Client ID: PS-MS-1

Analyte	Result	RL
Mercury	BRL	0.3

TCLP Metals by ICP

Units: mg/L (ppm) Method: EPA 1311/6010B

Matrix: Leachate Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: MP

Lab ID: 247041
Client ID: PS-MS-1

Analyte	Result	RL
Arsenic	BRL	0.5
Lead	BRL	0.5

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

MEP Arsenic Units: **ug/L (ppb)** Method: **EPA 1320/6010B**

Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247041
Client ID: PS-MS-1

Day	Result	RL
1	BRL	15
2	BRL	15
3	BRL	15
4	BRL	15
5	BRL	15
6	BRL	15
7	BRL	15
8	BRL	15
9	BRL	15

MEP Lead Units: **ug/L (ppb)** Method: **EPA 1320/6010B**

Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247041
Client ID: PS-MS-1

Day	Result	RL
1	33	10
2	64	10
3	152	10
4	129	10
5	BRL	10
6	BRL	10
7	BRL	10
8	BRL	10
9	BRL	10

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

Metals by ICP

Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 6010B**

Matrix: Soil Analysis Date: 4/12/00 Prep. Date: 4/12/00 Analyst: MP

Lab ID: 247042
Client ID: PS-MS-2

Analyte	Result	RL
Arsenic	24	1
Barium	153	0.2
Calcium	1.6	0.1
Chromium	18.0	0.3
Lead	1,200	0.7
Selenium	3.5	0.7
Silver	0.5	0.2

Mercury by Cold Vapor Atomic Absorption

Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 7471**

Matrix: Soil Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: SR

Lab ID: 247042
Client ID: PS-MS-2

Analyte	Result	RL
Mercury	BRL	0.3

TCLP Metals by ICP

Units: **mg/L (ppm)** Method: **EPA 1311/6010B**

Matrix: Leachate Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: MP

Lab ID: 247042
Client ID: PS-MS-2

Analyte	Result	RL
Arsenic	BRL	0.5
Lead	1.6	0.5

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

MEP Arsenic

Units: **ug/L (ppb)** Method: **EPA 1320/6010B**

Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247042
Client ID: PS-MS-2

Day	Result	RL
1	BRL	15
2	16	15
3	37	15
4	BRL	15
5	BRL	15
6	BRL	15
7	BRL	15
8	BRL	15
9	BRL	15

MEP Lead

Units: **ug/L (ppb)** Method: **EPA 1320/6010B**

Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247042
Client ID: PS-MS-2

Day	Result	RL
1	13	10
2	BRL	10
3	BRL	10
4	BRL	10
5	BRL	10
6	BRL	10
7	BRL	10
8	BRL	10
9	BRL	10

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

Metals by ICP

Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 6010B**

Matrix: Soil Analysis Date: 4/12/00 Prep. Date: 4/12/00 Analyst: MP

Lab ID: 247043
Client ID: PS-MS-3

Analyte	Result	RL
Arsenic	26.8	0.9
Barium	243	0.2
Calcium	1.6	0.1
Chromium	18.6	0.2
Lead	796	0.6
Selenium	1.7	0.6
Silver	0.3	0.2

Mercury by Cold Vapor Atomic Absorption

Units: **mg/Kg (ppm) by Dry Weight** Method: **EPA 7471**

Matrix: Soil Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: BH

Lab ID: 247043
Client ID: PS-MS-3

Analyte	Result	RL
Mercury	BRL	0.3

TCLP Metals by ICP

Units: **mg/L (ppm)** Method: **EPA 1311/6010B**

Matrix: Leachate Analysis Date: 4/10/00 Prep. Date: 4/7/00 Analyst: MP

Lab ID: 247043
Client ID: PS-MS-3

Analyte	Result	RL
Arsenic	BRL	0.5
Lead	BRL	0.5

HYGEIA LABORATORIES, INC.
1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33099 Report Date: 4/27/00

MEP Arsenic

Units: ug/L (ppb) Method: EPA 1320/6010B
Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247043
Client ID: PS-MS-3

Day	Result	RL
1	44	15
2	48	15
3	86	15
4	41	15
5	BRL	15
6	BRL	15
7	27	15
8	BRL	15
9	18	15

MEP Lead

Units: ug/L (ppb) Method: EPA 1320/6010B
Matrix: Leachate Analysis Date: 4/25/00 Prep. Date: 4/11-21/00 Analyst: MP

Lab ID: 247043
Client ID: PS-MS-3

Day	Result	RL
1	BRL	10
2	BRL	10
3	11	10
4	11	10
5	BRL	10
6	BRL	10
7	BRL	10
8	BRL	10
9	BRL	10

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- BRL = "Below Reporting Limit"
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

Alabama - Lab ID 40970; Arkansas; Connecticut - No. PH 0208Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kentucky - Lab ID 90053; Maryland - No. 293; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Accreditations

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 100649

Hydelo Laboratories, Inc.

DATA RESULT SHEETS - METALS PREPARATION

Project No: 33068, 33070, 33099, 33115, 33087 Matrix: soil water TCLP SPLP wipe filter paint chips other:

Analyst: SR Element: Pb Hg Other: Calibration Curve ID: MHg000410MHg000 CVAA

Date: 04/10/00 Analysis Method: SW-846 7420 7470 7471 EPA 200.9

Time: 10.00 Digestion Method: SW-846 3010A 3020A 3050B 7470 7471 Batch ID: MHg000407B

	Sample Identification	Detection Limit (units) PPM	Concentration (units) PPM	Comments Actual Value
1	246830	0.05	BDL	0.0092
2	246860	↓	BDL	0.0097
3	247041		BDL	~~0~~.028
4	247042		BDL	0.031
5	248043		BDL	0.037
6	247131		BDL	0.0399
7	246922	↓	0.0792	
8				
9				
10				
11				
12				
13				
14				
15				

	Sample Identification	Detection Limit (units) Dry Wt.	Concentration (units) D.L	Comments
16				
17				
18	247041	BDL	0.3	
19	247042		0.3	
20	247043	↓	0.3	
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

BDL = Below Detection Limit ppm = parts per million

% Wt = per cent weight ppb = parts per billion

Hygeia Laboratories, Inc.

Marietta, GA

PREPARATION LOG: MERCURY DIGESTION

LOGBOOK NO. 010600-03

SOP NO: ______ Method(circle 1): EPA 245.2 SW-846 7470 7471 ANALYSIS: CVAA MATRIX (circle 1): SOIL/SLUDGE FILTER WIPE PAINT CHIP WATER LEACHATE OTHER: ______ BATCH ID: MHg00040

PERFORMED BY: SR DATE: 04/07/00

	REAGENT	ID	Exp. Date
R1	HNO_3	200208	—
R2	H_2SO_4	990822	—
R3	Aqua Regia	—	—
R4	$K_2S_2O_8$	M100032216	092200
R5	$KMnO_4$	M100031510	091500
R6	$NaCl/NH_4OH$	M100032211	092200

	SPIKE	ID	CONC.(µg/mL)	Exp. Date
S1	Hg	MHg00040008	100	040900
S2				

	Project Number	Lab Sample Number	Sample Amount (mL or g)	Bottle Number	REAGENTS ID	Amt.(mL)	ID	Amt.(mL)	ID	Amt.(mL)	ID	Amt.(mL)	ID	Amt.(mL)	SPIKES ID	Amt.(mL)	Final Volume (mL)	Comments
MB	NA	Blank	1.00		H_2O	5.0	R3	5.0	H_2O	50.0	R5	15.0	R6	6.0	NA		136.5	
LCS	NA	LCS	1.00												S1	4.0	140.5	
1	33068	246830	1.00														136.5	
2	33074	246860																
3	33099	247041																
4		247042																
5		247043																
6	33115	247131																
7	33087	246922																
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
LCSD	NA	LCSD	1.00												S1	4.0	140.5	
MS		247041	1.00															
MSD		247041																
DUP		247041															136.5	

Abbreviations: NA = not applicable Y = Yes N = No

BATH TEMP (°C): 90 Therm. ID: ML-HP-024 BALANCE ID: PC160 START TIME (24 hr): 16.40 STOP TIME (24 hr): 18.10

Hygeia Laboratories, Inc.
Marietta, GA

QC SUMMARY: ATOMIC ABSORPTION
PROJECT NO(S): 33068

ANALYSIS (circle 1): Flame AA GF AA CV AA
CALIBRATION ID: MH000410B
ELEMENT (circle 1): As Pb Hg Se Tl
METHOD (circle 1): 7420 200.9 7470 7471

ANALYSIS QC DATA DATE: 04/10/00 TIME: 10.00 FILE: —

Initial Calibration

	ICV/ICB	Limits
% REC	104.2	±10
BLANK	BDL	< RL

Continuing Verification

	CCV/CC 1	CCV/CC 2	CCV/CC 3	CCV/CC 4	CCV/CC 5	CCV/CC 6	CCV/CC 7	Limits
% REC	103.2							
BLANK	BDL							< RL

True Value - ICV: 3.00 True Value - CCV: 4.00 Units: ppb

COMMENTS: ______ ALL OK

PREPARATION QC DATA

BATCH ID: MH000410B MATRIX: Soil PREP. DATE (m/d/y): 04/10/00 UNITS: ppm

LCS/LCSD Limits: Rec = ±15 %; RPD = ±20 %

True Value	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	RPD
0.400	0.448	112.0	0.445	111.2	0.7

DUPLICATE Limits: Rec = RPD = ____ %

Sample ID	Result	Duplicate	RPD
—	—	—	—

Use this data only if MS/MSD fails

METHOD BLANK Limit: < RL

Report Limit	Result
0.050	BDL

MS/MSD Limits: Rec = ±25 %; RPD = ±20 %

Sample ID	Result	Spike Conc.	MS Result	MS %Rec	MSD Result	MSD %Rec	RPD
247041	-0.045	0.400	0.407	101.7	0.411	102.7	0.97

COMMENTS: ______ ALL OK

PREPARATION QC DATA

BATCH ID: ______ MATRIX: ______ PREP. DATE (m/d/y): ______ UNITS: ______

LCS/LCSD Limits: Rec = ______ %; RPD = ____ %

True Value	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	RPD

DUPLICATE Limits: Rec = RPD = ____ %

Sample ID	Result	Duplicate	RPD

METHOD BLANK Limit: < RL

Report Limit	Result

MS/MSD Limits: Rec = ______ %; RPD = ____ %

Sample ID	Result	Spike Conc.	MS Result	MS %Rec	MSD Result	MSD %Rec	RPD

COMMENTS: ______ ALL OK

PREPARATION QC DATA

BATCH ID: ______ MATRIX: ______ PREP. DATE (m/d/y): ______ UNITS: ______

LCS/LCSD Limits: Rec = ______ %; RPD = ____ %

True Value	LCS Result	LCS %Rec	LCSD Result	LCSD %Rec	RPD

DUPLICATE Limits: Rec = RPD = ____ %

Sample ID	Result	Duplicate	RPD

METHOD BLANK Limit: < RL

Report Limit	Result

MS/MSD Limits: Rec = ______ %; RPD = ____ %

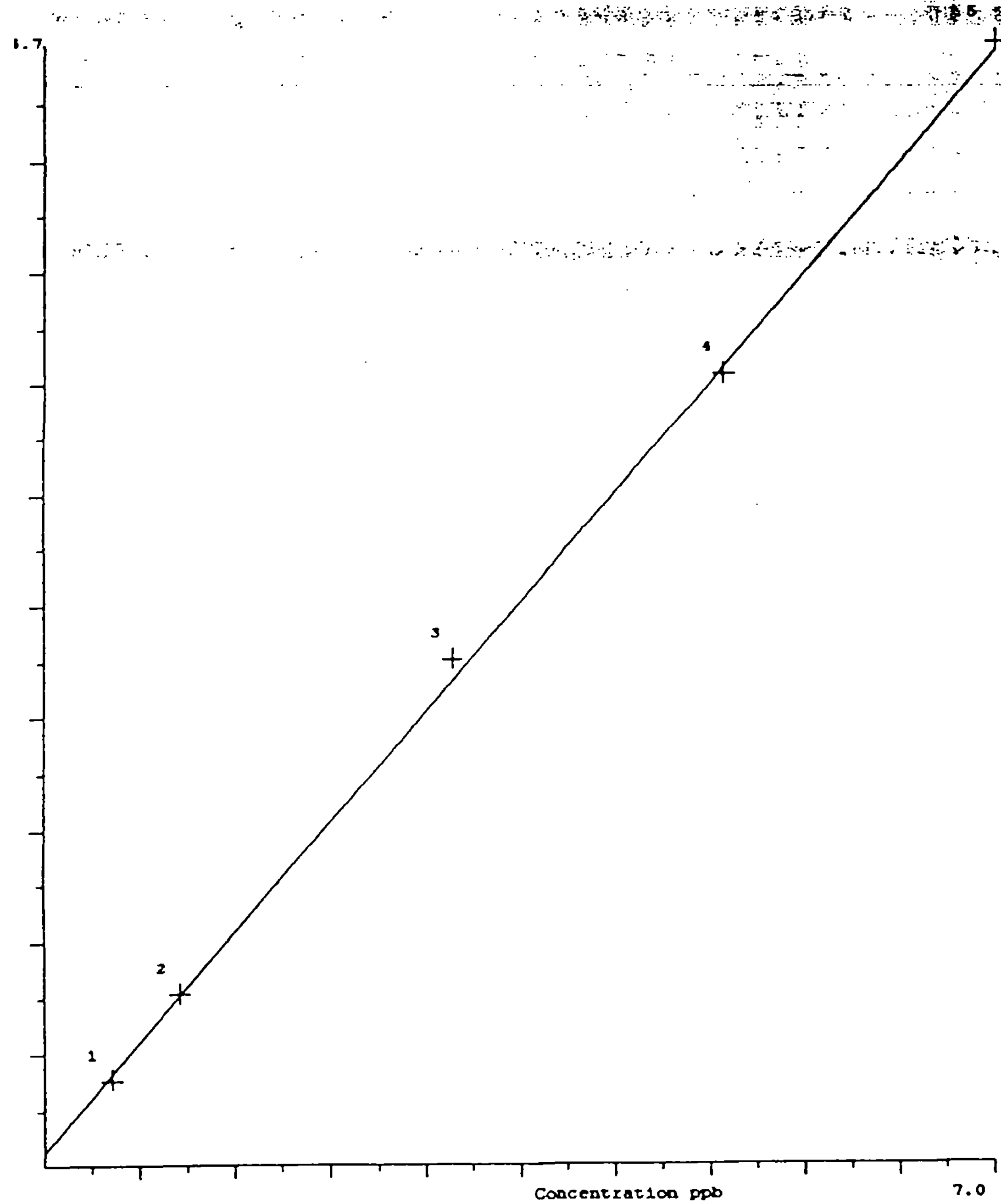
Sample ID	Result	Spike Conc.	MS Result	MS %Rec	MSD Result	MSD %Rec	RPD

COMMENTS: ______ ALL OK

Distribution: Original w/ raw data

result1 Calibration printed on 04/10/00 08:54:10

Active Calibration



Std	Conc	Output	Fit	Runs
1	0.500	9.700	-0.044	1
2	1.000	19.20	-0.003	1
3	3.000	56.30	0.111	1
4	5.000	88.20	-0.072	1
5	7.000	124.7	0.007	1

Fit Type: Least Square

Slope = 17.554

Linear Corr Coeff = 0.99967

Y Intercept = 1.691

000410

Printed from result1 on 10/04/00

No	Tag	Ref	Conc.	Unt	Output	Run	SD	Dilution	CODE	RSD	Date	Time
1	000410											
2	CAL	STD1	0.500	ppb	9.700	1	0.000	----	B	0.000	10/04/00	08:36 AM
3	CAL	STD2	1.000	ppb	19.20	1	0.000	----	B	0.000	10/04/00	08:36 AM
4	CAL	STD3	3.000	ppb	56.30	1	0.000	----	B	0.000	10/04/00	08:36 AM
5	CAL	STD4	5.000	ppb	88.20	1	0.000	----	B	0.000	10/04/00	08:36 AM
6	CAL	STD5	7.000	ppb	124.7	1	0.000	----	B	0.000	10/04/00	08:36 AM
7	[redacted]	NOREF	2.518	ppb	45.90	1	0.000	1.000	B	0.000	10/04/00	08:54 AM
8	ICV	NOREF	3.128	ppb	56.60	1	0.000	1.000	B	0.000	10/04/00	08:58 AM
9	ICB	NOREF	-0.051	ppb	0.800	1	0.000	1.000	B	0.000	10/04/00	09:02 AM
10	M.BLANK	MHg000407B	-0.056	ppb	0.700	1	0.000	1.000	B	0.000	10/04/00	09:08 AM
11	[redacted]	MHg000407B	4.649	ppb	83.30	1	0.000	1.000	B	0.000	10/04/00	09:18 AM
12	LCS	MHg000407B	4.489	ppb	80.50	1	0.000	1.000	B	0.000	10/04/00	09:22 AM
13	LCSD	MHg000407B	4.455	ppb	79.90	1	0.000	1.000	B	0.000	10/04/00	09:25 AM
14	041 MS	MHg000407B	4.068	ppb	73.10	1	0.000	1.000	B	0.000	10/04/00	09:29 AM
15	041 MSD	MHg000407B	4.108	ppb	73.80	1	0.000	1.000	B	0.000	10/04/00	09:32 AM
16	041 DUP	MHg000407B	-0.045	ppb	0.900	1	0.000	1.000	B	0.000	10/04/00	09:36 AM
17	246830	MHg000407B	0.092	ppb	3.300	1	0.000	1.000	B	0.000	10/04/00	09:39 AM
18	246860	MHg000407B	0.097	ppb	3.400	1	0.000	1.000	B	0.000	10/04/00	09:42 AM
19	247041	MHg000407B	-0.028	ppb	1.200	1	0.000	1.000	B	0.000	10/04/00	09:45 AM
20	247042	MHg000407B	0.308	ppb	7.100	1	0.000	1.000	B	0.000	10/04/00	09:48 AM

'rinted from result1 on 10/04/00

:1	247043	MHg000407B	0.371	ppb	8.200	1	0.000	1.000	B	0.000	10/04/00	09:50 AM
:2	247131	MHg000407B	0.399	ppb	8.700	1	0.000	1.000	B	0.000	10/04/00	09:54 AM
:3	246922	MHg000407B	0.792	ppb	15.60	1	0.000	1.000	B	0.000	10/04/00	09:57 AM
:4	CCV	MHg000407B	4.131	ppb	74.20	1	0.000	1.000	B	0.000	10/04/00	10:09 AM
'5	CCB	MHg000407B	-0.096	ppb	0.000	1	0.000	1.000	B	0.000	10/04/00	10:12 AM

CALIBRATION CURVE IDENTIFICATION

nalyst Name SR

ate of Calibration 04/10/00

libration Curve ID MHg0004101000 CVAA

strument ID CVAA

alysis Method SW 846-7471

paration Method SW-846 7471

ANALYSIS LOG: PERCENT SOLIDS/PERCENT MOISTURE

LOGBOOK NO. 030200-02

BATCH ID: IPS0004120A

SOP NO.: 168 BALANCE ID: CR16009 METHOD: ASTM D2216-92

BALANCE CALIB. EXP DATE: 01/01 OVEN ID: 20800001

	DATE (m/d/y)	TIME (hh:mm)	OVEN TEMP (°C) [a]	PERFORMED BY
START:	041200	1040	106	RB
STOP 1:	041200	1450	106	RB
STOP 2:	041200	1701	105	RB

	Project Number	Lab Sample Number	Pan Weight [b] (g)	Wet Weight [b] (g)	Dry Weight [b] # 1 (g)	Dry Weight [b] # 2 (g)	Calculated % Solids [c]	Calculated % Moisture [c]
1	33099	247041	1.3	55.5881	51.6864	51.6890	92.82	7.18
2		247042	↓	35.2185	25.6167	25.5683	71.55	28.45
3		247043		31.9675	26.7369	26.2383	81.32	18.68
4	33149	247356		36.9114	33.5734	33.5886	90.67	9.33
5		247357		43.1495	37.0327	37.0444	85.41	14.59
6		247358		49.3417	44.0559	44.0787	89.04	10.96
7		247359		~~43.1547~~ 22.5816	~~37.0327~~ 19.1655	19.1206	83.82	16.18
8	33150	247362		49.0220	39.3316	39.3570	79.75	20.25
9		247363		37.2041	31.3344	31.3597	83.72	16.28
10		247364		44.6749	36.9968	37.0190	82.35	17.65
11		247365		61.7718	51.3527	51.3498	82.77	17.23
12		247366	↓	44.9685	40.2163	40.2402	89.17	10.83
13								
14								
15								
16								
17								
18								
19								
20								
Dup		247366	1.3	43.0796	38.5799	38.5949	89.27	10.73

PERCENT SOLIDS CALCULATION

$$\% \text{ SOLIDS} = \frac{\text{DRY WEIGHT - PAN WEIGHT}}{\text{WET WEIGHT - PAN WEIGHT}} \times 100$$

PERCENT MOISTURE CALCULATION

% MOISTURE = 100 - % SOLIDS

[a] Oven temperature criteria = 105 ± 2 °C
[b] weigh to 2 decimal places
[c] calculate to 1 decimal place

NOTE: To reduce the decomposition of highly organic soils or gypsum (calcium sulfate dihydrate), reduce the oven temperature to 60°C or place in a dessicator at room temperature.

Percent Solids / Percent Moisture

PROJECT	SAMPLE#	PAN WT.	WET WT.	DRY WT.	% SOLIDS	%MOISTURE	A	B	%RPD
33099	247041	1.3	55.5881	51.6890	**92.82**	7.18	10.83	10.73	0.87
	247042	1.3	35.2185	25.5683	**71.55**	28.45			
	247043	1.3	31.9675	26.2383	**81.32**	18.68			
33149	247356	1.3	36.9114	33.5886	90.67	**9.33**			
	247357	1.3	43.1495	37.0444	85.41	**14.59**			
	247358	1.3	49.3417	44.0787	89.04	**10.96**			
	247359	1.3	22.5611	19.1206	83.82	**16.18**			
33150	247362	1.3	49.0220	39.3570	79.75	**20.25**			
	247363	1.3	37.2041	31.3597	83.72	**16.28**			
	247364	1.3	44.6749	37.0190	82.35	**17.65**			
	247365	1.3	61.7918	51.3698	82.77	**17.23**			
	247366	1.3	44.9685	40.2402	89.17	**10.83**			
	247366 dup	1.3	43.0796	38.5949	89.27	**10.73**			

Batch ID: IPS000412A

Analyst : b henry
4/13/00 10:27 AM

Matrix: Soil Project: 33099 Analyst: MP Date: 04/12/00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		mg/Kg	247041	247042	247043			Dry Wt. 247041	247042	247043	
Al	6010B	5									
Sb	6010B	0.75									
As	6010B	0.75	ND	17.16	~~109.4~~ 21.8	MP		ND / 0.9	24.0 / 1.0	26.8 / 0.9	
Ba	6010B	0.15	5.0	109.4	197.5			5.4 / 0.2	153 / 0.2	243 / 0.2	
Be	6010B	0.05									
Cd	6010B	0.1	0.27	1.16	1.3			~~0~~ 0.3 / 0.1	1.6 / 0.1	1.6 / 0.1	
Ca	6010B	2.5									
Cr	6010B	0.2	4.77	12.89	15.1			5.1 / 0.2	18.0 / 0.3	18.6 / 0.2	
Co	6010B	0.15									
Cu	6010B	0.2									
Fe	6010B	2.5									
Pb	6010B	0.5	0.63	857.7	647.7			0.7 / 0.5	1199 / 0.7	796 / 0.6	
Mg	6010B	1									
Mn	6010B	0.1									
Mo	6010B	0.5									
Ni	6010B	0.3									
K	6010B	5									
Se	6010B	0.5	ND	2.5	1.35			ND / 0.5	3.5 / 0.7	1.7 / 0.6	
Ag	6010B	0.15	ND	0.33	0.23			ND / 0.2	0.5 / 0.2	0.3 / 0.2	
Na	6010B	50									
Si	6010B	20									
Tl	6010B	1.2									
Sn	6010B	1									
Ti	6010B	0.15									
V	6010B	0.2									
Zn	6010B	0.5									
Other											
Other											

SOP NO*: M02 (All preparation methods are EPA SW-846 except NIOSH)

BATCH ID: MD3000412C

Prep. Method (circle 1): 3005A 3010A 3020A 3050B 3030C

Analysis Method (circle 1): ICP(EPA SW-846 6010B) GFAA (EPA 200.9) FLAA-lead (EPA SW-846 7420A) NIOSH 7082

PERFORMED BY: JC

DATE(m/d/y): 4-12-00

MATRIX (circle 1): COMP. FILTER SOIL/SLUDGE FILTER WIPE PAINT CHIP WATER TCLP SPLP Other:

Describe Procedural Deviations/Modifications: NONE

	REAGENT	ID	Exp. Date
R1	HNO_3	200208	—
R2	HCl	200040	—
R3	H_2O_2	200145	11/30/00

	SPIKE	ID	CONC.(µg/mL)	Exp. Date
S1	A	M100040301	20 ppm	10/03/00
S2	B	M10001104	20 ppm	7/10/00
S3	D	M16004101	20 ppm	10/11/00

	Project Number	Lab Sample Number	Sample Amount (mL or g)	pH	REAGENTS ID	Amt.(mL)	ID	Amt.(mL)	ID	Amt.(mL)	SPIKES ID	Amt.(µL)	ID	Amt.(µL)	ID	Amt.(µL)	Final Volume (mL)	Comments
MB	NA	MB	2.00g	—	R1	10	R2	5	R3	3	NA		NA		NA		100	
LCS	NA	LCS	0	—	↓	↓	↓	↓	↓	↓	S1	2000	S2	2000	S3	2000	↓	
1	33099	247041	↓	—	↓	↓	↓	↓	↓	↓	exp:		exp:		exp:		↓	
2	↓	042	↓	—	↓	↓	↓	↓	↓	↓							↓	
3	↓	043	↓	—	↓	↓	↓	↓	↓	↓							↓	
4	33087	246922	↓	—	↓	↓	↓	↓	↓	↓							↓	
5	33150	247366	↓	—	↓	↓	↓	↓	↓	↓							↓	
6	33115	247131	↓	—	↓	↓	↓	↓	↓	↓							↓	
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
MS	33115	131	↓	—	↓	↓	↓	↓	↓	↓	S1	↓	S2	2000	S3	2000	↓	
MSD	↓	131	↓	—	↓	↓	↓	↓	↓	↓	S1	↓	↓	2000	↓	2000	↓	
DUP	↓	131	↓	—	↓	↓	↓	↓	↓	↓	—	—	—	—	—	—	↓	
LCSD	NA	LCSD	↓	—	↓	↓	↓	↓	↓	↓	S1	↓	S2	2000	S3	2000	↓	

SPIKE A (20 ppm each)	SPIKE B	SPIKE D (20 ppm)
Sb	Mg - 100 ppm	Ag
As	Na - 1000 ppm	
Se	Ca - 300 ppm	
B	K - 80 ppm	
Mo	Al - 80 ppm	
Ba	Sn - 50 ppm	
Be	Fe - 40 ppm	
Cd		
Cr		
Co		
Cu		
Pb		
Mn		
Ni		
Tl		
V		
Zn		

BALANCE ID: ______ EXP. DATE: ______

Abbreviations: NA = not applicable
Y = Yes N = No

SOP's
M01 Digestion of Water Samples for Metals Analysis
M02 Digestion of Soil, Sludge and Sediment Samples for Total Metals Analysis
M04 Digestion of Wipe Samples for Total Metals Analysis
M05 Digestion of Composite Filter Samples for Total Metals Analysis

Analysis Report 04/12/00 02:10:37 PM page 1

Method: XP2 Sample Name: 247041 Operator: mp
Run Time: 04/12/00 14:04:27
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.86915	11344.	-6.6233	103.38	100.43	.43619	3912700.
SDev	1.39170	94.	5.1432	.86	.88	.03473	36604.
%RSD	160.12	.83248	77.654	.83001	.87548	7.9622	.93550
#1	.28469	11382.	-7.7396	103.33	101.09	.47624	3936400.
#2	-.47739	11414.	-11.117	104.26	100.77	.41444	3931200.
#3	-2.4147	11237.	-1.0135	102.54	99.432	.41788	3870600.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2.7951	1456.5	95.509	-1.3946	18560.	1243.7	51486.
SDev	.8781	10.1	.880	1.5484	171.	29.1	378.
%RSD	31.417	.69483	.92184	111.03	.92158	2.3427	.73463
#1	3.8085	1461.7	95.433	.22695	18642.	1276.3	51652.
#2	2.2591	1463.1	96.425	-2.8577	18675.	1234.5	51752.
#3	2.3176	1444.9	94.669	-1.5531	18364.	1220.3	51053.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	434.47	2.7646	6139.2	116.66	12.603	.4781	.0004
SDev	3.79	1.5848	198.9	2.41	3.912	.0031	.0000
%RSD	.87322	57.323	3.2400	2.0692	31.037	.6399	.7809
#1	436.35	4.3704	6103.8	119.29	8.3075	.4797	.0005
#2	436.96	1.2017	6353.4	114.54	13.542	.4800	.0005
#3	430.10	2.7218	5960.4	116.14	15.960	.4746	.0004

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	-5.2954	-5.0729	.0701	993.79	36.607	74.036	19.318
SDev	14.9518	31.7620	.0006	3.81	24.251	.594	48.945
%RSD	282.36	626.11	.8300	.38377	66.248	.80176	253.37
#1	-18.632	-29.942	.0701	994.00	10.057	74.721	71.688
#2	10.868	30.706	.0706	997.50	42.172	73.688	11.534
#3	-8.1224	-15.983	.0695	989.88	57.592	73.698	-25.269

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	104.27	16.118
SDev	1.67	1.634
%RSD	1.6042	10.140
#1	103.94	15.003
#2	106.08	17.994
#3	102.78	15.357

DF:50

Analysis Report 04/12/00 02:16:51 PM

Method: XP2 Sample Name: 247042 Operator: mp
Run Time: 04/12/00 14:10:42
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	6.6991	128340.	343.13	567.96	2187.9	28.342	860970.
SDev	.3937	2783.	15.98	13.19	48.4	.674	18967.
%RSD	5.8772	2.1686	4.6581	2.3226	2.2136	2.3789	2.2029
#1	6.4978	129800.	341.91	574.20	2214.4	28.677	870220.
#2	6.4468	125130.	327.79	552.81	2132.0	27.566	839160.
#3	7.1528	130080.	359.68	576.89	2217.2	28.783	873550.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	23.227	1096.3	257.97	1721.4	109330.	26446.	17043.
SDev	.279	25.9	5.89	38.6	2389.	472.	388.
%RSD	1.2024	2.3666	2.2818	2.2419	2.1852	1.7856	2.2742
#1	23.134	1109.3	259.66	1742.7	110450.	26757.	17222.
#2	23.007	1066.4	251.43	1676.8	106590.	25902.	16598.
#3	23.541	1113.1	262.83	1744.6	110960.	26678.	17308.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	948.39	47.793	13654.	629.95	17155.	.9330	.0004
SDev	21.39	6.941	182.	14.30	293.	.0209	.0000
%RSD	2.2558	14.523	1.3298	2.2706	1.7087	2.242	1.748
#1	958.47	46.764	13862.	636.84	17311.	.9422	.0004
#2	923.82	41.424	13529.	613.50	16816.	.9091	.0004
#3	962.88	55.190	13572.	639.50	17336.	.9478	.0004

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	360.92	50.035	.0506	969.14	155.46	7045.8	80.218
SDev	19.84	11.140	.0005	26.64	10.95	154.2	16.485
%RSD	5.4980	22.264	1.064	2.7492	7.0426	2.1890	20.550
#1	375.44	40.458	.0510	984.21	157.01	7121.7	62.977
#2	338.31	47.386	.0500	938.37	143.82	6868.3	95.824
#3	369.02	62.261	.0509	984.83	165.56	7147.3	81.855

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	523.11	2250.6
SDev	11.35	51.0
%RSD	2.1702	2.2650
#1	528.67	2272.2
#2	510.05	2192.4
#3	530.61	2287.3

DF: 50

Analysis Report 04/12/00 02:23:05 PM page 1

Method: XP2 Sample Name: 247043 Operator: mp
Run Time: 04/12/00 14:16:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4.7115	228760.	436.03	707.36	3951.0	44.341	1415100.
SDev	.4554	7262.	30.67	25.47	125.3	1.468	43074.
%RSD	9.6663	3.1745	7.0345	3.6000	3.1712	3.3118	3.0438
#1	5.1508	221600.	415.81	681.67	3826.8	42.888	1371800.
#2	4.2415	228570.	420.97	707.82	3949.0	44.310	1415800.
#3	4.7420	236120.	471.33	732.59	4077.3	45.824	1457900.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	26.005	205.37	301.64	1294.7	150980.	42431.	28670.
SDev	1.228	7.03	9.11	42.1	4888.	1099.	929.
%RSD	4.7207	3.4241	3.0190	3.2546	3.2375	2.5900	3.2391
#1	25.051	198.04	292.63	1253.3	146090.	41351.	27730.
#2	25.573	206.01	301.43	1293.4	151000.	42395.	28693.
#3	27.390	212.06	310.84	1337.5	155860.	43548.	29587.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1335.4	59.844	11931.	338.70	12955.	.8504	.0003
SDev	42.1	6.526	617.	11.59	178.	.0224	.0000
%RSD	3.1560	10.905	5.1697	3.4222	1.3765	2.635	2.087
#1	1293.2	56.371	11409.	326.64	12777.	.8280	.0003
#2	1335.5	55.789	11772.	339.69	13133.	.8503	.0003
#3	1377.5	67.372	12612.	349.76	12954.	.8728	.0003

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	262.68	27.047	.0542	1380.7	132.33	11610.	101.67
SDev	23.12	18.583	.0019	44.7	8.70	373.	78.49
%RSD	8.8021	68.705	3.530	3.2346	6.5763	3.2116	77.202
#1	250.65	31.375	.0525	1335.5	124.46	11238.	31.130
#2	248.06	6.6822	.0539	1381.9	130.85	11606.	87.652
#3	289.34	43.084	.0563	1424.8	141.68	11984.	186.22

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	903.62	1487.3
SDev	28.03	46.4
%RSD	3.1019	3.1213
#1	876.03	1440.6
#2	902.76	1487.9
#3	932.07	1533.4

DF:50

Matrix: Soil Project: 38099 Analyst: MP Date: 04/12/00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		mg/kg	MB 4/12 C	LCS 4/12			LCSD 4/12 C		
Al	6010B	5			80				
Sb	6010B	0.75			20				
As	6010B	0.75	ND	19.0	20	95	17.8	89	6
Ba	6010B	0.15	ND	20.1	20	100	20.2	100	0
Be	6010B	0.05			20				
Cd	6010B	0.1	ND	19.2	20	96	19.3	96	0
Ca	6010B	2.5			300				
Cr	6010B	0.2	ND	19.2	20	96	19.3	96	0
Co	6010B	0.15			20				
Cu	6010B	0.2			20				
Fe	6010B	2.5			40				
Pb	6010B	0.5	ND	18.7	20	93	18.6	93	0
Mg	6010B	1			100				
Mn	6010B	0.1			20				
Mo	6010B	0.5	ND	197.5	200	99	198.3	99	0
Ni	6010B	0.3			20				
K	6010B	5			80				
Se	6010B	0.5	ND	19.1	20	95	17.4	87	8
Ag	6010B	0.15	ND	19.0	20	95	19.1	95	0
Na	6010B	50			500				
Si	6010B								
Tl	6010B	1.2			20				
Sn	6010B								
Ti	6010B								
V	6010B	0.2			20				
Zn	6010B	0.2			20				
Other									
Other									

Matrix: Soil Project: 33099 Analyst: mp Date: 04/12/00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		mg/kg	247131	131 MS			131 MSD		
Al	6010B	5			80				
Sb	6010B	0.75			20				
As	6010B	0.75	5.9	17.9	20	60	20.1	71	11
Ba	6010B	0.15	40.6	44.7	20	20	45.6	25	5
Be	6010B	0.05			20				
Cd	6010B	0.1	2.8	17.3	20	72	16.4	68	4
Ca	6010B	2.5			300				
Cr	6010B	0.2	13.6	26.6	20	65	27.1	67	2
Co	6010B	0.15			20				
Cu	6010B	0.2			20				
Fe	6010B	2.5			40				
Pb	6010B	0.5	25.9	35.0	20	45	32.4	32	13
Mg	6010B	1			100				
Mn	6010B	0.1			20				
Mo	6010B	0.5	1.0	150.4	200	75	142.2	71	4
Ni	6010B	0.3			20				
K	6010B	5			80				
Se	6010B	0.5	1.5	14.7	20	66	13.2	58	8
Ag	6010B	0.15	ND	15.4	20	77	14.9	74	3
Na	6010B	50			500				
Si	6010B								
Tl	6010B	1.2			20				
Sn	6010B								
Ti	6010B								
V	6010B	0.2			20				
Zn	6010B	0.2			20				
Other									
Other									

nalysis Report 04/12/00 01:33:12 PM page 1

ethod: XP2 Sample Name: MB 4/12 C1 Operator: mp
un Time: 04/12/00 13:27:02
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.29778	246.80	5.8975	22.589	.08404	-.40204	43.954
SDev	.48694	15.25	7.1986	15.340	.31718	.06145	34.943
%RSD	163.52	6.1810	122.06	67.911	377.42	15.284	79.499
#1	-.77866	263.96	12.839	40.205	.43608	-.34397	84.268
#2	-.30967	241.67	-1.5329	15.390	-.00450	-.46638	25.266
#3	.19500	234.78	6.3859	12.172	-.17946	-.39576	22.329

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.41179	.32707	.26398	-1.9473	1.5049	41.796	8.9755
SDev	.40880	1.4095	.75403	1.6978	6.9186	57.285	2.9661
%RSD	99.274	430.93	285.64	87.186	459.75	137.06	33.046
#1	.01520	-.75390	.95982	-.72897	-6.4641	102.49	5.6127
#2	-.79957	-.18611	.36928	-3.8866	5.9782	-11.322	10.094
#3	-.45099	1.9212	-.53717	-1.2264	5.0005	34.217	11.219

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	-.04278	-1.7202	478.44	-1.4182	2.8057	.3814	.0004
SDev	.44213	1.5508	70.84	2.0042	4.8588	.0015	.0000
%RSD	1033.5	90.155	14.806	141.32	173.18	.4048	.3998
#1	.46775	-3.4590	551.60	-1.3092	.00048	.3830	.0004
#2	-.29794	-1.2216	410.18	.52927	.00048	.3812	.0004
#3	-.29814	-.47999	473.55	-3.4747	8.4161	.3799	.0004

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	-1.1187	-7.3854	.0413	19.490	267.27	.98442	35.353
SDev	12.3224	10.2076	.0005	29.527	224.91	.45581	30.941
%RSD	1101.5	138.21	1.296	151.50	84.151	46.302	87.519
#1	3.6791	-19.052	.0411	53.295	525.65	1.5048	11.215
#2	8.0832	-3.0049	.0408	6.4223	160.71	.65577	24.610
#3	-15.118	-.09925	.0419	-1.2489	115.44	.79272	70.233

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	-.28965	2.1156
SDev	.82547	1.5125
%RSD	284.99	71.493
#1	.31162	3.8318
#2	.05024	.97733
#3	-1.2308	1.5376

DF: 50

ıalysis Report 04/12/00 01:39:25 PM page 1

ːthod: XP2 Sample Name: LCS 4/12 C1 Operator: mp
ın Time: 04/12/00 13:33:16
ɔmment:
ɔde: CONC Corr. Factor: 1

:lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Inits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	381.02	1875.1	349.46	3660.3	402.90	391.53	7770.1
;Dev	1.98	12.2	20.18	19.6	2.19	2.44	55.2
;RSD	.51970	.64881	5.7757	.53425	.54244	.62265	.70981
:1	382.61	1862.3	326.17	3656.8	403.29	392.49	7793.6
:2	381.66	1886.6	360.30	3681.3	404.87	393.34	7809.5
:3	378.80	1876.5	361.90	3642.7	400.55	388.75	7707.0

:lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Inits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	384.36	376.31	384.60	1949.5	789.13	1519.1	1963.2
;Dev	2.66	2.31	2.35	11.2	20.15	62.6	12.0
;RSD	.69321	.61364	.61045	.57642	2.5538	4.1196	.61053
:1	386.24	377.56	386.42	1954.8	810.44	1591.2	1961.3
:2	385.52	377.72	385.42	1957.2	786.57	1487.3	1976.1
:3	381.31	373.64	381.95	1936.6	770.38	1478.8	1952.3

:lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Inits	ppb	ppb	ppb	ppb	ppb	ppm	ppm
ıvge	383.35	3950.0	14499.	383.62	374.52	.4143	.0004
;Dev	2.19	23.7	172.	5.43	4.84	.0051	.0000
;RSD	.57147	.59880	1.1859	1.4160	1.2930	1.229	.8674
:1	384.18	3959.4	14682.	389.89	379.34	.4180	.0004
:2	385.00	3967.5	14341.	380.36	369.65	.4164	.0004
:3	380.87	3923.1	14475.	380.61	374.56	.4085	.0004

:lem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Inits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
ıvge	361.62	382.91	.0446	396.97	1374.1	3.2198	282.28
;Dev	1.37	32.81	.0006	7.53	26.3	.4792	7.51
;RSD	.37887	8.5688	1.368	1.8969	1.9138	14.884	2.6592
:1	361.79	389.11	.0449	405.59	1404.5	3.2499	274.21
:2	360.17	412.18	.0439	393.63	1358.1	3.6833	283.57
:3	362.90	347.44	.0450	391.68	1359.9	2.7262	289.06

:lem	V_2924	Zn2062
Inits	ppb	ppb
ıvge	370.10	394.89
;Dev	3.81	2.03
;RSD	1.0295	.51488
:1	370.76	396.54
:2	373.53	395.52
:3	366.00	392.62

DF:50

ıalysis Report 04/12/00 01:45:40 PM page 1

:thod: XP2 Sample Name: LCSD 4/12 C1 Operator: mp
:n Time: 04/12/00 13:39:30
ımment:
ıde: CONC Corr. Factor: 1

:lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
'nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
.vge	382.22	1927.3	357.08	3704.7	404:67	394.61	7831.6
Dev	.64	2.7	11.55	6.0	.27	.24	3.3
RSD	.16763	.14119	3.2335	.16260	.06558	.06056	.04167
1	382.39	1924.9	369.86	3698.1	404.77	394.75	7830.7
2	381.51	1926.7	353.96	3706.2	404.37	394.33	7828.9
3	382.76	1930.2	347.41	3709.9	404.87	394.75	7835.3

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	386.85	378.45	386.76	1958.7	800.24	1513.4	2007.3
Dev	1.26	.45	.66	2.5	8.05	16.9	8.3
RSD	.32478	.11827	.17080	.12947	1.0062	1.1163	.41109
1	388.28	378.49	387.47	1958.2	801.15	1518.5	2015.9
2	386.36	378.87	386.18	1956.5	807.80	1527.1	2006.5
3	385.91	377.98	386.62	1961.5	791.78	1494.5	1999.5

lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
nits	ppb	ppb	ppb	ppb	ppb	ppm	ppm
vge	386.19	3966.9	13811.	388.73	372.37	.4120	.0004
Dev	.46	8.9	333.	1.93	7.89	.0037	.0000
RSD	.11965	.22478	2.4085	.49657	2.1182	.8950	.2638
1	386.64	3965.2	14079.	389.17	375.48	.4161	.0004
2	385.71	3976.6	13439.	386.62	363.40	.4109	.0004
3	386.23	3959.0	13915.	390.40	378.23	.4090	.0004

lem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	374.90	349.10	.0439	456.25	1348.6	1.6740	315.91
Dev	3.91	23.26	.0004	6.17	10.4	.4609	44.48
RSD	1.0424	6.6619	.9585	1.3522	.77395	27.536	14.081
1	378.10	322.33	.0437	450.13	1336.6	1.2462	276.79
2	370.55	364.30	.0437	462.47	1355.6	1.6136	364.29
3	376.06	360.67	.0444	456.14	1353.6	2.1622	306.64

lem	V_2924	Zn2062
ıits	ppb	ppb
vge	374.19	393.91
Dev	.39	.46
RSD	.10341	.11782
1	373.79	394.40
2	374.22	393.48
3	374.57	393.83

DF: 50

ıalysis Report 04/12/00 01:51:54 PM page 1

:thod: XP2 Sample Name: 247131 MS1 Operator: mp
ın Time: 04/12/00 13:45:45
ımment:
ıde: CONC Corr. Factor: 1

:lem	Ag3280	Al3082 .	As1890	B_2496	Ba4934	Be3130	Ca3158
Inits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	308.44	226930.	359.36	2718.4	894.38	313.96	18196.
;Dev	1.73	660.	9.28	4.7	2.93	1.06	76.
·RSD	.55971	.29064	2.5824	.17106	.32793	.33686	.41938
:1	310.43	227620.	349.41	2722.0	897.23	315.13	18284.
:2	307.49	226310.	367.77	2713.1	891.37	313.07	18143.
:3	307.39	226860.	360.91	2720.0	894.53	313.69	18162.

:lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Inits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	345.47	593.11	531.94	2158.9	540960.	8859.3	81599.
;Dev	1.48	2.68	2.22	5.4	2278.	33.3	304.
·RSD	.42920	.45264	.41671	.25179	.42109	.37640	.37287
:1	346.64	595.89	534.37	2164.4	543560.	8897.5	81941.
:2	343.80	590.53	530.04	2153.6	539280.	8844.2	81360.
:3	345.97	592.92	531.41	2158.5	540050.	8836.2	81495.

:lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Inits	ppb	ppb	ppb	ppb	ppb	ppm	ppm
.vge	7515.8	3008.4	13986.	766.10	699.68	.4726	.0004
:Dev	29.3	7.8	276.	2.89	3.68	.0035	.0000
RSD	.39006	.25852	1.9721	.37719	.52579	.7360	.5539
1	7548.9	3012.8	14289.	769.25	696.75	.4766	.0004
2	7493.1	3013.0	13750.	765.47	703.81	.4706	.0004
3	7505.4	2999.4	13918.	763.57	698.49	.4706	.0004

:lem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
nits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
.vge	308.81	294.62	.0620	4083.3	1072.8	1470.7	377.53
Dev	16.09	7.18	.0005	13.8	7.6	2.8	38.44
RSD	5.2092	2.4366	.8041	.33884	.70910	.19314	10.181
1	291.21	302.37	.0624	4074.4	1078.2	1468.8	388.22
2	312.45	293.28	.0622	4076.4	1064.1	1469.3	409.50
3	322.76	288.21	.0615	4099.3	1076.1	1473.9	334.88

.lem	V_2924	Zn2062
nits	ppb	ppb
.vge	569.16	1442.8
Dev	2.53	7.8
RSD	.44472	.53875
1	572.07	1451.6
2	567.86	1436.7
3	567.53	1440.1

DF:50

nalysis Report 04/12/00 01:58:08 PM

ethod: XP2 Sample Name: 247131 MSD1 Operator: mp
un Time: 04/12/00 13:51:59
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	298.32	168040.	401.44	2557.6	912.85	297.05	17746.
SDev	.61	484.	11.08	8.6	2.48	1.13	73.
%RSD	.20286	.28788	2.7610	.33561	.27121	.38077	.40897
#1	298.74	168530.	399.56	2564.4	914.88	298.14	17824.
#2	298.59	168030.	413.34	2560.4	913.59	297.14	17735.
#3	297.63	167560.	391.41	2548.0	910.09	295.88	17680.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	327.39	556.08	542.67	1962.6	498940.	7097.8	57948.
SDev	1.70	4.38	2.14	4.7	1934.	36.0	227.
%RSD	.51859	.78782	.39457	.24101	.38755	.50682	.39195
#1	329.32	559.50	545.13	1966.6	500850.	7139.1	58161.
#2	326.70	557.59	541.66	1963.9	498980.	7080.7	57975.
#3	326.14	551.14	541.23	1957.4	496980.	7073.5	57709.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	5381.1	2845.1	13263.	669.38	649.08	.4383	.0003
SDev	20.6	10.9	142.	1.42	4.57	.0027	.0000
%RSD	.38299	.38330	1.0677	.21203	.70341	.6200	.7033
#1	5399.5	2856.6	13128.	670.78	654.36	.4409	.0004
#2	5385.0	2834.8	13411.	669.43	646.42	.4385	.0003
#3	5358.8	2844.0	13251.	667.94	646.48	.4355	.0003

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	307.24	264.25	.0589	4095.9	1044.7	1752.4	333.94
SDev	4.94	15.67	.0007	14.1	24.0	8.8	21.05
%RSD	1.6072	5.9310	1.172	.34427	2.3007	.50104	6.3028
#1	301.55	274.11	.0585	4079.9	1031.7	1762.5	358.22
#2	309.67	246.17	.0597	4106.2	1072.4	1747.9	321.01
#3	310.49	272.46	.0585	4101.7	1030.0	1746.7	322.57

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	571.04	1544.9
SDev	2.22	5.4
%RSD	.38943	.35125
#1	572.90	1548.5
#2	571.63	1547.5
#3	568.58	1538.7

DF: 50

Matrix: ______ Project: ______ Analyst: MJ Date: 4-12-00

Metal	QC # 19	True Value	% Recovery	QC # ICP - 2	True Value	% Recovery	CCV	True Value	% Recovery
Al					1000			5000	
Sb		2000						1000	
As	2036	2000	102				1006	1000	101
Ba				986	1000	99	1006	1000	101
Be		2000						1000	
Cd	2057	2000	103				1021	1000	102
Ca		2000						5000	
Cr	2059	2000	103				1017	1000	102
Co		2000						1000	
Cu		2000						1000	
Fe		2000						5000	
Pb	2021	2000	101				1008	1000	101
Mg		2000						5000	
Mn		2000						1000	
Mo	2237	2000	112				2686	2500	107
Ni		2000						1000	
K					10000			5000	
Se	2137	2000	107				1087	1000	109
Ag				490	500	98	991	1000	99
Na					1000			10000 1EC	
Si					5000				
Tl		2000						1000	
Sn								2500	
Ti		2000						2500	
V		2000						1000	
Zn	2086	2000	104				1028	1000	103
Other									
Other									

andardization Rpt. 04/12/00 08:05:55 AM

thod: XP2 Standard: BLANK
n Time: 04/12/00 08:00:18

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
vge	-.00023	-.02915	.00047	.00164	-.00000	.00589	.00004
Dev	.00023	.00043	.00079	.00039	.00031	.00010	.00012
RSD	100.13	1.4678	168.28	24.020	92330.	1.7559	313.11
1	.00000	-.02921	.00135	.00203	-.00006	.00591	.00000
2	-.00023	-.02869	.00023	.00124	.00034	.00598	.00017
3	-.00045	-.02954	-.00017	.00164	-.00028	.00577	-.00006

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
vge	.00045	.00053	.00017	.02771	.00100	.05536	.00011
Dev	.00107	.00020	.00056	.00155	.00073	.00223	.00035
RSD	238.25	37.503	335.02	5.6092	73.796	4.0317	311.89
1	-.00017	.00051	.00017	.02864	.00158	.05791	-.00017
2	.00169	.00073	.00073	.02858	.00017	.05440	.00051
3	-.00017	.00034	-.00040	.02592	.00125	.05376	.00000

lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
vge	.00051	.00019	.00100	.00002	.00135	.00034	.00070
Dev	.00026	.00006	.00189	.00386	.00298	.00039	.00094
RSD	50.945	34.690	189.37	22771.	220.23	115.69	134.93
1	.00023	.00023	-.00118	.00377	-.00045	.00011	.00056
2	.00073	.00011	.00197	-.00395	.00479	.00011	-.00017
3	.00057	.00023	.00221	.00023	-.00028	.00079	.00170

lem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
vge	.00250	-.00008	-.00395	-.00011	.00009	.00023
Dev	.00003	.00003	.00044	.00069	.00012	.00006
RSD	1.1066	43.613	11.022	609.21	124.76	25.042
1	.00253	-.00006	-.00388	.00017	.00000	.00017
2	.00248	-.00006	-.00355	.00039	.00023	.00028
3	.00249	-.00011	-.00441	-.00091	.00006	.00023

Standardization Rpt. 04/12/00 08:15:44 AM

Method: XP2 Standard: stdM1M
Run Time: 04/12/00 08:10:54

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	1.2659	.13431	.60458	3.7205	1.8275	.27680	.81680
SDev	.0030	.00208	.00038	.0061	.0010	.00082	.00240
%RSD	.23875	1.5479	.06221	.16324	.05347	.29523	.29384
#1	1.2624	.13196	.60442	3.7154	1.8264	.27598	.81518
#2	1.2678	.13507	.60501	3.7190	1.8280	.27682	.81566
#3	1.2675	.13590	.60432	3.7272	1.8282	.27761	.81956

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	1.0519	.83751	1.0723	.78666	.06523	.03955	.01985
SDev	.0017	.00107	.0061	.00347	.00317	.00048	.00063
%RSD	.16137	.12751	.56977	.44157	4.8683	1.2145	3.1607
#1	1.0527	.83663	1.0676	.78827	.06157	.03983	.02009
#2	1.0499	.83719	1.0702	.78267	.06725	.03899	.02032
#3	1.0529	.83870	1.0792	.78903	.06687	.03981	.01914

Elem	V_2924	Zn2062
Avge	.20639	.09482
SDev	.00047	.00030
%RSD	.22581	.31859
#1	.20616	.09451
#2	.20609	.09482
#3	.20693	.09512

andardization Rpt. 04/12/00 08:20:39 AM page 1

thod: XP2 Standard: stdM1H
n Time: 04/12/00 08:15:49

lem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
vge	2.5199	.26646	1.2037	7.3728	3.6310	.54985	1.6264
Dev	.0041	.00400	.0009	.0040	.0050	.00069	.0009
RSD	.16215	1.4992	.07239	.05475	.13650	.12512	.05340
1	2.5226	.26303	1.2045	7.3725	3.6311	.55064	1.6272
2	2.5219	.26549	1.2039	7.3770	3.6358	.54947	1.6255
3	2.5152	.27085	1.2028	7.3689	3.6259	.54943	1.6265

lem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
vge	2.0658	1.6661	2.1338	1.5531	.13635	.07586	.03910
Dev	.0018	.0010	.0044	.0075	.00058	.00092	.00071
RSD	.08555	.05722	.20530	.48205	.42805	1.2057	1.8079
1	2.0652	1.6660	2.1344	1.5614	.13700	.07522	.03899
2	2.0678	1.6671	2.1379	1.5469	.13588	.07546	.03986
3	2.0645	1.6653	2.1292	1.5511	.13617	.07691	.03845

lem	V_2924	Zn2062
vge	.41121	.18733
Dev	.00049	.00048
RSD	.11947	.25577
#1	.41083	.18759
#2	.41176	.18762
#3	.41103	.18677

Standardization Rpt. 04/12/00 08:32:04 AM page 1

Method: XP2 Standard: stdM2M
Run Time: 04/12/00 08:26:26

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.30776	.57711	.18056	.27570	1.0826	.23309	.19089
SDev	.00240	.00517	.00154	.00064	.0041	.00226	.00268
%RSD	.77920	.89519	.85343	.23373	.37900	.97109	1.4051
#1	.30500	.57114	.17879	.27497	1.0779	.23048	.18783
#2	.30929	.58005	.18156	.27618	1.0856	.23427	.19286
#3	.30900	.58013	.18134	.27594	1.0842	.23452	.19196

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.08606	.03718	.03455	1.9757
SDev	.00060	.00039	.00054	.0175
%RSD	.69736	1.0606	1.5725	.88569
#1	.08624	.03673	.03394	1.9555
#2	.08654	.03734	.03497	1.9860
#3	.08539	.03747	.03475	1.9856

:tandardization Report 04/12/00 08:37:48 AM page 1

Iethod: XP2 Slope = Conc(SIR)/IR

:lement	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
.g3280	328.068	Multiple	Standards	795.348	.194996	04/12/00 08:15:49
.l3082	308.215	Multiple	Standards	14738.5	429.484	04/12/00 08:32:09
.s1890	189.042	Multiple	Standards	7493.92	-3.51414	04/12/00 08:15:49
_2496	249.678	Multiple	Standards	4331.13	-7.05328	04/12/00 08:32:09
a4934	493.409	Multiple	Standards	1655.52	-.004499	04/12/00 08:15:49
.e3130	313.042	Multiple	Standards	269.998	-1.59423	04/12/00 08:15:49
:a3158	315.887	Multiple	Standards	27631.6	-1.03305	04/12/00 08:32:09
'd2265	226.502	Multiple	Standards	549.158	-.247861	04/12/00 08:15:49
'o2286	228.616	Multiple	Standards	3627.27	-1.91228	04/12/00 08:15:4_
'r2677	267.716	Multiple	Standards	1224.76	-.213566	04/12/00 08:15:4_
'u3247	324.753	Multiple	Standards	973.452	-26.9979	04/12/00 08:15:49
'e2714	271.441	Multiple	Standards	18211.6	-18.0960	04/12/00 08:32:09
_7664	766.491	Multiple	Standards	4831.63	-267.568	04/12/00 08:32:09
g2790	279.078	Multiple	Standards	21437.1	-2.37428	04/12/00 08:32:09
n2576	257.610	Multiple	Standards	1195.55	-.614023	04/12/00 08:15:49
o2020	202.030	Multiple	Standards	14042.9	-1.96413	04/12/00 08:32:09
a3302	330.232	Multiple	Standards	172318.	-172.961	04/12/00 08:32:09
i2316	231.604	Multiple	Standards	935.363	-.014780	04/12/00 08:15:49
b2203	220.351	Multiple	Standards	1273.34	-1.74428	04/12/00 08:15:49
b220A	220.352	STD2	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
b2203	220.353		NONE	1.00000	.000000	*NOT STANDARDIZED
_1960	196.026	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
b2068	206.838	Multiple	Standards	16881.0	-5.30594	04/12/00 08:15:49
e1960	196.261	Multiple	Standards	27589.5	-19.0521	04/12/00 08:15:49
e196A	196.262	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
i2881	288.158	Multiple	Standards	71474.0	-178.763	04/12/00 08:32:09
n1899	189.989	Multiple	Standards	94969.6	10.0568	04/12/00 08:32:0-
i3372	337.280	Multiple	Standards	1269.26	5.08530	04/12/00 08:32:0_
l1908	190.864	Multiple	Standards	50799.2	5.80783	04/12/00 08:15:49
_2924	292.402	Multiple	Standards	4847.21	-.462369	04/12/00 08:15:49
n2062	206.200	Multiple	Standards	10642.2	-2.39902	04/12/00 08:15:49

alysis Report   QC Standard   04/12/00 08:43:30 AM   page 1

thod: XP2   Sample Name: M199121508 ICP-2   Operator:
n Time: 04/12/00 08:37:52
mment:
de: CONC   Corr. Factor: 1

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	490.37	989.39	-4.0700	1000.5	986.20	.12969	3.1174
Dev	1.63	7.76	13.3759	2.4	.93	.01966	.8944
RSD	.33280	.78426	328.65	.24045	.09475	15.160	28.692
1	490.38	998.29	-5.6221	1003.2	985.77	.10703	3.6305
2	488.74	985.81	-16.602	998.50	985.57	.13984	3.6371
3	492.00	984.07	10.014	999.86	987.28	.14219	2.0846
rrors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
alue	500.00	1000.0		1000.0	1000.0		
ange	10.000	1000.0		10.000	10.000		

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	-.48526	-.75403	.03953	1.7210	8.2341	9756.8	.43758
Dev	.23668	.71877	.10571	.7882	14.225	12.3	6.6470
RSD	48.774	95.324	267.44	45.800	172.76	.12556	1519.0
1	-.27876	-.68789	-.07576	1.7539	4.4444	9766.5	7.2739
2	-.43349	-1.5036	.06244	.91689	23.970	9743.0	.04117
3	-.74355	-.07061	.13190	2.4924	-3.7124	9760.9	-6.0024
rrors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
alue						10000.	
ange						10.000	

lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
nits	ppb	ppb	ppb	ppb	ppb	ppm	ppm
vge	.05954	19.383	978.65	-.82248	4.4304	.4148	.0005
Dev	.06778	14.624	435.93	1.48547	4.9251	.0015	.0000
RSD	113.84	75.445	44.544	180.61	111.17	.3645	.1380
1	-.00868	33.588	Q1465.4	-.33051	3.5568	.4134	.0005
2	.12688	20.188	Q846.39	-2.4915	9.7338	.4146	.0005
3	.06044	4.3736	Q624.18	.35459	.00051	.4165	.0005
rrors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK
alue			1000.0				
ange			10.000				

lem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Jnits	ppb	ppb	ppm	ppb	ppb	ppb	ppb
vge	3.2463	-14.906	.0412	4794.1	18.959	2.8440	-5.6372
Dev	7.7703	1.801	.0007	3.5	34.783	.8257	15.1454
RSD	239.36	12.082	1.785	.07313	183.47	29.033	268.67
1	11.789	-15.948	.0405	4795.3	52.800	3.6572	.09202
2	1.3514	-15.943	.0413	4790.2	-16.695	2.8686	-22.811
3	-3.4013	-12.826	.0419	4796.9	20.772	2.0063	5.8078
rrors	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK

ıalysis Report QC Standard 04/12/00 08:49:13 AM

ethod: XP2 Sample Name: M199121507 QC-19 Operator:
ın Time: 04/12/00 08:43:35
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Jnits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	.46383	98.187	2036.1	126.98	.43138	2076.4	2029.9
SDev	.20509	15.154	28.2	1.82	.05240	5.3	1.5
RSD	44.217	15.434	1.3836	1.4349	12.146	.25712	.07586
1	.24008	112.84	2004.1	128.96	.37088	2082.4	2030.5
2	.64290	99.140	2057.2	126.61	.46166	2074.3	2028.1
3	.50849	82.579	2046.9	125.38	.46161	2072.4	2031.0
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value			2000.0			2000.0	2000.0
Range			10.000			10.000	10.000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Jnits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	2057.1	2075.7	2058.8	1949.1	Q1747.3	23.480	2029.8
SDev	4.3	2.6	6.8	4.5	23.8	4.243	5.1
RSD	.20703	.12373	.32977	.22836	1.3600	18.070	.25042
1	2062.0	2078.5	2066.1	1954.0	Q1753.4	26.586	2035.5
2	2054.9	2075.1	2057.5	1947.9	Q1767.5	25.208	2025.8
3	2054.3	2073.5	2052.8	1945.3	Q1721.1	18.646	2028.0
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	NOCHECK	QC Pass
Value	2000.0	2000.0	2000.0	2000.0	2000.0		2000.0
Range	10.000	10.000	10.000	10.000	10.000		10.000

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	2078.6	Q2237.5	446.70	2039.9	2021.3	Q.4646	.0005
SDev	6.0	1.8	428.21	8.3	7.0	.0024	.0000
RSD	.28656	.07982	95.862	.40861	.34687	.5197	.3821
1	2085.4	Q2235.7	667.09	2047.2	2029.4	Q.4674	.0005
2	2076.3	Q2239.3	719.83	2041.9	2017.6	Q.4634	.0005
3	2074.1	Q2237.4	-46.820	2030.8	2016.9	Q.4631	.0005
Errors	QC Pass	QC Fail	NOCHECK	QC Pass	QC Pass	QC Fail	NOCHECK
Value	2000.0	2000.0		2000.0	2000.0	2000.	
Range	10.000	10.000		10.000	10.000	10.00	

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	Q2295.7	2137.4	Q.0466	1243.8	2791.7	2061.9	2144.6
SDev	27.1	19.4	.0001	3.1	18.3	4.9	28.7
RSD	1.1804	.90710	.3041	.24941	.65476	.23648	1.3382
1	Q2264.5	2115.7	Q.0466	1247.4	2777.2	2067.4	2174.2
2	Q2309.6	2153.1	Q.0464	1242.1	2785.8	2060.1	2142.8
3	Q2313.1	2143.5	Q.0467	1241.9	2812.2	2058.1	2116.8
Errors	QC Fail	QC Pass	QC Fail	NOCHECK	NOCHECK	QC Pass	QC Pass

nalysis Report 04/12/00 08:55:27 AM page 1

ethod: XP2 Sample Name: IEC 1 Operator:
un Time: 04/12/00 08:49:18
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.44673	12242.	-15.734	13.754	.08844	.21465	59935.
SDev	.25462	12.	11.293	1.004	.48444	.05813	42.
%RSD	56.996	.09648	71.770	7.2976	547.79	27.082	.06962
#1	-.65679	12230.	-9.0054	13.210	.36877	.26247	59889.
#2	-.16355	12245.	-9.4262	14.912	-.47095	.23152	59944.
#3	-.51984	12253.	-28.772	13.140	.36749	.14995	59971.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4.8212	.06205	2.1079	-13.043	45950.	14.599	30127.
SDev	1.0121	.31510	.2011	.861	80.	13.952	6.
%RSD	20.994	507.78	9.5402	6.6043	.17514	95.573	.01880
#1	3.8381	.13229	1.9956	-13.171	45862.	30.375	30120.
#2	4.7653	.33611	2.3400	-13.833	46019.	3.8808	30130.
#3	5.8601	-.28223	1.9880	-12.124	45969.	9.5407	30130.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1.9662	14.126	10728.	-.52161	15.105	.4221	.0005
SDev	.2750	13.068	170.	2.78700	2.957	.0002	.0000
%RSD	13.985	92.513	1.5826	534.30	19.573	.0384	.1905
#1	2.2837	27.323	10919.	-1.4910	17.419	.4222	.0005
#2	1.8113	13.862	10596.	2.6206	16.122	.4221	.0005
#3	1.8037	1.1912	10668.	-2.6945	11.775	.4219	.0004

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	60.947	23.413	.0474	18.397	27.899	2.5612	-18.936
SDev	39.535	22.516	.0002	3.717	22.287	.6121	33.063
%RSD	64.868	96.170	.4491	20.205	79.884	23.898	174.61
#1	100.31	8.9402	.0475	18.646	52.882	3.2252	-2.7823
#2	61.282	49.354	.0472	14.562	20.760	2.4389	2.9453
#3	21.245	11.944	.0476	21.984	10.057	2.0195	-56.971

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	1.9940	1.3969
SDev	1.5220	1.2528
%RSD	76.331	89.681
#1	3.6359	1.8000
#2	.63021	2.3986
#3	1.7159	-.00777

nalysis Report 04/12/00 09:01:40 AM page 1

ethod: XP2 Sample Name: CCV 1 Operator:
ın Time: 04/12/00 08:55:32
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	991.19	4979.7	1006.5	2517.4	1005.9	1025.6	5019.3
SDev	1.91	6.8	12.1	1.6	2.1	1.8	8.6
%RSD	.19234	.13708	1.2050	.06392	.20511	.17346	.17131
#1	989.00	4986.2	1006.7	2517.4	1008.2	1027.7	5029.1
#2	992.47	4972.6	994.21	2515.7	1004.6	1024.5	5015.2
#3	992.10	4980.5	1018.5	2519.0	1004.7	1024.7	5013.4

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1021.0	1022.2	1017.4	970.52	4858.0	4978.4	5000.9
SDev	1.9	1.7	2.1	1.92	22.6	17.5	6.5
%RSD	.18378	.16243	.20808	.19763	.46594	.35089	.12951
#1	1023.1	1023.8	1019.9	972.69	4877.7	4988.0	5008.4
#2	1019.9	1022.3	1016.5	969.85	4833.3	4989.0	4997.1
#3	1019.9	1020.5	1015.9	969.04	4862.9	4958.3	4997.2

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1016.4	2685.9	14854.	1013.4	1007.8	.4451	.0005
SDev	1.0	6.6	466.	3.7	4.0	.0012	.0000
%RSD	.09374	.24512	3.1402	.36737	.39419	.2696	.1724
#1	1017.3	2682.2	14967.	1017.6	1009.1	.4462	.0005
#2	1016.6	2682.1	15255.	1010.4	1003.3	.4453	.0005
#3	1015.4	2693.5	14342.	1012.2	1010.9	.4438	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	1106.5	1087.4	.0441	2677.0	3415.3	2517.0	981.97
SDev	25.4	33.5	.0005	35.6	21.3	4.8	38.86
%RSD	2.2956	3.0795	1.156	1.3313	.62279	.19048	3.9576
#1	1082.0	1048.7	.0444	2716.7	3428.1	2522.1	967.32
#2	1132.7	1106.3	.0445	2647.8	3390.7	2512.6	1026.0
#3	1104.9	1107.2	.0435	2666.5	3427.0	2516.2	952.57

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	999.70	1028.3
SDev	1.49	6.5
%RSD	.14923	.63134
#1	1001.4	1033.6
#2	999.28	1030.2
#3	998.46	1021.1

.x: TCLP/ SPLP Project: 33099 Analyst: MP Date: 04/10/00

	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		mg/L	247041	247042	247043						
Al	6010B	0.1									
Sb	6010B										
As	6010B	0.015	ND	ND	ND						
Ba	6010B	0.003	0.605	1.187	1.630						
Be	6010B										
Cd	6010B	0.002	ND	0.025	0.008						
Ca	6010B										
Cr	6010B	0.004	ND	0.006	0.008						
Co	6010B										
Cu	6010B	0.004									
Fe	6010B	0.05									
Pb	6010B	0.01	ND	1.628	0.121						
Mg	6010B										
Mn	6010B										
Mo	6010B										
Ni	6010B	0.006									
K	6010B										
Se	6010B	0.01	ND	ND	0.031						
Ag	6010B	0.003	ND	ND	ND						
Na	6010B										
Si	6010B										
Tl	6010B										
Sn	6010B										
Ti	6010B										
V	6010B										
Zn	6010B	0.01									
Other											
Other											

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Marietta, GA

LOGBOOK NO. 032200-02

SOP NO*: M01 (All preparation methods are EPA SW-846 except NIOSH)

BATCH ID: MDg000407-A

Prep. Method (circle 1): 3005A 3010A 3020A 3050B 3030C

Analysis Method (circle 1): ICP(EPA SW-846 6010B) GFAA (EPA 200.9) FLAA-lead (EPA SW-846 7420A) NIOSH 7082

PERFORMED BY: R.R.

DATE(m/d/y): 4/7/00

MATRIX (circle 1): COMP. FILTER SOIL/SLUDGE FILTER WIPE PAINT CHIP WATER TCLP SPLP Other:

	REAGENT	ID	Exp. Date
R1	HNO_3	200207	——
R2	HCl	990823	
R3			

	SPIKE	ID	CONC.(µg/mL)	Exp. Date
S1	A	M100040301	20.0	10.3.00
S2	B	M10001104	20.0	7.10.00
S3	D	M10003602	20.0	9.16.00

Describe Procedural Deviations/Modifications:

NONE

	Project Number	Lab Sample Number	Sample Amount (mL or g)	pH	REAGENTS ID	Amt.(mL)	ID	Amt.(mL)	ID	Amt.(mL)	SPIKES ID	Amt.(µL)	ID	Amt.(µL)	ID	Amt.(µL)	Final Volume (mL)	Comments
MB	NA	BLK	50.0		R1	2.0	R2	1.0			NA		NA		NA		50.0	
LCS	NA	LCS									S1	1000	S2	1000	S3	1000		
1	33099	247041									exp.:		exp.:		exp.:			
2		247042									SPIKE A		SPIKE B		SPIKE D			
3		247043									(20 ppm each)				(20 ppm)			
4	33078	246872									Sb		Mg - 100 ppm		Ag			
5											As		Na - 1000 ppm					
6											Se		Ca - 300 ppm					
7											B		K - 80 ppm					
8											Mo		Al - 80 ppm					
9											Ba		Sn - 50 ppm					
10											Be		Fe - 40 ppm					
11											Cd							
12											Cr							
13											Co							
14											Cu							
15											Pb							
16											Mn							
17											Ni							
18											Tl							
19											V							
20											Zn							
MS	33099	247043									S1	1000	S2	1000	S3	1000		
MSD											S1	1000	S2	1000	S3	1000		
DUP																		
LCSD	NA	LCSD									S1	1000	S2	1000	S3	1000		

Abbreviations: NA = not applic... Y = Yes, N = No

BALANCE ID: PE1600 EXP. DATE: 01/01

SOP's
M01 Digestion of Water Samples for Metals Analysis
M02 Digestion of Soil, Sludge and Sediment Samples for Total Metals Analysis
M03 Digestion of Paint Chip Samples for Total Metals Analysis
M04 Digestion of Wipe Samples for Total Metals Analysis
M05 Digestion of Composite Filter Samples for Total Metals Analysis

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - **Metals/SVOs**

LOGBOOK NO. 072799-01

SOP NO.: M 95 METHOD: 1311 Circle 1: Instrument T-1 T-2 BATCH ID: MTC000406

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP (° C) [b]	RPM Check [c]	PERFORMED BY
START:	4/6/00	16:45	21.7	30	R.R
STOP:	4/7/00	8:45	19.5	30	R.R

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after 1N HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank	Blank	NA	NA	NA	—	1 2	
1	33078	246872	>5	>5	25.5	510	1 2	
2	33099	247041	>5	>5	50.0	1000	1 2	
3		247042	>5	>5	50.0	1000	1 2	
4		247043	>5	>5	50.0	1000	1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations

NA = not applicable

OK = no problems encountered

Thermometer ID. 9720546 Exp. 042200

Balance ID PE1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2	M1000320	2.84

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water:

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

Analysis Report 04/07/00 02:35:05 PM

Method: XP2 Sample Name: 247041 Operator: mp
Run Time: 04/07/00 14:28:55
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.55153	386.97	-13.328	254.70	605.02	-.46842	1919200.
SDev	.83069	3.50	12.410	13.96	.58	.02685	1062.
%RSD	150.62	.90378	93.116	5.4822	.09591	5.7324	.05534
#1	.40720	390.68	-22.073	270.28	605.08	-.44266	1920000.
#2	-1.0570	383.73	-18.787	250.49	604.41	-.49624	1919700.
#3	-1.0048	386.51	.87627	243.32	605.56	-.46637	1918000.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.44268	1588.9	2.5887	-8.0649	969.30	386.70	20977.
SDev	.38577	.9	.4289	.6000	2.55	10.30	37.
%RSD	87.145	.05887	16.567	7.4395	.26355	2.6635	.17494
#1	.63214	1588.3	2.7251	-7.4394	966.40	395.34	20952.
#2	-.00119	1588.5	2.1082	-8.1196	971.23	389.45	21019.
#3	.69710	1590.0	2.9328	-8.6357	970.27	375.30	20960.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	257.64	5.7954	4527.1	31.561	.00059	.4753	.0005
SDev	.15	6.2603	537.4	2.475	.00000	.0017	.0000
%RSD	.05840	108.02	11.871	7.8415	.32015	.3658	.3201
#1	257.78	12.630	4760.6	29.132	.00060	.4768	.0005
#2	257.66	4.4184	4908.2	31.470	.00059	.4757	.0005
#3	257.48	.33820	3912.4	34.080	.00059	.4734	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	11.469	6.3739	.0604	1346.4	-2.4471	5.2722	47.580
SDev	12.253	29.434	.0007	49.3	2.4835	.5544	45.536
%RSD	106.83	461.79	1.189	3.6619	101.49	10.515	95.705
#1	25.252	16.803	.0610	1400.8	-3.8809	5.4252	-4.9730
#2	1.8101	29.173	.0607	1333.8	-3.8809	5.7340	75.337
#3	7.3461	-26.855	.0596	1304.7	.42058	4.6574	72.376

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	10.178	384.16
SDev	.170	2.06
%RSD	1.6719	.53611
#1	10.116	385.29
#2	10.370	381.78
#3	10.047	385.40

Analysis Report 04/07/00 02:41:19 PM page 1

Method: XP2 Sample Name: 247042 Operator: mp
Run Time: 04/07/00 14:35:10
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.27848	2325.5	-3.1436	772.31	1187.5	.68696	1226900.
SDev	1.6529	1675.0	7.3578	671.86	1027.7	1.9265	1062195.
%RSD	593.53	72.027	234.06	86.994	86.544	280.44	86.576
#1	-1.3641	3282.9	5.2620	1161.6	1779.8	1.8224	1839500.
#2	.25807	3302.2	-6.2755	1158.8	1781.8	1.7759	1840800.
#3	1.9415	391.43	-8.4174	-3.4866	.80123	-1.5374	377.06

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	24.755	278.84	6.2071	90.160	587.79	32338.	11084.
SDev	21.332	242.79	6.2292	105.55	567.92	29172.	9597.
%RSD	86.176	87.073	100.36	117.07	96.619	90.208	86.579
#1	37.203	418.10	10.065	149.98	924.02	49159.	16619.
#2	36.939	419.91	9.5357	152.21	907.27	49202.	16632.
#3	.12246	-1.5119	-.97925	-31.715	-67.913	-1346.3	2.9882

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	634.99	47.238	11520.	178.11	1627.9	.3910	.0003
SDev	549.90	48.014	10443.	152.66	1409.8	.2547	.0002
%RSD	86.600	101.64	90.653	85.712	86.603	65.14	59.70
#1	952.27	78.768	17267.	264.50	2442.5	.5401	.0005
#2	952.69	70.966	17827.	267.99	2441.2	.5359	.0005
#3	.01982	-8.0210	-534.48	1.8430	.00012	.0969	.0001

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	325.90	-2.9805	.0428	45944.	1.3923	25.997	31.196
SDev	283.59	21.6190	.0279	39596.	9.9811	18.630	41.728
%RSD	87.018	725.34	65.18	86.184	716.87	71.660	133.76
#1	501.38	-27.838	.0596	68567.	12.904	36.254	71.257
#2	477.59	11.436	.0583	69041.	-3.8809	37.244	-12.020
#3	-1.2742	7.4612	.0106	222.77	-4.8461	4.4931	34.351

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	28.001	1328.2
SDev	24.976	1150.5
%RSD	89.197	86.622
#1	43.332	1994.3
#2	41.491	1990.6
#3	-.81939	-.28918

Analysis Report 04/07/00 02:47:34 PM page 1

Method: XP2 Sample Name: 247043 Operator: mp
Run Time: 04/07/00 14:41:25
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.98605	2788.2	-3.8053	822.61	1630.2	1.3810	1868900.
SDev	.63590	10.5	3.3652	1.88	.8	.0456	1854.
%RSD	64.490	.37560	88.434	.22875	.05078	3.3042	.09921
#1	.84492	2781.5	-1.8624	820.60	1631.2	1.3571	1869900.
#2	1.6807	2800.3	-7.6911	824.33	1629.9	1.4337	1870100.
#3	.43256	2782.9	-1.8624	822.90	1629.6	1.3524	1866800.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	8.0169	237.71	8.5396	139.87	635.82	44352.	15321.
SDev	.9314	.54	.6921	.75	44.66	46.	10.
%RSD	11.618	.22535	8.1042	.53919	7.0244	.10411	.06478
#1	7.5492	237.46	8.1440	139.33	592.36	44380.	15319.
#2	7.4120	238.33	8.1362	140.73	681.59	44379.	15332.
#3	9.0895	237.35	9.3388	139.56	633.50	44299.	15312.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1061.0	37.228	14222.	121.33	120.61	.4694	.0005
SDev	1.1	6.629	318.	2.01	3.53	.0039	.0000
%RSD	.10439	17.805	2.2358	1.6600	2.9287	.8282	.3707
#1	1061.6	41.845	14585.	122.23	124.69	.4738	.0005
#2	1061.6	40.206	13990.	122.73	118.67	.4680	.0005
#3	1059.7	29.633	14091.	119.02	118.48	.4664	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	38.366	31.548	.0592	68895.	8.7752	28.298	6.0967
SDev	11.431	25.172	.0004	130.	4.2334	.764	11.719
%RSD	29.794	79.790	.7446	.18817	48.243	2.7002	192.22
#1	42.077	45.335	.0587	68747.	13.036	27.652	-7.0555
#2	47.481	46.815	.0596	68950.	4.5696	29.141	15.430
#3	25.541	2.4943	.0592	68988.	8.7201	28.102	9.9157

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	59.994	931.59
SDev	1.239	1.12
%RSD	2.0646	.12063
#1	60.738	930.48
#2	60.680	932.73
#3	58.564	931.56

Matrix: TCLP Project: 33078 Analyst: MP Date: 04/10/00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		ug/L	MB A4/7	LCS A4/7			LCSD A4/7		
Al	200.7	100			1600				
Sb	200.7	15			400				
As	200.7	15	ND	374	400	93	397	99	6
Ba	200.7	3	ND	396	400	99	419	105	6
Be	200.7	1			400				
Cd	200.7	2	ND	385	400	96	404	101	5
Ca	200.7	50			6000				
Cr	200.7	4	ND	383	400	96	401	100	4
Co	200.7	3			400				
Cu	200.7	4			400				
Fe	200.7	50			800				
Pb	200.7	10	ND	372	400	93	396	~~126~~ 99	~~37~~ 6
Mg	200.7	20			2000				
Mn	200.7	2			400				
Mo	200.7	10			400				
Ni	200.7	6			400				
K	200.7	100			1600				
Se	200.7	10	ND	393	400	98	420	105	7
Ag	200.7	3	ND	348	400	87	370	92	5
Na	200.7	1000	~~ND~~	~~3~~	10000				
Si	200.7								
Tl	200.7	25			400				
Sn	200.7								
Ti	200.7								
V	200.7	4			400				
Zn	200.7	10			400				
Other									
Other									

Matrix: TCLP Project: 33078 Analyst: MP Date: 04/10/00

Metal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		ug/L	043 DUP	043 MS			043 MSD		
Al	200.7	100			1600				
Sb	200.7	15			400				
As	200.7	15	ND	359	400	90	368	92	2
Ba	200.7	3	1560	1918	400	89	1980	105	16
Be	200.7	1			400				
Cd	200.7	2	8	362	400	88	375	92	4
Ca	200.7	50			6000				
Cr	200.7	4	8	370	400	90	383	94	4
Co	200.7	3			400				
Cu	200.7	4			400				
Fe	200.7	50			800				
Pb	200.7	10	112	456	400	86	467	89	3
Mg	200.7	20			2000				
Mn	200.7	2			400				
Mo	200.7	10			400				
Ni	200.7	6			400				
K	200.7	100			1600				
Se	200.7	10	12	389	400	94	460	112	18
Ag	200.7	3	ND	373	400	93	380	95	2
Na	200.7	1000			10000				
Si	200.7								
Tl	200.7	25			400				
Sn	200.7								
Ti	200.7								
V	200.7	4			400				
Zn	200.7	10			400				
)ther									
)ther									

Analysis Report 04/07/00 03:05:33 PM page 1

Method: XP2 Sample Name: MB A 4/7 Operator: mp
Run Time: 04/07/00 15:00:00
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.96677	395.57	-1.1404	94.657	.11865	-.61992	27.613
SDev	.95775	21.80	17.7781	36.644	.33018	.03098	11.176
%RSD	99.067	5.5105	1559.0	38.712	278.27	4.9972	40.475
#1	1.9717	420.36	-21.549	135.41	-.26260	-.58547	40.387
#2	.86407	386.97	10.984	84.141	.30949	-.64547	22.815
#3	.06451	379.39	7.1432	64.421	.30907	-.62884	19.637

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.0837	.66022	1.7700	-3.5895	58.056	33.146	5.0014
SDev	.1890	.74856	.7871	1.3331	25.024	34.302	2.5249
%RSD	17.437	113.38	44.470	37.139	43.104	103.49	50.485
#1	1.2078	.86521	2.6644	-2.3766	85.900	70.199	5.8079
#2	1.1771	-.16948	1.4634	-5.0168	50.824	2.4998	7.0245
#3	.86623	1.2849	1.1824	-3.3751	37.444	26.738	2.1717

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	.09475	-3.9303	647.95	1.5373	3.6672	.4282	.0004
SDev	.24827	1.1641	447.92	.1235	3.2149	.0017	.0000
%RSD	262.02	29.619	69.128	8.0347	87.665	.3975	.1055
#1	-.11173	-5.2001	404.04	1.6087	6.0027	.4276	.0004
#2	.02577	-2.9135	374.93	1.6086	.00056	.4269	.0004
#3	.37022	-3.6773	1164.9	1.3947	4.9985	.4302	.0004

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	-2.5634	.71480	.0454	62.885	-1.1898	.89024	5.2028
SDev	3.7495	44.485	.0006	29.052	8.3996	.44196	20.238
%RSD	146.27	6223.4	1.382	46.199	705.98	49.645	388.98
#1	.55595	51.740	.0449	96.363	-7.9140	1.3992	23.978
#2	-6.7233	-19.676	.0451	48.005	3.2256	.60325	-16.234
#3	-1.5229	-29.919	.0461	44.288	-3.8809	.66829	7.8649

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	-.27169	1.2920
SDev	.90271	1.2362
%RSD	332.25	95.674
#1	-1.3012	2.2812
#2	.10173	1.6887
#3	.38438	-.09374

Analysis Report 04/07/00 02:03:31 PM page 1

Method: XP2 Sample Name: LCS A 4/7 Operator: mp
Run Time: 04/07/00 13:57:22
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	348.26	1924.1	374.13	3600.7	396.17	393.79	7613.1
SDev	.88	9.2	16.63	11.8	.49	.51	18.1
%RSD	.25166	.48005	4.4455	.32782	.12403	.13065	.23791
#1	347.82	1932.3	359.50	3613.9	396.11	393.97	7618.6
#2	347.69	1914.1	370.66	3597.3	396.69	394.19	7627.8
#3	349.27	1926.0	392.22	3591.0	395.72	393.21	7592.9

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	385.50	375.72	383.04	1902.3	808.22	1364.7	2012.5
SDev	.73	.17	1.19	2.0	9.43	12.8	5.7
%RSD	.18909	.04508	.31184	.10377	1.1673	.94155	.28489
#1	386.22	375.73	381.80	1903.0	797.69	1369.0	2006.3
#2	385.52	375.54	384.19	1903.9	815.90	1350.3	2017.6
#3	384.76	375.88	383.14	1900.1	811.07	1374.9	2013.6

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	378.11	3709.8	11009.	387.59	372.58	.4632	.0005
SDev	.28	26.4	435.	1.78	5.63	.0011	.0000
%RSD	.07321	.71091	3.9507	.45797	1.5112	.2382	.0993
#1	378.29	3679.8	11508.	389.53	379.08	.4621	.0005
#2	378.24	3720.1	10709.	386.05	369.17	.4631	.0005
#3	377.79	3729.4	10810.	387.18	369.50	.4643	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	411.73	392.98	.0480	199.55	1033.3	.44446	280.81
SDev	12.15	14.11	.0002	6.65	17.9	.04299	48.70
%RSD	2.9517	3.5903	.4416	3.3315	1.7359	9.6729	17.342
#1	413.48	391.40	.0479	205.10	1034.6	.39516	283.60
#2	398.80	379.72	.0482	201.36	1014.8	.46409	230.78
#3	422.92	407.80	.0479	192.18	1050.6	.47414	328.05

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	368.57	402.33
SDev	1.41	2.28
%RSD	.38289	.56573
#1	367.05	402.68
#2	369.84	404.41
#3	368.82	399.90

Analysis Report 04/07/00 02:09:45 PM

Method: XP2 Sample Name: LCAD A 4/7 Operator: mp
Run Time: 04/07/00 14:03:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	369.91	1995.9	396.62	3782.6	419.21	414.53	7949.2
SDev	.37	10.6	8.69	5.8	.69	.65	16.5
%RSD	.10088	.53005	2.1899	.15463	.16501	.15671	.20736
#1	369.55	1994.9	392.42	3787.6	419.86	415.28	7967.9
#2	370.29	1985.9	390.82	3784.0	419.29	414.11	7936.5
#3	369.87	2007.0	406.60	3776.2	418.48	414.19	7943.3

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	404.43	394.08	401.37	2010.1	841.27	1393.9	2079.2
SDev	2.04	.88	1.12	4.4	7.25	8.4	5.0
%RSD	.50480	.22397	.27969	.22054	.86134	.60334	.23953
#1	406.69	395.09	402.47	2015.0	836.55	1402.7	2081.7
#2	402.70	393.46	401.41	2006.2	837.65	1385.9	2073.5
#3	403.92	393.68	400.22	2009.2	849.61	1393.2	2082.4

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	398.59	3908.9	11462.	404.18	395.81	.4622	.0005
SDev	.47	7.8	588.	.69	8.95	.0008	.0000
%RSD	.11768	.19920	5.1274	.17183	2.2601	.1672	.3014
#1	399.13	3916.6	11346.	403.82	388.73	.4630	.0005
#2	398.29	3901.0	10940.	403.75	392.85	.4621	.0005
#3	398.36	3909.0	12098.	404.98	405.87	.4615	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	420.43	400.91	.0489	209.89	1047.4	.43230	320.70
SDev	11.02	33.11	.0005	1.18	15.6	.31522	12.69
%RSD	2.6219	8.2577	.9833	.56341	1.4899	72.919	3.9564
#1	418.96	403.87	.0494	211.25	1063.9	.23658	327.39
#2	410.21	366.43	.0489	209.20	1032.8	.26437	328.65
#3	432.11	432.44	.0485	209.20	1045.6	.79593	306.07

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	388.17	415.40
SDev	1.38	2.19
%RSD	.35590	.52757
#1	389.23	415.38
#2	388.67	413.21
#3	386.61	417.60

Analysis Report 04/07/00 02:16:00 PM

Method: XP2 Sample Name: 247043 DUP1 Operator: mp
Run Time: 04/07/00 14:09:51
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.06946	2678.7	-9.3575	912.86	1560.2	1.3574	1821800.
SDev	1.0197	6.3	14.1614	2.37	1.4	.0249	5320.
%RSD	1468.1	.23693	151.34	.25932	.08861	1.8377	.29202
#1	.70313	2677.6	-8.6235	915.25	1561.1	1.3862	1827800.
#2	-1.1068	2673.0	4.4226	912.79	1558.6	1.3422	1819900.
#3	.61210	2685.5	-23.872	910.52	1560.9	1.3438	1817700.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	7.8891	232.62	8.3818	136.79	764.87	42565.	14766.
SDev	.4355	.76	.5452	.91	18.72	83.	15.
%RSD	5.5208	.32783	6.5043	.66245	2.4478	.19570	.10233
#1	7.4165	233.49	7.8083	137.44	783.08	42661.	14772.
#2	7.9763	232.12	8.4436	137.18	765.86	42512.	14748.
#3	8.2744	232.24	8.8934	135.76	745.67	42523.	14777.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1025.8	45.938	12547.	116.70	111.69	.4701	.0005
SDev	1.2	4.566	444.	2.98	2.39	.0024	.0000
%RSD	.11999	9.9390	3.5349	2.5527	2.1407	.5037	.2189
#1	1027.1	50.871	13059.	118.43	112.47	.4728	.0005
#2	1025.6	41.860	12303.	113.26	109.01	.4685	.0005
#3	1024.7	45.084	12279.	118.42	113.60	.4690	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	29.045	12.269	.0589	62159.	13.060	26.531	67.917
SDev	11.356	10.001	.0009	3423.	11.182	.194	19.713
%RSD	39.097	81.516	1.538	5.5061	85.618	.73266	29.026
#1	23.657	22.533	.0598	58458.	8.8622	26.458	49.231
#2	42.092	11.721	.0580	62810.	25.734	26.752	66.002
#3	21.387	2.5531	.0589	65210.	4.5848	26.385	88.517

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	57.024	846.67
SDev	1.352	4.66
%RSD	2.3703	.55038
#1	58.055	841.29
#2	57.523	849.13
#3	55.494	849.58

Analysis Report 04/07/00 02:22:15 PM

Method: XP2 Sample Name: 247043 MS1 Operator: mp
Run Time: 04/07/00 14:16:05
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	372.83	4198.7	358.77	4441.1	1918.4	381.28	1771200.
SDev	1.00	21.8	23.43	39.1	1.5	.11	2868.
%RSD	.26757	.51942	6.5311	.87958	.07888	.02895	.16193
#1	373.98	4223.3	366.33	4486.1	1918.7	381.38	1774400.
#2	372.29	4191.1	332.50	4415.9	1916.7	381.16	1770500.
#3	372.21	4181.8	377.50	4421.2	1919.7	381.29	1768800.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	362.07	572.82	370.12	2090.5	1757.2	42197.	16230.
SDev	1.18	.79	1.15	2.0	9.4	54.	17.
%RSD	.32515	.13847	.31090	.09359	.53405	.12758	.10210
#1	363.43	573.60	371.38	2092.1	1765.9	42256.	16244.
#2	361.35	572.01	369.85	2088.3	1747.2	42185.	16235.
#3	361.44	572.84	369.13	2091.1	1758.5	42151.	16212.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1362.5	3548.8	25726.	463.50	456.31	.4812	.0005
SDev	.3	14.5	82.	3.37	7.75	.0026	.0000
%RSD	.02498	.40769	.31754	.72617	1.6981	.5378	.4520
#1	1362.7	3564.4	25669.	466.70	462.11	.4828	.0005
#2	1362.7	3535.8	25819.	463.82	447.51	.4825	.0005
#3	1362.1	3546.1	25688.	459.99	459.31	.4782	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	434.25	388.90	.0588	65302.	940.05	25.720	317.21
SDev	7.94	28.14	.0004	407.	16.43	.782	25.67
%RSD	1.8288	7.2365	.7246	.62384	1.7480	3.0423	8.0928
#1	432.49	413.34	.0588	64850.	959.00	26.580	291.52
#2	427.33	395.23	.0593	65415.	931.30	25.532	342.87
#3	442.92	358.13	.0584	65641.	929.84	25.050	317.23

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	414.90	1164.0
SDev	1.59	3.2
%RSD	.38232	.27562
#1	414.29	1167.7
#2	416.70	1162.1
#3	413.70	1162.1

Analysis Report 04/07/00 02:28:29 PM

Method: XP2 Sample Name: 247043 MSD1 Operator: mp
Run Time: 04/07/00 14:22:20
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	380.21	4338.5	368.00	4487.2	1980.4	395.36	1815600.
SDev	.66	12.9	17.38	28.7	4.0	.73	1961.
%RSD	.17446	.29716	4.7239	.64000	.20430	.18531	.10799
#1	379.71	4345.1	384.80	4520.1	1976.1	394.52	1813400.
#2	380.96	4346.8	369.12	4473.8	1981.0	395.69	1816800.
#3	379.96	4323.7	350.08	4467.6	1984.1	395.88	1816700.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	374.60	590.39	383.03	2162.2	1387.9	43666.	16778.
SDev	1.27	1.54	.67	5.3	7.3	52.	35.
%RSD	.34006	.26112	.17550	.24359	.52477	.12013	.21063
#1	373.44	590.36	382.26	2156.1	1396.2	43609.	16740.
#2	375.96	591.95	383.30	2165.1	1382.5	43712.	16784.
#3	374.39	588.86	383.52	2165.4	1385.0	43678.	16809.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1401.4	3685.7	24458.	482.54	466.87	.4819	.0005
SDev	2.2	25.0	19.	3.91	13.85	.0007	.0000
%RSD	.15541	.67891	.07965	.80984	2.9655	.1485	.3865
#1	1398.9	3659.7	24439.	478.31	480.10	.4827	.0005
#2	1402.7	3709.6	24478.	483.29	452.48	.4818	.0005
#3	1402.8	3687.7	24456.	486.02	468.03	.4812	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	451.54	359.68	.0607	67282.	983.47	26.375	303.49
SDev	8.45	34.20	.0001	346.	18.44	.618	51.52
%RSD	1.8720	9.5087	.2489	.51449	1.8754	2.3446	16.977
#1	452.86	349.15	.0609	66890.	997.54	26.110	253.06
#2	442.51	331.98	.0606	67408.	962.59	25.933	356.04
#3	459.26	397.91	.0606	67548.	990.29	27.082	301.37

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	430.38	1192.2
SDev	.36	2.9
%RSD	.08424	.24263
#1	429.97	1194.2
#2	430.56	1188.9
#3	430.62	1193.6

Matrix: ______ Project: 32767 Analyst: mp Date: 4-7-00

Metal	QC # 19	True Value	% Recovery	QC # ICP - 2	True Value	% Recovery	CCV	True Value	% Recovery
Al					1000			5000	
Sb		2000						1000	
As		2000						1000	
Ba				995	1000	99	1021	1000	102
Be		2000						1000	
Cd	2038	2000	102				1028	1000	103
Ca		2000						5000	
Cr	2055	2000	103				1027	1000	103
Co		2000						1000	
Cu	1963	2000	98				989	1000	99
Fe		2000						5000	
Pb	2012	2000	101				1024	1000	102
Mg		2000						5000	
Mn		2000						1000	
Mo		2000						2500	
Ni	2030	2000	101				1023	1000	102
K					10000			5000	
Se		2000						1000	
Ag				492	500	98	1023	1000	102
Na					1000			10000 1EC	
Si					5000				
Tl		2000						1000	
Sn								2500	
Ti		2000						2500	
V		2000						1000	
Zn	2060	2000	103				1030	1000	103
Other									
Other									

Standardization Rpt. 04/07/00 08:11:05 AM page 1

Method: XP2 Standard: BLANK
Run Time: 04/07/00 08:05:28

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Avge	-.00159	-.02891	.00026	.00217	-.00036	.00599	-.00018
SDev	.00070	.00026	.00186	.00030	.00012	.00006	.00006
%RSD	44.137	.89705	725.29	13.920	33.169	.97655	33.357
#1	-.00239	-.02899	-.00108	.00221	-.00024	.00592	-.00018
#2	-.00107	-.02862	-.00054	.00244	-.00036	.00602	-.00024
#3	-.00131	-.02912	.00238	.00185	-.00048	.00602	-.00012

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Avge	-.00074	.00038	.00018	.02893	-.00012	.06280	-.00004
SDev	.00021	.00025	.00048	.00134	.00161	.00260	.00017
%RSD	28.304	65.702	266.63	4.6180	1357.7	4.1421	434.30
#1	-.00054	.00018	.00018	.02774	-.00024	.06456	.00006
#2	-.00072	.00066	-.00030	.02868	.00155	.05981	.00006
#3	-.00095	.00030	.00066	.03037	-.00167	.06402	-.00024

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Avge	.00008	.00024	-.00135	-.00179	.00342	.00012	.00020
SDev	.00009	.00010	.00101	.00280	.00326	.00026	.00141
%RSD	114.65	43.141	74.583	155.97	95.236	217.88	716.72
#1	.00018	.00018	-.00024	-.00502	.00251	.00000	-.00143
#2	.00006	.00018	-.00161	-.00012	.00704	.00042	.00101
#3	.00000	.00036	-.00220	-.00024	.00071	-.00006	.00101

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Avge	.00251	.00006	-.00428	-.00056	.00020	.00012
SDev	.00006	.00006	.00030	.00056	.00012	.00016
%RSD	2.2649	99.918	6.9388	101.17	62.401	132.40
#1	.00245	.00006	-.00448	-.00012	.00006	.00030
#2	.00256	.00012	-.00394	-.00036	.00030	.00000
#3	.00250	.00000	-.00441	-.00119	.00024	.00006

Standardization Rpt. 04/07/00 08:16:00 AM page 1

Method: XP2 Standard: stdM1L
Run Time: 04/07/00 08:11:10

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	.24989	.02439	.11723	.74267	.35849	.05403	.15768
SDev	.00100	.00069	.00005	.00057	.00074	.00027	.00043
%RSD	.39985	2.8370	.04310	.07626	.20738	.49542	.27406
#1	.25012	.02512	.11728	.74330	.35885	.05431	.15718
#2	.25076	.02374	.11722	.74248	.35763	.05400	.15795
#3	.24880	.02431	.11719	.74222	.35898	.05377	.15790

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	.23266	.16274	.20714	.15680	.00636	.00742	.00407
SDev	.00108	.00026	.00195	.00126	.00234	.00091	.00021
%RSD	.46583	.16284	.94293	.80236	36.743	12.276	5.1671
#1	.23283	.16298	.20915	.15562	.00401	.00670	.00395
#2	.23151	.16279	.20525	.15812	.00640	.00712	.00395
#3	.23365	.16246	.20701	.15665	.00868	.00844	.00431

Elem	V_2924	Zn2062
Avge	.04013	.01883
SDev	.00027	.00014
%RSD	.68325	.73012
#1	.04037	.01872
#2	.03983	.01878
#3	.04018	.01898

Standardization Rpt. 04/07/00 08:20:55 AM

Method: XP2 Standard: stdM1M
Run Time: 04/07/00 08:16:05

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	1.2550	.13439	.58158	3.6773	1.7822	.26912	.78600
SDev	.0022	.00334	.00053	.0015	.0037	.00086	.00055
%RSD	.17713	2.4821	.09101	.04069	.20678	.31832	.06931
#1	1.2526	.13737	.58207	3.6772	1.7812	.26813	.78566
#2	1.2569	.13501	.58164	3.6788	1.7863	.26961	.78572
#3	1.2555	.13078	.58102	3.6759	1.7792	.26962	.78663

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	1.0305	.80806	1.0421	.76088	.06113	.03957	.01928
SDev	.0006	.00044	.0004	.00452	.00690	.00144	.00048
%RSD	.06220	.05481	.03471	.59427	11.291	3.6465	2.4856
#1	1.0301	.80764	1.0423	.75805	.05337	.03836	.01969
#2	1.0312	.80852	1.0416	.76610	.06343	.03918	.01938
#3	1.0301	.80803	1.0422	.75850	.06659	.04117	.01875

Elem	V_2924	Zn2062
Avge	.19782	.09402
SDev	.00017	.00028
%RSD	.08822	.30055
#1	.19801	.09432
#2	.19766	.09397
#3	.19780	.09376

Standardization Rpt. 04/07/00 08:25:50 AM page 1

Method: XP2 Standard: stdM1H
Run Time: 04/07/00 08:21:00

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	2.4851	.26826	1.1501	7.2639	3.5315	.53379	1.5613
SDev	.0002	.00315	.0007	.0052	.0041	.00054	.0006
%RSD	.00795	1.1762	.06091	.07201	.11613	.10043	.04134
#1	2.4850	.26752	1.1502	7.2596	3.5324	.53354	1.5612
#2	2.4849	.26553	1.1507	7.2697	3.5350	.53342	1.5620
#3	2.4853	.27171	1.1493	7.2624	3.5270	.53440	1.5607

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	2.0074	1.6023	2.0632	1.5067	.13540	.07760	.03783
SDev	.0006	.0009	.0046	.0028	.00176	.00181	.00025
%RSD	.03136	.05670	.22321	.18454	1.3018	2.3364	.66233
#1	2.0077	1.6013	2.0675	1.5058	.13343	.07631	.03780
#2	2.0066	1.6031	2.0636	1.5099	.13596	.07967	.03761
#3	2.0078	1.6024	2.0583	1.5045	.13682	.07681	.03810

Elem	V_2924	Zn2062
Avge	.39263	.18532
SDev	.00081	.00075
%RSD	.20658	.40343
#1	.39256	.18523
#2	.39348	.18610
#3	.39186	.18461

Standardization Rpt. 04/07/00 08:31:32 AM page 1

Method: XP2 Standard: stdM2L
Run Time: 04/07/00 08:25:55

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.03797	.11662	.03430	.05330	.26217	.04526	.03354
SDev	.00066	.00032	.00006	.00111	.00255	.00016	.00291
%RSD	1.7320	.27608	.18403	2.0762	.97296	.36290	8.6782
#1	.03822	.11656	.03423	.05417	.26069	.04518	.03024
#2	.03847	.11696	.03436	.05368	.26071	.04545	.03465
#3	.03723	.11633	.03431	.05206	.26511	.04515	.03574

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.01462	.00935	.00620	.37869
SDev	.00315	.00001	.00021	.00185
%RSD	21.522	.09836	3.4701	.48785
#1	.01393	.00935	.00601	.37725
#2	.01187	.00936	.00614	.38077
#3	.01805	.00935	.00643	.37805

Standardization Rpt. 04/07/00 08:37:14 AM

Method: XP2 Standard: stdM2M
Run Time: 04/07/00 08:31:37

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.29979	.57961	.17252	.26731	1.0659	.22762	.18774
SDev	.00133	.00119	.00022	.00210	.0029	.00014	.00017
%RSD	.44471	.20548	.12528	.78636	.26880	.06294	.08971
#1	.29963	.57833	.17238	.26759	1.0676	.22758	.18792
#2	.30120	.58068	.17277	.26509	1.0675	.22777	.18758
#3	.29855	.57981	.17241	.26926	1.0626	.22750	.18771

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.08644	.03660	.03606	1.9063
SDev	.00309	.00001	.00032	.0009
%RSD	3.5718	.01800	.88030	.04559
#1	.09000	.03660	.03588	1.9067
#2	.08482	.03659	.03587	1.9069
#3	.08449	.03661	.03643	1.9053

Standardization Rpt. 04/07/00 08:42:57 AM page 1

Method: XP2 Standard: stdM2H
Run Time: 04/07/00 08:37:20

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.64078	1.1885	.35086	.54269	2.0933	.46382	.38367
SDev	.00087	.0013	.00027	.00169	.0033	.00086	.00122
%RSD	.13596	.11260	.07726	.31140	.15731	.18486	.31693
#1	.64167	1.1886	.35117	.54282	2.0965	.46471	.38506
#2	.64076	1.1898	.35073	.54430	2.0899	.46299	.38314
#3	.63993	1.1871	.35069	.54093	2.0935	.46376	.38281

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.17644	.07173	.07295	3.8896
SDev	.00113	.00008	.00023	.0056
%RSD	.63890	.11777	.32243	.14291
#1	.17519	.07175	.07279	3.8959
#2	.17673	.07164	.07322	3.8854
#3	.17738	.07181	.07284	3.8874

Method: XP2 Slope = Conc(SIR)/IR

Element	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
Ag3280	328.068	Multiple	Standards	798.447	1.26298	04/07/00 08:21:00
Al3082	308.215	Multiple	Standards	15030.6	434.535	04/07/00 08:37:20
As1890	189.042	Multiple	Standards	7713.98	-1.86242	04/07/00 08:21:00
B_2496	249.678	Multiple	Standards	4302.99	-9.25701	04/07/00 08:37:20
Ba4934	493.409	Multiple	Standards	1719.17	.595794	04/07/00 08:21:00
Be3130	313.042	Multiple	Standards	273.140	-1.64620	04/07/00 08:21:00
Ca3158	315.887	Multiple	Standards	28812.1	5.22111	04/07/00 08:37:20
Cd2265	226.502	Multiple	Standards	561.271	.398194	04/07/00 08:21:00
Co2286	228.616	Multiple	Standards	3732.78	-1.41277	04/07/00 08:21:00
Cr2677	267.716	Multiple	Standards	1274.52	-.234675	04/07/00 08:21:00
Cu3247	324.753	Multiple	Standards	996.931	-28.8692	04/07/00 08:21:00
Fe2714	271.441	Multiple	Standards	18611.2	2.26600	04/07/00 08:37:20
K_7664	766.491	Multiple	Standards	4974.59	-312.313	04/07/00 08:37:20
Mg2790	279.078	Multiple	Standards	21862.3	.956326	04/07/00 08:37:20
Mn2576	257.610	Multiple	Standards	1238.48	-.111731	04/07/00 08:21:00
Mo2020	202.030	Multiple	Standards	13738.4	-2.91350	04/07/00 08:37:20
Na3302	330.232	Multiple	Standards	175385.	238.629	04/07/00 08:37:20
Ni2316	231.604	Multiple	Standards	961.258	1.71532	04/07/00 08:21:00
Pb2203	220.351	Multiple	Standards	1318.16	-4.52792	04/07/00 08:21:00
Pb220A	220.352	STD2	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
Pb2203	220.353		NONE	1.00000	.000000	*NOT STANDARDIZED
S_1960	196.026	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
Sb2068	206.838	Multiple	Standards	18735.9	-1.52293	04/07/00 08:21:00
Se1960	196.261	Multiple	Standards	26267.6	-5.09441	04/07/00 08:21:00
Se196A	196.262	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
Si2881	288.158	Multiple	Standards	72849.6	-182.506	04/07/00 08:37:20
Sn1899	189.989	Multiple	Standards	72695.6	-3.88093	04/07/00 08:37:20
Ti3372	337.280	Multiple	Standards	1299.28	5.57994	04/07/00 08:37:20
Tl1908	190.864	Multiple	Standards	48290.4	26.6570	04/07/00 08:21:00
V_2924	292.402	Multiple	Standards	5055.09	-1.02075	04/07/00 08:21:00
Zn2062	206.200	Multiple	Standards	10713.1	-1.28488	04/07/00 08:21:00

Analysis Report QC Standard 04/07/00 08:48:41 AM page 1

Method: XP2 Sample Name: M199121508 ICP-2 Operator:
Run Time: 04/07/00 08:43:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	492.89	977.70	-4.6411	997.81	994.91	.05993	13.874
SDev	.86	2.83	10.5229	6.51	.26	.00030	1.731
%RSD	.17455	.28943	226.73	.65227	.02620	.49356	12.475
#1	493.63	980.76	-.00899	1005.2	994.64	.06010	15.605
#2	491.94	975.18	-16.685	995.11	994.96	.05959	13.872
#3	493.10	977.15	2.7712	993.09	995.15	.06010	12.144
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value	500.00	1000.0		1000.0	1000.0		
Range	10.000	1000.0		10.000	10.000		

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.64537	.15647	1.3729	1.2688	17.915	9877.7	13.211
SDev	.32735	1.3449	.2761	.1703	8.059	11.5	2.732
%RSD	50.723	859.53	20.111	13.423	44.984	.11679	20.678
#1	.56676	.15676	1.1433	1.3716	20.153	9866.9	14.088
#2	1.0049	1.5012	1.2960	1.3626	24.618	9889.9	15.397
#3	.36448	-1.1885	1.6792	1.0722	8.9735	9876.2	10.149
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value						10000.	
Range						10.000	

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1.0288	34.494	Q1116.5	2.5042	5.1574	.4388	.0005
SDev	.1550	21.919	309.4	1.8342	4.0411	.0008	.0000
%RSD	15.068	63.543	27.715	73.245	78.356	.1881	.0173
#1	1.1529	59.804	Q1471.2	.38730	2.0439	.4384	.0005
#2	.85507	21.836	902.13	3.6202	3.7041	.4398	.0005
#3	1.0785	21.843	976.07	3.5053	9.7241	.4384	.0005
Errors	NOCHECK	NOCHECK	QC Fail	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			1000.0				
Range			10.000				

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	22.107	-6.6738	.0438	4812.8	81.987	3.6032	30.527
SDev	18.523	15.2133	.0006	2.2	10.987	2.1189	28.170
%RSD	83.789	227.96	1.458	.04621	13.401	58.807	92.281
#1	32.240	-12.984	.0431	4814.7	92.185	6.0482	23.756
#2	33.354	10.679	.0441	4813.2	83.425	2.3031	6.3584
#3	.72790	-17.717	.0442	4810.4	70.352	2.4582	61.465
Errors	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK

SAMPLE CHAIN-OF-CUSTODY RECORD

COC#

KIBER ENVIRONMENTAL SERVICES

3145 MEDLOCK BRIDGE ROAD
NORCROSS, GEORGIA 30071
(770) 242-4090 FAX (770) 242-9198

CLIENT NAME: Kiber
PROJECT NAME: PSA
KES PROJECT #: 3216 - 8900
TAT or DUE DATE: STD
CONTACT: TOM Lantz
KES PROJECT MANAGER: George Zacharchuk x250
PHONE#: EXT.:
RECEIVING LAB:
PO#: 8900
SAMPLED BY: George Zacharchuk (PRINTED NAME) [signature] (SIGNATURE) Kiber (COMPANY)

ANALYSES (indicate target list): ANC (ASTM C 1370)

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample Matrix	Preservative	# / Size of Cont.	ANC (ASTM C 1370)							Remarks
PS-MS-1	Treated Soil	4/4/00 1500	S	—	1-8oz	X							
PS-MS-2	↓	↓	↓	↓	↓	X							
PS-MS-3	↓	↓	↓	↓	↓	X							

3 samples
coring w/method
Kyber
@ $50
per George
TL

CASE NARRATIVE REQUESTED: YES NO PM INITIALS: GMZ

KI[BER RELINQUISHED BY]	DATE/TIME	SAMPLES ACCEPTED BY:	DATE/TIME	COMMENTS:
[signature]	4/4/00 1500	Holly Edmonds	4/5/00	Please provide maximum amount of raw data available.

REV 4 10/27/98

Dry Weight Results is Default for Soils/Applicable Wastes

h:\treat\coc1.wk4

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

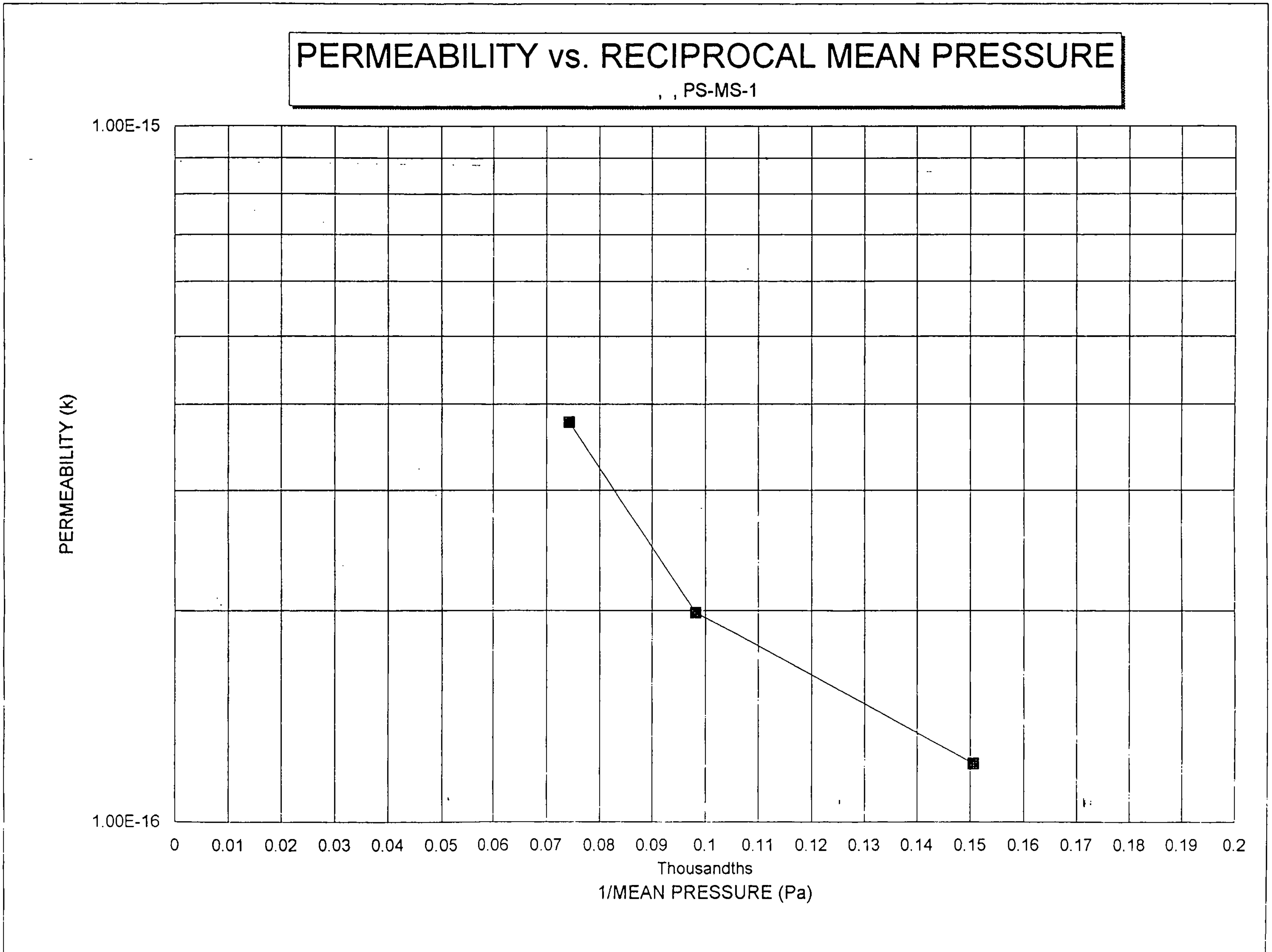
CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.		SAMPLED	1-9-2000 CA
DEPTH		TEST STARTED	4-17-2000 CAL
SAMPLE NO.	PS-MS-1	TEST FINISHED	4-18-2000 CAL
SOIL DESCR.	#3216-8899	CELL NUMBER	22S
TEST TYPE	TX/Pbp	CONF. PRES. (psf)	720
		AIR TEMP. (°C)	24.0

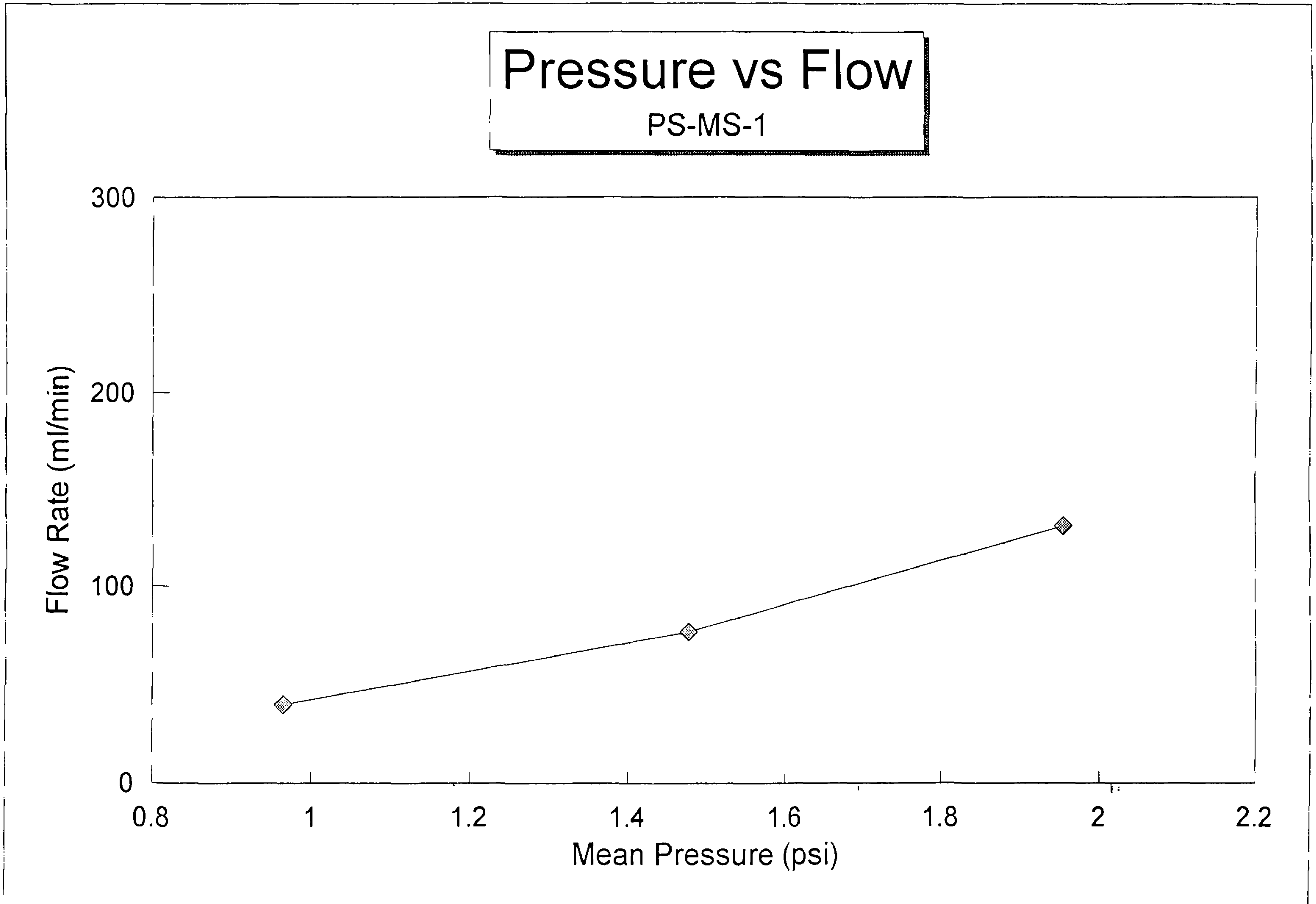
MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST	
Wt. Soil + Moisture (g)	624.8	624.3	
Wt. Wet Soil & Pan (g)	640.6	640.0	
Wt. Dry Soil & Pan (g)	601.2	601.2	
Wt. Lost Moisture (g)	39.4	38.8	
Wt. of Pan Only (g)	15.7	15.7	
Wt. of Dry Soil (g)	585.4	585.4	
Moisture Content %	6.7	6.6	
Wet Density PCF	142.0	142.5	
Dry Density PCF	133.0	133.7	
Init. Diameter (in)	2.776	(cm)	7.051
Init. Area (sq in)	6.052	(sq cm)	39.050
Init. Height (in)	2.770	(cm)	7.036
Height Change (in)	0.013	(cm)	0.033
Final Height (in)	2.757	(cm)	7.003
Sample Volume Before Test (ft^3)	0.00970		
Sample Volume After Test (ft^3)	0.00966		
Specific Gravity (assumed)	2.70		
Porosity %	21.1		

Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Pressure (psi)	Permeability k m^2
131.00	2.18E-06	3.88	0.03	1.954	3.8E-16
76.50	1.28E-06	2.94	0.01	1.477	2.0E-16
39.70	6.62E-07	1.92	0.01	0.964	1.2E-16

Data entry by: CAL/SR Date: 04/20/2000
Checked by: CAC Date: 4/20/00
FileName: KBAPCMS1

ADVANCED TERRA TESTING, INC.


PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-MS-1
PERMEABILITY (k)
1.00E-15
1.00E-16
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.11
0.12
0.13
0.14
0.15
0.16
0.17
0.18
0.19
0.2
Thousandths
1/MEAN PRESSURE (Pa)


Pressure vs Flow
PS-MS-1
300
200
100
0
Flow Rate (ml/min)
0.8
1
1.2
1.4
1.6
1.8
2
2.2
Mean Pressure (psi)

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.		SAMPLED	1-10-00 CJA
DEPTH		TEST STARTED	4-18-00 CAL
SAMPLE NO.	PS-MS-2	TEST FINISHED	4-19-00 CAL
SOIL DESCR.	PSA; Project # 3216-8899	CELL NUMBER	22S
TEST TYPE	TX/Pbp	CONF. PRES. (psf)	720
AIR TEMP. (°C)	23		

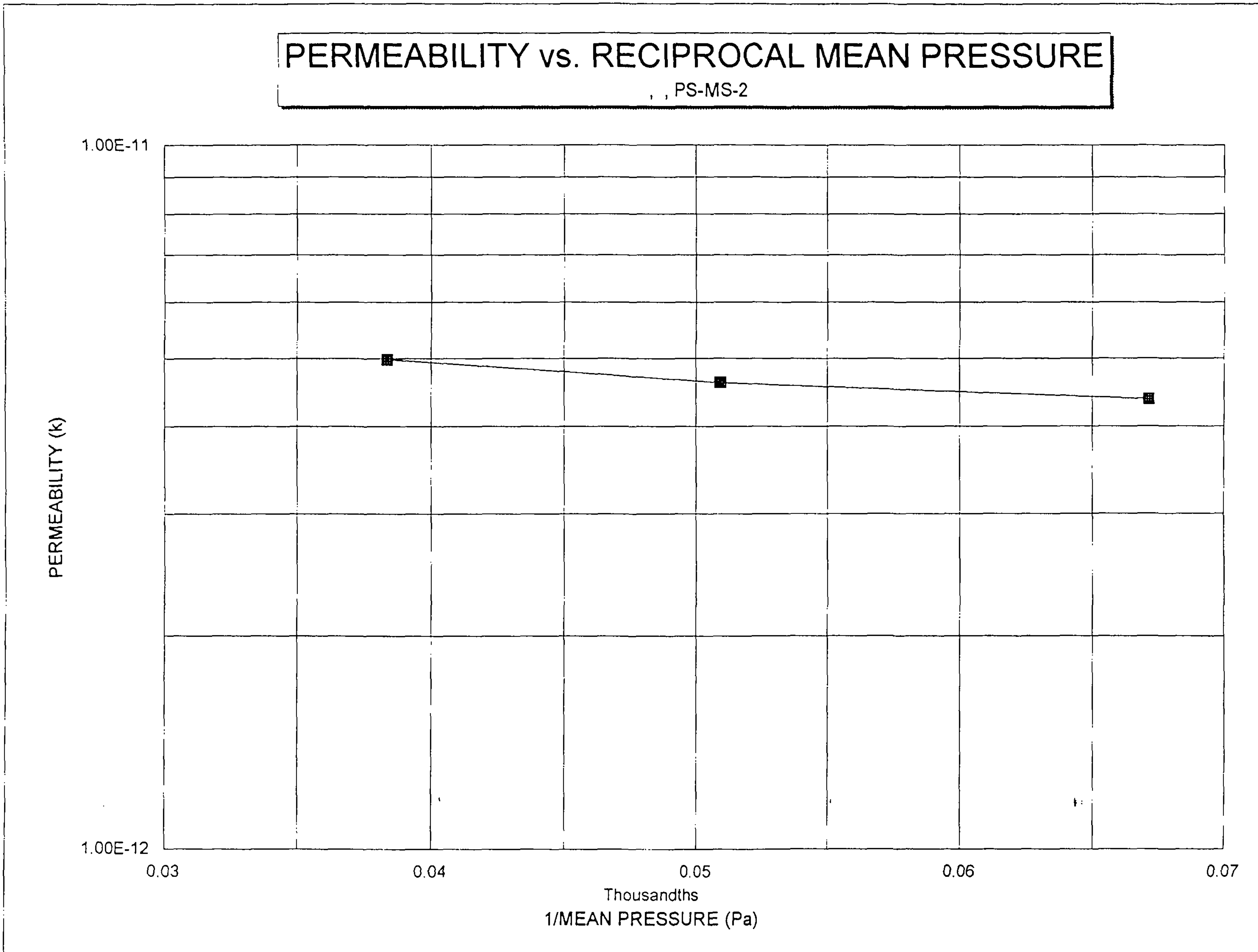
MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST	
Wt. Soil + Moisture (g)	646.2	644.7	
Wt. Wet Soil & Pan (g)	661.6	660.1	
Wt. Dry Soil & Pan (g)	502.3	502.3	
Wt. Lost Moisture (g)	159.3	157.8	
Wt. of Pan Only (g)	15.4	15.4	
Wt. of Dry Soil (g)	486.9	486.9	
Moisture Content %	32.7	32.4	
Wet Density PCF	94.3	94.8	
Dry Density PCF	71.1	71.6	
Init. Diameter (in)	2.828	(cm)	7.183
Init. Area (sq in)	6.281	(sq cm)	40.527
Init. Height (in)	4.155	(cm)	10.554
Height Change (in)	0.031	(cm)	0.079
Final Height (in)	4.124	(cm)	10.475
Sample Volume Before Test (ft^3)	0.01510		
Sample Volume After Test (ft^3)	0.01499		
Specific Gravity (assumed)	2.70		
Porosity %	57.8		

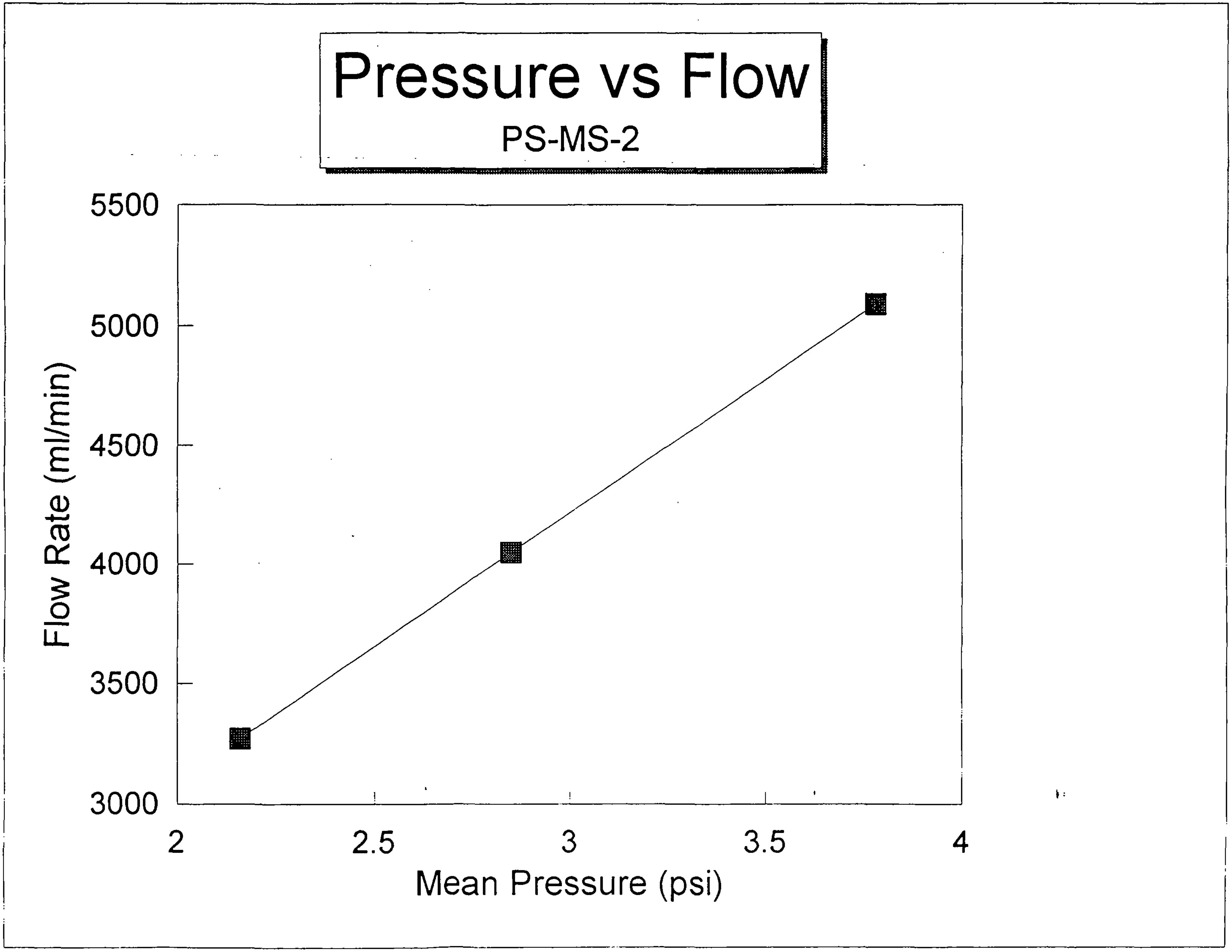
Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Pressure (psi)	Permeability k m^2
5090.0	8.48E-05	4.290	3.270	3.780	5.0E-12
4050.0	6.75E-05	3.280	2.420	2.850	4.6E-12
3270.0	5.45E-05	2.520	1.800	2.160	4.4E-12

Note:
Sample is approximately 5 pcf denser than target because more compaction was necessary to hold the sample together.

Data entry by: CAL/DLS Date: 04/24/2000
Checked by: CAL Date: 04/24/2000
FileName: KBAPMS2

ADVANCED TERRA TESTING, INC.


PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-MS-2
1.00E-11
1.00E-12
PERMEABILITY (k)
0.03
0.04
0.05
0.06
0.07
Thousandths
1/MEAN PRESSURE (Pa)



Pressure vs Flow
PS-MS-2
Flow Rate (ml/min)
5500
5000
4500
4000
3500
3000
2
2.5
3
3.5
4
Mean Pressure (psi)

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.		SAMPLED	1-10-2000 CA
DEPTH		TEST STARTED	4-12-2000 CAL
SAMPLE NO.	PS-MS-3	TEST FINISHED	4-14-2000 CAL
SOIL DESCR.	Proj# 3216-8899	CELL NUMBER	22S
LOCATION	PSA	CONF. PRES. (psf)	720
TEST TYPE	TX/Pbp	AIR TEMP. (°C)	24.0

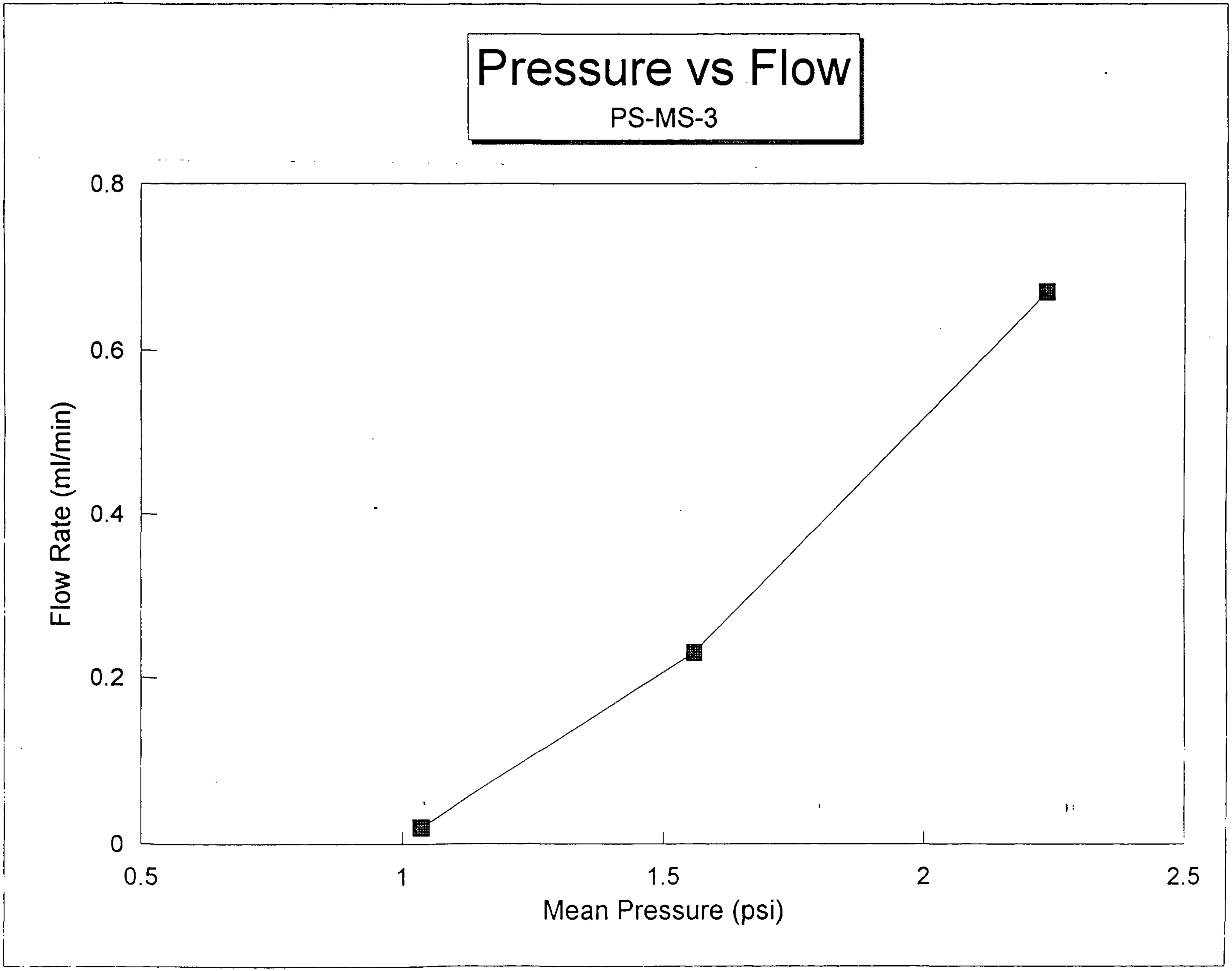
MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	942.3	941.2
Wt. Wet Soil & Pan (g)	957.5	956.3
Wt. Dry Soil & Pan (g)	789.8	789.8
Wt. Lost Moisture (g)	167.7	166.5
Wt. of Pan Only (g)	15.1	15.1
Wt. of Dry Soil (g)	774.7	774.7
Moisture Content %	21.6	21.5
Wet Density PCF	107.3	107.3
Dry Density PCF	88.2	88.3

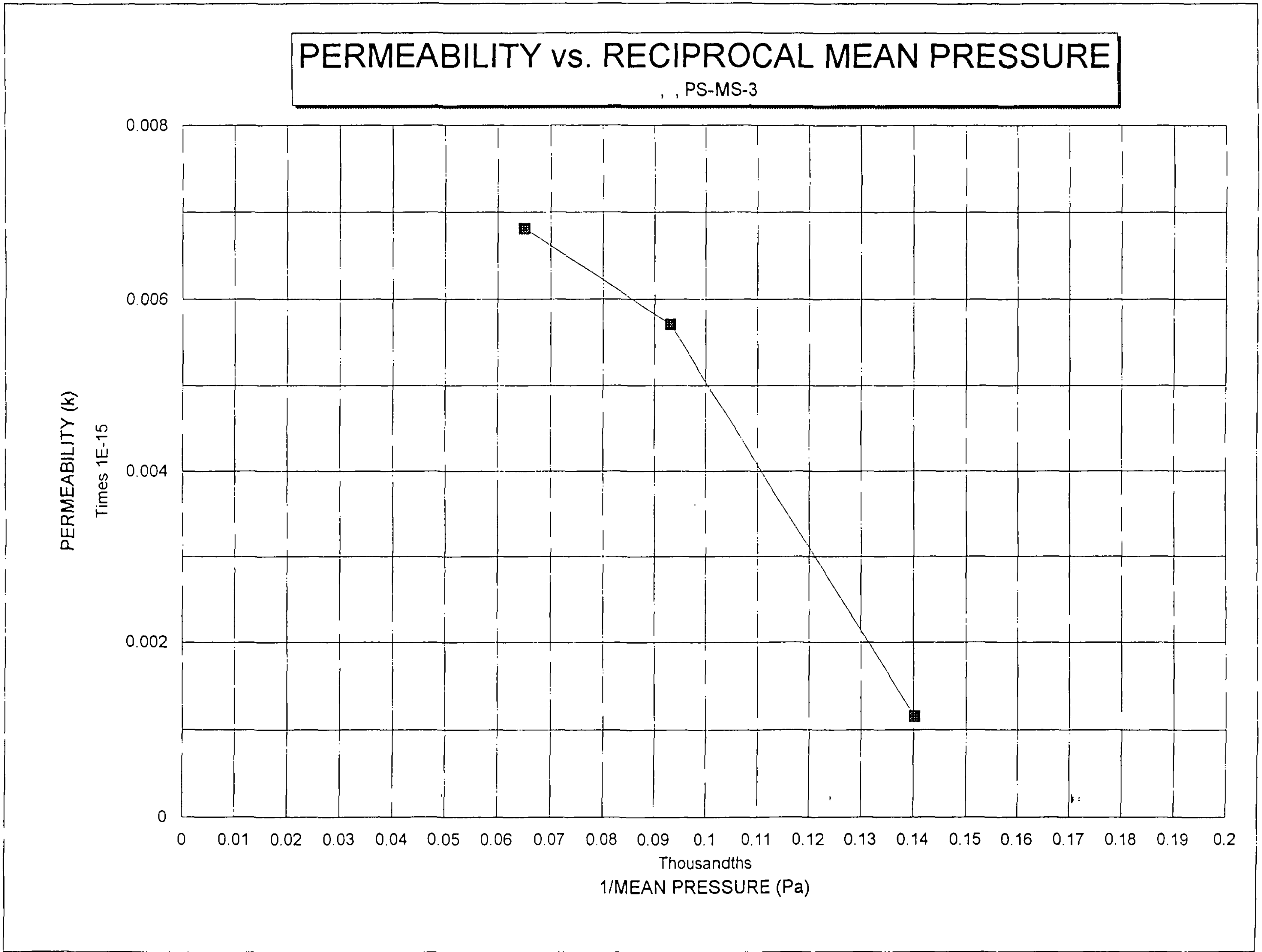
Init. Diameter (in)	2.758	(cm)	7.005
Init. Area (sq in)	5.974	(sq cm)	38.545
Init. Height (in)	5.599	(cm)	14.221
Height Change (in)	0.007	(cm)	0.018
Final Height (in)	5.592	(cm)	14.204
Sample Volume Before Test (ft^3)	0.01936		
Sample Volume After Test (ft^3)	0.01933		
Specific Gravity (assumed)	2.70		
Porosity %	47.7		

Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Pressure (psi)	Permeability k m^2
0.67	1.12E-08	4.41	0.06	2.235	6.8E-18
0.23	3.83E-09	3.05	0.07	1.560	5.7E-18
0.02	3.33E-10	2.00	0.07	1.035	1.2E-18

Data entry by: CAL/DLS/S Date: 04/20/2000
Checked by: CA Date: 4/20/00
FileName: KBAPCMS3

ADVANCED TERRA TESTING, INC.


Pressure vs Flow
PS-MS-3
0.8
0.6
0.4
0.2
0
Flow Rate (ml/min)
0.5
1
1.5
2
2.5
Mean Pressure (psi)


PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-MS-3
0.008
0.006
0.004
0.002
0
PERMEABILITY (k)
Times 1E-15
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
0.08
0.09
0.1
0.11
0.12
0.13
0.14
0.15
0.16
0.17
0.18
0.19
0.2
Thousandths
1/MEAN PRESSURE (Pa)

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.		SAMPLED	
DEPTH		TEST STARTED	4-27-00 CAL
SAMPLE NO.	PS-DM-1	TEST FINISHED	4-27-00 CAL
SOIL DESCR.	Drainage Material	CELL NUMBER	WWC
TEST TYPE	Air Perm	Normal Pressure (psf)	575
AIR TEMP. (°C)	24		

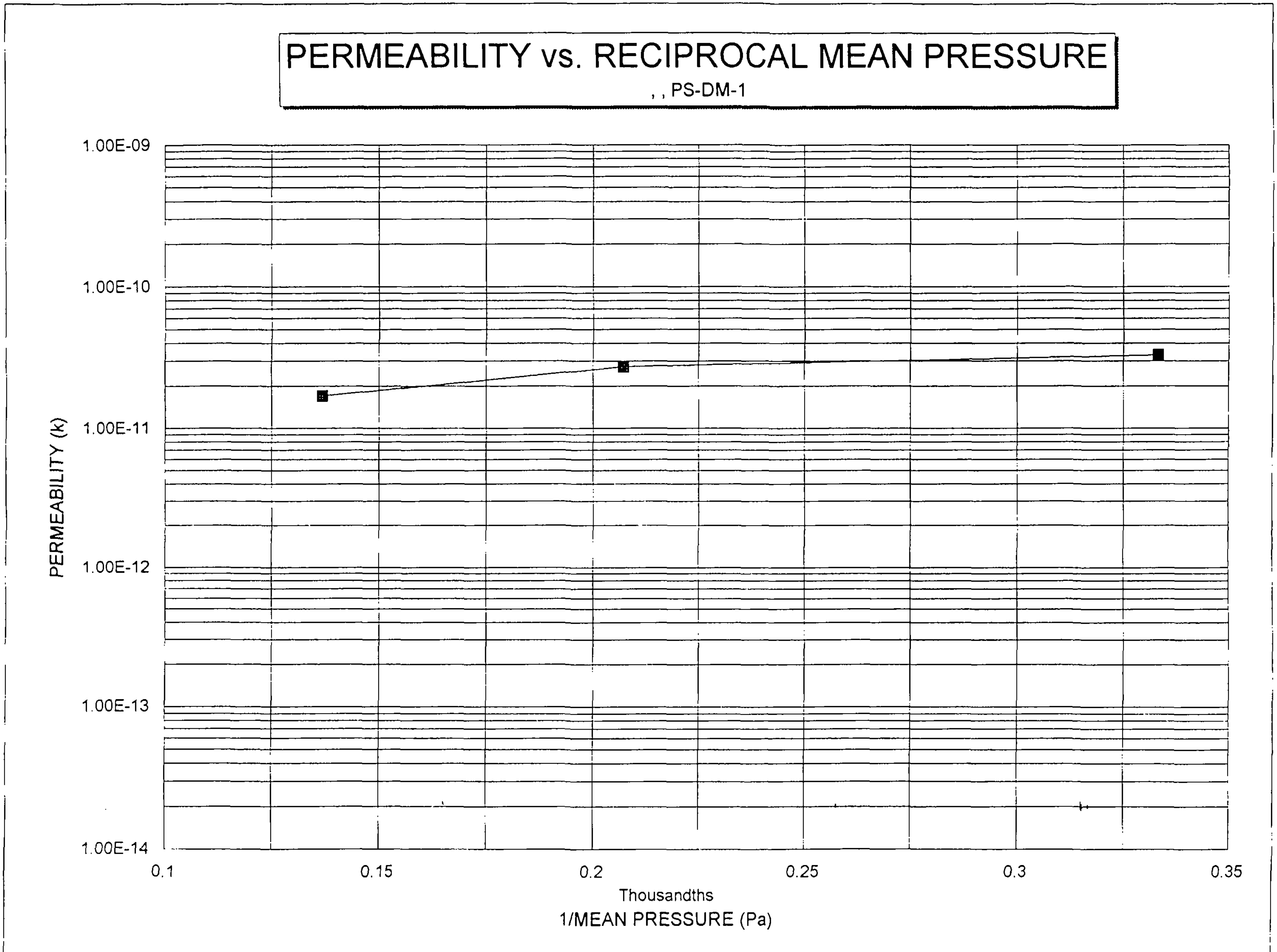
MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (lbs)	59.7	59.7
Wt. Wet Soil & Pan (lbs)	59.7	59.7
Wt. Dry Soil & Pan (lbs)	59.7	59.7
Wt. Lost Moisture (lbs)	0.0	0.0
Wt. of Pan Only (lbs)	0.0	0.0
Wt. of Dry Soil (lbs)	59.7	59.7
Moisture Content %	0.0	0.0
Wet Density PCF	76.0	76.0
Dry Density PCF	76.0	76.0

Init. Diameter (in)	12.000	(cm)	30.480
Init. Area (sq in)	113.097	(sq cm)	729.704
Init. Height (in)	12.000	(cm)	30.480
Height Change (in)	0.000	(cm)	0.000
Final Height (in)	12.000	(cm)	30.480
Sample Volume Before Test (ft^3)	0.78540		
Sample Volume After Test (ft^3)	0.78540		
Specific Gravity (assumed)	2.65		
Porosity %	99.9		

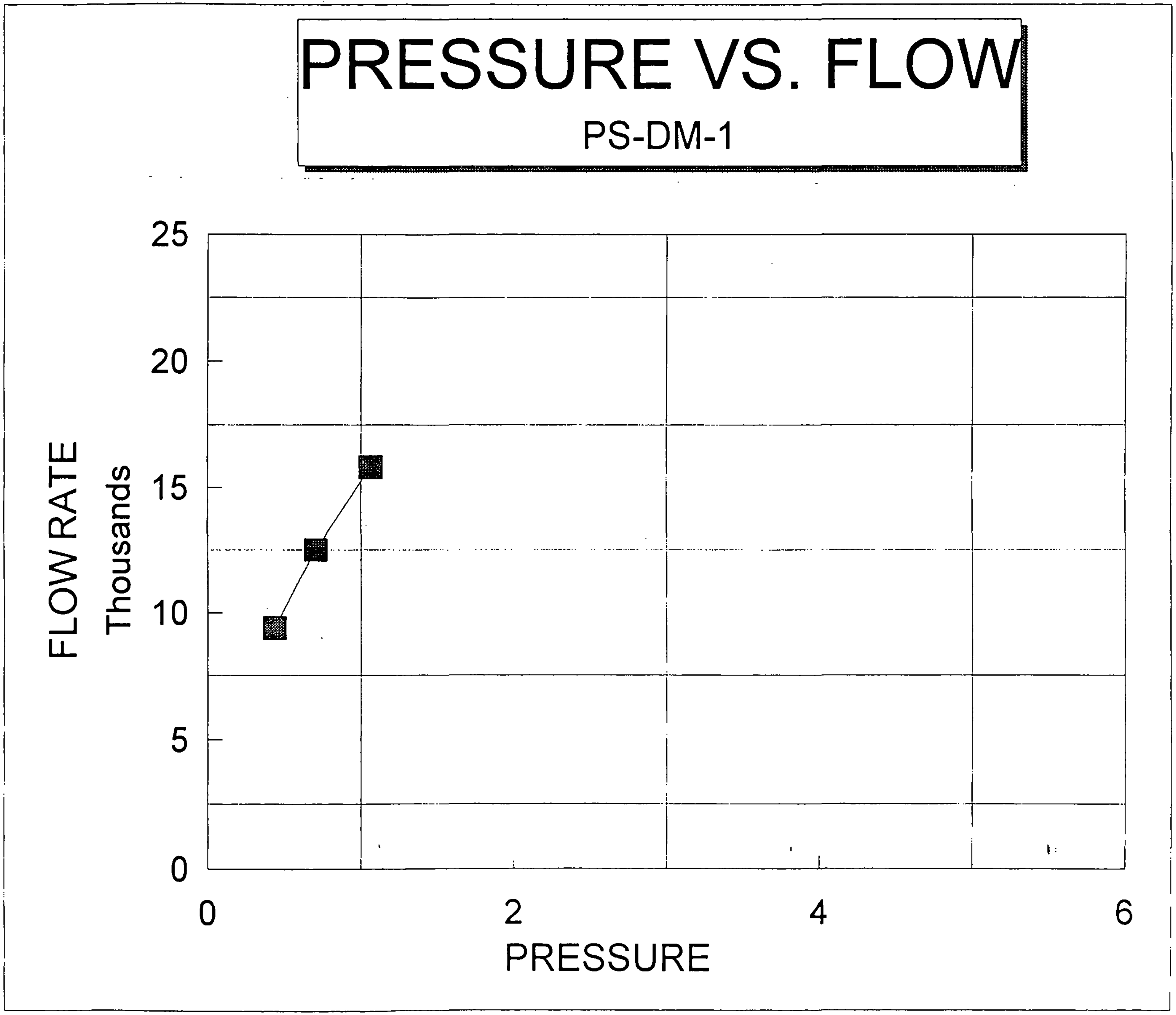
Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Differential (psi)	1/mean pressure (Pa)	Permeability k m^2
15800	2.63E-04	1.140	0.980	1.060	1.37E-04	1.7E-11
12500	2.08E-04	0.740	0.660	0.700	2.07E-04	2.8E-11
9400	1.57E-04	0.460	0.410	0.435	3.33E-04	3.3E-11

Note: The sample flow rate may be greater than shown. The system flow rate capacity was reached during testing.

Data entry by:	CAL	Date:	04/29/2000
Checked by: DPM		Date: 04/29/2000	
FileName:	KBAPDM1		ADVANCED TERRA TESTING, INC.



PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-DM-1
1.00E-09
1.00E-10
1.00E-11
1.00E-12
1.00E-13
1.00E-14
PERMEABILITY (k)
0.1
0.15
0.2
0.25
0.3
0.35
Thousandths
1/MEAN PRESSURE (Pa)


PRESSURE VS. FLOW
PS-DM-1
FLOW RATE
Thousands
25
20
15
10
5
0
0
2
4
6
PRESSURE

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

CLIENT Kiber Environmental Services

JOB NO. 2453-01

BORING NO.		SAMPLED	
DEPTH		TEST STARTED	4-28-00 CAL
SAMPLE NO.	PS-DM-2	TEST FINISHED	4-28-00 CAL
SOIL DESCR.	Drainage Material	CELL NUMBER	WWC
TEST TYPE	Air Perm	Normal Pressure (psf)	575
AIR TEMP. (°C)	24		

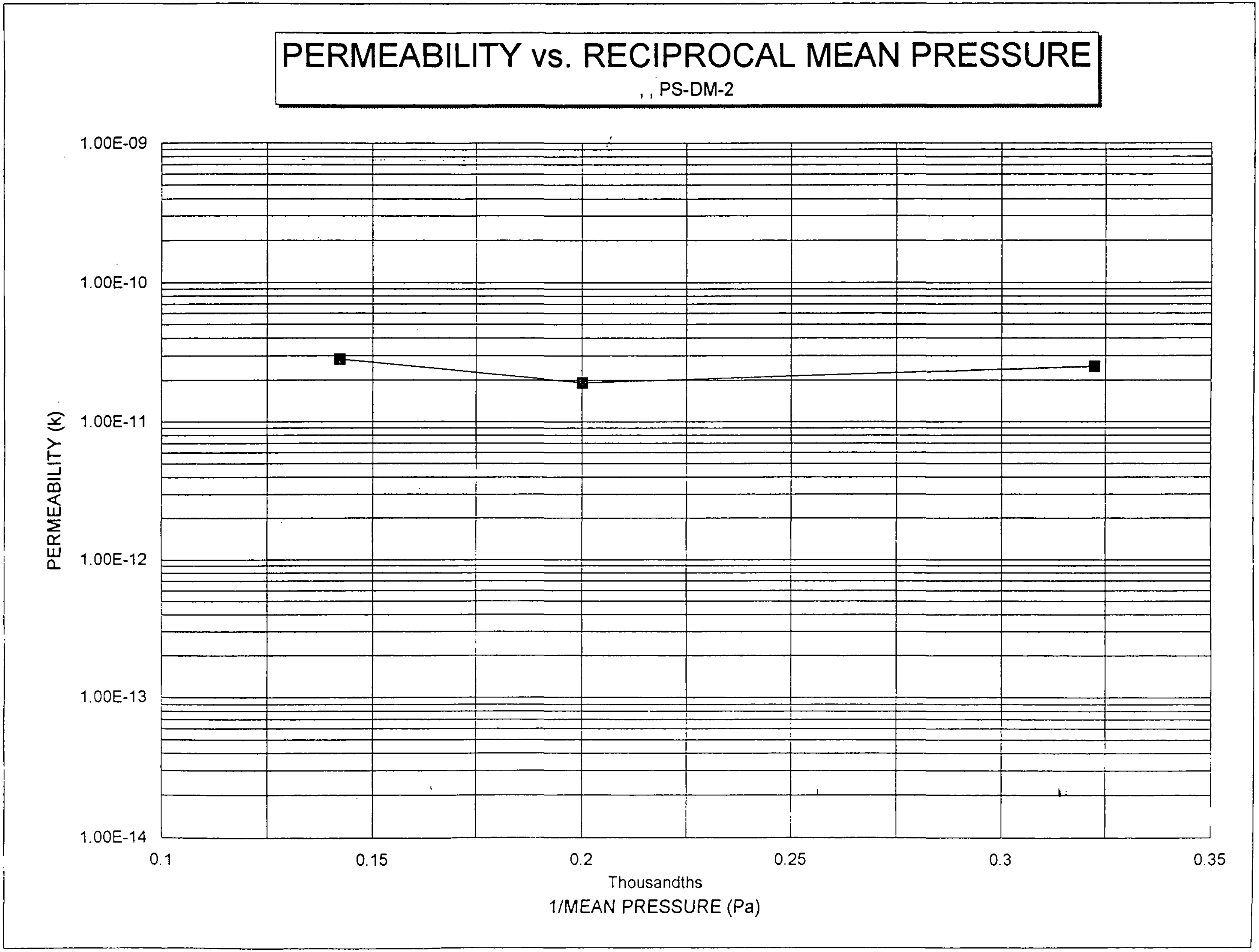
MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST	
Wt. Soil + Moisture (lbs)	59.1	59.1	
Wt. Wet Soil & Pan (lbs)	59.1	59.1	
Wt. Dry Soil & Pan (lbs)	59.1	59.1	
Wt. Lost Moisture (lbs)	0.0	0.0	
Wt. of Pan Only (lbs)	0.0	0.0	
Wt. of Dry Soil (lbs)	59.1	59.1	
Moisture Content %	0.0	0.0	
Wet Density PCF	75.2	75.2	
Dry Density PCF	75.2	75.2	
Init. Diameter (in)	12.000	(cm)	30.480
Init. Area (sq in)	113.097	(sq cm)	729.704
Init. Height (in)	12.000	(cm)	30.480
Height Change (in)	0.000	(cm)	0.000
Final Height (in)	12.000	(cm)	30.480
Sample Volume Before Test (ft^3)	0.78540		
Sample Volume After Test (ft^3)	0.78540		
Specific Gravity (assumed)	2.65		
Porosity %	99.9		

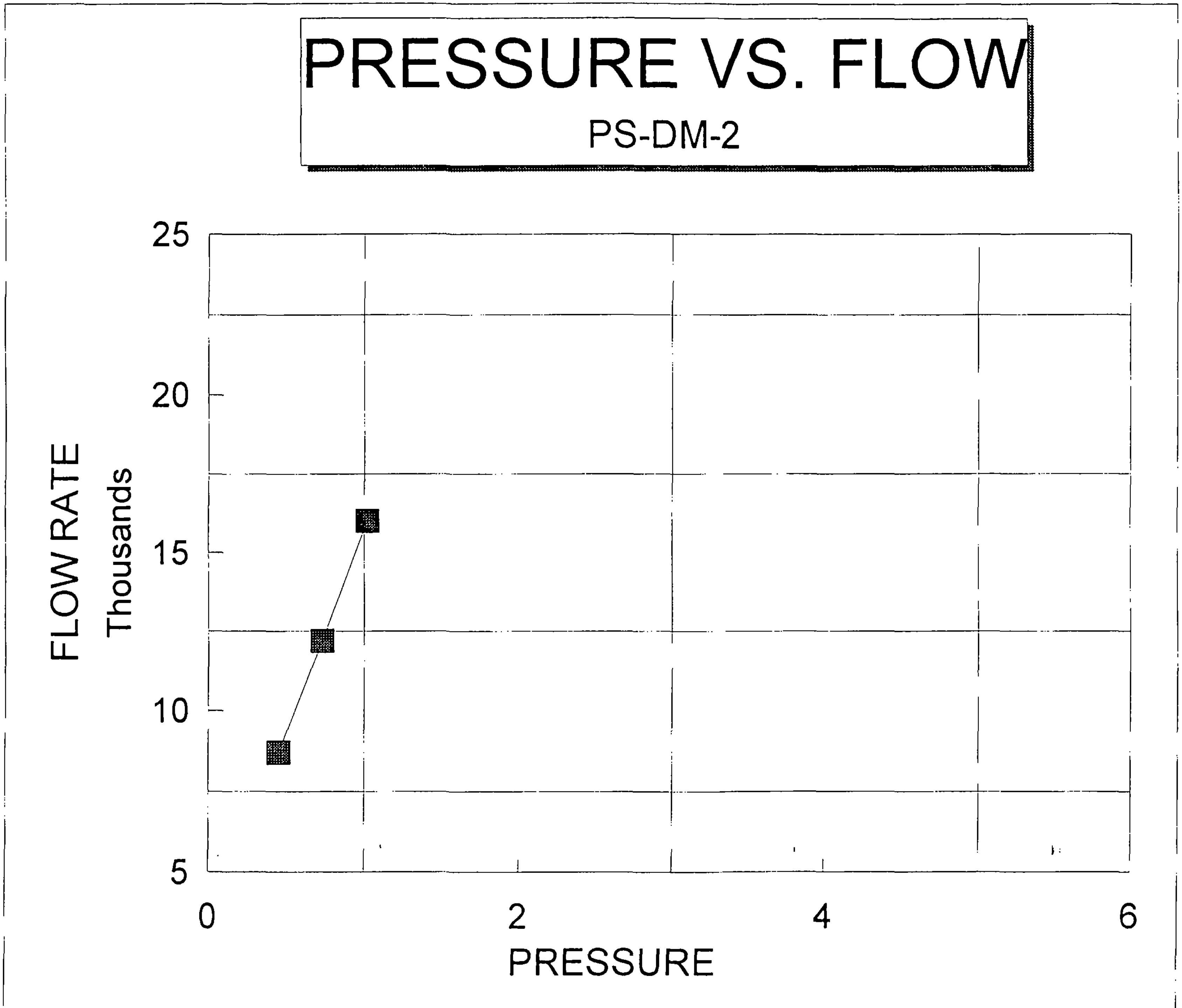
Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Differential (psi)	1/mean pressure (Pa)	Permeability k m^2
16000	2.67E-04	1.070	0.970	1.020	1.42E-04	2.8E-11
12200	2.03E-04	0.780	0.670	0.725	2.00E-04	1.9E-11
8700	1.45E-04	0.480	0.420	0.450	3.22E-04	2.5E-11

Note: The sample flow rate may be greater than shown. The system flow rate capacity was reached during testing.

Data entry by: CAL Date: 04/30/2000
Checked by: DPM Date: 04/30/2000
FileName: KBAPDM2

ADVANCED TERRA TESTING, INC.


PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-DM-2
PERMEABILITY (k)
1.00E-09
1.00E-10
1.00E-11
1.00E-12
1.00E-13
1.00E-14
0.1
0.15
0.2
0.25
0.3
0.35
Thousandths
1/MEAN PRESSURE (Pa)


PRESSURE VS. FLOW
PS-DM-2
25
20
15
10
5
FLOW RATE
Thousands
0
2
4
6
PRESSURE

PERMEABILITY TEST - BY FLOWING AIR
ASTM D 4525 Modified

CLIENT Kiber Environmental Services

JOB NO. 2453-01

BORING NO.		SAMPLED	
DEPTH		TEST STARTED	4-28-00 CAL
SAMPLE NO.	PS-DM-3	TEST FINISHED	4-28-00 CAL
SOIL DESCR.	Drainage Material	CELL NUMBER	WWC
TEST TYPE	Air Perm	Normal Pressure (psf)	575
AIR TEMP. (°C)	24		

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (lbs)	63.6	63.6
Wt. Wet Soil & Pan (lbs)	63.6	63.6
Wt. Dry Soil & Pan (lbs)	63.6	63.6
Wt. Lost Moisture (lbs)	0.0	0.0
Wt. of Pan Only (lbs)	0.0	0.0
Wt. of Dry Soil (lbs)	63.6	63.6
Moisture Content %	0.0	0.0
Wet Density PCF	81.0	81.0
Dry Density PCF	81.0	81.0

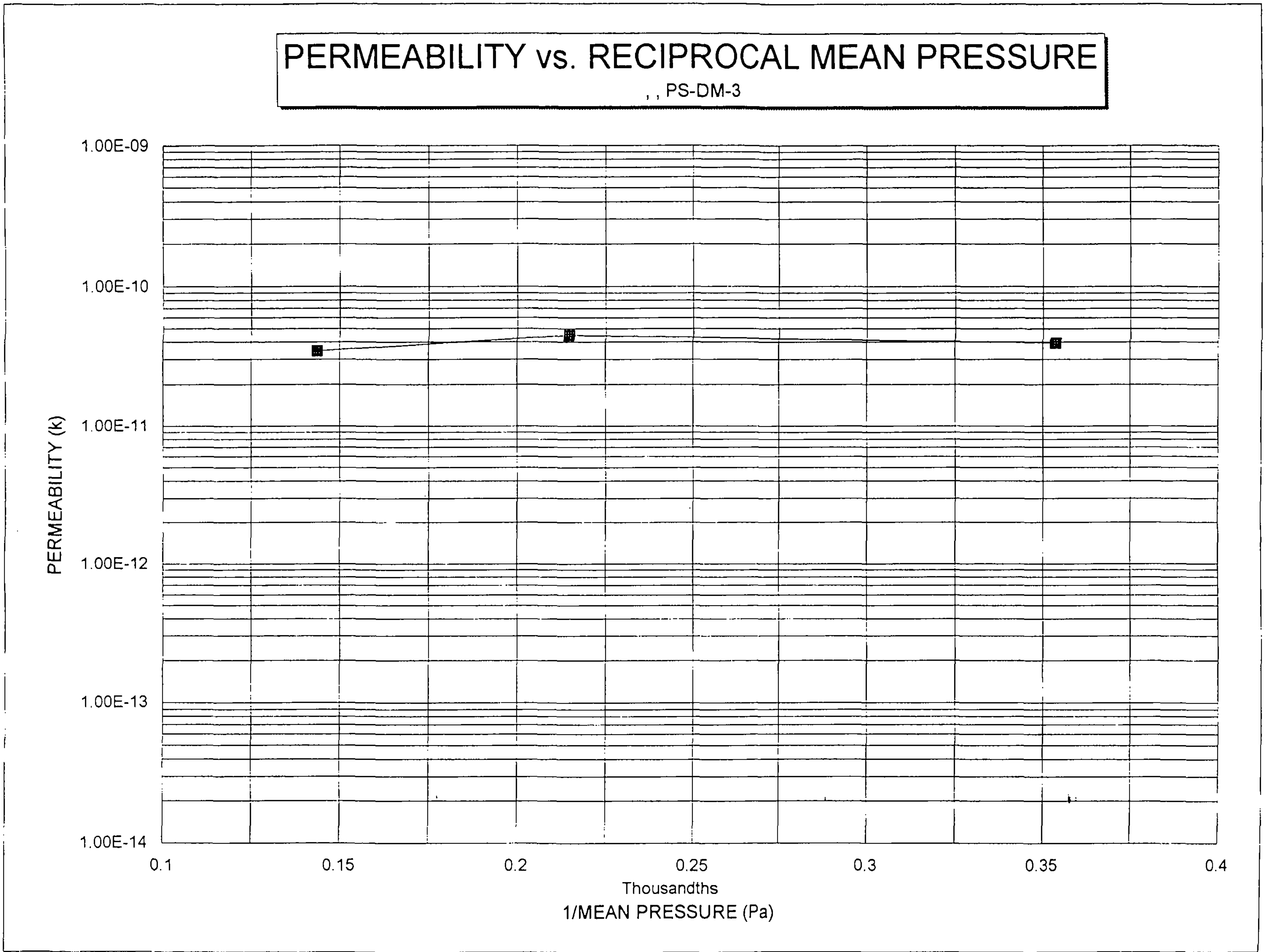
Init. Diameter (in)	12.000	(cm)	30.480
Init. Area (sq in)	113.097	(sq cm)	729.704
Init. Height (in)	12.000	(cm)	30.480
Height Change (in)	0.000	(cm)	0.000
Final Height (in)	12.000	(cm)	30.480
Sample Volume Before Test (ft^3)	0.78540		
Sample Volume After Test (ft^3)	0.78540		
Specific Gravity (assumed)	2.65		
Porosity %	99.9		

Flow ml/min	Flow m^3/sec	Entrance Pressure (psi)	Exit Pressure (psi)	Mean Differential (psi)	1/mean pressure (Pa)	Permeability k m^2
15400	2.57E-04	1.050	0.970	1.010	1.44E-04	3.5E-11
12400	2.07E-04	0.700	0.650	0.675	2.15E-04	4.5E-11
8900	1.48E-04	0.430	0.390	0.410	3.54E-04	4.0E-11

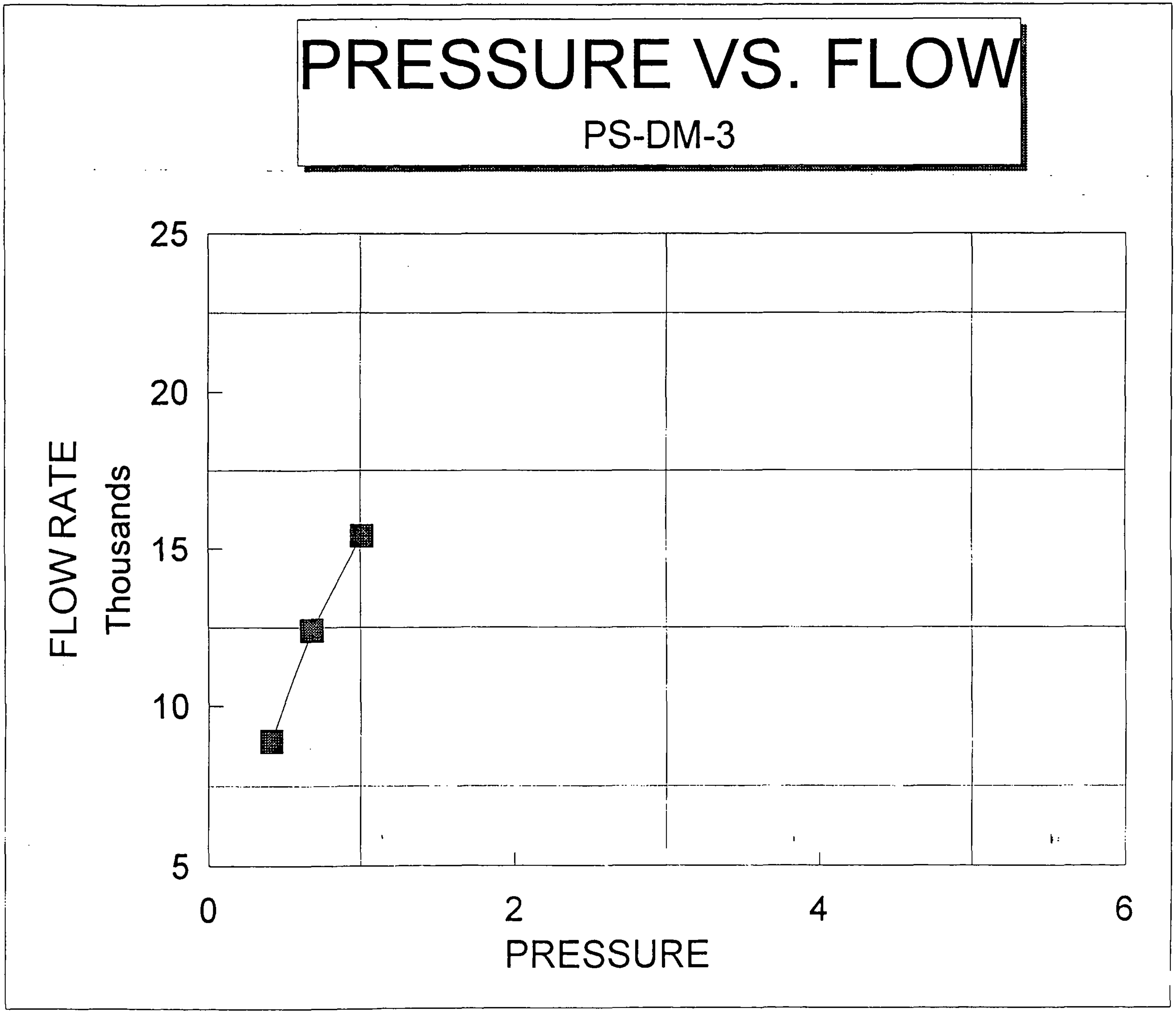
Note: The sample flow rate may be greater than shown. The system flow rate capacity was reached during testing.

Data entry by: CAL Date: 04/30/2000
Checked by: DPM Date: 04/30/2000
FileName: KBAPDM3

ADVANCED TERRA TESTING, INC.



PERMEABILITY vs. RECIPROCAL MEAN PRESSURE
, , PS-DM-3
1.00E-09
1.00E-10
1.00E-11
1.00E-12
1.00E-13
1.00E-14
PERMEABILITY (k)
0.1
0.15
0.2
0.25
0.3
0.35
0.4
Thousandths
1/MEAN PRESSURE (Pa)



PRESSURE VS. FLOW
PS-DM-3
FLOW RATE
Thousands
25
20
15
10
5
0
2
4
6
PRESSURE

Value			5000.0
Range			10.000

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	-1.0206	.85989
SDev	1.5775	.74284
%RSD	154.57	86.387
#1	-.10981	.00214
#2	-2.8421	1.2884
#3	-.10981	1.2892
Errors	NOCHECK	NOCHECK
Value		
Range		

Analysis Report QC Standard 04/07/00 08:54:24 AM page 1

Method: XP2 Sample Name: M199121507 QC-19 Operator:
Run Time: 04/07/00 08:48:46
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2.2797	91.419	2159.0	124.25	.56162	2071.1	2016.2
SDev	.6341	3.264	26.0	2.39	.11854	.7	3.3
%RSD	27.813	3.5700	1.2035	1.9266	21.107	.03181	.16476
#1	1.7400	91.500	2180.3	125.97	.69851	2071.8	2015.8
#2	2.9780	94.641	2130.1	125.28	.49322	2070.7	2013.1
#3	2.1211	88.115	2166.6	121.52	.49314	2070.7	2019.7
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value			2000.0			2000.0	2000.0
Range			10.000			10.000	10.000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2038.3	2068.8	2055.4	1963.4	Q1759.5	11.129	2022.5
SDev	2.9	3.7	1.2	1.3	20.6	16.571	8.7
%RSD	.14398	.17764	.06068	.06721	1.1733	148.90	.42785
#1	2040.5	2067.9	2056.8	1964.6	Q1782.4	.34519	2015.0
#2	2039.6	2072.8	2054.6	1962.0	Q1753.4	30.210	2032.0
#3	2035.0	2065.6	2054.8	1963.6	Q1742.5	2.8317	2020.4
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	NOCHECK	QC Pass
Value	2000.0	2000.0	2000.0	2000.0	2000.0		2000.0
Range	10.000	10.000	10.000	10.000	10.000		10.000

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	2071.0	2128.1	699.35	2030.2	2011.8	Q.4850	.0005
SDev	1.6	7.4	267.08	4.0	18.5	.0036	.0000
%RSD	.07873	.34545	38.190	.19733	.92068	.7396	.0658
#1	2072.8	2119.7	804.46	2032.4	2032.6	Q.4809	.0005
#2	2070.6	2132.4	897.89	2032.5	1997.0	Q.4865	.0005
#3	2069.7	2132.3	395.71	2025.5	2005.8	Q.4876	.0005
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	QC Fail	NOCHECK
Value	2000.0	2000.0		2000.0	2000.0	2000.	
Range	10.000	10.000		10.000	10.000	10.00	

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	Q2524.0	2118.4	Q.0478	1187.6	2122.9	2025.5	1990.2
SDev	72.9	13.9	.0006	6.7	24.0	.7	38.1
%RSD	2.8884	.65645	1.315	.56759	1.1307	.03423	1.9135
#1	Q2439.8	2122.9	Q.0476	1184.1	2150.3	2026.0	2023.1
#2	Q2566.3	2129.5	Q.0474	1195.4	2112.8	2024.7	1948.5
#3	Q2565.9	2102.8	Q.0485	1183.3	2105.6	2025.9	1998.9
Errors	QC Fail	QC Pass	QC Fail	NOCHECK	NOCHECK	QC Pass	QC Pass

Analysis Report 04/07/00 09:12:25 AM page 1

Method: XP2 Sample Name: IEC 1 Operator:
Run Time: 04/07/00 09:06:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.66744	12524.	-12.288	12.446	.35313	.05106	60955.
SDev	1.4503	31.	10.649	.746	.33424	.03344	163.
%RSD	217.29	.24449	86.665	5.9965	94.651	65.500	.26753
#1	-.81367	12555.	-18.193	12.866	-.02811	.08849	61117.
#2	2.0848	12524.	.00571	11.584	.59579	.04056	60958.
#3	.73120	12494.	-18.677	12.888	.49170	.02412	60790.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	6.1279	.46985	1.8994	-11.452	46374.	.41904	30676.
SDev	.2796	.65180	.5123	1.495	119.	2.1846	75.
%RSD	4.5630	138.73	26.974	13.055	.25743	521.33	.24527
#1	6.4410	.84501	2.4635	-9.7543	46511.	-2.0967	30757.
#2	5.9032	-.28279	1.4629	-12.573	46319.	1.5168	30661.
#3	6.0394	.84733	1.7717	-12.028	46291.	1.8370	30609.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	2.5868	10.943	10967.	.47398	9.2743	.4497	.0005
SDev	.1974	5.832	113.	.42146	1.4773	.0038	.0000
%RSD	7.6303	53.292	1.0291	88.919	15.929	.8516	.0577
#1	2.7348	17.030	10985.	.95948	9.3449	.4509	.0005
#2	2.3627	10.395	10846.	.20217	10.715	.4455	.0005
#3	2.6628	5.4047	11070.	.26028	7.7630	.4529	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	36.277	10.797	.0500	21.788	23.977	2.7747	31.522
SDev	12.021	19.260	.0005	5.029	26.506	1.3085	17.611
%RSD	33.137	178.39	.9198	23.082	110.55	47.158	55.871
#1	38.141	33.037	.0506	24.590	48.883	4.1654	50.024
#2	23.433	-.32339	.0498	24.791	26.928	2.5907	29.581
#3	47.257	-.32310	.0498	15.982	-3.8809	1.5679	14.962

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	.40726	2.1732
SDev	1.1590	.7478
%RSD	284.58	34.409
#1	-.10347	2.6030
#2	-.40864	2.6068
#3	1.7339	1.3097

Analysis Report 04/07/00 09:18:39 AM

Method: XP2 Sample Name: CCV 1 Operator:
Run Time: 04/07/00 09:12:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1022.8	4988.8	1054.7	2511.7	1021.4	1037.1	5029.7
SDev	2.1	16.0	13.9	2.3	.5	.3	4.3
%RSD	.20783	.32115	1.3174	.09031	.05379	.03214	.08589
#1	1021.8	5007.0	1043.6	2510.2	1022.0	1037.5	5031.0
#2	1025.3	4977.0	1070.3	2510.5	1020.9	1036.9	5024.8
#3	1021.4	4982.4	1050.1	2514.3	1021.3	1037.1	5033.2

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1027.9	1033.8	1027.5	989.02	4895.2	5014.6	5010.5
SDev	2.0	2.1	1.3	.28	7.6	11.8	9.3
%RSD	.19224	.20333	.12981	.02868	.15626	.23432	.18542
#1	1029.5	1035.5	1026.3	988.72	4899.5	5001.0	5019.8
#2	1025.7	1031.4	1027.5	989.08	4899.8	5021.3	5010.3
#3	1028.6	1034.3	1028.9	989.28	4886.4	5021.5	5001.2

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Pb220A	S_1960
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppm
Avge	1026.9	2575.1	15352.	1022.8	1023.7	.4719	.0005
SDev	.5	10.6	573.	3.4	5.5	.0004	.0000
%RSD	.04497	.41201	3.7306	.33434	.53618	.0959	.1338
#1	1026.8	2574.1	14828.	1022.0	1026.0	.4719	.0005
#2	1027.4	2565.0	15964.	1019.8	1017.4	.4714	.0005
#3	1026.5	2586.2	15265.	1026.5	1027.7	.4723	.0005

Elem	Sb2068	Se1960	Se196A	Si2881	Sn1899	Ti3372	Tl1908
Units	ppb	ppb	ppm	ppb	ppb	ppb	ppb
Avge	1221.7	1047.0	.0475	2515.9	2633.0	2500.1	942.50
SDev	69.4	24.3	.0004	3.5	20.9	.9	30.39
%RSD	5.6768	2.3201	.7787	.13797	.79270	.03775	3.2243
#1	1147.3	1062.8	.0471	2518.7	2612.4	2499.1	954.14
#2	1233.4	1059.2	.0476	2516.9	2632.4	2500.1	965.36
#3	1284.5	1019.0	.0478	2512.0	2654.1	2501.0	908.02

Elem	V_2924	Zn2062
Units	ppb	ppb
Avge	1011.5	1029.8
SDev	1.2	1.7
%RSD	.11903	.16258
#1	1012.4	1028.2
#2	1010.2	1031.5
#3	1012.0	1029.6

~~Water~~ Ep extract Project: 33099 Analyst: mp Date: 4-25-00

		MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		ug/L	247041	042	043	041	042	043	041	042	043
	[redacted]	[redacted]	1st day	1st	1st	2nd	2nd	2nd	3rd	3rd	3rd
	200.7	15									
.s)	200.7	15	ND	ND	44	ND	16	48	ND	37	86
Ba	200.7	3									
Be	200.7	1									
Cd	200.7	2									
Ca	200.7	50									
Cr	200.7	4									
Co	200.7	3									
Cu	200.7	4									
Fe	200.7	50									
Pb	200.7	10	33	13	ND	64	ND	ND	152	ND	11
Mg	200.7	20									
Mn	200.7	2									
Mo	200.7	10									
Ni	200.7	6									
K	200.7	100									
Se	200.7	10									
Ag	200.7	3									
Na	200.7	1000									
Si	200.7	400									
Tl	200.7	25									
Sn	200.7	20									
Ti	200.7	3									
V	200.7	4									
Zn	200.7	10									
Other											
Other											

MEP extract

Matrix: ~~Water~~ Project: 33099 Analyst: MP Date: 4-25-00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		ug/L	247041	042	043	041	042	043	041	042	043
Al	200.7	100	4 th	4 th	4 th	5 th	5 th	5 th	6 th	6 th	6 th
Sb	200.7	15									
As	200.7	15	ND	ND	41	ND	ND	ND	ND	ND	ND
Ba	200.7	3									
Be	200.7	1									
Cd	200.7	2									
Ca	200.7	50									
Cr	200.7	4									
Co	200.7	3									
Cu	200.7	4									
Fe	200.7	50									
Pb	200.7	10	129	ND	11	ND	ND	ND	ND	ND	ND
Mg	200.7	20									
Mn	200.7	2									
Mo	200.7	10									
Ni	200.7	6									
K	200.7	100									
Se	200.7	10									
Ag	200.7	3									
Na	200.7	1000									
Si	200.7	400									
Tl	200.7	25									
Sn	200.7	20									
Ti	200.7	3									
V	200.7	4									
Zn	200.7	10									
Other											
Other											

Matrix: ~~Water~~ MEP extract Project: 33099 Analyst: mp Date: 4-25-00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		ug/L	247041	042	043	041	042	043	041	042	043
Al	200.7	100	7th	7th	7th	8th	8th	8th	9th	9th	9th
Sb	200.7	15									
As	200.7	15	ND	ND	27	ND	ND	ND	ND	ND	18
Ba	200.7	3									
Be	200.7	1									
Cd	200.7	2									
Ca	200.7	50									
Cr	200.7	4									
Co	200.7	3									
Cu	200.7	4									
Fe	200.7	50									
Pb	200.7	10	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mg	200.7	20									
Mn	200.7	2									
Mo	200.7	10									
Ni	200.7	6									
K	200.7	100									
Se	200.7	10									
Ag	200.7	3									
Na	200.7	1000									
Si	200.7	400									
Tl	200.7	25									
Sn	200.7	20									
Ti	200.7	3									
V	200.7	4									
Zn	200.7	10									
Other											
Other											

nalysis Report 04/25/00 11:25:06 AM page 1

lethod: XP2 Sample Name: 247041(1) MEP Operator: mp
un Time: 04/25/00 11:18:58
omment:
lode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.2415	96.757	-26.068	184.45	75.413	-.36695	532730.
SDev	.9625	11.510	13.793	2.29	1.582	.03054	3914.
%RSD	77.530	11.896	52.910	1.2427	2.0981	8.3218	.73465
#1	.91142	88.860	-10.153	186.42	76.534	-.37692	529130.
#2	.48742	91.447	-34.539	184.99	76.101	-.39126	532160.
#3	2.3256	109.96	-33.513	181.93	73.603	-.33267	536890.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.71644	217.50	2.4367	-1.7540	174.92	11212.	6096.3
SDev	.21313	9.23	.8748	1.2035	117.00	57.	64.6
%RSD	29.748	4.2453	35.902	68.615	66.888	.50779	1.0593
#1	.50654	207.16	2.0258	-2.2959	309.81	11167.	6037.6
#2	.71013	220.42	1.8429	-2.5913	114.05	11192.	6085.9
#3	.93266	224.91	3.4413	-.37481	100.91	11276.	6165.5

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	25.894	3.4385	1753.4	12.181	33.437	.0003	5.7310
SDev	.410	2.5143	198.3	1.450	11.974	.0000	3.0845
%RSD	1.5822	73.124	11.310	11.903	35.811	1.358	53.821
#1	25.423	.68812	1661.9	10.893	44.417	.0003	9.2725
#2	26.168	4.0083	1617.5	11.900	20.669	.0003	3.6321
#3	26.090	5.6190	1981.0	13.751	35.226	.0003	4.2884

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	34.246	735.52	50.657	3.1611	-12.408	5.0345	62.817
SDev	20.466	13.45	8.869	2.2788	20.467	.2245	5.287
%RSD	59.761	1.8285	17.508	72.088	164.95	4.4602	8.4159
#1	46.401	725.74	54.575	5.7579	-31.517	5.2835	63.817
#2	10.618	750.86	56.892	2.2304	9.1902	4.8474	57.101
#3	45.720	729.96	40.504	1.4950	-14.897	4.9725	67.532

Analysis Report 04/25/00 11:31:19 AM page 1

Method: XP2 Sample Name: 247042(1) MEP Operator: mp
Run Time: 04/25/00 11:25:11
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.03960	998.18	14.682	253.33	68.613	-.54822	58311.
SDev	.97250	51.74	12.764	1.55	7.713	.01471	2707.
%RSD	2455.8	5.1830	86.939	.61337	11.242	2.6824	4.6419
#1	-.70735	945.51	22.496	255.02	59.810	-.56168	55189.
#2	1.0762	1000.1	21.597	251.97	71.842	-.53252	59740.
#3	-.48761	1048.9	-.04785	252.99	74.187	-.55047	60004.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.08589	4.6742	-.21605	74.046	31.751	20568.	123.56
SDev	.58787	.8611	.39767	.857	13.830	24.	3.68
%RSD	684.48	18.422	184.06	1.1568	43.558	.11430	2.9801
#1	.74971	5.6086	-.64075	73.868	17.093	20552.	121.82
#2	-.36890	3.9126	.14753	74.978	33.591	20556.	121.06
#3	-.12315	4.5014	-.15494	73.293	44.569	20595.	127.79

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.41810	18.587	3645.6	27.713	13.333	.0003	112.71
SDev	.10154	1.330	273.2	1.157	2.328	.0000	10.68
%RSD	24.286	7.1565	7.4949	4.1756	17.457	.3610	9.4746
#1	.53534	17.332	3341.7	26.924	10.971	.0003	105.06
#2	.35784	19.982	3724.0	29.042	13.403	.0003	108.16
#3	.36113	18.446	3871.0	27.175	15.625	.0003	124.91

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	25.353	4260.4	17.261	9.5898	13.605	146.19	8.6801
SDev	16.087	612.1	9.664	5.4617	15.415	3.31	1.4524
%RSD	63.455	14.366	55.987	56.953	113.30	2.2623	16.732
#1	43.500	4862.0	15.186	15.739	-1.8233	150.00	9.3237
#2	12.842	4280.8	27.794	7.7277	29.006	144.61	9.6995
#3	19.716	3638.4	8.8034	5.3026	13.632	143.98	7.0171

Analysis Report 04/25/00 11:37:32 AM

Method: XP2 Sample Name: CCV1 Operator: mp
Run Time: 04/25/00 11:31:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	994.29	5060.6	985.71	2496.7	996.66	1032.0	5217.2
SDev	1.80	12.7	23.98	4.5	1.58	1.0	76.6
%RSD	.18102	.25002	2.4331	.18053	.15855	.09882	1.4685
#1	994.77	5075.2	994.26	2501.9	998.49	1033.1	5302.6
#2	992.30	5053.0	958.62	2494.2	995.69	1031.7	5194.6
#3	995.81	5053.6	1004.2	2493.9	995.82	1031.1	5154.5

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1053.3	1027.2	1019.5	925.23	5048.2	4722.8	5346.3
SDev	1.7	1.1	1.7	2.26	35.9	7.4	9.7
%RSD	.15747	.11100	.16281	.24438	.71145	.15586	.18070
#1	1051.3	1028.2	1021.0	927.83	5088.2	4731.3	5342.8
#2	1054.3	1027.6	1019.9	923.74	5037.4	4719.0	5357.2
#3	1054.1	1026.0	1017.7	924.11	5018.9	4718.2	5338.8

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1005.1	2528.9	14956.	1034.2	1040.6	.0003	997.95
SDev	.6	14.3	214.	1.7	3.0	.0000	133.09
%RSD	.05591	.56451	1.4329	.16865	.28923	.1342	13.336
#1	1005.8	2512.5	14719.	1034.5	1041.0	.0003	844.49
#2	1004.7	2535.7	15135.	1035.7	1037.4	.0003	1067.5
#3	1004.8	2538.4	15015.	1032.3	1043.4	.0003	1081.8

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1036.8	2674.7	2703.2	2489.8	952.27	991.53	1067.4
SDev	22.1	93.0	11.0	1.6	22.73	1.25	1.8
%RSD	2.1272	3.4777	.40553	.06546	2.3866	.12635	.16664
#1	1041.2	2781.3	2710.7	2488.0	932.44	992.18	1066.6
#2	1012.9	2633.1	2690.6	2490.2	977.07	990.09	1069.4
#3	1056.3	2609.8	2708.3	2491.1	947.31	992.33	1066.1

Analysis Report 04/25/00 11:43:45 AM page 1

Method: XP2 Sample Name: 247043(1) MEP Operator: mp
Run Time: 04/25/00 11:37:37
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.18630	149.29	44.375	168.64	36.716	-.41838	85769.
SDev	.86153	3.79	11.823	.68	3.119	.03803	1574.
%RSD	462.43	2.5353	26.644	.40314	8.4947	9.0899	1.8348
#1	-.27144	149.25	50.419	168.59	33.146	-.37449	83958.
#2	-1.0021	153.10	51.955	169.34	38.089	-.44148	86545.
#3	.71464	145.53	30.752	167.99	38.914	-.43917	86804.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg279[illegible]
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.48980	1.0236	.34570	31.352	-11.990	22340.	294.51
SDev	.15906	.5795	.07662	.635	8.480	36.	7.08
%RSD	32.474	56.613	22.162	2.0245	70.720	.16089	2.4040
#1	.37741	1.2070	.29925	30.682	-15.831	22301.	286.34
#2	.67180	1.4892	.43413	31.430	-17.870	22372.	298.59
#3	.42020	.37459	.30373	31.944	-2.2700	22347.	298.61

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.51443	40.243	2903.6	10.475	1.2838	.0003	112.05
SDev	.05135	10.587	191.2	.890	1.6032	.0000	36.36
%RSD	9.9810	26.308	6.5854	8.5012	124.88	.1961	32.453
#1	.54275	52.367	3117.8	9.6561	.00029	.0003	151.75
#2	.45516	35.536	2843.0	10.346	3.0809	.0003	104.03
#3	.54537	32.825	2750.0	11.423	.77031	.0003	80.36

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-12.249	8117.7	20.715	3.5563	-14.676	152.04	2.3237
SDev	20.049	310.3	8.099	.4626	24.459	8.96	.7130
%RSD	163.67	3.8222	39.100	13.007	166.67	5.8953	30.682
#1	8.2112	7787.2	28.224	3.7774	-42.178	162.22	2.9361
#2	-31.860	8402.8	21.787	3.8668	-6.4910	148.57	1.5410
#3	-13.099	8163.0	12.132	3.0247	4.6416	145.33	2.4939

Analysis Report 04/25/00 11:49:59 AM page 1

Method: XP2 Sample Name: 247041(2) MEP Operator: mp
Run Time: 04/25/00 11:43:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	9.0268	166.08	-11.077	178.75	68.052	-.18413	584460.
SDev	6.2929	20.40	11.921	12.31	2.614	.20521	17769.
%RSD	69.714	12.283	107.62	6.8857	3.8409	111.45	3.0403
#1	15.672	188.90	-18.436	176.69	70.854	.00820	568720.
#2	8.2504	159.75	2.6768	167.61	65.681	-.40017	580930.
#3	3.1580	149.61	-17.472	191.97	67.620	-.16042	603730.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2.7108	242.49	10.322	7.9191	287.89	12131.	6919.1
SDev	.8714	11.54	4.573	6.2716	122.45	581.	404.3
%RSD	32.146	4.7601	44.303	79.195	42.532	4.7858	5.8431
#1	2.6254	233.11	12.829	12.411	289.52	11895.	6587.6
#2	1.8852	238.98	5.0440	.75384	164.64	11706.	6800.1
#3	3.6217	255.38	13.094	10.593	409.51	12793.	7369.5

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	26.026	9.0444	4326.3	20.863	64.630	.0003	34.770
SDev	1.404	3.4088	1730.2	4.462	56.050	.0000	24.306
%RSD	5.3963	37.690	39.994	21.387	86.724	.7013	69.907
#1	25.340	12.593	6140.1	21.546	93.975	.0003	62.156
#2	25.096	5.7949	4144.7	16.099	99.914	.0003	26.396
#3	27.641	8.7455	2694.0	24.945	.00033	.0003	15.757

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	74.677	921.35	48.177	-1.7243	-26.201	4.3468	61.864
SDev	85.469	54.79	8.501	9.2439	38.529	10.821	11.437
%RSD	114.45	5.9472	17.646	536.10	147.05	248.93	18.486
#1	101.55	975.31	57.752	-4.5320	-51.711	.52828	52.419
#2	143.48	922.98	41.513	-9.2387	-45.012	-4.0468	58.595
#3	-20.998	865.76	45.267	8.5979	18.121	16.559	74.580

Analysis Report 04/25/00 11:56:12 AM page 1

Method: XP2 Sample Name: 247042(2) MEP Operator: mp
Run Time: 04/25/00 11:50:04
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.68823	1119.8	16.354	247.87	68.041	-.69716	64754.
SDev	1.2607	94.1	11.044	.44	6.412	.04140	2254.
%RSD	183.18	8.4079	67.529	.17842	9.4242	5.9382	3.4809
#1	-.02280	1038.3	28.982	247.75	60.644	-.73208	62179.
#2	-.05636	1098.1	8.5028	248.36	71.463	-.70797	66366.
#3	2.1438	1222.8	11.577	247.50	72.018	-.65142	65718.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.07147	6.1733	.53547	70.767	-13.463	22430.	143.07
SDev	.73601	.9852	.54602	1.651	8.045	153.	13.81
%RSD	1029.8	15.960	101.97	2.3336	59.755	.68297	9.6538
#1	-.92050	7.2653	-.05834	68.945	-17.742	22266.	127.25
#2	.32024	5.3510	.64885	72.166	-18.464	22570.	152.72
#3	.38585	5.9036	1.0159	71.192	-4.1830	22452.	149.23

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.50327	23.257	3733.3	29.844	1.4783	.0003	120.18
SDev	.07238	1.196	194.9	3.362	1.7248	.0000	1.27
%RSD	14.383	5.1428	5.2193	11.266	116.67	.2761	1.0562
#1	.48850	22.101	3512.4	26.579	1.0613	.0003	118.98
#2	.58190	24.489	3806.8	33.296	.00034	.0003	121.51
#3	.43940	23.180	3880.8	29.658	3.3734	.0003	120.04

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-11.415	4257.0	17.161	1.1805	-13.130	151.02	5.4402
SDev	28.376	820.8	14.171	.5606	23.503	1.16	.7538
%RSD	248.58	19.282	82.574	47.491	179.01	.76685	13.857
#1	-26.369	5144.4	33.042	.78982	13.487	152.19	6.2719
#2	-29.187	4101.5	12.634	.92875	-21.847	151.00	4.8019
#3	21.310	3525.0	5.8071	1.8228	-31.030	149.87	5.2467

Analysis Report 04/25/00 12:02:25 PM page 1

Method: XP2 Sample Name: 247043(2) MEP Operator: mp
Run Time: 04/25/00 11:56:17
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.07745	208.74	48.295	170.20	39.499	-.73337	94965.
SDev	.51817	9.65	8.409	.52	2.194	.01244	228.
%RSD	669.03	4.6230	17.412	.30639	5.5556	1.6965	.24044
#1	-.45707	211.61	45.448	169.80	42.030	-.74474	94929.
#2	-.28816	216.63	41.680	170.01	38.332	-.73529	94756.
#3	.51288	197.98	57.758	170.79	38.135	-.72008	95209.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.15013	2.8263	-.49903	28.933	-24.333	24349.	338.05
SDev	.17844	.6550	.09615	1.094	20.801	80.	1.23
%RSD	118.86	23.174	19.267	3.7824	85.486	.32817	.36484
#1	-.01180	3.2715	-.52971	27.673	-2.0358	24341.	338.71
#2	.34144	2.0742	-.39128	29.654	-43.216	24274.	338.82
#3	.12075	3.1331	-.57609	29.470	-27.747	24433.	336.63

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.48686	19.274	2510.0	11.370	3.5488	.0003	40.220
SDev	.13986	2.840	524.8	.596	2.1700	.0000	4.345
%RSD	28.727	14.735	20.908	5.2444	61.146	.3541	10.803
#1	.34834	17.921	2546.5	12.000	3.3443	.0003	42.442
#2	.48421	22.537	1967.9	11.296	1.4883	.0003	43.004
#3	.62802	17.364	3015.5	10.814	5.8138	.0003	35.213

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	11.598	5825.6	8.0521	.51672	.96616	151.35	2.8080
SDev	27.196	97.4	13.720	.86046	22.603	.94	.8340
%RSD	234.48	1.6712	170.39	166.52	2339.5	.61856	29.701
#1	41.142	5728.1	16.007	-.14024	25.240	150.28	3.3077
#2	-12.392	5825.9	15.940	.19967	-2.8661	151.73	3.2711
#3	6.0439	5922.9	-7.7903	1.4907	-19.476	152.04	1.8452

Analysis Report 04/25/00 12:08:39 PM

Method: XP2 Sample Name: 247041(3) MEP Operator: mp
Run Time: 04/25/00 12:02:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	11.326	223.26	-3.0373	272.17	99.300	2.6628	707510.
SDev	40.089	236.57	103.126	45.78	16.117	.8669	42634.
%RSD	353.95	105.96	3395.3	16.821	16.230	32.557	6.0259
#1	-.26627	132.24	-11.759	302.79	84.132	3.5813	750030.
#2	55.934	491.82	104.17	219.54	116.22	2.5483	707740.
#3	-21.690	45.710	-101.53	294.19	97.547	1.8589	664770.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	23.738	187.42	89.789	110.21	733.61	108950.	9222.6
SDev	4.898	20.60	19.618	29.60	360.96	32066.	417.2
%RSD	20.635	10.993	21.849	26.854	49.203	29.433	4.5239
#1	29.343	210.22	111.62	143.09	640.36	73984.	9482.8
#2	21.588	181.88	84.117	101.83	1132.0	115880.	9443.8
#3	20.281	170.15	73.632	85.707	428.43	136980.	8741.4

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	69.077	51.856	6662.1	89.707	152.48	.0004	35.695
SDev	4.408	14.759	10221.	19.890	252.99	.0001	107.72
%RSD	6.3816	28.461	153.41	22.173	165.91	19.41	301.78
#1	67.219	66.645	2488.0	111.64	12.934	.0003	-3.3777
#2	74.111	51.796	18309.	84.650	444.52	.0004	157.50
#3	65.903	37.128	-810.69	72.834	.00052	.0005	-47.035

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	198.51	1389.1	95.179	-14.670	-28.681	-3.6669	230.88
SDev	348.99	110.9	38.064	21.599	128.999	24.9318	15.51
%RSD	175.81	7.9852	39.992	147.23	449.78	679.91	6.7199
#1	-25.970	1336.3	60.678	-3.2366	-177.62	5.6655	213.29
#2	600.58	1516.5	136.01	-39.582	47.832	-31.919	242.61
#3	20.917	1314.4	88.848	-1.1907	43.743	15.252	236.73

Analysis Report 04/25/00 12:14:52 PM page 1

Method: XP2 Sample Name: 247042(3) MEP Operator: mp
Run Time: 04/25/00 12:08:44
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.11702	1426.6	37.518	209.98	72.235	-.79390	51958.
SDev	1.6814	233.6	14.986	12.65	5.799	.03161	435.
%RSD	1436.9	16.373	39.945	6.0239	8.0278	3.9822	.83786
#1	-.38588	1164.9	40.895	208.95	67.502	-.78734	51460.
#2	1.9925	1500.9	50.527	197.87	70.501	-.76608	52144.
#3	-1.2556	1613.9	21.131	223.11	78.704	-.82828	52269.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.22510	4.2034	-.76926	24.009	-43.731	64778.	216.71
SDev	1.26866	.5295	1.08329	2.018	7.460	344.	67.73
%RSD	563.61	12.597	140.82	8.4036	17.060	.53158	31.255
#1	-1.6696	4.7959	-1.3946	21.822	-36.700	65099.	202.46
#2	.28620	4.0380	.48162	24.408	-42.937	64820.	157.23
#3	.70814	3.7764	-1.3948	25.797	-51.557	64414.	290.43

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2.1706	11.647	4097.3	7.6279	3.5713	.0005	94.347
SDev	1.3667	2.585	975.5	2.4600	6.1847	.0000	61.013
%RSD	62.964	22.191	23.808	32.250	173.18	.0790	64.669
#1	2.1695	9.2440	3060.7	5.4173	.00059	.0005	129.47
#2	.80443	11.315	4997.3	10.278	10.713	.0005	129.68
#3	3.5378	14.381	4233.9	7.1884	.00059	.0005	23.895

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-41.341	2748.6	2.4207	-2.2554	64.795	89.878	14.685
SDev	127.001	20.8	10.206	7.7177	68.650	11.315	5.308
%RSD	307.20	.75609	421.63	342.19	105.95	12.589	36.146
#1	-46.257	2759.9	8.3088	-6.4585	40.286	86.533	20.636
#2	88.047	2724.6	8.3179	-6.9591	142.34	80.612	10.439
#3	-165.81	2761.3	-9.3645	6.6516	11.764	102.49	12.980

Analysis Report   04/25/00 12:21:05 PM

Method: XP2   Sample Name: 247043(3) MEP   Operator: mp
Run Time: 04/25/00 12:14:57
Comment:
Mode: CONC   Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.1027	1180.9	86.391	137.92	22.472	-.97131	67957.
SDev	3.3255	66.5	22.817	5.56	3.665	.16310	864.
%RSD	301.57	5.6302	26.411	4.0278	16.309	16.791	1.2708
#1	-.23992	1245.8	62.540	131.66	26.703	-.80592	66963.
#2	4.8896	1183.8	108.01	142.27	20.306	-1.1320	68387.
#3	-1.3416	1112.9	88.625	139.84	20.407	-.97599	68521.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.59892	-1.7301	-2.4501	12.126	-89.786	124690.	71.784
SDev	.81412	3.5958	3.9623	3.082	106.345	4746.	9.608
%RSD	135.93	207.84	161.72	25.418	118.44	3.8064	13.384
#1	.31447	1.6757	1.7738	15.276	-49.943	130160.	61.620
#2	-.86308	-5.4897	-6.0848	9.1164	-210.30	122060.	73.018
#3	-1.2482	-1.3761	-3.0392	11.987	-9.1162	121830.	80.716

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.02498	19.505	5365.5	10.721	10.944	.0004	46.036
SDev	.10582	2.787	315.0	4.369	8.022	.0000	23.722
%RSD	423.68	14.290	5.8708	40.754	73.305	4.482	51.528
#1	.05859	21.476	5379.1	12.150	7.6029	.0004	70.067
#2	-.09357	20.722	5673.4	5.8159	20.097	.0004	45.406
#3	.10990	16.316	5043.9	14.196	5.1318	.0004	22.636

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	7.7446	9524.1	-11.132	-7.0906	-25.999	239.96	7.0360
SDev	53.629	30.9	2.419	.6137	65.098	.70	1.5410
%RSD	692.46	.32404	21.727	8.6551	250.39	.29374	21.902
#1	-35.869	9489.6	-8.3396	-7.7967	-95.808	239.16	7.6082
#2	-8.5196	9533.7	-12.554	-6.6852	-15.235	240.23	8.2091
#3	67.623	9549.1	-12.504	-6.7900	33.047	240.50	5.2907

Analysis Report 04/25/00 01:35:12 PM page 1

Method: XP2 Sample Name: 247041(4) MEP Operator: mp
Run Time: 04/25/00 13:29:04
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	8.7596	173.62	-39.226	291.86	95.512	.13139	714820.
SDev	17.101	89.49	31.256	26.09	2.511	.75206	7259.
%RSD	195.22	51.543	79.684	8.9403	2.6285	572.40	1.0155
#1	14.837	217.10	-49.548	306.37	95.204	.97277	708120.
#2	21.992	233.06	-4.1136	307.46	98.163	-.10318	713800.
#3	-10.550	70.699	-64.015	261.73	93.170	-.47543	722530.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4.9181	111.97	18.135	20.556	172.46	57013.	9027.1
SDev	4.8399	14.41	18.588	23.033	433.05	2123.	133.5
%RSD	98.411	12.868	102.50	112.05	251.11	3.7244	1.4791
#1	10.008	127.98	39.010	46.271	451.34	54963.	8877.3
#2	4.3718	107.85	12.021	13.578	392.47	56874.	9070.4
#3	.37450	100.06	3.3746	1.8189	-326.43	59203.	9133.6

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	70.152	26.848	5145.9	23.517	129.46	.0004	93.412
SDev	1.447	20.530	4323.5	17.899	37.80	.0000	50.817
%RSD	2.0631	76.469	84.019	76.113	29.200	4.759	54.401
#1	68.769	50.450	6878.9	43.159	120.12	.0004	129.74
#2	71.656	16.974	8333.9	19.267	97.200	.0004	115.16
#3	70.033	13.121	224.72	8.1249	171.05	.0004	35.341

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	162.22	1737.9	89.944	-13.808	-98.051	-7.2663	122.12
SDev	98.92	80.2	22.460	15.134	52.796	17.1445	26.19
%RSD	60.979	4.6136	24.971	109.60	53.845	235.94	21.448
#1	213.56	1795.7	80.893	-8.1888	-143.83	.00081	95.397
#2	48.186	1771.5	115.52	-2.2879	-110.03	5.0477	123.22
#3	224.92	1646.3	73.422	-30.949	-40.296	-26.848	147.75

nalysis Report 04/25/00 01:41:25 PM page 1

ethod: XP2 Sample Name: 247042(4) MEP Operator: mp
un Time: 04/25/00 13:35:17
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.55197	816.15	-18.068	247.66	68.753	-.74522	53080.
SDev	1.11930	23.43	11.343	1.85	2.179	.08155	311.
%RSD	202.78	2.8702	62.779	.74817	3.1694	10.943	.58523
#1	-1.7193	789.15	-16.275	247.05	66.739	-.82057	53027.
#2	.51219	828.29	-30.200	246.18	68.454	-.75646	52799.
#3	-.44882	831.02	-7.7281	249.73	71.066	-.65864	53413.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.18955	1.5106	-.99837	27.303	-19.833	27313.	166.54
SDev	.94600	.6523	2.81949	2.716	28.332	247.	12.36
%RSD	499.08	43.180	282.41	9.9484	142.85	.90358	7.4212
#1	-1.2772	.78541	-4.2540	24.192	-40.578	27510.	178.55
#2	.26691	2.0494	.62219	28.509	12.446	27036.	153.86
#3	.44167	1.6971	.63672	29.207	-31.367	27392.	167.21

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.5384	14.604	2848.6	8.6838	.00039	.0004	145.26
SDev	.7437	2.778	320.9	2.0210	.00003	.0000	10.78
%RSD	48.341	19.019	11.264	23.273	7.2704	1.714	7.4224
#1	2.3937	16.485	2488.2	6.9050	.00041	.0004	140.27
#2	1.0442	15.914	2954.7	8.2651	.00040	.0004	157.64
#3	1.1774	11.414	3103.0	10.881	.00036	.0004	137.88

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-46.535	3134.3	20.258	-1.0105	-16.409	87.391	5.8863
SDev	23.337	130.2	7.540	1.8185	26.965	2.998	1.1657
%RSD	50.149	4.1541	37.221	179.96	164.33	3.4306	19.803
#1	-42.422	3213.4	11.552	.96461	-44.179	90.526	7.1646
#2	-25.528	3205.6	24.506	-2.6155	-14.718	87.096	4.8822
#3	-71.656	2984.1	24.716	-1.3808	9.6705	84.552	5.6121

nalysis Report 04/25/00 01:47:39 PM page 1

lethod: XP2 Sample Name: 247043(4) MEP Operator: mp
un Time: 04/25/00 13:41:30
omment:
lode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.49393	676.54	41.080	165.67	21.535	-.63105	67258.
SDev	1.04822	28.35	15.552	1.49	1.159	.04048	398.
%RSD	212.22	4.1908	37.858	.90110	5.3807	6.4154	.59129
#1	-1.2885	648.96	34.270	163.96	22.861	-.62483	66813.
#2	.69410	675.04	30.094	166.71	21.025	-.59403	67579.
#3	-.88739	705.61	58.875	166.33	20.718	-.67428	67382.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.11257	1.7720	1.6935	17.741	-67.399	60901.	85.509
SDev	.81650	.8820	.5956	.785	11.742	183.	5.475
%RSD	725.30	49.778	35.170	4.4253	17.421	.30002	6.4026
#1	.93856	2.6836	2.0071	17.411	-65.330	60905.	80.893
#2	-.69409	1.7094	2.0668	18.637	-56.829	61082.	91.557
#3	.09326	.92287	1.0066	17.175	-80.037	60717.	84.075

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.00104	20.538	3335.2	14.362	11.320	.0004	32.810
SDev	.03511	2.010	331.4	2.460	3.126	.0000	1.534
%RSD	3383.9	9.7890	9.9374	17.127	27.615	.2481	4.6748
#1	.02173	22.395	3387.1	14.918	11.620	.0004	31.457
#2	-.03950	20.817	3637.7	16.497	14.285	.0004	32.497
#3	.02088	18.403	2980.9	11.673	8.0547	.0004	34.476

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-16.261	9406.4	2.4402	-2.7040	11.774	241.21	3.4844
SDev	38.685	104.1	13.407	.8505	65.712	1.92	1.0030
%RSD	237.89	1.1069	549.42	31.453	558.12	.79416	28.784
#1	-60.718	9506.9	15.858	-3.6154	87.114	239.07	3.7125
#2	9.7345	9413.3	2.4195	-2.5650	-33.703	242.75	4.3538
#3	2.1994	9299.0	-10.956	-1.9315	-18.090	241.82	2.3871

Analysis Report 04/25/00 01:53:52 PM

Method: XP2 Sample Name: 247041(5) MEP Operator: mp
Run Time: 04/25/00 13:47:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.5224	187.95	-2.2165	269.41	144.38	-.74807	79889.
SDev	1.8256	3.23	5.1221	4.11	4.07	.21742	236.
%RSD	119.92	1.7198	231.09	1.5266	2.8155	29.064	.29565
#1	2.1930	188.29	3.6672	274.01	139.78	-.60917	80053.
#2	2.9178	191.00	-5.6806	266.08	145.87	-.63640	79996.
#3	-.54373	184.56	-4.6360	268.14	147.49	-.99863	79619.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.41905	1.1325	-2.7635	-8.5241	-46.539	12245.	1505.5
SDev	1.48965	5.9374	6.1419	8.2109	80.483	228.	2.5
%RSD	355.48	524.27	222.25	96.325	172.94	1.8596	.16827
#1	.96776	5.0160	1.6974	-2.4861	14.602	12437.	1507.6
#2	-.23119	4.0837	-.21918	-5.2126	-16.497	12305.	1506.1
#3	-1.9937	-5.7022	-9.7688	-17.874	-137.72	11994.	1502.7

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.1480	.02477	2450.9	-3.3182	9.9469	.0004	14.394
SDev	.2971	8.0627	342.9	4.3110	10.670	.0000	31.990
%RSD	25.877	32555.	13.991	129.92	107.27	.4043	222.25
#1	1.4892	2.1060	2802.0	-1.1618	.00045	.0004	28.246
#2	.94660	6.8428	2116.9	-.51081	21.217	.0004	-22.188
#3	1.0083	-8.8745	2433.7	-8.2819	8.6234	.0004	37.124

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	22.989	2763.1	18.907	-2.7608	57.394	3.0779	11.994
SDev	23.389	13.2	10.372	.6813	52.002	.9694	.787
%RSD	101.74	.47815	54.858	24.676	90.605	31.495	6.5645
#1	24.605	2748.0	24.817	-2.2617	40.632	4.1145	11.486
#2	45.528	2772.7	24.974	-3.5369	15.840	2.1939	11.595
#3	-1.1662	2768.6	6.9308	-2.4838	115.71	2.9252	12.901

nalysis Report 04/25/00 02:06:37 PM page 1

ethod: XP2 Sample Name: CCV1 Operator: mp
un Time: 04/25/00 14:00:29
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	980.33	5614.6	1109.1	2536.8	949.74	1064.5	5767.4
SDev	.62	5.9	37.8	6.4	2.70	2.2	19.0
%RSD	.06334	.10470	3.4047	.25035	.28403	.20814	.32943
#1	979.73	5617.9	1134.5	2530.9	947.79	1063.3	5775.9
#2	980.97	5618.1	1127.0	2543.6	952.82	1067.0	5780.7
#3	980.29	5607.8	1065.7	2535.9	948.61	1063.1	5745.7

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1198.5	1111.2	1094.3	872.99	5427.5	5602.1	6458.1
SDev	2.7	3.1	3.2	2.22	10.7	35.7	13.3
%RSD	.22600	.27902	.29522	.25443	.19722	.63648	.20652
#1	1199.8	1109.4	1094.9	872.51	5430.9	5638.1	6468.0
#2	1200.4	1114.8	1097.1	875.42	5436.0	5601.5	6463.5
#3	1195.4	1109.5	1090.7	871.05	5415.5	5566.8	6443.0

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1052.7	2697.3	17869.	1126.4	1192.0	.0004	1105.4
SDev	2.9	7.1	380.	4.7	5.5	.0000	22.7
%RSD	.27151	.26152	2.1251	.41791	.46108	.5022	2.0529
#1	1052.0	2690.4	18239.	1124.7	1191.0	.0004	1081.3
#2	1055.8	2704.5	17888.	1131.7	1198.0	.0004	1126.3
#3	1050.2	2697.0	17480.	1122.7	1187.1	.0004	1108.7

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1108.5	2722.9	3233.6	2489.6	1005.1	1030.5	1288.4
SDev	8.2	14.5	11.6	4.8	3.8	3.8	5.2
%RSD	.74035	.53302	.36014	.19190	.37961	.36995	.39990
#1	1107.1	2735.0	3220.9	2487.7	1009.5	1030.5	1288.3
#2	1101.1	2726.9	3236.1	2495.1	1003.2	1034.4	1293.6
#3	1117.3	2706.8	3243.8	2486.1	1002.6	1026.7	1283.3

ınalysis Report 04/25/00 02:12:51 PM page 1

!ethod: XP2 Sample Name: 247042(5) MEP Operator: mp
:un Time: 04/25/00 14:06:42
:omment:
Iode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.29019	911.64	3.4776	223.70	93.941	-.60361	46033.
SDev	1.5644	54.90	28.243	1.97	11.190	.05656	1928.
%RSD	539.09	6.0216	812.15	.88266	11.911	9.3707	4.1890
#1	.24682	849.12	-6.1052	221.43	81.483	-.54358	43843.
#2	1.8758	933.85	-18.728	225.04	97.202	-.61136	46780.
#3	-1.2520	951.95	35.266	224.62	103.14	-.65591	47476.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.56927	1.0370	.89502	15.837	-9.2220	41716.	195.78
SDev	.87583	1.1519	.48073	1.165	18.2127	222.	16.95
%RSD	153.85	111.08	53.711	7.3546	197.49	.53290	8.6594
#1	.18139	2.3256	.70052	17.145	8.3175	41459.	178.35
#2	-.04564	.10739	1.4425	14.910	-28.040	41855.	196.76
#3	1.5721	.67800	.54203	15.457	-7.9429	41833.	212.22

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.05555	36.180	2447.4	4.0923	9.7140	.0003	221.87
SDev	.03566	15.517	542.0	.9817	8.4210	.0000	38.61
%RSD	64.190	42.888	22.144	23.989	86.689	.7532	17.404
#1	.01438	53.665	3006.0	4.6242	14.188	.0003	255.01
#2	.07591	30.826	2412.6	4.6932	14.954	.0004	231.14
#3	.07635	24.049	1923.7	2.9594	.00035	.0004	179.47

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-65.377	4585.7	8.2395	-1.8375	3.6747	60.433	5.1404
SDev	70.581	500.7	13.970	.7180	34.545	2.413	.7696
%RSD	107.96	10.919	169.56	39.075	940.08	3.9927	14.973
#1	-9.6019	4968.1	-1.8802	-2.6474	42.612	63.178	4.6443
#2	-41.801	4770.2	24.179	-1.2790	-23.298	59.477	4.7499
#3	-144.73	4018.9	2.4195	-1.5861	-8.2893	58.645	6.0270

Analysis Report 04/25/00 02:19:04 PM page 1

Method: XP2 Sample Name: 247043(5) MEP Operator: mp
Run Time: 04/25/00 14:12:56
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.45152	1537.2	12.276	162.69	43.987	-.67150	64489.
SDev	.53998	169.4	7.714	3.41	2.297	.01108	1502.
%RSD	119.59	11.021	62.838	2.0931	5.2227	1.6494	2.3293
#1	.07762	1354.3	7.0955	159.34	46.491	-.66075	62757.
#2	1.0706	1568.7	8.5904	166.15	43.495	-.68287	65438.
#3	.20635	1688.7	21.141	162.57	41.977	-.67089	65272.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.09259	1.0931	1.1868	12.755	-27.591	20470.	65.199
SDev	.88645	.2033	.7630	1.196	24.750	344.	8.764
%RSD	957.37	18.601	64.289	9.3800	89.702	1.6827	13.443
#1	.29160	1.1471	1.1906	13.492	-46.787	20077.	72.558
#2	-.87644	1.2640	1.9480	13.398	.34251	20720.	67.536
#3	.86262	.86824	.42197	11.375	-36.330	20612.	55.503

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	-.00372	16.266	3906.8	10.925	6.5773	.0003	36.821
SDev	.12565	1.950	314.7	.934	3.3223	.0000	13.377
%RSD	3381.2	11.991	8.0555	8.5449	50.512	2.245	36.331
#1	-.04680	18.047	4176.6	11.613	6.6805	.0003	48.243
#2	.13781	16.568	3561.0	9.8624	3.2046	.0004	40.115
#3	-.10216	14.182	3982.7	11.299	9.8468	.0004	22.104

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-33.180	8903.5	21.390	-2.2417	-15.388	137.90	3.8645
SDev	25.459	151.7	29.621	.4072	38.685	2.90	1.1043
%RSD	76.729	1.7037	138.48	18.166	251.40	2.1027	28.575
#1	-50.099	8728.3	-1.7892	-1.7793	7.1056	134.82	2.6342
#2	-45.541	8993.5	11.196	-2.3989	-60.058	140.58	4.1892
#3	-3.9008	8988.5	54.761	-2.5469	6.7878	138.31	4.7700

Analysis Report 04/25/00 02:25:18 PM page 1

Method: XP2 Sample Name: 247041(6) MEP Operator: mp
Run Time: 04/25/00 14:19:09
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.83945	221.95	-15.075	268.07	146.28	-.65828	79385.
SDev	.29706	6.68	17.738	4.33	2.33	.03984	261.
%RSD	35.388	3.0089	117.67	1.6138	1.5956	6.0523	.32880
#1	1.1385	224.37	2.3796	273.05	143.65	-.66192	79465.
#2	.54440	214.40	-33.083	265.26	148.11	-.61674	79597.
#3	.83546	227.08	-14.520	265.89	147.09	-.69617	79094.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.10699	2.8292	-.07130	-3.3425	27.900	12153.	1480.6
SDev	.52997	1.7485	.62415	1.4401	44.427	89.	5.7
%RSD	495.34	61.802	875.44	43.083	159.23	.73300	.38589
#1	.68685	2.3380	.64593	-1.6817	73.563	12075.	1476.9
#2	-.35233	4.7709	-.36859	-4.1030	-15.177	12250.	1487.2
#3	-.01354	1.3789	-.49122	-4.2429	25.315	12134.	1477.8

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.48348	3.2347	2543.9	-1.9523	8.8276	.0003	7.2901
SDev	.26578	1.5737	190.3	.8001	6.9342	.0000	8.1234
%RSD	54.972	48.650	7.4805	40.984	78.552	.4536	111.43
#1	.25044	4.9958	2636.5	-1.3978	9.8810	.0003	-1.9360
#2	.42707	2.7416	2670.2	-1.5896	15.175	.0003	10.437
#3	.77294	1.9666	2325.0	-2.8696	1.4269	.0003	13.369

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-9.5865	2751.7	26.817	-1.8624	-7.0994	2.6330	9.0021
SDev	1.8565	19.3	9.033	.0811	43.5863	1.4928	.5708
%RSD	19.366	.70205	33.685	4.3560	613.95	56.695	6.3408
#1	-7.7538	2735.8	23.986	-1.9536	-14.000	3.7289	8.4142
#2	-9.5399	2773.2	36.926	-1.8351	-46.824	.93282	9.0380
#3	-11.466	2746.1	19.538	-1.7984	39.525	3.2373	9.5542

Analysis Report 04/25/00 02:31:31 PM page 1

Method: XP2 Sample Name: 247042(6) MEP Operator: mp
Run Time: 04/25/00 14:25:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.4980	1518.8	-4.2808	222.41	98.503	-.65540	47681.
SDev	.6324	170.2	1.0292	2.24	2.662	.05119	46.
%RSD	42.216	11.208	24.043	1.0090	2.7023	7.8103	.09693
#1	1.6944	1325.1	-4.6144	224.99	95.500	-.61514	47685.
#2	2.0088	1586.6	-5.1019	221.37	99.435	-.63805	47726.
#3	.79069	1644.7	-3.1262	220.89	100.57	-.71301	47634.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.40946	1.3240	1.0714	17.032	-5.5979	42033.	215.04
SDev	.90076	1.2456	.1940	1.089	29.7977	294.	4.10
%RSD	219.99	94.077	18.108	6.3931	532.30	.69894	1.9066
#1	1.4484	1.9732	1.2484	17.689	-22.462	42367.	219.71
#2	-.15184	2.1110	1.1017	17.632	28.807	41914.	213.37
#3	-.06823	-.11207	.86398	15.775	-23.139	41817.	212.04

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.26743	10.658	2789.1	4.5647	7.7877	.0003	109.02
SDev	.03735	4.492	202.7	4.5254	2.1716	.0000	3.86
%RSD	13.968	42.149	7.2677	99.141	27.885	.8002	3.5375
#1	.31056	5.7652	2558.8	9.5599	7.4655	.0003	112.83
#2	.24605	14.596	2868.1	3.3958	5.7952	.0003	105.12
#3	.24568	11.611	2940.4	.73832	10.102	.0003	109.10

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-39.300	3649.9	2.4144	-2.6488	25.664	58.491	2.9733
SDev	22.577	26.5	17.062	.6839	11.952	.989	2.2344
%RSD	57.448	.72553	706.67	25.819	46.569	1.6914	75.148
#1	-50.676	3631.1	2.4195	-2.7982	12.848	59.107	5.3204
#2	-53.925	3638.4	-14.650	-1.9025	36.506	59.015	2.7276
#3	-13.298	3680.2	19.474	-3.2456	27.639	57.349	.87193

Analysis Report 04/25/00 02:37:45 PM page 1

Method: XP2 Sample Name: 247043(6) MEP Operator: mp
Run Time: 04/25/00 14:31:36
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.78174	1901.3	6.5259	157.62	48.216	-.66652	65107.
SDev	.73708	41.0	17.140	4.60	5.964	.03321	575.
%RSD	94.287	2.1541	262.64	2.9183	12.370	4.9819	.88287
#1	1.5756	1948.4	16.457	157.44	54.812	-.62843	65278.
#2	.11909	1873.9	16.386	162.31	46.631	-.68935	65577.
#3	.65052	1881.6	-13.265	153.11	43.204	-.68179	64466.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.22181	1.9862	2.4468	15.081	-28.671	20839.	75.773
SDev	.82243	1.4315	1.1820	1.947	19.950	215.	6.058
%RSD	370.79	72.075	48.309	12.911	69.583	1.0333	7.9944
#1	.12676	1.8947	3.5418	16.714	-19.459	21015.	69.547
#2	1.0876	.60253	1.1937	15.602	-14.991	20903.	81.647
#3	-.54898	3.4612	2.6048	12.926	-51.562	20599.	76.125

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	-.12404	17.525	3849.6	10.410	9.4518	.0003	23.111
SDev	.18497	.810	262.8	1.850	1.6062	.0000	18.296
%RSD	149.12	4.6242	6.8278	17.775	16.993	.8798	79.165
#1	-.33489	18.142	4039.9	12.241	7.9712	.0003	21.219
#2	.01090	16.607	3549.7	8.5406	11.159	.0003	42.280
#3	-.04814	17.825	3959.3	10.448	9.2249	.0003	5.8349

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	46.068	9046.2	9.3755	-2.4268	-11.515	139.58	3.2180
SDev	22.996	88.6	8.6477	.5834	41.763	2.18	2.0313
%RSD	49.919	.97954	92.237	24.041	362.68	1.5583	63.121
#1	35.615	9110.8	6.6492	-3.0808	-28.051	139.38	2.0559
#2	30.154	9082.7	2.4195	-1.9599	-42.478	141.85	2.0347
#3	72.434	8945.2	19.058	-2.2397	35.984	137.51	5.5635

Analysis Report 04/25/00 02:43:58 PM

Method: XP2 Sample Name: 247041(7) MEP Operator: mp
Run Time: 04/25/00 14:37:50
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.3982	219.86	-4.6221	274.47	145.61	-.67546	79687.
SDev	1.7176	5.84	10.6028	3.36	4.29	.05279	105.
%RSD	122.85	2.6562	229.40	1.2255	2.9485	7.8159	.13218
#1	1.1424	226.13	-16.647	271.29	140.67	-.70520	79732.
#2	3.2294	214.57	-.60433	277.99	147.70	-.61451	79762.
#3	-.17720	218.87	3.3847	274.11	148.45	-.70668	79567.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.51073	2.0982	-.54607	-3.7888	10.815	12161.	1498.2
SDev	.85688	.9238	1.14261	1.3925	13.618	57.	4.7
%RSD	167.78	44.027	209.24	36.753	125.92	.47106	.31677
#1	1.1397	2.7282	-1.2651	-2.5576	3.8788	12185.	1492.7
#2	.85775	1.0377	.77147	-3.5086	2.0610	12204.	1500.8
#3	-.46523	2.5286	-1.1446	-5.3000	26.504	12096.	1501.1

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.76315	3.7517	2246.9	2.4952	4.0711	.0003	-14.675
SDev	.18937	5.7480	343.7	2.7748	5.1564	.0000	27.969
%RSD	24.814	153.21	15.296	111.20	126.66	.1657	190.59
#1	.54743	5.0181	1860.7	5.4813	.00044	.0003	-43.314
#2	.90200	-2.5239	2519.1	-.00375	9.8695	.0003	12.572
#3	.84002	8.7610	2360.8	2.0082	2.3434	.0003	-13.283

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-4.1354	2799.3	15.412	-2.3821	-25.032	3.5070	10.742
SDev	26.3466	17.3	22.904	.6771	24.127	1.4256	.350
%RSD	637.11	.61946	148.61	28.426	96.385	40.651	3.2553
#1	-32.772	2779.9	6.7489	-2.3283	-29.085	4.4443	10.965
#2	1.2889	2813.3	41.384	-1.7334	.86511	4.2104	10.339
#3	19.077	2804.8	-1.8974	-3.0845	-46.876	1.8664	10.921

Analysis Report 04/25/00 02:50:11 PM

Method: XP2 Sample Name: 247042(7) MEP Operator: mp
Run Time: 04/25/00 14:44:03
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.88689	1606.4	4.7223	218.19	99.938	-.70616	47648.
SDev	2.79698	117.6	4.9212	3.35	2.553	.06068	177.
%RSD	315.37	7.3198	104.21	1.5362	2.5548	8.5935	.37238
#1	-.55150	1472.4	9.7091	217.02	97.028	-.63863	47453.
#2	1.7273	1654.6	-.13059	221.97	100.98	-.72375	47800.
#3	-3.8364	1692.3	4.5886	215.59	101.80	-.75611	47690.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.12091	.07855	.56779	16.352	-27.332	41760.	217.78
SDev	.87647	1.5162	1.8741	1.525	29.484	270.	9.61
%RSD	724.91	1930.3	330.07	9.3280	107.87	.64751	4.4127
#1	.62578	1.3675	2.3384	18.009	-19.557	41936.	221.10
#2	.09740	.46003	.75993	16.041	-2.5145	41895.	225.29
#3	-1.0859	-1.5919	-1.3950	15.006	-59.925	41449.	206.95

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.07460	9.5508	2139.7	5.9166	3.6902	.0003	120.85
SDev	.00450	1.4412	470.6	1.8631	3.1986	.0000	8.26
%RSD	6.0310	15.090	21.996	31.489	86.679	1.904	6.8350
#1	.07107	7.8967	2100.6	4.0547	5.3921	.0003	112.15
#2	.07306	10.220	2628.6	5.9141	5.6781	.0003	128.58
#3	.07967	10.536	1689.8	7.7809	.00044	.0004	121.83

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.24961	3667.8	5.3666	-2.6649	53.682	58.268	2.8406
SDev	54.6547	28.9	5.1045	.5324	26.544	.864	1.7573
%RSD	21896.	.78684	95.115	19.978	49.448	1.4830	61.866
#1	-20.360	3634.7	2.4195	-2.8936	36.486	58.496	.87151
#2	61.611	3687.7	2.4195	-2.0564	84.253	58.994	3.4005
#3	-42.000	3680.9	11.261	-3.0447	40.306	57.312	4.2497

Analysis Report 04/25/00 02:56:25 PM page 1

Method: XP2 Sample Name: 247043(7) MEP Operator: mp
Run Time: 04/25/00 14:50:16
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.66711	1929.9	26.814	156.22	50.344	-.71022	64832.
SDev	.45563	14.6	15.601	2.63	6.684	.06314	277.
%RSD	68.299	.75606	58.182	1.6809	13.276	8.8900	.42788
#1	1.0484	1946.5	10.293	155.91	57.845	-.66493	64749.
#2	.79047	1918.9	41.294	158.98	48.164	-.68340	64606.
#3	.16250	1924.5	28.856	153.76	45.022	-.78234	65142.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.26719	1.1317	2.0743	13.568	-12.678	20839.	67.481
SDev	.87421	1.5504	1.6509	2.135	19.889	43.	11.012
%RSD	327.19	137.00	79.588	15.738	156.88	.20535	16.319
#1	-.54484	1.9446	1.8840	15.643	5.5812	20885.	79.700
#2	.15388	2.1066	3.8120	13.683	-33.871	20801.	64.419
#3	1.1925	-.65610	.52676	11.377	-9.7445	20831.	58.324

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.07214	12.686	3727.2	8.9779	1.6074	.0003	17.872
SDev	.17552	4.391	435.0	.9937	2.0702	.0000	4.418
%RSD	243.29	34.617	11.671	11.068	128.80	.6023	24.722
#1	.24821	17.669	3601.9	10.094	3.9435	.0003	16.496
#2	.07102	9.3798	4211.2	8.6485	.87812	.0003	14.305
#3	-.10281	11.009	3368.7	8.1907	.00043	.0003	22.814

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	28.864	9043.3	2.4698	-3.2805	5.1283	137.69	6.2796
SDev	19.682	39.8	14.900	.4513	53.033	.45	1.0076
%RSD	68.189	.43962	603.29	13.757	1034.1	.32544	16.046
#1	48.976	9069.6	-6.1606	-2.8119	45.520	138.12	6.4858
#2	9.6418	8997.6	-6.1051	-3.7122	-54.928	137.23	5.1849
#3	27.975	9062.7	19.675	-3.3175	24.794	137.72	7.1682

Analysis Report 04/25/00 03:02:38 PM page 1

Method: XP2 Sample Name: 247041(8) MEP Operator: mp
Run Time: 04/25/00 14:56:30
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.34645	258.51	-14.155	223.49	143.83	-.71139	52049.
SDev	1.07597	14.86	32.974	3.94	15.29	.04902	172.
%RSD	310.57	5.7475	232.94	1.7622	10.629	6.8913	.33109
#1	.12020	273.15	-52.226	227.12	126.71	-.69025	52217.
#2	.41741	243.44	4.3852	219.30	148.68	-.67649	51872.
#3	-1.5770	258.94	5.3743	224.05	156.10	-.76744	52059.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.30299	2.0285	.50835	-3.5512	-7.6355	1192.5	1502.3
SDev	.62510	2.1597	.69182	1.3532	10.7404	33.5	10.6
%RSD	206.31	106.47	136.09	38.106	140.66	2.8058	.70393
#1	-.04425	-.46526	.05239	-3.5671	-14.296	1199.4	1491.1
#2	1.0246	3.2782	1.3044	-2.1900	4.7548	1222.0	1503.5
#3	-.07141	3.2727	.16827	-4.8963	-13.365	1156.1	1512.1

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.72272	2.9952	2794.4	-.40723	3.6738	.0003	-16.404
SDev	.06057	3.8592	83.9	1.15351	6.3624	.0000	17.031
%RSD	8.3803	128.84	3.0038	283.26	173.18	.1846	103.82
#1	.78352	-.26152	2889.7	-1.5914	.00044	.0003	-36.060
#2	.72225	7.2576	2731.4	.71302	11.020	.0003	-6.0594
#3	.66239	1.9895	2762.1	-.34336	.00043	.0003	-7.0915

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	23.922	3201.7	18.268	-2.8100	6.8427	1.2443	281.74
SDev	40.806	13.6	13.889	.6789	28.521	.7109	37.28
%RSD	170.58	.42421	76.033	24.161	416.81	57.135	13.232
#1	69.381	3191.9	24.060	-2.0294	-20.089	.46840	244.40
#2	11.930	3196.1	28.323	-3.2630	3.8935	1.4001	281.87
#3	-9.5441	3217.2	2.4195	-3.1376	36.724	1.8644	318.96

Analysis Report 04/25/00 03:08:52 PM

Method: XP2 Sample Name: 247042(8) MEP Operator: mp
Run Time: 04/25/00 15:02:43
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.7559	1238.4	-2.6130	159.77	102.82	-.71537	34633.
SDev	1.1420	80.3	.9944	1.99	.24	.03630	169.
%RSD	65.035	6.4828	38.056	1.2425	.23666	5.0749	.48937
#1	1.9137	1146.3	-3.6110	159.78	102.97	-.73421	34505.
#2	2.8108	1275.4	-2.6056	161.76	102.54	-.67352	34825.
#3	.54327	1293.5	-1.6223	157.79	102.96	-.73839	34568.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.15678	1.4758	10.471	9.7068	-11.221	17985.	232.57
SDev	.65172	.4420	.618	1.7868	27.308	49.	15.69
%RSD	415.69	29.948	5.9039	18.408	243.36	.27513	6.7461
#1	-.77976	1.9860	10.984	7.8202	-27.073	18015.	250.55
#2	.52030	1.2331	9.7847	11.373	20.311	18012.	221.69
#3	-.21088	1.2084	10.644	9.9267	-26.901	17928.	225.46

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.33084	.99889	2596.3	4.6691	9.1306	.0003	128.48
SDev	.09211	3.5748	580.7	2.5572	6.4971	.0000	11.12
%RSD	27.841	357.88	22.367	54.769	71.157	.5026	8.6517
#1	.31226	-1.7716	2922.9	3.8096	15.766	.0003	138.16
#2	.43082	5.0342	2940.1	2.6524	8.8434	.0003	130.92
#3	.24944	-.26590	1925.8	7.5454	2.7819	.0003	116.34

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-21.716	3376.7	8.1824	-2.2091	24.885	45.593	30.794
SDev	89.811	15.4	13.253	.9417	33.810	.905	6.146
%RSD	413.56	.45490	161.97	42.627	135.86	1.9842	19.958
#1	28.324	3385.4	-6.2611	-3.2955	6.8325	46.424	37.363
#2	31.927	3385.8	19.783	-1.6264	63.889	45.726	29.836
#3	-125.40	3359.0	11.025	-1.7055	3.9333	44.629	25.184

Analysis Report 04/25/00 03:15:05 PM page 1

Method: XP2 Sample Name: 247043(8) MEP Operator: mp
Run Time: 04/25/00 15:08:57
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.45262	2149.2	7.8756	181.36	73.352	-.74071	60034.
SDev	.82064	6.8	8.1516	6.08	8.677	.05324	95.
%RSD	181.31	.31541	103.50	3.3498	11.829	7.1875	.15782
#1	-.13749	2141.9	1.9632	181.34	83.242	-.74581	59946.
#2	-1.3841	2150.7	4.4891	175.29	69.795	-.68511	60135.
#3	.16375	2155.2	17.175	187.44	67.019	-.79122	60022.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.41822	-1.0236	.38470	6.3211	5.5143	16204.	83.218
SDev	.82396	1.8289	.91566	2.1625	11.208	102.	11.490
%RSD	197.01	178.68	238.02	34.211	203.26	.62793	13.807
#1	-.53097	-1.7817	.78844	8.2055	3.0711	16229.	96.410
#2	.94922	1.0625	1.0291	6.7977	17.743	16291.	75.394
#3	.83642	-2.3516	-.66345	3.9600	-4.2709	16092.	77.850

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.61444	6.3495	4922.4	6.6496	5.8171	.0004	5.1094
SDev	.15848	8.8295	266.5	.1503	10.075	.0000	6.8121
%RSD	25.793	139.06	5.4131	2.2598	173.19	.0817	133.33
#1	.67399	16.507	4615.1	6.7139	.00044	.0004	5.4533
#2	.43481	.50710	5063.5	6.7570	17.450	.0004	-1.8682
#3	.73451	2.0347	5088.6	6.4779	.00044	.0004	11.743

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-5.6349	7442.5	15.544	-2.6409	-24.486	84.894	21.236
SDev	17.2935	18.2	11.573	1.3346	39.447	.545	1.886
%RSD	306.90	.24406	74.453	50.538	161.10	.64142	8.8829
#1	-3.8351	7457.4	24.285	-1.7798	6.7643	85.517	23.132
#2	-23.758	7447.8	2.4195	-4.1783	-68.810	84.513	21.217
#3	10.688	7422.3	19.928	-1.9645	-11.413	84.651	19.359

Analysis Report 04/25/00 03:21:19 PM page 1

Method: XP2 Sample Name: CCV1 Operator: mp
Run Time: 04/25/00 15:15:10
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	959.72	5531.4	1062.7	2451.5	939.06	1043.8	5766.7
SDev	7.76	48.4	24.3	20.8	6.94	9.1	129.5
%RSD	.80857	.87528	2.2900	.84670	.73857	.86821	2.2449
#1	968.57	5587.3	1049.5	2475.5	947.05	1054.2	5915.6
#2	954.07	5502.1	1090.8	2438.5	934.59	1039.0	5702.9
#3	956.53	5504.8	1047.9	2440.6	935.54	1038.1	5681.5

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1175.7	1081.2	1069.4	854.50	5306.8	5464.5	6326.0
SDev	12.4	9.1	9.6	8.92	56.7	33.1	58.3
%RSD	1.0545	.84224	.89971	1.0434	1.0686	.60500	.92183
#1	1190.0	1091.7	1080.5	864.78	5369.3	5497.6	6393.1
#2	1169.1	1075.0	1064.3	849.89	5292.3	5431.4	6287.1
#3	1168.0	1076.9	1063.4	848.83	5258.7	5464.4	6297.9

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1029.0	2587.4	16835.	1104.2	1149.1	.0004	973.84
SDev	8.7	7.1	378.	12.4	6.5	.0000	148.48
%RSD	.84521	.27592	2.2429	1.1262	.56307	.8397	15.247
#1	1039.1	2595.6	16710.	1118.5	1149.6	.0004	804.54
#2	1024.1	2584.0	16536.	1097.3	1155.3	.0004	1035.0
#3	1023.9	2582.5	17260.	1096.6	1142.4	.0004	1081.9

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1075.2	2965.9	3134.8	2421.3	1041.5	1009.5	1271.5
SDev	42.9	151.4	27.0	18.2	15.5	9.9	12.9
%RSD	3.9945	5.1056	.86160	.75297	1.4867	.97838	1.0172
#1	1071.1	3140.5	3165.1	2442.3	1024.7	1020.7	1286.4
#2	1120.0	2887.2	3113.1	2409.7	1044.5	1002.0	1265.0
#3	1034.4	2870.1	3126.2	2411.8	1055.2	1005.8	1263.1

nalysis Report 04/25/00 03:27:32 PM page 1

ethod: XP2 Sample Name: 247041(9) MEP Operator: mp
un Time: 04/25/00 15:21:24
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.09235	201.56	-26.292	231.07	149.39	-.64750	51051.
SDev	.88148	9.85	11.782	3.53	4.47	.03182	239.
%RSD	954.47	4.8851	44.813	1.5291	2.9913	4.9148	.46787
#1	.72604	194.20	-34.133	234.65	144.63	-.63616	50897.
#2	.46532	212.75	-32.001	230.99	150.05	-.62290	50930.
#3	-.91430	197.74	-12.743	227.58	153.49	-.68344	51326.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.78016	1.5146	.12488	-3.5201	19.080	1068.3	1489.1
SDev	.32375	1.2616	1.2248	.9331	32.483	22.5	2.3
%RSD	41.499	83.296	980.72	26.508	170.25	2.1047	.15775
#1	.40966	.69576	-.35855	-4.0911	49.242	1060.4	1491.6
#2	.92218	2.9675	1.5176	-2.4433	23.307	1093.6	1488.8
#3	1.0086	.88061	-.78439	-4.0258	-15.310	1050.8	1487.0

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.39677	23.192	2763.5	-.88507	3.1475	.0004	83.426
SDev	.20928	13.512	171.2	2.02467	2.7739	.0000	31.325
%RSD	52.745	58.261	6.1957	228.76	88.130	.1777	37.548
#1	.19817	38.789	2734.3	-1.6971	5.2373	.0004	104.25
#2	.61529	15.766	2947.4	1.4196	.00044	.0004	98.628
#3	.37684	15.022	2608.7	-2.3777	4.2048	.0004	47.401

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-8.6096	3570.1	22.901	-3.0788	-32.720	1.8165	294.21
SDev	22.1689	72.7	17.738	.6665	15.862	.5943	4.33
%RSD	257.49	2.0352	77.453	21.649	48.477	32.718	1.4728
#1	-3.7141	3488.5	33.178	-3.3112	-51.036	1.1876	298.39
#2	10.702	3594.0	2.4195	-2.3272	-23.540	1.8931	289.73
#3	-32.817	3627.8	33.106	-3.5979	-23.585	2.3689	294.51

Analysis Report 04/25/00 03:33:46 PM page 1

Method: XP2 Sample Name: 247042(9) MEP Operator: mp
Run Time: 04/25/00 15:27:38
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.1684	704.87	-3.2631	163.28	94.264	-.67228	33505.
SDev	1.8980	13.99	12.5401	3.04	6.823	.04773	1249.
%RSD	162.44	1.9844	384.30	1.8624	7.2378	7.0996	3.7278
#1	.50973	693.65	11.145	166.59	86.654	-.65173	32068.
#2	3.3080	700.41	-11.718	162.64	96.306	-.63826	34115.
#3	-.31252	720.54	-9.2159	160.60	99.833	-.72684	34331.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.99203	1.6458	11.206	10.446	19.628	17550.	203.65
SDev	.66827	1.4351	1.044	1.934	40.673	41.	10.26
%RSD	67.364	87.198	9.3193	18.514	207.22	.23624	5.0369
#1	1.5822	2.9816	11.917	12.626	8.6477	17569.	192.75
#2	.26640	1.8272	11.694	8.9347	64.663	17579.	213.11
#3	1.1275	.12863	10.007	9.7785	-14.428	17503.	205.10

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.21781	15.550	2752.2	3.6253	9.2278	.0004	159.18
SDev	.09032	7.788	525.9	2.5518	1.6113	.0000	14.02
%RSD	41.467	50.086	19.107	70.390	17.462	.3204	8.8046
#1	.19803	21.174	2853.2	.79266	8.6698	.0004	153.55
#2	.31639	18.815	3220.2	4.3386	11.044	.0004	148.85
#3	.13903	6.6606	2183.1	5.7445	7.9697	.0004	175.13

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-18.847	4310.3	22.936	-2.5847	9.8670	45.869	16.896
SDev	47.186	647.1	15.436	.1198	55.351	1.588	1.627
%RSD	250.36	15.013	67.301	4.6336	560.97	3.4629	9.6296
#1	32.651	4981.0	37.558	-2.6449	-20.623	46.742	15.629
#2	-60.006	4260.0	6.7977	-2.4468	-23.534	46.829	18.731
#3	-29.187	3689.7	24.451	-2.6624	73.758	44.035	16.329

Method: XP2 Sample Name: 247043(9) MEP Operator: mp
Run Time: 04/25/00 15:33:52
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.4704	1733.4	18.272	184.46	65.626	-.72969	59973.
SDev	.4841	227.7	22.517	3.23	3.418	.05929	282.
%RSD	32.927	13.134	123.23	1.7528	5.2086	8.1259	.46983
#1	2.0087	1490.1	-7.6493	180.86	69.297	-.67086	59856.
#2	1.0707	1768.7	32.987	187.11	65.045	-.72877	60295.
#3	1.3316	1941.3	29.478	185.41	62.535	-.78944	59769.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.38977	.18545	.87454	7.6957	4.2525	16322.	88.850
SDev	.65913	1.4464	1.0888	.3757	28.738	102.	7.927
%RSD	169.11	779.91	124.50	4.8814	675.78	.62554-	8.9217
#1	.66383	-.83491	-.06078	8.1288	35.096	16337.	81.060
#2	-.36218	-.44939	2.0698	7.4577	-21.770	16415.	88.582
#3	.86765	1.8407	.61462	7.5007	-.56849	16213.	96.907

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.15765	11.705	5440.3	6.0341	.00044	.0004	31.697
SDev	.12557	1.733	501.0	.9051	.00000	.0000	14.797
%RSD	79.652	14.805	9.2095	14.999	.40414	.4041	46.683
#1	.01693	12.663	5930.5	5.0944	.00044	.0004	21.062
#2	.19775	12.747	5461.3	6.1080	.00044	.0004	25.432
#3	.25828	9.7044	4929.1	6.9000	.00044	.0004	48.596

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	14.291	7323.7	12.611	-2.7519	-3.3090	85.298	11.358
SDev	47.448	32.6	16.576	.3510	56.0273	.181	.304
%RSD	332.01	.44563	131.44	12.756	1693.2	.21200	2.6759
#1	35.837	7345.5	24.230	-2.9667	-35.460	85.300	11.709
#2	47.143	7286.2	19.975	-2.9423	61.385	85.116	11.172
#3	-40.107	7339.4	-6.3712	-2.3468	-35.852	85.477	11.194

nalysis Report 04/25/00 03:46:14 PM page 1

Method: XP2 Sample Name: CCV1 Operator: mp
Run Time: 04/25/00 15:40:05
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	963.70	5665.6	1055.8	2465.5	944.31	1045.8[illegible]	6054.2
SDev	4.48	26.3	3.3	8.6	3.90	4.1	71.9
%RSD	.46512	.46498	.30899	.34759	.41324	.39539	1.1876
#1	968.88	5695.4	1057.1	2469.4	947.36	1049.7	6137.2
#2	961.15	5656.0	1052.0	2455.7	939.91	1041.5	6010.7
#3	961.08	5645.4	1058.1	2471.4	945.65	1046.1	6014.7

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1182.1	1083.0	1073.0	859.50	5347.1	5589.5	6376.5
SDev	4.4	5.6	4.7	4.46	49.1	24.3	22.6
%RSD	.36977	.51675	.43897	.51908	.91902	.43548	.35382
#1	1185.4	1086.7	1077.7	864.57	5380.7	5606.7	6397.6
#2	1177.2	1076.6	1068.3	856.18	5290.7	5561.7	6352.7
#3	1183.9	1085.7	1073.1	857.74	5369.9	5600.3	6379.1

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1030.4	2597.0	17744.	1109.3	1172.5	.0004	964.60
SDev	3.6	7.1	361.	4.4	14.8	.0000	111.84
%RSD	.34774	.27339	2.0333	.39470	1.2662	.6014	11.595
#1	1033.8	2601.0	17835.	1114.3	1189.4	.0004	835.76
#2	1026.6	2601.2	18051.	1106.0	1161.5	.0004	1021.3
#3	1030.7	2588.8	17346.	1107.7	1166.7	.0004	1036.7

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1106.3	2897.3	3154.2	2420.8	1013.0	1011.6	1290.6
SDev	51.6	75.6	11.9	7.7	35.1	2.9	10.5
%RSD	4.6627	2.6081	.37852	.31942	3.4685	.28226	.81041
#1	1075.0	2984.4	3160.6	2427.0	978.04	1013.3	1301.3
#2	1078.1	2849.9	3140.5	2412.1	1048.3	1008.3	1290.2
#3	1165.8	2857.5	3161.6	2423.3	1012.6	1013.2	1280.4

Matrix: ______ Project: ______ Analyst: mp Date: 4-25-00

Metal	QC # 19	True Value	% Recovery	QC # ICP - 2	True Value	% Recovery	CCV	True Value	% Recovery
Al					1000			5000	
Sb		2000						1000	
As	1987	2000	99				976	1000	98
Ba					1000			1000	
Be		2000						1000	
Cd		2000						1000	
Ca		2000						5000	
Cr		2000						1000	
Co		2000						1000	
Cu	1934	2000	97				942	1000	94
Fe	1766	2000	88				4899	5000	98
Pb	1990	2000	99				984	1000	98
Mg		2000						5000	
Mn		2000						1000	
Mo		2000						2500	
Ni		2000						1000	
K					10000			5000	
Se		2000						1000	
Ag					500			1000	
Na					1000			10000 1EC	
Si					5000				
Tl		2000						1000	
Sn								2500	
Ti		2000						2500	
V		2000						1000	
Zn	2047	2000	102				995	1000	99
Other									
Other									

Standardization Rpt. 04/25/00 08:51:56 AM page 1

Method: XP2 Standard: BLANK
Run Time: 04/25/00 08:46:20

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Avge	-.00005	-.02120	.00036	.00106	-.00007	.00352	.00015
SDev	.00008	.00051	.00051	.00027	.00007	.00068	.00002
%RSD	150.90	2.4014	142.02	25.822	100.05	19.193	12.465
#1	-.00013	-.02126	.00062	.00115	.00000	.00430	.00016
#2	.00003	-.02066	.00069	.00075	-.00007	.00311	.00013
#3	-.00007	-.02167	-.00023	.00128	-.00013	.00315	.00016

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Avge	-.00032	.00037	.00067	.01810	.00034	.03661	.00005
SDev	.00061	.00027	.00073	.00190	.00009	.00857	.00019
%RSD	191.99	73.504	109.41	10.487	27.871	23.397	340.79
#1	-.00049	.00059	.00151	.02028	.00023	.04650	.00000
#2	.00036	.00046	.00023	.01683	.00039	.03196	-.00010
#3	-.00082	.00007	.00026	.01718	.00039	.03138	.00026

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Avge	.00012	.00007	-.00081	.00098	.00325	.00032	.00071
SDev	.00008	.00015	.00148	.00085	.00246	.00022	.00039
%RSD	63.021	229.32	182.51	86.673	75.794	70.414	54.660
#1	.00016	-.00007	-.00072	.00151	.00495	.00007	.00092
#2	.00003	.00023	.00062	.00144	.00435	.00039	.00095
#3	.00016	.00003	-.00233	.00000	.00043	.00049	.00026

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Avge	.00164	-.00002	-.00207	-.00023	.00000	.00028
SDev	.00000	.00007	.00040	.00010	.00023	.00007
%RSD	.10801	311.95	19.306	42.897	5963400.	23.919
#1	.00164	.00000	-.00233	-.00023	-.00016	.00026
#2	.00164	.00003	-.00226	-.00013	-.00010	.00036
#3	.00164	-.00010	-.00161	-.00033	.00026	.00023

04/25/00 08:56:50 AM

ardization Rpt. Standard: stdM1L

od: XP2

Time: 04/25/00 08:52:01

em	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
ge	.20146	.01736	.11845	.57877	.30779	.04645	.14506
ev	.00076	.00169	.00008	.00030	.00066	.00010	.00063
RSD	.37786	9.7549	.06966	.05265	.21419	.21515	.43102
1	.20225	.01838	.11852	.57909	.30855	.04648	.14571
#2	.20141	.01829	.11836	.57873	.30733	.04653	.14503
#3	.20073	.01540	.11847	.57849	.30750	.04634	.14446

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	.18266	.14733	.17940	.13380	.00658	.00544	.00257
SDev	.00070	.00021	.00048	.00214	.00115	.00045	.00016
%RSD	.38270	.14557	.26876	1.5967	17.463	8.3540	6.4409
#1	.18338	.14744	.17902	.13617	.00531	.00524	.00239
#2	.18262	.14709	.17994	.13318	.00690	.00596	.00259
#3	.18198	.14747	.17923	.13204	.00754	.00511	.00272

Elem	V_2924	Zn2062
Avge	.03722	.01401
SDev	.00008	.00017
%RSD	.20593	1.2138
#1	.03718	.01402
#2	.03730	.01417
#3	.03716	.01383

Standardization Rpt. 04/25/00 09:01:44 AM page 1

Method: XP2 Standard: stdM1M
Run Time: 04/25/00 08:56:55

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	1.0340	.08874	.59804	2.9036	1.5546	.23376	.73258
SDev	.0006	.00175	.00044	.0011	.0018	.00030	.00102
%RSD	.05608	1.9667	.07394	.03721	.11458	.12613	.13928
#1	1.0333	.08674	.59753	2.9023	1.5525	.23346	.73146
#2	1.0343	.08992	.59836	2.9040	1.5555	.23405	.73284
#3	1.0343	.08957	.59823	2.9043	1.5557	.23376	.73345

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	.84675	.74103	.91589	.66386	.04678	.02578	.01510
SDev	.00092	.00075	.00055	.00422	.00304	.00089	.00048
%RSD	.10821	.10108	.05946	.63515	6.5067	3.4585	3.1676
#1	.84574	.74019	.91551	.66869	.04329	.02602	.01472
#2	.84752	.74126	.91652	.66190	.04820	.02479	.01495
#3	.84700	.74163	.91565	.66097	.04886	.02652	.01564

Elem	V_2924	Zn2062
Avge	.18702	.07069
SDev	.00017	.00006
%RSD	.08938	.09232
#1	.18696	.07076
#2	.18720	.07064
#3	.18688	.07066

Standardization Rpt. 04/25/00 09:06:39 AM page 1

Method: XP2 Standard: stdM1H
Run Time: 04/25/00 09:01:50

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	2.0524	.17491	1.1849	5.7403	3.0797	.46415	1.4559
SDev	.0022	.00108	.0019	.0111	.0066	.00137	.0030
%RSD	.10696	.61900	.16144	.19416	.21483	.29502	.20716
#1	2.0542	.17613	1.1865	5.7510	3.0868	.46552	1.4585
#2	2.0532	.17408	1.1854	5.7411	3.0785	.46416	1.4566
#3	2.0500	.17451	1.1828	5.7288	3.0737	.46278	1.4526

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	1.6617	1.4687	1.8185	1.3114	.09702	.04908	.02841
SDev	.0040	.0029	.0057	.0041	.00120	.00049	.00072
%RSD	.23926	.19611	.31251	.31561	1.2356	1.0015	2.5236
#1	1.6656	1.4717	1.8249	1.3138	.09612	.04954	.02845
#2	1.6618	1.4685	1.8169	1.3066	.09656	.04914	.02910
#3	1.6577	1.4659	1.8139	1.3137	.09838	.04856	.02767

Elem	V_2924	Zn2062
Avge	.37131	.13969
SDev	.00071	.00063
%RSD	.19171	.45130
#1	.37206	.14030
#2	.37122	.13973
#3	.37064	.13904

Standardization Rpt. 04/25/00 09:53:55 AM page 1

Method: XP2 Standard: stdM2L
Run Time: 04/25/00 09:48:18

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.03586	.07795	.03534	.04802	.24395	.03767	.02814
SDev	.00005	.00032	.00019	.00033	.00217	.00014	.00077
%RSD	.14162	.40727	.52503	.68086	.89109	.37445	2.7210
#1	.03581	.07758	.03513	.04812	.24361	.03781	.02730
#2	.03591	.07809	.03549	.04829	.24197	.03753	.02831
#3	.03585	.07817	.03540	.04766	.24628	.03768	.02880

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.01548	.00672	.00472	.36169
SDev	.00084	.00003	.00021	.00062
%RSD	5.4434	.49277	4.3849	.17207
#1	.01454	.00670	.00458	.36110
#2	.01616	.00676	.00462	.36234
#3	.01574	.00669	.00496	.36164

Method: XP2 Standard: stdM2M
Run Time: 04/25/00 09:54:00

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.26546	.39431	.16732	.24127	.91208	.18962	.14626
SDev	.00050	.00027	.00032	.00015	.00140	.00022	.00020
%RSD	.18983	.06933	.18861	.06434	.15330	.11462	.13687
#1	.26563	.39400	.16738	.24112	.91368	.18971	.14642
#2	.26586	.39451	.16760	.24143	.91110	.18978	.14632
#3	.26490	.39442	.16698	.24126	.91147	.18938	.14604

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.07492	.02815	.02574	1.8378
SDev	.00034	.00008	.00016	.0029
%RSD	.45019	.27803	.61720	.15951
#1	.07481	.02820	.02582	1.8392
#2	.07465	.02819	.02584	1.8398
#3	.07530	.02806	.02555	1.8344

Method: XP2 Standard: stdM2H
Run Time: 04/25/00 09:59:42

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.53139	.78621	.33258	.47936	1.7661	.37817	.29315
SDev	.00205	.00204	.00096	.00135	.0069	.00119	.00069
%RSD	.38581	.25908	.28781	.28248	.38991	.31399	.23591
#1	.53117	.78477	.33251	.47961	1.7658	.37838	.29267
#2	.52945	.78532	.33166	.47790	1.7593	.37690	.29284
#3	.53353	.78854	.33357	.48058	1.7731	.37924	.29395

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.14935	.05445	.05194	3.6645
SDev	.00160	.00012	.00009	.0106
%RSD	1.0695	.22678	.17125	.28922
#1	.14995	.05437	.05186	3.6621
#2	.14754	.05438	.05203	3.6553
#3	.15057	.05459	.05194	3.6761

tandardization Report 04/25/00 10:05:19 AM

:ethod: XP2 Slope = Conc(SIR)/IR

lement	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
.g3280	328.068	Multiple	Standards	977.822	.077621	04/25/00 09:01:50
.13082	308.215	Multiple	Standards	17684.6	374.797	04/25/00 09:59:42
.s1890	189.042	Multiple	Standards	11509.3	-4.11357	04/25/00 09:01:50
_2496	249.678	Multiple	Standards	6408.52	-6.73274	04/25/00 09:59:42
a4934	493.409	Multiple	Standards	1682.39	.114508	04/25/00 09:01:50
e3130	313.042	Multiple	Standards	347.032	-1.21915	04/25/00 09:01:50
a3158	315.887	Multiple	Standards	29455.2	-4.81641	04/25/00 09:59:42
d2265	226.502	Multiple	Standards	647.184	.209387	04/25/00 09:01:50
o2286	228.616	Multiple	Standards	4312.27	-1.59192	04/25/00 09:01:50
r2677	267.716	Multiple	Standards	1375.15	-.905693	04/25/00 09:01:50
u3247	324.753	Multiple	Standards	1212.96	-21.9476	04/25/00 09:01:50
e2714	271.441	Multiple	Standards	20865.7	-7.02762	04/25/00 09:59:42
_7664	766.491	Multiple	Standards	5404.08	-198.866	04/25/00 09:59:42
g2790	279.078	Multiple	Standards	26467.8	-1.41237	04/25/00 09:59:42
n2576	257.610	Multiple	Standards	1356.68	-.161694	04/25/00 09:01:50
o2020	202.030	Multiple	Standards	17314.9	-1.01549	04/25/00 09:59:42
a3302	330.232	Multiple	Standards	193799.	155.498	04/25/00 09:59:42
i2316	231.604	Multiple	Standards	1104.61	-1.06226	04/25/00 09:01:50
b2203	220.351	Multiple	Standards	1524.80	-4.94148	04/25/00 09:01:50
b2203	220.353		NONE	1.00000	.000000	*NOT STANDARDIZED
_1960	196.026	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
b2068	206.838	Multiple	Standards	23759.7	-7.09149	04/25/00 09:01:50
e1960	196.261	Multiple	Standards	41156.3	-29.1866	04/25/00 09:01:50
i2881	288.158	Multiple	Standards	95770.2	-156.859	04/25/00 09:59:42
n1899	189.989	Multiple	Standards	99392.9	2.41955	04/25/00 09:59:42
i3372	337.280	Multiple	Standards	1365.61	2.84674	04/25/00 09:59:42
l1908	190.864	Multiple	Standards	68760.6	15.8404	04/25/00 09:01:50
_2924	292.402	Multiple	Standards	5369.12	.000808	04/25/00 09:01:50
n2062	206.200	Multiple	Standards	14372.5	-4.06031	04/25/00 09:01:50

Analysis Report QC Standard 04/25/00 10:11:01 AM page 1

Method: XP2 Sample Name: M199121508 ICP-2 Operator:
Run Time: 04/25/00 10:05:24
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	490.81	1018.4	-8.3450	1003.7	995.26	-.21954	10.235
SDev	.59	.8	16.9442	2.9	2.16	.03810	2.444
%RSD	.11987	.08284	203.04	.29193	.21734	17.355	23.881
#1	490.13	1019.3	-27.706	1001.4	992.88	-.18033	7.6427
#2	491.22	1017.6	3.7793	1007.0	997.12	-.22186	12.498
#3	491.06	1018.3	-1.1085	1002.7	995.76	-.25643	10.565
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value	500.00	1000.0		1000.0	1000.0		
Range	10.000	1000.0		10.000	10.000		

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.05135	-.51369	-.63726	-1.1414	5.6662	9287.1	3.1913
SDev	.35596	.80056	1.20769	.9744	8.1808	8.2	.5043
%RSD	693.16	155.84	189.51	85.373	144.38	.08826	15.804
#1	.35679	-.75006	-.27928	-1.7014	13.340	9278.1	2.8936
#2	-.21331	-1.1695	-1.9835	-1.7066	6.6003	9289.1	3.7737
#3	-.29755	.37844	.35098	-.01621	-2.9416	9294.1	2.9068
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value						10000.	
Range						10.000	

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.39874	27.389	Q1143.3	-.71389	1.2560	.0003	7.3793
SDev	.05181	13.737	252.6	.81132	2.1749	.0000	7.3812
%RSD	12.994	50.156	22.091	113.65	173.16	.1959	100.03
#1	.36802	42.365	Q1290.5	-.99038	.00033	.0003	-.13380
#2	.45856	24.429	Q851.66	-1.3508	.00033	.0003	7.6507
#3	.36964	15.373	Q1287.7	.19953	3.7674	.0003	14.621
Errors	NOCHECK	NOCHECK	QC Fail	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			1000.0				
Range			10.000				

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-15.325	4903.6	32.663	3.0668	20.292	.52625	-.77947
SDev	19.096	11.1	9.861	2.3011	29.373	.17577	.00643
%RSD	124.61	.22706	30.189	75.033	144.75	33.400	.82469
#1	-6.4217	4894.3	41.227	5.5572	51.637	.35020	-.78681
#2	-2.3064	4915.9	34.878	2.6238	15.840	.52681	-.77483
#3	-37.246	4900.5	21.883	1.0194	-6.6010	.70174	-.77676
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK

Analysis Report QC Standard 04/25/00 10:16:43 AM page 1

Method: XP2 Sample Name: M199121507 QC-19 Operator:
Run Time: 04/25/00 10:11:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.97877	154.53	1987.4	125.12	.33351	2055.8	1986.0
SDev	.19287	6.73	16.8	1.34	.14497	1.9	2.1
%RSD	19.705	4.3556	.84496	1.0700	43.469	.09238	.10507
#1	1.1597	148.58	1968.2	126.35	.44307	2056.9	1988.4
#2	1.0007	153.16	1994.7	125.32	.38833	2056.9	1984.7
#3	.77588	161.83	1999.4	123.69	.16912	2053.6	1984.8
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value			2000.0			2000.0	2000.0
Range			10.000			10.000	10.000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2030.8	2041.0	2031.9	1933.8	Q1766.0	-30.519	2037.4
SDev	2.3	1.4	1.9	3.0	6.8	12.331	6.8
%RSD	.11442	.07017	.09310	.15339	.38647	40.404	.33504
#1	2028.5	2039.4	2032.3	1936.7	Q1773.7	-33.523	2042.1
#2	2033.2	2041.4	2033.5	1934.1	Q1763.7	-41.071	2040.5
#3	2030.7	2042.1	2029.8	1930.8	Q1760.7	-16.964	2029.5
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	NOCHECK	QC Pass
Value	2000.0	2000.0	2000.0	2000.0	2000.0		2000.0
Range	10.000	10.000	10.000	10.000	10.000		10.000

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2042.3	2095.7	311.06	2020.8	1990.3	.0003	Q2255.7
SDev	.8	2.7	92.00	3.3	5.6	.0000	54.4
%RSD	.03827	.12681	29.578	.16542	.28137	.1623	2.4106
#1	2043.1	2093.3	351.05	2022.7	1994.3	.0003	2197.0
#2	2042.1	2098.5	376.30	2022.7	1992.7	.0003	Q2266.0
#3	2041.6	2095.3	205.82	2016.9	1983.9	.0003	Q2304.3
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Fail
Value	2000.0	2000.0		2000.0	2000.0		2000.0
Range	10.000	10.000		10.000	10.000		10.000

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2050.7	1266.4	2115.2	2047.0	2055.1	2026.0	2046.9
SDev	35.4	1.5	16.9	1.7	35.5	4.0	3.9
%RSD	1.7247	.12146	.79741	.08130	1.7262	.19907	.19097
#1	2072.6	1267.7	2124.7	2047.5	2014.4	2026.2	2042.6
#2	2009.9	1264.7	2095.8	2048.4	2079.6	2030.0	2050.3
#3	2069.5	1266.9	2125.3	2045.1	2071.4	2022.0	2047.7
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass

Analysis Report 04/25/00 10:22:56 AM

Method: XP2 Sample Name: IEC 1 Operator: mp
Run Time: 04/25/00 10:16:48
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.25914	8041.1	-6.9911	10.030	.78487	.90133	39083.
SDev	1.0980	6692.1	5.5263	13.326	.75892	2.8883	33845.
%RSD	423.72	83.223	79.047	132.86	96.694	320.45	86.598
#1	-.91976	12063.	-13.202	11.401	.50200	-.05446	59193.
#2	1.2528	11744.	-2.6182	22.617	1.6446	4.1463	58048.
#3	.44442	315.95	-5.1529	-3.9281	.20800	-1.3879	7.4605

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	4.8335	1.1122	1.2996	-15.122	31818.	-62.584	19969.
SDev	4.8237	2.6583	3.0340	3.489	27565.	85.364	17292.
%RSD	99.798	239.01	233.46	23.070	86.632	136.40	86.594
#1	4.7238	-.03115	-.00075	-15.482	48405.	-9.6733	29933.
#2	9.7110	4.1509	4.7670	-11.468	47051.	-17.016	29972.
#3	.06552	-.78311	-.86748	-18.417	-1.0848	-161.06	1.8972

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2.5778	21.311	6452.8	.68742	2.7178	.0002	60.254
SDev	3.9348	17.625	5409.8	4.3723	4.7071	.0001	66.430
%RSD	152.64	82.702	83.835	636.06	173.19	61.66	110.25
#1	.59718	34.877	9510.1	-2.4434	8.1532	.0003	132.06
#2	7.1093	27.667	9641.8	5.6830	.00026	.0003	47.702
#3	.02679	1.3901	206.66	-1.1774	.00007	.0001	.99600

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-60.051	-16.242	25.247	5.8063	78.374	6.7435	4.2980
SDev	72.025	87.230	17.132	4.1918	123.88	10.627	6.4270
%RSD	119.94	537.07	67.859	72.193	158.06	157.58	149.54
#1	-11.582	32.211	38.394	3.9251	2.2657	.88412	3.9791
#2	-142.82	36.006	31.475	10.609	221.32	19.010	10.879
#3	-25.756	-116.94	5.8718	2.8847	11.542	.33648	-1.9636

Analysis Report 04/25/00 10:29:09 AM

Method: XP2 Sample Name: CCV 1 Operator: mp
Run Time: 04/25/00 10:23:01
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	994.53	4926.0	976.07	2494.2	993.46	1000.7	4891.5
SDev	2.92	11.7	4.90	2.8	2.00	1.9	9.9
%RSD	.29385	.23844	.50192	.11118	.20104	.18561	.20311
#1	996.63	4916.5	980.77	2496.6	994.74	1001.8	4898.8
#2	991.19	4922.5	970.99	2491.1	991.16	998.60	4880.2
#3	995.77	4939.1	976.45	2494.8	994.49	1001.8	4895.4

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	992.56	992.29	988.61	941.97	4899.1	4663.1	4985.4
SDev	1.66	2.34	1.10	2.75	19.9	8.0	13.7
%RSD	.16741	.23618	.11175	.29144	.40678	.17205	.27505
#1	993.42	994.74	989.26	942.49	4922.1	4670.8	4992.6
#2	990.64	990.07	987.33	939.00	4888.1	4654.8	4969.6
#3	993.61	992.06	989.23	944.41	4887.1	4663.8	4994.0

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	983.25	2504.4	14551.	989.61	984.44	.0003	1075.8
SDev	2.56	18.5	212.	.47	4.61	.0000	35.3
%RSD	.26020	.73964	1.4573	.04772	.46789	.1637	3.2774
#1	984.88	2483.0	14786.	990.15	983.85	.0003	1038.0
#2	980.30	2516.0	14374.	989.31	980.16	.0003	1081.5
#3	984.57	2514.1	14493.	989.35	989.31	.0003	1107.8

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1001.7	2519.7	2572.7	2490.0	942.15	970.11	994.95
SDev	17.4	8.9	5.7	5.3	41.61	2.19	3.20
%RSD	1.7325	.35359	.22332	.21253	4.4163	.22609	.32168
#1	1006.0	2525.2	2566.9	2494.1	896.22	972.15	998.02
#2	1016.5	2509.5	2572.9	2484.0	952.94	967.79	991.64
#3	982.59	2524.5	2578.4	2491.9	977.31	970.40	995.18

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: 1311 Circle 1: Instrument T-1 T-2 BATCH ID: MME0004H-B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	4-11-00	16.00	22.0	30	SR
STOP:	4-12-00	16.00	21.0	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ 5N AcOH Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	\$ Fluid #3:
1	33099	247041	>5	~5	100.0	1600	1 3 2	
2		247042	>5	~5	100.0	1600	1 3 2	Contains DI
3		247043	>5	~5	100.0	1600	1 3 2	water with pH
4							1 2	adjusted to
5							1 2	~5.0 with 5N
6							1 2	acetic acid.
7							1 2	
8							1 2	
9							1 2	# pH was >5.2
10							1 2	AcOH was added
11							1 2	and tumbled
12							1 2	for four more
13							1 2	hours.
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE1600 Exp. 01/01

REAGENTS

HCl (1 N)		pH
Fluid #1		
Fluid #2		

Fluid #3 DI water (~5pH)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water:

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail
Fluid #3	5.0 ± 0.2 pH	Pass / Fail

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

Multiple Extraction Procedure
TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MMS0 00421-B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/13/00	17:05	22	30	SR
STOP:	04/14/00	17:05	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ 60:40 H_2SO_4:HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	* Fluid #3:
1	33099	247041	>5	~3.0	58	1160	1 3 2	Contains dI
2		247042	>5	~3.0	59	1180	1 3 2	water with pH
3		247043	>5	~3.0	97	1940	1 3 2	adjusted to ~3.0
4							1 2	with 60:40
5							1 2	H_2SO_4:HCl.
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE 1600 Exp. 01/01

REAGENTS

HCl (1 N)		pH
Fluid #1		
Fluid #2		

Fluid #3 dI water (~3 pH)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.00 ± 0.2 Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MHE 000411-B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/14/00	17.30	21	30	SR
STOP:	04/15/00	17.30	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ HNO3/H2SO4/HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3.0	57	1140	1 3 2	X Fluid # 3:
2		247042	>5	~3.0	59	1180	1 3 2	same as
3		247043	>5	~3.0	80	1600	1 3 2	earlier.
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 9727054 6 Exp. 4/22/00

Balance ID: PE1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid#3 DI water (~3 pH)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

Fluid #3 3.00 ± 0.2 Pass

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water:

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

File = Lbtclp

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: ____

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/15/00	17.50	22	30	SR
STOP:	04/16/00	17.50	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ 60:40 H_2SO_4:HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3.0	57	1140	1 3 2	* Fluid #3
2		247042	>5	~3.0	59	1180	1 3 2	same as
3		247043	>5	~3.0	80	1600	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 dI water (~3 pH)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.00 ± 0.2 (Pass)

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MM[illegible]000411-B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/16/00	17.50	22	30	SR
STOP:	04/17/00	17.50	23	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ [illegible] Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3	58	1140	1 3 2	* Fluid #3
2		247042	>5	~3	58	1180	1 3 2	Same as
3		247043	>5	~3	79	1580	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid#3 dI water (pH ~3)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.00 ± 0.2 Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MMG000411-B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/17/00	18.00	22	30	SR
STOP:	04/18/00	18.00	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ 60:40 H_2SO_4:HNO_3 Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3	60	1200	1 3 2	Fluid #3:
2		247042	>5	~3	59	1180	1 3 2	Same as
3		247043	>5	~3	76	1520	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE 1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 dI water (pH ~3)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.00 ± 0.2 Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MM15000411B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/18/00	18.00	22	30	SP
STOP:	04/19/00	18.00	22	30	SP

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ Acidify w/ HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3	61	1220	1 3 2	* Fluid #3:
2		247042	>5	~3	60	1200	1 3 2	same as
3		247043	>5	~3	78	1560	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 di water (pH ~3)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.0 ± 0.2 pH Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MME0004MB

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/19/00	18.00	23	30	SP
STOP:	04/20/00	18.00	23	30	SP

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ 60:40 H_2SO_4:[illegible] Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	847041	>5	~3	57	1140	1 3 2	* Fluid #3:
2		847042	>5	~3	59	1180	1 3 2	Same as
3		847043	>5	~3	78	1560	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
0							1 2	
1							1 2	
2							1 2	
3							1 2	
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
0							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PC1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 DI water (pH~3)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water. Fluid #3. 3.00 ±0.2pH Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MME000641 B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/20/00	18.05	22	30	SR
STOP:	04/21/00	18.05	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3	57	1140	1 3 2	* Fluid #3:
2		247042	>5	~3	59	1180	1 3 2	same as
3		247043	>5	~3	78	1560	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PG1600 Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 DI water (pH~3)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water: Fluid #3 3.00 ± 0.2 pH Pass

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

File = Lbtclp

TOXICITY CHARACTERISTIC LEACHING PROCEDURE - Metals/SVOs

LOGBOOK NO. 032400-01

SOP NO.: M 95 METHOD: ~~1311~~ 1320 Circle 1: Instrument T-1 T-2 BATCH ID: MMG000411B

	DATE (m/d/y)	TIME (hh:mm) [a]	TEMP. (° C) [b]	RPM Check [c]	PERFORMED BY
START:	04/21/00	18.15	22	30	SR
STOP:	04/22/00	18.15	22	30	SR

	Project Number	Lab Sample Number	pH of DI Water [d]	pH after ~~1N HCl~~ [illegible] H_2SO_4/HCl Addition [d]	Sample Amount (grams)	Extraction Fluid Vol. (mL)	Extraction Fluid Fluid ID (circle)	Comment
	Blank		NA	NA	NA		1 2	
	Blank		NA	NA	NA		1 2	
	Tumble Duplicate						1 2	
1	33099	247041	>5	~3	59	1180	1 3 2	* Fluid #3:
2		247042	>5	~3	60	1200	1 3 2	same as
3		247043	>5	~3	79	1580	1 3 2	earlier
4							1 2	
5							1 2	
6							1 2	
7							1 2	
8							1 2	
9							1 2	
10							1 2	
11							1 2	
12							1 2	
13							1 2	
14							1 2	
15							1 2	
16							1 2	
17							1 2	
18							1 2	
19							1 2	
20							1 2	

Abbreviations:

NA = not applicable

OK = no problems encountered

Thermometer ID: 97270546 Exp. 4/22/00

Balance ID: PE160D Exp. 01/01

REAGENTS

		pH
HCl (1 N)		
Fluid #1		
Fluid #2		

Fluid #3 dI water (pH ~3)

[a] Elapsed time shall be 18 ± 2 hours

[b] Criterion: 23 ± 2 °C

[c] Criterion: 30 ± 2 revolutions per minute (RPM)

Acceptance Criteria:

Fluid #1	4.93 ± 0.05 pH	Pass / Fail
Fluid #2	2.88 ± 0.05 pH	Pass / Fail
Fluid #3	3.00 ± 0.2 pH	Pass

[d] After adding 96.5 mL of reagent water and stirring for 5 minutes, check the pH of the water:

i. if the pH < 5.0, use fluid #1 for the procedure

ii. if the pH > 5.0, add 3.5 mL of 1 N HCl to make a slurry, heat for 5 minutes at 50 °C, cool and record the pH

- if the pH < 5.0, use fluid #1 for the procedure
- if the pH > 5.0, use fluid #2 for the procedure

File = Lbtclp

LAW & COMPANY

Consulting and Analytical Chemists

3770 GREEN INDUSTRIAL WAY
CHAMBLEE, GA. 30341

PHONE· 770-216-2044
FAX. 770-216-2045

Chemical Report

05/18/00

Number: 824298-00

Received: 04/05/00

31950
Mr George Z
Kiber Environmental Services
3145 Medlock Bridge Road
Norcross, GA 30071

Description: PS - Ms 1-3, Treated Soils. PSA 3216-8900

Lab ID:	824298	824299	824300
Sample ID:	PS-MS -1	PS-MS-2	PS-MS-3
Total Neutralizing Capability (as CaO) (ASTM -C-1318)	3.42 %	2.98%	2.18%
Dissolved Magnesium (as CaO)	0.06%	0.03%	0.02%
Total Dissolved Oxides (as CaO)	3.74%	3.05%	2.27%

*****

Respectfully Submitted,
LAW & COMPANY

By: Thomas E. Lanty

5 15000amg

Samples are retained for a period of thirty to sixty days after completion of testing. After that time, samples are disposed of in an environmentally sound manner unless other arrangements are made by the client.

RELATIVE DENSITY TEST

ASTM D 4253 & 4254

Relative Density Test
ASTM D 4253 & 4254

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.	PS-DM-1	SOIL DESCR.	Proj# 3216-8899
DEPTH		SAMPLED	1-10-00 CLA
SAMPLE NO.	Drainage Material	DATE TESTED	
LOCATION	PSA		

Mold Data

Height (ft)	0.758
Diameter (ft)	0.917
Area (sq ft)	0.660
Volume (cu ft)	0.500

MINIMUM DENSITY DETERMINATION

	Trial 1	Trial 2	Trial 3
Weight of Mold & Dry Soil (lbs)	55.71	55.41	55.49
Weight of Mold (lbs)	20.58	20.58	20.58
Weight of Dry Soil (lbs)	35.13	34.83	34.91
Minimum Dry Density (pcf)	70.24	69.64	69.80

Average Minimum Dry Density (pcf) **69.89**

MAXIMUM DENSITY DETERMINATION

	Trial 1	Trial 2
Average Height to Loading Plate (in)	0.798	0.789
Loading Plate Thickness (in)	0.471	0.471
Height of Sample (in)	7.829	7.838
Volume of Sample (sq ft)	0.430	0.431
Dry Weight of Sample & Mold (lbs)	53.70	53.52
Weight of Mold (lbs)	20.58	20.58
Dry Weight of Sample (lbs)	33.12	32.94
Maximum Dry Density (pcf)	76.95	76.44

Average Maximum Dry Density (pcf) **76.70**

Data entry by: DLS Date: 04/17/2000
Data checked by: CAL Date: 4/19/00
Filename: KBRDDM1

ADVANCED TERRA TESTING, INC.

Relative Density Test
ASTM D 4253 & 4254

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.	PS-DM-2	SOIL DESCR.	Proj# 3216-8899
DEPTH		SAMPLED	1-10-00 CLA
SAMPLE NO.	Drainage Material	DATE TESTED	4-14-00 MC
LOCATION	PSA		

Mold Data

Height (ft)	0.758
Diameter (ft)	0.917
Area (sq ft)	0.660
Volume (cu ft)	0.500

MINIMUM DENSITY DETERMINATION

	Trial 1	**Trial 2**	**Trial 3**
Weight of Mold & Dry Soil (lbs)	55.06	54.97	55.02
Weight of Mold (lbs)	20.58	20.58	20.58
Weight of Dry Soil (lbs)	34.48	34.39	34.44
Minimum Dry Density (pcf)	68.94	68.76	68.86

Average Minimum Dry Density (pcf) **68.85**

MAXIMUM DENSITY DETERMINATION

	Trial 1	**Trial 2**
Average Height to Loading Plate (in)	0.799	0.773
Loading Plate Thickness (in)	0.471	0.471
Height of Sample (in)	7.829	7.854
Volume of Sample (sq ft)	0.430	0.432
Dry Weight of Sample & Mold (lbs)	53.34	53.30
Weight of Mold (lbs)	20.58	20.58
Dry Weight of Sample (lbs)	32.76	32.72
Maximum Dry Density (pcf)	76.21	75.78

Average Maximum Dry Density (pcf) **75.99**

Data entry by: DLS Date: 04/17/2000
Data checked by: CAL Date: 04/18/00
Filename: KBRDDM2

ADVANCED TERRA TESTING, INC.

Relative Density Test
ASTM D 4253 & 4254

CLIENT	Kiber Environmental Services	JOB NO.	2453-01
BORING NO.	PS-DM-3	SOIL DESCR.	Proj# 3216-8899
DEPTH	Drainage Material	SAMPLED	1-10-00
SAMPLE NO.	048103-0845	DATE TESTED	4-12-00 MC
LOCATION	PSA		

Mold Data

Height (ft)	0.758
Diameter (ft)	0.917
Area (sq ft)	0.660
Volume (cu ft)	0.500

MINIMUM DENSITY DETERMINATION

	Trial 1	Trial 2	Trial 3
Weight of Mold & Dry Soil (lbs)	57.84	57.52	57.59
Weight of Mold (lbs)	20.58	20.58	20.58
Weight of Dry Soil (lbs)	37.26	36.94	37.01
Minimum Dry Density (pcf)	74.49	73.85	73.99

Average Minimum Dry Density (pcf) **74.11**

MAXIMUM DENSITY DETERMINATION

	Trial 1	Trial 2
Average Height to Loading Plate (in)	0.930	0.932
Loading Plate Thickness (in)	0.471	0.471
Height of Sample (in)	7.697	7.695
Volume of Sample (sq ft)	0.423	0.423
Dry Weight of Sample & Mold (lbs)	34.64	55.22
Weight of Mold (lbs)	0.00	20.58
Dry Weight of Sample (lbs)	34.64	34.64
Maximum Dry Density (pcf)	81.87	81.89

Average Maximum Dry Density (pcf) **81.88**

Data entry by: DLS Date: 04/17/2000
Data checked by: CM Date: 4/18/00
Filename: KBRDDM3

ADVANCED TERRA TESTING, INC.

KIBER ENVIRONMENTAL SERVICES

SAMPLE CHAIN-OF-CUSTODY RECORD

COC#

3145 MEDLOCK BRIDGE ROAD
NORCROSS, GEORGIA 30071
(770) 242-4090 FAX (770) 242-9198

CLIENT NAME	PROJECT NAME	KES PROJECT #
Kiber	PSA	3216-8899

TAT or DUE DATE	CONTACT	KES PROJECT MANAGER
STD	Chris Wieneck	George Zaharchak
	PHONE# / EXT.	RECEIVING LAB: ATT / PO#: 8899

SAMPLED BY: George Zaharchak (PRINTED NAME) — SIGNATURE — Kiber (COMPANY)

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample Matrix	Preservative	# / Size of Cont.	Permeability (ASTM D 5084)	Min/Max Density (ASTM D 4253/4254)							Remarks
PS-MS-1	Treated Cores	4/4/00	S	—	2x8	X								
PS-MS-2	↓	↓	↓	↓	↓	X								
PS-MS-3	↓	↓	↓	↓	↓	X								
PS-DM-1	Drainage Material	↓	↓	↓	3 8qt	X	X							
PS-DM-2	↓	↓	↓	↓	↓	X	X							
PS-DM-3	↓	↓	↓	↓	↓	X	X							

KIBER QA/QC LEVEL REQUESTED: I II III IV — CASE NARRATIVE REQUESTED: YES NO — PM INITIALS

SAMPLES RELINQUISHED BY:	DATE/TIME	SAMPLES ACCEPTED BY:	DATE/TIME
[signature]	4/4/00 1500		

COMMENTS: Please provide maximum amount of QA/QC data available

UNCONFINED COMPRESSION TEST

ASTM D 2166
SUMMARY OF RESULTS

PROJECT:	PSA	LOAD CELL:	6000 lb.
PROJECT No.:	3216	DATE CALIBRATED:	8 JUNE 1999
SAMPLE No.:	PS-MS-3	DIAL GAGE:	LDT 2
TESTING DATE:	13 APRIL 2000	LOADING RATE:	0.04 in./min.
TESTED BY:	GMZ	TRACKING CODE:	0296_US

TESTING PARAMETER AND RESULTS	
MOISTURE CONTENT	25.9 %
BULK UNIT WEIGHT	119.7 lb/ft^3
DRY UNIT WEIGHT	95.1 lb/ft^3
UCS •	777.5 lb/in^2

• UCS - UNCONFINED COMPRESSIVE STRENGTH

UNCONFINED COMPRESSION TEST

ASTM D 2166

PROJECT:	PSA	LOAD CELL:	6000 lb.
PROJECT No.:	3216	DATE CALIBRATED:	8 JUNE 1999
SAMPLE No.:	PS-MS-3	DIAL GAGE:	LDT 2
TESTING DATE:	13 APRIL 2000	LOADING RATE:	0.04 in./min.
TESTED BY:	GMZ	TRACKING CODE:	0296_US

MOISTURE CONTENT (Dry Basis)	
1. MOISTURE TIN NO.	PS-MS-3
2. WT MOISTURE TIN (tare weight)	1.27 g
3. WT WET SOIL + TARE	28.35 g
4. WT DRY SOIL + TARE	22.78 g
5. WT WATER, Ww	5.57 g
6. WT DRY SOIL, Ws	21.51 g
7. MOISTURE CONTENT, W	**25.89 %**

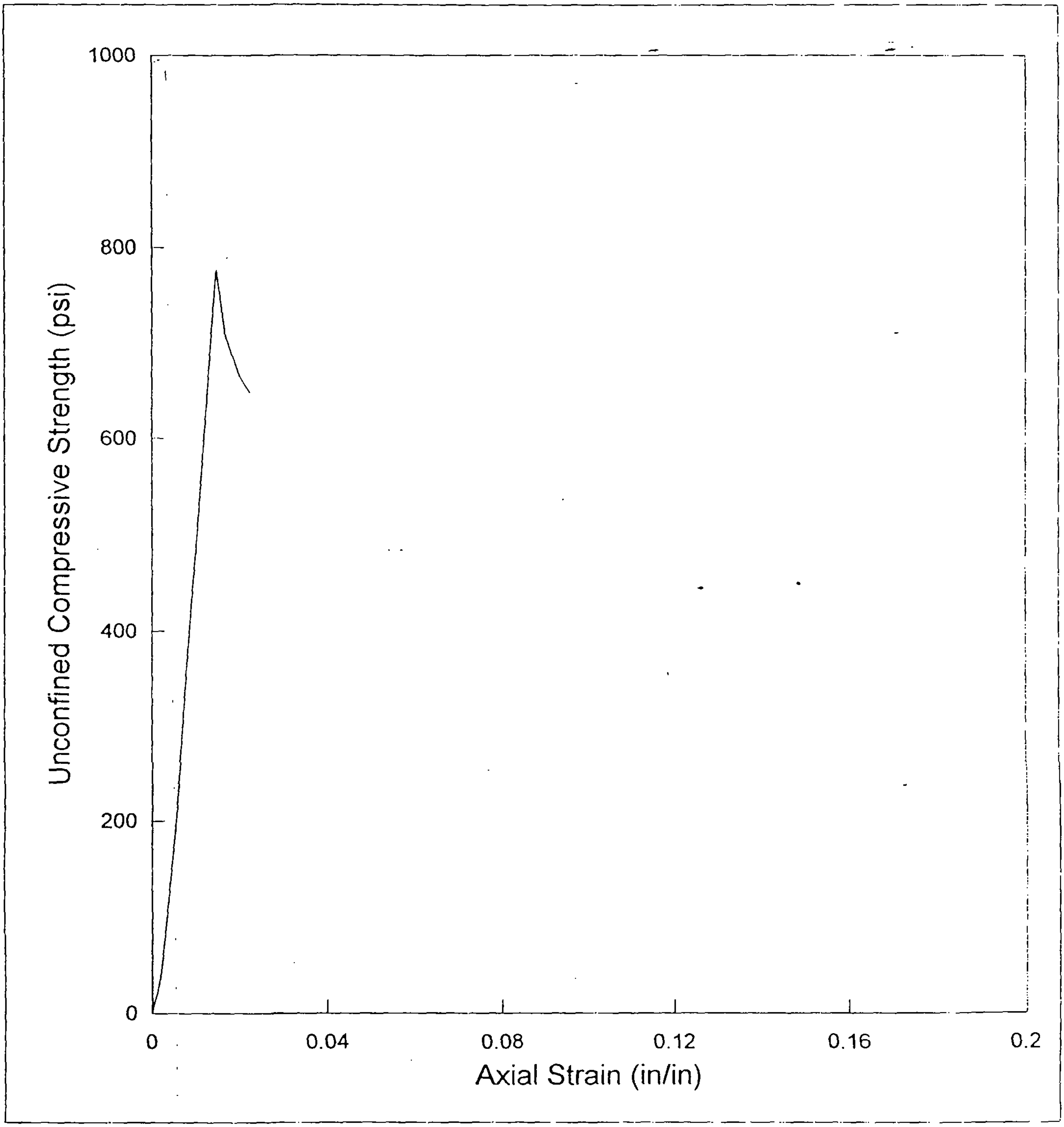
SOIL SPECIMEN DIMENSIONS		
	DIAMETER	*LENGTH*
No. 1	2.72 in.	4.44 in.
No. 2	2.75 in.	4.43 in.
No. 3	2.72 in.	4.44 in.
Average	**2.73 in.**	**4.44 in.**

SPECIMEN CONDITIONS	
Initial Specimen WT, Wo	***815.83 g***
Initial Area, Ao	5.85 in^2
Initial Volume, Vo	25.97 in^3
Initial Bulk Unit Weight,	119.7 lb/ft^3
Initial Dry Unit Weight	95.1 lb/ft^3
15 % Strain (0.15 Lo)	0.67 in.
UCS	777 5 lb/in^2

COMPRESSIVE LOAD (lbs.)	DIAL GAGE READING (in.)	SPECIMEN DEFORMATION (in.)	CORRECTED AREA (in^2)	AXIAL STRAIN (in/in)	UNCONFINED COMPRESSIVE STRENGTH (lb/in^2)
0	0.000	0.000	5.853	0.0000	0.0
80	0.003	0.003	5.857	0.0007	13.7
114	0.005	0.005	5.860	0.0011	19.5
169	0.007	0.007	5.863	0.0016	28.8
260	0.010	0.010	5.867	0.0023	44.3
561	0.015	0.015	5.873	0.0034	95.5
845	0.020	0.020	5.880	0.0045	143.7
1173	0.025	0.025	5.887	0.0056	199.3
1623	0.030	0.030	5.893	0.0068	275.4
2079	0.035	0.035	5.900	0.0079	352.4
2495	0.040	0.040	5.907	0.0090	422.4
2887	0.045	0.045	5.913	0.0101	488.2
3310	0.050	0.050	5.920	0.0113	559.1
3747	0.055	0.055	5.927	0.0124	632.2
4209	0.060	0.060	5.934	0 0135	709.3
4619	0.065	0.065	5.941	0.0147	777.5
4214	0.075	0.075	5.954	0.0169	707.7
3961	0.090	0.090	5.975	0.0203	663.0
3878	0.100	0.100	5.988	0 0225	647.6

UNCONFINED COMPRESSION TESTING

Sample No. PS-MS-3



A. J. EDMOND COMPANY

An ISO 9002 Certified Company
CHEMISTS / ENGINEERS
1530 Texas Avenue
Texas City, Texas 77590
Phone: (409) 948-4504 Fax: (409) 948-4046

ISO 9002
Certificate Number 34314

ANALYTICAL LABORATORIES
CARGO SURVEYS
BARGE SURVEYS
COMMODITY SURVEYS
INSPECTORS
CONSULTANTS
MANUFACTURING
SAMPLING SYSTEMS

April 14, 2000

Kiber Enviromental Services
3145 Medlock Bridge Road
Norcross, GA 30071

Project Number: TC00705

Kiber Enviromental
Waste Material
4/13/00

Attn: Mr. George Zaharchak

LABORATORY ANALYSES

Date	Sample Description	Sample ID	Hardgrove Grindability Index
4/13/00	Waste Material	PS-MS-1	76
4/13/00	Waste Material	PS-MS-2	98
4/13/00	Waste Material	PS-MS-3	80

KJK/
Form 2.10f2a-0

Respectfully Submitted

A. J. EDMOND COMPANY

by K. J. Kumke
K. J. Kumke

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

ANALYTICAL REPORT

Client:	**Kiber Environmental Services, Inc** 3145 Medlock Bridge Road Norcross, GA 30071
Attention:	**George Zaharchak**
Project Name:	**PSA**
Project ID:	3216-8913
Received:	4/20/00
Lab Project No.	33336

Report Date: 4/26/00

CASE NARRATIVE

1 The holding times for each sample were met.

2 Where applicable, results & reporting limits are based on wet weight; dry weight calculations available.

Reviewed by:

Respectfully Submitted,

Hygeia Laboratories, Inc.

LAB ID	CLIENT ID	MATRIX	COLLECTED
248634	PS-MS-2 Test	WATER	4/19/00
248635	PS-MS-2 Control	WATER	4/19/00
248636	PS-MS-3 Test	WATER	4/19/00
248637	PS-MS-3 Control	WATER	4/19/00

HYGEIA LABORATORIES, INC.

1300 Williams Drive, Suite A - Marietta, Georgia 30066-6299 - (770) 514-6933, FAX (770) 514-6966

Lab Project No. 33336

Report Date: 04/26/00

Metals by ICP

Units: **ug/L (ppb)** Method: **EPA 200.7**

Matrix: Water Analysis Date: 04/21/00 Prep. Date: 04/21/00 Analyst: MP

Lab ID:	248634		248635		248636		248637	
Client ID:	PS-MS-2 Test		PS-MS-2 Control		PS-MS-3 Test		PS-MS-3 Control	
Analyte	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
Arsenic	BRL	15	16	15	BRL	15	22	15
Lead	BRL	10	BRL	10	BRL	10	BRL	10

NOTES:

- Results relate only to the samples tested as received (see chain-of-custody).
- BRL = "Below Reporting Limit"
- RL = "Reporting Limit"
- Dates are presented in the format "month/day/year"

Certifications

Alabama - Lab ID 40970; Arkansas; Connecticut - No. PH 0208Delaware; Florida - No. 97056 (EW), No. 97268 (DW); Georgia - No. 804; Indiana - Lab ID C-GA-01; Kentucky - Lab ID 90053; Maryland - No. 293; North Carolina - No. 409; South Carolina - No. 98012; Tennessee - Lab ID 02827 (DW), UST Program; Virginia - Lab ID 0024

Accreditations

American Association for Laboratory Accreditation (A2LA) - No. 0330-01; American Industrial Hygiene Association (AIHA) - Lab ID 100649

Matrix: Water Project: 33336 Analyst: mp Date: 4-21-00

Metal	Method	MDL	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #	LAB ID #
		ug/L	248634	635	636	637					
Al	200.7	100									
Sb	200.7	15									
As	200.7	15	ND	16	ND	22					
Ba	200.7	3									
Be	200.7	1									
Cd	200.7	2									
Ca	200.7	50									
Cr	200.7	4									
Co	200.7	3									
Cu	200.7	4									
Fe	200.7	50									
Pb	200.7	10	ND	ND	ND	ND					
Mg	200.7	20									
Mn	200.7	2									
Mo	200.7	10									
Ni	200.7	6									
K	200.7	100									
Se	200.7	10									
Ag	200.7	3									
Na	200.7	1000									
Si	200.7	400									
Tl	200.7	25									
Sn	200.7	20									
Ti	200.7	3									
V	200.7	4									
Zn	200.7	10									
Other											
Other											

SOP NO: M01 (All preparation methods are EPA SW-846 except NIOSH)

BATCH ID: MDg000421-1

Prep. Method (circle 1): 3005A 3010A 3020A 3050B 3030C

Analysis Method (circle 1): ICP(EPA SW-846 6010B) GFAA (EPA 200.9) FLAA-lead (EPA SW-846 7420A) NIOSH 7082

PERFORMED BY: R.R.

DATE(m/d/y): 4.21.00

MATRIX (circle 1): COMP FILTER SOIL/SLUDGE FILTER WIPE PAINT CHIP WATER TCLP SPLP Other:

	REAGENT	ID	Exp. Date
R1	HNO_3	200207	—
R2	HCl	200040	—
R3			

	SPIKE	ID	CONC (µg/mL)	Exp. Date
S1	A	M10004030l	20.0 ppm	10.3.00
S2	B	M10004l104	20.0 ppm	10.12.00
S3	D	M10004l101	20.0 ppm	10.11.00

Describe Procedural Deviations/Modifications:
NONE

	Project Number	Lab Sample Number	Sample Amount (mL or g)	pH	REAGENTS ID	Amt (mL)	ID	Amt (mL)	ID	Amt (mL)	SPIKES ID	Amt (µL)	ID	Amt (µL)	ID	Amt (µL)	Final Volume (mL)	Comments
MB	NA	BlK	50.0		R1	2.0	R2	1.0			NA		NA		NA		50.0	
LCS	NA	LCS									S1	1000	S2	1000	S3	1000		
1	33283	248654									exp		exp		exp			
2	33281	248044									SPIKE A		SPIKE B		SPIKE D			
3		248045									(20 ppm each)				(20 ppm)			
4		248046									Sb		Mg - 100 ppm		Ag			
5	33287	248066									As		Na - 1000 ppm					
6		248067									Se		Ca - 300 ppm					
7		248068									B		K - 80 ppm					
8	33209	247648									Mo		Al - 80 ppm					
9	33293	248269									Ba		Sn - 50 ppm					
10	33304	248299									Be		Fe - 40 ppm					
11		248784									Cd							
12	33359	248748									Cr							
13	33133	248753									Co							
14		248761									Cu							
15	33366	248771									Pb							
16	33357	248733									Mn							
17	33336	248634									Ni							
18		248635									Tl							
19		248636									V							
20		248637									Zn							
MS	33209	247648									S1	1000	S2	1000	S3	1000		
MSD											S1	1000	S2	1000	S3	1000		
DUP											~~S1~~	~~10~~						
LCSD	NA	LCSD									S1	1000	S2	1000	S3	1000		

Abbreviations: NA = not applicable Y = Yes N = No

BALANCE ID: PE1600 EXP DATE 01/01

SOP's M01 Digestion of Water Samples for Metals Analysis
M02 Digestion of Soil, Sludge and Sediment Samples for Total Metals Analysis
M03 Digestion of Paint Chip Samples for Total Metals Analysis
M04 Digestion of Wipe Samples for Total Metals Analysis
M05 Digestion of Composite Filter Samples for Total Metals Analysis

Analysis Report 04/21/00 01:23:32 PM

Method: XP2 Sample Name: 248634 Operator: mp
Run Time: 04/21/00 13:17:23
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.01331	828.26	12.876	338.97	19.739	-.16701	41490.
SDev	.09396	8.95	2.587	.30	.014	.02435	68.
%RSD	705.75	1.0800	20.093	.08751	.06959	14.582	.16457
#1	-.11293	818.01	10.103	338.63	19.751	-.15899	41429.
#2	.07372	832.27	13.299	339.19	19.742	-.19436	41564.
#3	-.00072	834.50	15.225	339.08	19.724	-.14767	41478.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.60525	.67151	1.2825	331.31	31.762	49782.	181.54
SDev	.12854	1.0993	.2915	.26	10.970	104.	1.29
%RSD	21.238	163.70	22.732	.07921	34.538	.20906	.71071
#1	-.46356	-.40116	1.4782	331.14	40.652	49667.	180.46
#2	-.71440	.62012	.94747	331.18	35.132	49810.	182.96
#3	-.63780	1.7956	1.4219	331.61	19.502	49869.	181.19

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.2044	114.72	20129.	76.257	4.0063	.0003	116.52
SDev	.0333	7.25	528.	1.603	3.5927	.0000	13.42
%RSD	2.7629	6.3194	2.6237	2.1024	89.676	.2198	11.518
#1	1.1861	110.73	19669.	76.403	6.9430	.0003	101.13
#2	1.2428	110.35	20706.	74.586	5.0754	.0003	125.82
#3	1.1843	123.09	20013.	77.782	.00039	.0003	122.60

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-25.025	1099.4	2.0197	2.5084	24.122	37.807	9.1957
SDev	11.931	1.6	8.2106	.5452	16.150	.399	1.3572
%RSD	47.676	.14409	406.53	21.737	66.953	1.0565	14.759
#1	-12.008	1101.1	-6.9443	2.1422	41.061	37.718	8.6696
#2	-35.441	1097.9	3.8278	2.2480	22.408	38.244	8.1804
#3	-27.625	1099.4	9.1755	3.1350	8.8968	37.460	10.737

nalysis Report 04/21/00 01:29:45 PM

ethod: XP2 Sample Name: 248635 Operator: mp
un Time: 04/21/00 13:23:37
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.47353	1468.7	15.689	368.80	30.962	-.17220	49390.
SDev	.18852	10.0	5.262	3.45	.314	.02110	102.
%RSD	39.811	.67967	33.538	.93628	1.0149	12.251	.20572
#1	.44924	1461.6	19.690	370.29	30.757	-.15260	49302.
#2	.29833	1480.1	17.648	371.26	31.323	-.16947	49501.
#3	.67301	1464.3	9.7288	364.85	30.804	-.19453	49367.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	3.4504	.84905	1.6286	333.57	66.371	50597.	160.75
SDev	.7904	1.1971	.1690	.67	12.118	87.	7.23
%RSD	22.906	140.99	10.374	.20085	18.258	.17180	4.4967
#1	2.5473	1.9872	1.4362	334.18	63.022	50506.	155.84
#2	3.7880	-.39936	1.6973	333.67	79.811	50678.	169.05
#3	4.0160	.95937	1.7525	332.85	56.280	50607.	157.36

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.1378	114.84	20199.	72.062	5.2534	.0003	58.355
SDev	.0507	1.27	474.	2.143	6.5706	.0000	5.359
%RSD	4.4540	1.1102	2.3478	2.9743	125.07	.1858	9.1842
#1	1.0875	116.24	19982.	73.719	1.3493	.0003	52.733
#2	1.1889	113.75	19872.	72.826	12.839	.0003	63.406
#3	1.1369	114.52	20743.	69.642	1.5716	.0003	58.925

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-20.276	1253.8	11.042	2.3574	-30.431	61.185	16.734
SDev	23.106	7.3	12.500	.3894	20.508	.513	.280
%RSD	113.96	.57916	113.20	16.517	67.394	.83815	1.6724
#1	-2.4824	1249.9	25.476	1.9669	-25.985	60.696	16.601
#2	-46.390	1262.2	3.8234	2.3597	-12.509	61.719	17.056
#3	-11.956	1249.4	3.8270	2.7456	-52.797	61.141	16.546

nalysis Report 04/21/00 01:35:59 PM page 1

ethod: XP2 Sample Name: 248636 Operator: mp
un Time: 04/21/00 13:29:50
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.36902	2800.0	11.027	451.05	21.722	-.20161	34921.
SDev	.35117	11.2	11.260	1.55	.240	.02359	36.
%RSD	95.162	.39930	102.11	.34264	1.1029	11.699	.10246
#1	.73719	2789.7	4.1447	451.81	21.924	-.20033	34880.
#2	.33210	2798.5	24.022	449.27	21.457	-.22582	34940.
#3	.03778	2811.9	4.9152	452.07	21.784	-.17870	34943.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.22375	6.8109	7.2449	119.42	35.498	72254.	113.25
SDev	.40527	.4961	.5903	1.16	20.188	74.	3.43
%RSD	181.13	7.2832	8.1477	.96800	56.870	.10238	3.0271
#1	-.21504	7.0978	7.5183	119.05	38.205	72178.	116.93
#2	-.63330	7.0968	6.5674	118.49	54.196	72258.	110.15
#3	.17709	6.2381	7.6489	120.71	14.093	72326.	112.68

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.61266	105.64	23418.	46.735	5.5123	.0003	38.738
SDev	.12063	3.63	283.	.487	1.3392	.0000	2.242
%RSD	19.690	3.4342	1.2073	1.0414	24.294	.1901	5.7875
#1	.75195	102.34	23092.	46.231	3.9871	.0003	36.703
#2	.54411	105.07	23559.	46.770	6.4955	.0003	41.141
#3	.54193	109.52	23602.	47.203	6.0543	.0003	38.370

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-36.899	2660.2	-1.5658	2.1123	-16.884	121.69	11.406
SDev	26.702	9.9	10.6038	.2174	19.962	1.00	.809
%RSD	72.366	.37193	677.23	10.294	118.23	.81906	7.0934
#1	-13.812	2648.8	9.0383	1.8931	-30.949	122.17	11.593
#2	-66.142	2665.4	-12.169	2.3279	-25.666	122.36	12.105
#3	-30.744	2666.4	-1.5662	2.1158	5.9642	120.55	10.520

nalysis Report 04/21/00 01:42:13 PM

ethod: XP2 Sample Name: CCV1 Operator: mp
un Time: 04/21/00 13:36:04
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	995.34	4946.9	971.31	2436.3	972.97	1003.7	4968.5
SDev	.58	9.1	22.61	6.7	1.11	.5	2.7
%RSD	.05797	.18446	2.3279	.27406	.11441	.05440	.05430
#1	995.95	4957.1	997.05	2429.5	972.08	1003.4	4966.7
#2	995.29	4939.4	954.66	2436.4	974.22	1004.3	4967.3
#3	994.80	4944.3	962.22	2442.9	972.61	1003.4	4971.6

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	999.80	1008.3	1000.8	939.70	4946.5	4850.9	4994.9
SDev	1.60	3.6	.9	.53	5.5	10.6	5.7
%RSD	.16047	.35307	.08795	.05644	.11065	.21812	.11488
#1	998.14	1012.4	999.80	939.53	4950.3	4860.9	4990.4
#2	1001.3	1006.5	1001.3	940.29	4940.2	4851.9	5001.4
#3	999.91	1006.1	1001.4	939.27	4949.0	4839.9	4993.1

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	991.57	2716.5	15508.	992.87	1002.6	.0003	1036.0
SDev	.70	29.8	311.	.24	2.0	.0000	91.1
%RSD	.07014	1.0966	2.0080	.02376	.20218	.2253	8.7895
#1	990.77	2682.2	15845.	992.87	1001.5	.0003	931.25
#2	992.08	2731.8	15232.	992.63	1001.2	.0003	1080.6
#3	991.84	2735.6	15446.	993.10	1004.9	.0003	1096.2

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1057.8	2469.6	3799.0	2507.4	1000.1	975.26	1000.2
SDev	46.9	3.9	53.1	2.5	45.4	1.78	4.3
%RSD	4.4330	.15732	1.3973	.09888	4.5373	.18270	.42816
#1	1071.7	2474.0	3759.5	2504.5	969.64	973.28	995.42
#2	1005.5	2466.5	3778.1	2509.0	978.35	976.74	1001.5
#3	1096.2	2468.2	3859.3	2508.6	1052.2	975.76	1003.7

nalysis Report 04/21/00 01:48:27 PM page 1

ethod: XP2 Sample Name: 248637 Operator: mp
un Time: 04/21/00 13:42:18
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.21096	3646.9	22.007	420.28	16.277	-.02669	35665.
SDev	.79035	10.1	5.053	2.29	.083	.09796	90.
%RSD	374.64	.27681	22.963	.54419	.50829	366.96	.25253
#1	.03714	3637.3	16.694	417.68	16.372	.08589	35602.
#2	-.47801	3645.9	26.753	422.01	16.219	-.07350	35625.
#3	1.0738	3657.5	22.574	421.14	16.240	-.09247	35768.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.42910	8.4117	9.0829	124.37	234.31	80212.	93.741
SDev	.50949	.6835	.0315	1.09	10.52	89.	2.129
%RSD	118.74	8.1252	.34734	.87991	4.4911	.11094	2.2716
#1	-1.0062	7.8128	9.0465	125.55	239.55	80165.	92.284
#2	-.23964	8.2662	9.1016	123.39	222.20	80156.	92.753
#3	-.04148	9.1562	9.1007	124.17	241.19	80314.	96.184

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.7805	130.02	24547.	42.256	7.6701	.0003	118.57
SDev	.1364	18.42	252.	1.476	2.2006	.0000	56.67
%RSD	7.6582	14.165	1.0261	3.4937	28.690	3055	47.795
#1	1.9053	151.15	24277.	41.513	9.7786	.0003	181.56
#2	1.6350	121.55	24588.	41.298	5.3878	.0003	102.45
#3	1.8011	117.36	24775.	43.956	7.8439	.0003	71.707

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-18.340	2869.6	28.601	9.5039	20.970	131.63	21.963
SDev	22.857	4.9	20.203	1.7261	60.845	.57	1.035
%RSD	124.63	.17178	70.638	18.162	290.16	.43359	4.7129
#1	-2.8919	2868.0	51.734	11.497	6.1004	130.97	23.039
#2	-44.597	2865.7	19.643	8.4676	87.871	131.91	21.875
#3	-7.5312	2875.1	14.426	8.5476	-31.062	132.01	20.974

Matrix: H2O Project: 33283 Analyst: mp Date: 4-21-00

Metal	Method	MDL ug/L	Sample Duplicate MB A 4/21	Spike LCS A 4/21	Spike Amount	Spike % Recovery	Spike Duplicate LCSD A 4/21	Spike Duplicate % Recovery	Spike % RPD
Al	200.7	100			1600				
Sb	200.7	15			400				
As	200.7	15	ND	416	400	104	413	103	1
Ba	200.7	3	ND	424	400	106	422	105	1
Be	200.7	1			400				
Cd	200.7	2	ND	422	400	105	421	105	0
Ca	200.7	50			6000				-
Cr	200.7	4	ND	436	400	109	437	109	0
Co	200.7	3			400				
Cu	200.7	4	ND	2214	2000 ~~400~~	110	2209	110	0
Fe	200.7	50	798	913	800	14	1126	41	21
Pb	200.7	10	ND	435	400	108	435	108	0
Mg	200.7	20			2000				
Mn	200.7	2	6	433	400	107	434	107	0
Mo	200.7	10			400				
Ni	200.7	6	ND	429	400	107	431	108	1
K	200.7	100			1600				
Se	200.7	10	ND	400	400	100	410	102	2
Ag	200.7	3	ND	433	400	108	442	110	2
Na	200.7	1000	722	24652	20000 ~~10000~~	120	24917	117	3
Si	200.7								
Tl	200.7	25			400				
Sn	200.7								
Ti	200.7								
V	200.7	4			400				
Zn	200.7	10	ND	443	400	111	439	110	1
Other									
Other									

Matrix: H_2O Project: 33283 Analyst: mp Date: 4-21-00

etal	Method	MDL	Sample Duplicate	Spike	Spike Amount	Spike % Recovery	Spike Duplicate	Spike Duplicate % Recovery	Spike % RPD
		ug/L	247648	648			648		
Al	200.7	100			1600				
Sb	200.7	15			400				
As	200.7	15	ND	422	400	105	401	100	5
Ba	200.7	3	625	1001	400	94	996	93	1
Be	200.7	1			400				
Cd	200.7	2	ND	418	400	104	410	102	2
Ca	200.7	50			6000				
Cr	200.7	4	4	439	400	109	430	106	3
Co	200.7	3			400				
Cu	200.7	4	7	2223	2000 ~~400~~	111	2184	109	2
Fe	200.7	50	4899	4215	800	—	3973	—	—
Pb	200.7	10	11	440	400	107	429	104	3
Mg	200.7	20			2000				
Mn	200.7	2	2767	2973	400	51	2954	47	4
Mo	200.7	10			400				
Ni	200.7	6	9	439	400	107	432	106	1
K	200.7	100			1600				
Se	200.7	10	ND	438	400	109	415	104	5
Ag	200.7	3	ND	432	400	108	440	110	2
Na	200.7	1000	2105	26466	10000	123 ~~244~~	26223	121 ~~242~~	2
Si	200.7								
Tl	200.7	25			400				
Sn	200.7								
Ti	200.7								
V	200.7	4			400				
Zn	200.7	10	82	504	400	105	498	104	1
ther									
ther									

alysis Report 04/21/00 11:27:01 AM page 1

thod: XP2 Sample Name: MB A 4/21 Operator: mp
n Time: 04/21/00 11:20:52
nment:
de: CONC Corr. Factor: 1

lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	.77198	109.43	.37049	318.91	.93678	-.08968	117.40
Dev	.47356	4.13	14.638	41.72	.13168	.02353	.58
RSD	61.343	3.7782	3950.9	13.081	14.057	26.241	.49283
1	.26253	108.00	13.010	366.10	.78833	-.06607	117.68
2	.85467	106.20	3.7697	303.72	1.0395	-.11314	116.74
3	1.1987	114.09	-15.668	286.92	.98255	-.08984	117.79

lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	-.52216	-.33651	-.14245	.75547	797.63	97.740	13.422
Dev	.21306	.77507	.22164	1.1450	29.91	3.252	1.564
RSD	40.803	230.32	155.59	151.56	3.7503	3.3270	11.655
1	-.31414	.46735	.09541	1.5762	832.17	96.003	14.889
2	-.51242	-1.0792	-.34318	1.2428	780.91	95.725	13.600
3	-.73992	-.39774	-.17958	-.55253	779.82	101.49	11.776

lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
nits	ppb	ppb	ppb	ppb	ppb	ppm	ppb
vge	5.6353	9.6103	722.48	-.58809	1.9223	.0003	26.494
Dev	.0895	2.8258	168.30	1.34217	3.3289	.0000	20.371
RSD	1.5884	29.404	23.295	228.22	173.17	.8837	76.889
1	5.6863	11.321	844.95	.88514	5.7662	.0003	48.513
2	5.5320	11.161	791.91	-1.7414	.00039	.0003	22.648
3	5.6877	6.3486	530.57	-.90805	.00039	.0003	8.3202

lem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
vge	-27.626	215.81	45.300	1.7102	-29.601	-.20803	7.8362
Dev	27.298	6.89	24.639	.2765	16.232	.43019	1.4374
RSD	98.814	3.1918	54.391	16.165	54.836	206.79	18.343
1	-14.928	222.66	69.259	1.3956	-31.530	-.34270	6.1775
2	-8.9895	215.89	46.607	1.8206	-12.491	-.55479	8.6153
3	-58.960	208.88	20.033	1.9144	-44.783	.27338	8.7159

ıalysis Report 04/21/00 11:33:14 AM page 1

ethod: XP2 Sample Name: LCS A 4/21 Operator: mp
ın Time: 04/21/00 11:27:05
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	432.89	1938.3	416.31	4357.1	423.94	441.27	8793.8
SDev	1.06	16.7	6.87	14.2	1.50	1.65	26.1
%RSD	.24516	.86344	1.6508	.32589	.35473	.37342	.29732
#1	432.19	1951.0	424.11	4373.5	425.42	442.79	8818.2
#2	432.37	1919.3	413.65	4349.2	422.42	439.52	8766.2
#3	434.11	1944.7	411.16	4348.6	423.97	441.50	8797.0

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	421.66	439.29	435.94	2214.2	913.11	1640.7	2218.0
SDev	3.30	2.04	1.15	5.7	5.38	9.7	9.8
%RSD	.78158	.46532	.26412	.25927	.58887	.58834	.43975
#1	423.43	441.33	436.18	2219.9	912.78	1647.1	2228.0
#2	417.86	437.24	434.68	2208.5	907.91	1629.6	2208.5
#3	423.70	439.29	436.95	2214.1	918.65	1645.3	2217.5

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	433.55	4907.9	24652.	428.97	435.21	.0003	449.13
SDev	1.70	6.2	401.	1.88	3.11	.0000	13.54
%RSD	.39209	.12714	1.6283	.43810	.71438	.4994	3.0148
#1	435.17	4904.0	24582.	429.38	436.50	.0003	433.54
#2	431.78	4904.7	24290.	426.92	431.66	.0003	455.85
#3	433.70	4915.1	25083.	430.62	437.46	.0003	457.99

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	399.99	221.29	1660.6	.71596	377.28	413.25	443.28
SDev	4.03	1.48	3.6	.69501	15.32	2.26	2.36
%RSD	1.0088	.67037	.21755	97.075	4.0612	.54693	.53219
#1	404.51	222.26	1662.5	-.08656	370.33	414.64	440.80
#2	398.74	222.02	1662.8	1.1208	366.67	410.64	445.50
#3	396.73	219.58	1656.4	1.1137	394.85	414.47	443.54

ıalysis Report 04/21/00 11:39:27 AM page 1

:thod: XP2 Sample Name: LCSD A 4/21 Operator: mp
ın Time: 04/21/00 11:33:18
›mment:
›de: CONC Corr. Factor: 1

:lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
'nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
.vge	441.69	1938.4	413.09	4313.6	422.34	441.03	8809.6
:Dev	.96	6.0	23.48	5.1	.42	.43	16.4
·RSD	.21835	.31159	5.6839	.11725	.09853	.09639	.18598
:1	442.41	1933.2	386.25	4319.0	422.81	441.30	8822.1
:2	442.06	1945.0	429.82	4313.0	422.16	441.24	8815.6
·3	440.60	1937.0	423.20	4308.9	422.04	440.54	8791.0

:lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
'nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
.vge	420.90	440.61	437.22	2209.0	1125.9	1634.4	2230.6
:Dev	.83	.09	.57	2.3	5.9	21.0	9.3
·RSD	.19603	.01969	.13015	.10269	.52599	1.2855	.41801
·1	421.73	440.56	437.80	2208.6	1130.6	1655.9	2226.5
·2	420.09	440.57	437.22	2211.5	1127.7	1633.3	2241.3
3	420.87	440.71	436.66	2207.1	1119.2	1613.9	2224.1

:lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
'nits	ppb	ppb	ppb	ppb	ppb	ppm	ppb
.vge	433.95	4904.1	24917.	430.89	435.11	.0003	460.84
:Dev	.80	20.4	272.	.82	5.19	.0000	9.01
RSD	.18404	.41578	1.0913	.19098	1.1920	.4004	1.9546
:1	434.38	4881.9	25226.	431.28	429.13	.0003	453.40
·2	434.44	4908.4	24714.	431.44	437.82	.0003	458.28
3	433.03	4922.0	24810.	429.94	438.38	.0003	470.86

:lem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
'nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
.vge	409.86	215.97	1643.1	.74358	396.48	412.65	438.79
:Dev	36.99	4.19	20.9	.54822	10.65	.90	1.00
·RSD	9.0251	1.9391	1.2712	73.727	2.6856	.21891	.22853
·1	452.52	217.64	1663.1	1.2714	385.58	413.22	439.51
:2	386.66	219.06	1621.4	.78240	397.01	411.61	439.23
·3	390.40	211.20	1644.7	.17698	406.86	413.12	437.65

ıalysis Report 04/21/00 11:45:40 AM page 1

ethod: XP2 Sample Name: 247648 DUP1 Operator: mp
ın Time: 04/21/00 11:39:32
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.30330	4570.2	2.5902	210.89	625.08	1.2641	1861.0
SDev	.72343	4.9	16.360	7.24	.34	.0291	6.2
%RSD	238.52	.10667	631.61	3.4331	.05490	2.3057	.33562
#1	-.25079	4568.2	14.073	219.20	625.28	1.2895	1866.3
#2	.03897	4575.7	9.8389	207.55	625.29	1.2704	1862.6
#3	1.1217	4566.6	-16.142	205.93	624.69	1.2323	1854.1

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	.92671	37.127	4.0164	7.5255	4898.7	6658.3	2583.9
SDev	.44217	.361	.1981	1.3197	18.1	2.6	3.4
%RSD	47.714	.97153	4.9335	17.536	.37044	.03849	.13144
#1	1.4042	36.815	4.1113	7.6982	4903.8	6660.9	2581.0
#2	.53136	37.044	3.7887	6.1280	4878.5	6658.3	2587.6
#3	.84459	37.522	4.1493	8.7504	4913.7	6655.8	2582.9

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2766.9	15.179	2105.0	9.0469	11.184	.0003	15.475
SDev	1.0	8.244	213.9	3.0855	2.256	.0000	12.209
%RSD	.03775	54.315	10.160	34.106	20.175	.1598	78.897
#1	2768.1	22.390	2314.4	5.5868	9.9889	.0003	2.9857
#2	2766.2	16.956	2113.7	10.041	13.786	.0003	27.383
#3	2766.4	6.1908	1887.0	11.513	9.7765	.0003	16.055

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-9.1246	10879.	24.441	162.39	7.4425	22.593	82.280
SDev	27.8513	6.	8.990	.32	13.021	.806	2.558
%RSD	305.23	.05468	36.784	.19432	174.96	3.5673	3.1092
#1	-39.822	10885.	19.281	162.26	5.7469	22.769	84.120
#2	14.529	10873.	34.822	162.17	-4.6480	21.714	79.359
#3	-2.0809	10879.	19.220	162.75	21.229	23.297	83.362

ıalysis Report 04/21/00 11:51:53 AM page 1

ethod: XP2 Sample Name: 247648 MS1 Operator: mp
ın Time: 04/21/00 11:45:45
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	431.62	2948.3	421.78	4317.3	1001.4	442.62	10507.
SDev	.52	10.6	15.69	6.4	1.3	.46	6.
%RSD	.12147	.35844	3.7207	.14933	.13010	.10367	.05398
#1	431.60	2948.0	438.59	4323.0	1002.8	443.14	10513.
#2	431.10	2937.9	419.22	4318.5	1000.3	442.29	10501.
#3	432.15	2959.0	407.52	4310.3	1001.0	442.42	10507.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	418.58	476.04	438.67	2223.3	4215.1	7396.6	4282.7
SDev	1.29	1.31	.68	2.6	17.7	13.5	9.8
%RSD	.30701	.27618	.15551	.11564	.42043	.18232	.22934
#1	420.03	477.01	439.41	2226.2	4235.5	7409.0	4293.7
#2	418.11	474.54	438.06	2221.8	4203.6	7398.6	4279.4
#3	417.60	476.57	438.54	2221.8	4206.1	7382.2	4274.9

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2972.6	4862.1	26466.	438.65	440.53	.0003	454.58
SDev	2.9	10.6	222.	1.35	4.49	.0000	12.78
%RSD	.09901	.21757	.83727	.30700	1.0190	.2632	2.8109
#1	2975.9	4853.7	26544.	440.21	442.59	.0003	440.35
#2	2970.2	4858.5	26216.	437.85	443.62	.0003	465.06
#3	2971.8	4874.0	26639.	437.91	435.38	.0003	458.33

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	438.42	6220.0	1670.5	29.425	420.46	431.24	501.41
SDev	12.08	14.6	19.9	.498	11.85	.14	4.58
%RSD	2.7561	.23466	1.1902	1.6922	2.8184	.03181	.91430
#1	452.01	6236.6	1692.9	29.949	430.44	431.31	505.95
#2	428.88	6209.1	1655.1	29.367	423.56	431.08	501.49
#3	434.37	6214.3	1663.5	28.959	407.36	431.33	496.78

ıalysis Report 04/21/00 11:58:06 AM page 1

ethod: XP2 Sample Name: 247648 MSD1 Operator: mp
ın Time: 04/21/00 11:51:58
omment:
ode: CONC Corr. Factor: 1

:lem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Jnits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	440.00	3906.7	400.73	4239.0	996.37	433.09	10441.
SDev	.94	9.2	14.76	1.7	.38	.19	5.
;RSD	.21328	.23593	3.6825	.03968	.03809	.04353	.05218
:1	439.23	3907.1	401.89	4240.2	996.80	433.24	10447.
:2	441.04	3897.3	385.43	4237.1	996.16	432.88	10440.
:3	439.71	3915.7	414.88	4239.7	996.13	433.17	10436.

:lem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Jnits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
ıvge	410.00	465.80	430.52	2183.9	3972.6	7517.8	4302.5
SDev	.42	.97	.99	1.6	21.2	6.8	6.7
RSD	.10245	.20769	.22898	.07274	.53319	.09049	.15569
:1	410.18	464.88	429.42	2183.5	3960.6	7517.7	4310.2
:2	410.29	465.71	431.34	2182.5	3997.1	7511.0	4299.3
:3	409.51	466.81	430.79	2185.6	3960.2	7524.6	4297.9

:lem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
:nits	ppb	ppb	ppb	ppb	ppb	ppm	ppb
.vge	2953.6	4777.8	26223.	432.39	429.55	.0003	431.46
Dev	1.3	16.8	205.	1.66	7.65	.0000	14.44
RSD	.04484	.35223	.78179	.38471	1.7811	.3381	3.3475
1	2954.7	4766.6	26093.	430.49	421.36	.0003	416.47
2	2952.1	4797.2	26459.	433.59	430.78	.0003	432.61
3	2954.0	4769.7	26116.	433.09	436.51	.0003	445.29

lem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
nits	ppb	ppb	ppb	ppb	ppb	ppb	ppb
.vge	414.65	7363.9	1662.1	55.431	387.69	421.77	497.97
Dev	29.78	6.7	17.9	.437	35.22	.80	1.13
RSD	7.1814	.09137	1.0768	.78821	9.0836	.18980	.22744
1	380.86	7371.7	1682.8	55.905	396.30	422.39	499.06
2	426.03	7359.6	1651.3	55.044	348.97	422.04	498.06
3	437.06	7360.5	1652.3	55.345	417.81	420.87	496.80

Matrix: ______ Project: ______ Analyst: ______ Date: ______

Metal	QC # 19	True Value	% Recovery	QC # ICP - 2	True Value	% Recovery	CCV	True Value	% Recovery
Al					1000			5000	
Sb		2000						1000	
As	1197	2000	120				1007	1000	101
Ba				991	1000	99	1012	1000	101
Be		2000						1000	
Cd	2026	2000	101				1013	1000	101
Ca		2000						5000	
Cr	2041	2000	102				1019	1000	102
Co		2000						1000	
Cu	1950	2000	97				977	1000	98
Fe	1751	2000	87				4987	5000	100
Pb	2003	2000	100					1000	
Mg		2000						5000	
Mn	2056	2000	103				1017	1000	102
Mo		2000						2500	
Ni	2013	2000	100				1013	1000	101
K					10000			5000	
Se	2155	2000	108				1025	1000	102
Ag				494	500	99	1016	1000	102
Na				1295	1000	129	10521	10000 1EC	105
Si					5000				
Tl		2000						1000	
Sn								2500	
Ti		2000						2500	
V		2000						1000	
Zn	2044	2000	102				1019	1000	102
Other									
Other									

tandardization Rpt. 04/21/00 08:19:22 AM

ethod: XP2 Standard: BLANK
un Time: 04/21/00 08:13:46

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Avge	-.00010	-.01570	-.00022	.00129	.00009	.00386	.00008
SDev	.00085	.00048	.00141	.00014	.00006	.00007	.00000
%RSD	812.35	3.0825	638.25	10.926	65.725	1.8369	.27747
#1	-.00101	-.01514	.00140	.00144	.00004	.00378	.00008
#2	.00004	-.01594	-.00090	.00125	.00016	.00391	.00008
#3	.00066	-.01601	-.00117	.00117	.00008	.00389	.00008

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Avge	.00044	.00029	.00044	.01926	.00093	.04029	.00012
SDev	.00051	.00008	.00048	.00043	.00071	.00443	.00017
%RSD	114.96	28.522	108.70	2.2157	76.292	11.003	145.25
#1	-.00004	.00019	.00004	.01908	.00062	.03535	-.00008
#2	.00039	.00035	.00031	.01895	.00043	.04158	.00023
#3	.00097	.00031	.00097	.01975	.00175	.04392	.00019

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	Sb2068	Se1960
Avge	.00009	-.00007	-.00052	-.00030	.00261	-.00022	.00077
SDev	.00002	.00022	.00067	.00064	.00113	.00050	.00056
%RSD	24.670	340.10	129.29	214.77	43.274	226.19	73.611
#1	.00012	.00012	-.00074	-.00031	.00210	-.00043	.00012
#2	.00008	-.00031	.00023	-.00094	.00391	-.00059	.00113
#3	.00008	.00000	-.00105	.00035	.00183	.00035	.00105

Elem	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Avge	.00184	.00004	-.00253	.00014	.00014	.00021
SDev	.00002	.00007	.00017	.00066	.00012	.00006
%RSD	1.0372	173.21	6.7806	460.84	83.227	28.930
#1	.00183	.00012	-.00257	-.00012	.00027	.00019
#2	.00184	.00000	-.00234	.00090	.00012	.00027
#3	.00187	.00000	-.00268	-.00035	.00004	.00016

:andardization Rpt. 04/21/00 08:30:25 AM page 1

ethod: XP2 Standard: stdM1L
in Time: 04/21/00 08:25:36

:lem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
vge	.20558	.02007	.11551	.60775	.31096	.04587	.14480
;Dev	.00083	.00119	.00019	.00047	.00218	.00021	.00055
:RSD	.40437	5.9091	.16316	.07677	.70252	.46375	.38279
:1	.20476	.01894	.11571	.60787	.31307	.04567	.14504
:2	.20643	.02130	.11549	.60723	.31109	.04586	.14417
:3	.20556	.01996	.11533	.60814	.30871	.04609	.14520

:lem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
vge	.19075	.14747	.18223	.13404	.00614	.00516	.00276
:Dev	.00075	.00021	.00153	.00554	.00157	.00026	.00027
RSD	.39373	.14577	.84201	4.1363	25.555	5.0541	9.8910
1	.19071	.14772	.18350	.12835	.00453	.00500	.00248
2	.19003	.14731	.18265	.13436	.00624	.00502	.00279
3	.19153	.14740	.18052	.13942	.00766	.00546	.00303

lem	V_2924	Zn2062
vge	.03771	.01504
Dev	.00012	.00014
RSD	.30467	.93000
1	.03783	.01520
2	.03770	.01499
3	.03761	.01493

:andardization Rpt. 04/21/00 08:35:19 AM page 1

ethod: XP2 Standard: stdM1M
ın Time: 04/21/00 08:30:30

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	1.0448	.09720	.57748	3.0255	1.5592	.23018	.72695
SDev	.0015	.00096	.00070	.0037	.0018	.00005	.00121
%RSD	.14749	.98646	.12092	.12282	.11814	.02008	.16683
#1	1.0436	.09806	.57739	3.0261	1.5597	.23021	.72694
#2	1.0443	.09736	.57683	3.0215	1.5571	.23019	.72574
#3	1.0466	.09617	.57822	3.0288	1.5607	.23012	.72816

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	.87432	.73709	.91735	.65818	.04634	.02645	.01579
SDev	.00096	.00073	.00375	.00194	.00400	.00098	.00056
%RSD	.10917	.09850	.40914	.29515	8.6429	3.7012	3.5222
#1	.87332	.73733	.91450	.66035	.04190	.02592	.01570
#2	.87441	.73627	.91594	.65756	.04747	.02585	.01528
#3	.87522	.73766	.92160	.65661	.04967	.02758	.01638

Elem	V_2924	Zn2062
Avge	.18911	.07482
SDev	.00031	.00026
%RSD	.16572	.34148
#1	.18907	.07464
#2	.18882	.07471
#3	.18944	.07511

tandardization Rpt. 04/21/00 08:40:14 AM page 1

ethod: XP2 Standard: stdM1H
un Time: 04/21/00 08:35:24

Elem	Ag3280	As1890	Ba4934	Be3130	Cd2265	Co2286	Cr2677
Avge	2.0669	.18918	1.1406	5.9642	3.0774	.45557	1.4394
SDev	.0025	.00051	.0010	.0025	.0033	.00028	.0007
%RSD	.12324	.26723	.09003	.04244	.10609	.06061	.05105
#1	2.0654	.18860	1.1415	5.9668	3.0773	.45548	1.4402
#2	2.0699	.18953	1.1409	5.9642	3.0743	.45534	1.4390
#3	2.0655	.18942	1.1395	5.9617	3.0808	.45587	1.4389

Elem	Cu3247	Mn2576	Ni2316	Pb2203	Sb2068	Se1960	Tl1908
Avge	1.7067	1.4577	1.8124	1.2980	.10030	.05405	.02929
SDev	.0023	.0004	.0029	.0023	.00084	.00037	.00081
%RSD	.13476	.02642	.15981	.17962	.84192	.69013	2.7587
#1	1.7091	1.4582	1.8136	1.3000	.09932	.05433	.02891
#2	1.7064	1.4576	1.8146	1.2987	.10076	.05418	.03022
#3	1.7046	1.4575	1.8091	1.2954	.10081	.05362	.02875

Elem	V_2924	Zn2062
Avge	.37451	.14775
SDev	.00048	.00055
%RSD	.12769	.36963
#1	.37490	.14837
#2	.37466	.14750
#3	.37398	.14736

tandardization Rpt. 04/21/00 08:45:55 AM page 1

ethod: XP2 Standard: stdM2L
un Time: 04/21/00 08:40:19

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.04260	.08505	.03338	.04749	.22499	.03969	.02130
SDev	.00023	.00058	.00014	.00010	.00101	.00021	.00129
%RSD	.54767	.68718	.41167	.21173	.44738	.52665	6.0731
#1	.04235	.08489	.03354	.04737	.22615	.03958	.01983
#2	.04263	.08456	.03329	.04756	.22438	.03994	.02180
#3	.04281	.08570	.03332	.04754	.22444	.03957	.02226

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.01321	.00744	.00038	.33740
SDev	.00071	.00006	.00006	.00182
%RSD	5.3642	.80903	15.950	.53821
#1	.01239	.00744	.00031	.33542
#2	.01360	.00750	.00043	.33777
#3	.01363	.00738	.00039	.33900

:andardization Rpt. 04/21/00 08:51:37 AM page 1

:thod: XP2 Standard: stdM2M
in Time: 04/21/00 08:46:00

:lem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
ivge	.27616	.42441	.16666	.24194	.95039	.19706	.15284
;Dev	.00064	.00112	.00022	.00238	.00229	.00040	.00076
;RSD	.23234	.26491	.13169	.98327	.24071	.20303	.49534
ł1	.27545	.42311	.16644	.24111	.95292	.19682	.15217
ł2	.27632	.42505	.16688	.24462	.94976	.19752	.15269
ł3	.27670	.42507	.16668	.24008	.94848	.19683	.15366

:lem	Na3302	Si2881	Sn1899	Ti3372
ivge	.07260	.02995	.02503	1.7773
;Dev	.00076	.00006	.00002	.0036
;RSD	1.0447	.19290	.09400	.20077
ł1	.07189	.02991	.02501	1.7732
ł2	.07252	.03001	.02502	1.7797
ł3	.07340	.02992	.02505	1.7789

tandardization Rpt. 04/21/00 08:57:19 AM page 1

ethod: XP2 Standard: stdM2H
un Time: 04/21/00 08:51:42

Elem	Al3082	B_2496	Ca3158	Fe2714	K_7664	Mg2790	Mo2020
Avge	.56669	.85149	.33289	.48348	1.8534	.39341	.31348
SDev	.00098	.00097	.00043	.00052	.0034	.00053	.00021
%RSD	.17329	.11362	.13049	.10862	.18471	.13560	.06562
#1	.56731	.85147	.33335	.48408	1.8573	.39395	.31364
#2	.56556	.85053	.33283	.48309	1.8510	.39289	.31354
#3	.56721	.85247	.33248	.48328	1.8518	.39337	.31325

Elem	Na3302	Si2881	Sn1899	Ti3372
Avge	.14738	.05847	.05421	3.5658
SDev	.00170	.00004	.00036	.0013
%RSD	1.1515	.07332	.66724	.03755
#1	.14723	.05852	.05454	3.5673
#2	.14576	.05844	.05382	3.5653
#3	.14914	.05846	.05426	3.5648

tandardization Report 04/21/00 08:57:20 AM

ethod: XP2 Slope = Conc(SIR)/IR

lement	Wavelen	High std	Low std	Slope	Y-intercept	Date Standardized
g3280	328.068	Multiple	Standards	965.573	.111178	04/21/00 08:35:24
13082	308.215	Multiple	Standards	17151.8	269.305	04/21/00 08:51:42
s1890	189.042	Multiple	Standards	10220.8	2.19574	04/21/00 08:35:24
_2496	249.678	Multiple	Standards	5919.12	-7.57375	04/21/00 08:51:42
a4934	493.409	Multiple	Standards	1739.39	-.165925	04/21/00 08:35:24
e3130	313.042	Multiple	Standards	332.554	-1.29104	04/21/00 08:35:24
a3158	315.887	Multiple	Standards	30028.6	-2.34165	04/21/00 08:51:42
d2265	226.502	Multiple	Standards	645.196	-.288856	04/21/00 08:35:24
o2286	228.616	Multiple	Standards	4376.52	-1.24765	04/21/00 08:35:24
r2677	267.716	Multiple	Standards	1383.90	-.609584	04/21/00 08:35:24
u3247	324.753	Multiple	Standards	1173.62	-22.6146	04/21/00 08:35:24
e2714	271.441	Multiple	Standards	20975.9	-19.3927	04/21/00 08:51:42
_7664	766.491	Multiple	Standards	5474.37	-220.631	04/21/00 08:51:42
g2790	279.078	Multiple	Standards	25360.8	-2.99917	04/21/00 08:51:42
n2576	257.610	Multiple	Standards	1361.96	-.131058	04/21/00 08:35:24
o2020	202.030	Multiple	Standards	17991.9	2.15587	04/21/00 08:51:42
a3302	330.232	Multiple	Standards	208597.	109.275	04/21/00 08:51:42
i2316	231.604	Multiple	Standards	1096.24	.326692	04/21/00 08:35:24
o2203	220.351	Multiple	Standards	1530.32	-4.00855	04/21/00 08:3[illegible]
o2203	220.353		NONE	1.00000	.000000	*NOT STANDARDIZED
_1960	196.026	STD4	STD1-Blank	1.00000	.000000	*NOT STANDARDIZED
b2068	206.838	Multiple	Standards	23297.1	5.60567	04/21/00 08:35:24
e1960	196.261	Multiple	Standards	40360.2	-30.7436	04/21/00 08:35:24
i2881	288.158	Multiple	Standards	88855.8	-163.836	04/21/00 08:51:42
n1899	189.989	Multiple	Standards	139029.	-1.56616	04/21/00 08:51:42
i3372	337.280	Multiple	Standards	1424.72	3.74044	04/21/00 08:51:42
l1908	190.864	Multiple	Standards	69234.9	-9.62546	04/21/00 08:35:24
_2924	292.402	Multiple	Standards	5319.10	-.759573	04/21/00 08:35:24
n2062	206.200	Multiple	Standards	13481.1	-2.80328	04/21/00 08:35:24

nalysis Report QC Standard 04/21/00 09:03:01 AM page 1

ethod: XP2 Sample Name: M199121508 ICP-2 Operator:
un Time: 04/21/00 08:57:24
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	493.88	983.80	13.973	1008.8	991.55	.09427	8.2791
SDev	.71	11.02	9.239	4.2	.79	.01331	1.1792
%RSD	.14438	1.1206	66.120	.41550	.07947	14.119	14.243
#1	493.13	995.68	5.0091	1013.5	992.41	.10816	7.1047
#2	494.55	973.91	13.446	1007.4	991.38	.08163	9.4630
#3	493.95	981.80	23.465	1005.5	990.86	.09302	8.2696
Errors	QC Pass	QC Pass	NOCHECK	QC Pass	QC Pass	NOCHECK	NOCHECK
Value	500.00	1000.0		1000.0	1000.0		
Range	10.000	1000.0		10.000	10.000		

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.17060	.35726	.04293	.47710	4.2299	9863.9	1.6547
SDev	.13949	.71458	.65932	.38906	16.051	16.0	6.0904
%RSD	81.764	200.01	1536.0	81.547	379.46	.16183	368.07
#1	-.26349	.12910	.42435	.09080	-2.8964	9882.3	2.9843
#2	-.23813	-.21537	-.71839	.86887	-7.0239	9855.0	6.9705
#3	-.01020	1.1581	.42281	.47164	22.610	9854.4	-4.9907
Errors	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK	QC Pass	NOCHECK
Value						10000.	
Range						10.000	

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	.35065	48.834	Q1295.3	.72877	.98736	.0003	19.958
SDev	.00038	29.074	337.2	1.3590	1.7095	.0000	19.002
%RSD	.10914	59.536	26.029	186.48	173.14	.0794	95.211
#1	.35094	81.393	Q1684.1	1.9216	.00035	.0003	40.417
#2	.35081	39.642	Q1117.9	-.75067	.00035	.0003	16.596
#3	.35022	25.468	1083.9	1.0154	2.9614	.0003	2.8615
Errors	NOCHECK	NOCHECK	QC Fail	NOCHECK	NOCHECK	NOCHECK	NOCHECK
Value			1000.0				
Range			10.000				

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-20.171	4855.2	45.789	4.4132	-16.148	-.34205	.55219
SDev	8.140	8.0	16.713	2.3086	48.975	1.10530	.30769
%RSD	40.353	.16451	36.500	52.312	303.28	323.14	55.721
#1	-29.157	4860.5	64.037	7.0458	17.399	-.75957	.90747
#2	-13.291	4859.1	31.226	3.4604	6.5048	-1.1778	.37648
#3	-18.066	4846.1	42.104	2.7335	-72.349	.91120	.37261
Errors	NOCHECK	QC Pass	NOCHECK	NOCHECK	NOCHECK	NOCHECK	NOCHECK

Method: XP2 Sample Name: M199121507 QC-19 Operator:
Run Time: 04/21/00 09:03:06
Comment:
Mode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1.2343	93.177	1997.3	128.18	-.53767	2053.1	2020.8
SDev	.7696	9.495	23.8	1.29	.04206	2.0	5.6
%RSD	62.349	10.190	1.1902	1.0079	7.8227	.09595	.27757
#1	.78848	96.189	2024.0	129.67	.51191	2052.9	2019.8
#2	2.1229	82.542	1989.4	127.38	.58620	2055.1	2026.8
#3	.79145	100.80	1978.4	127.49	.51488	2051.1	2015.7
Errors	NOCHECK	NOCHECK	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass
Value			2000.0			2000.0	2000.0
Range			10.000			10.000	10.000

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2026.1	2058.4	2041.2	1950.1	Q1750.9	15.655	2009.7
SDev	2.8	2.3	3.2	3.1	20.1	10.334	5.3
%RSD	.13637	.11142	.15620	.15871	1.1486	66.011	.26303
#1	2024.0	2056.6	2039.0	1947.4	Q1756.9	11.050	2006.2
#2	2029.2	2061.0	2044.9	1953.5	Q1767.4	27.490	2015.8
#3	2025.1	2057.6	2039.8	1949.6	Q1728.5	8.4233	2007.1
Errors	QC Pass	QC Pass	QC Pass	QC Pass	QC Fail	NOCHECK	QC Pass
Value	2000.0	2000.0	2000.0	2000.0	2000.0		2000.0
Range	10.000	10.000	10.000	10.000	10.000		10.000

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	2055.6	Q2312.2	485.61	2013.0	2003.3	.0003	Q2316.1
SDev	2.1	34.0	287.76	5.2	11.8	.0000	98.5
%RSD	.10065	1.4725	59.258	.25603	.58675	.4344	4.2544
#1	2055.0	Q2273.1	279.98	2010.9	1995.9	.0003	Q2204.5
#2	2057.9	Q2335.4	814.46	2018.9	2016.9	.0003	Q2352.8
#3	2053.9	Q2328.2	362.38	2009.3	1997.2	.0003	Q2391.0
Errors	QC Pass	QC Fail	NOCHECK	QC Pass	QC Pass	NOCHECK	QC Fail
Value	2000.0	2000.0		2000.0	2000.0		2000.0
Range	10.000	10.000		10.000	10.000		10.000

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	2155.5	1271.3	3065.6	2070.3	2150.8	2044.1	2044.1
SDev	18.2	8.0	3.9	3.0	10.5	1.8	8.5
%RSD	.84404	.63147	.12834	.14316	.48770	.08882	.41451
#1	2161.8	1276.6	3065.0	2067.1	2159.4	2043.9	2045.6
#2	2169.8	1275.2	3069.9	2072.9	2153.9	2046.0	2051.8
#3	2135.0	1262.1	3062.1	2071.0	2139.1	2042.4	2035.0
Errors	QC Pass	NOCHECK	NOCHECK	QC Pass	QC Pass	QC Pass	QC Pass

nalysis Report 04/21/00 09:16:43 AM page 1

ethod: XP2 Sample Name: IEC 1 Operator: mp
un Time: 04/21/00 09:10:35
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-.11609	12499.	4.6016	23.031	1.2913	.61134	61085.
SDev	.98821	253.	11.723	10.792	.2194	.06481	1188.
%RSD	851.24	2.0242	254.75	46.860	16.989	10.601	1.9440
#1	-.60914	12791.	2.9983	35.421	1.5414	.53697	62454.
#2	-.76076	12353.	17.043	17.990	1.1316	.64135	60341.
#3	1.0216	12353.	-6.2370	15.681	1.2008	.65570	60458.

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	5.2095	.81484	1.0755	-13.719	49392.	1.7411	30173.
SDev	.5573	.61979	1.4779	.644	739.	32.382	590.
%RSD	10.698	76.063	137.42	4.6924	1.4964	1859.8	1.9550
#1	5.3350	1.3299	1.4552	-14.044	50241.	11.077	30852.
#2	4.6001	.12699	-.55525	-14.136	48889.	-34.283	29793.
#3	5.6934	.98763	2.3264	-12.978	49047.	28.429	29873.

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1.0456	28.060	10521.	-.10352	15.123	.0003	83.672
SDev	.3504	16.064	506.	1.24105	.970	.0000	29.828
%RSD	33.515	57.249	4.8107	1198.9	6.4151	.0375	35.649
#1	1.4197	45.954	10896.	-.31894	14.017	.0003	116.29
#2	.99188	23.348	9945.3	-1.2228	15.518	.0003	76.951
#3	.72508	14.879	10722.	1.2311	15.832	.0003	57.778

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	-28.634	95.544	42.113	3.4792	-12.549	1.4686	5.6674
SDev	19.172	41.592	10.918	.6746	77.414	.2421	.0032
%RSD	66.957	43.532	25.926	19.390	616.90	16.484	.05601
#1	-35.498	143.18	53.021	4.1880	-80.504	1.3289	5.6658
#2	-6.9744	66.414	31.185	3.4048	71.723	1.3288	5.6654
#3	-43.429	77.041	42.131	2.8449	-28.866	1.7482	5.6711

lethod: XP2 Sample Name: CCV 1 Operator: mp
un Time: 04/21/00 09:16:48
omment:
ode: CONC Corr. Factor: 1

Elem	Ag3280	Al3082	As1890	B_2496	Ba4934	Be3130	Ca3158
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1016.5	5116.1	1006.8	2578.7	1011.6	1025.6	5106.6
SDev	2.2	3.0	15.5	6.1	1.5	1.1	12.6
%RSD	.21538	.05811	1.5393	.23660	.15241	.10395	.24695
#1	1019.0	5114.1	1006.5	2576.5	1012.9	1026.0	5112.6
#2	1015.7	5119.5	1022.4	2585.6	1012.0	1026.3	5115.0
#3	1014.9	5114.8	991.44	2573.9	1009.9	1024.3	5092.1

Elem	Cd2265	Co2286	Cr2677	Cu3247	Fe2714	K_7664	Mg2790
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1013.4	1025.9	1018.7	976.84	4987.0	5065.5	5054.5
SDev	1.5	2.4	1.5	1.06	25.2	21.5	4.8
%RSD	.14377	.23081	.14572	.10882	.50491	.42475	.09594
#1	1014.1	1026.9	1018.7	977.90	4983.6	5042.7	5049.0
#2	1014.3	1027.6	1020.1	976.85	5013.8	5085.4	5058.0
#3	1011.7	1023.2	1017.2	975.78	4963.8	5068.6	5056.6

Elem	Mn2576	Mo2020	Na3302	Ni2316	Pb2203	S_1960	Sb2068
Units	ppb	ppb	ppb	ppb	ppb	ppm	ppb
Avge	1017.0	2823.5	15657.	1013.0	1017.0	.0003	1118.0
SDev	1.5	21.4	165.	1.6	.6	.0000	58.3
%RSD	.15091	.75645	1.0540	.15916	.05970	.1318	5.2137
#1	1017.4	2800.4	15842.	1011.3	1016.8	.0003	1050.7
#2	1018.3	2827.7	15525.	1013.3	1017.7	.0003	1150.0
#3	1015.3	2842.5	15604.	1014.5	1016.6	.0003	1153.2

Elem	Se1960	Si2881	Sn1899	Ti3372	Tl1908	V_2924	Zn2062
Units	ppb	ppb	ppb	ppb	ppb	ppb	ppb
Avge	1024.9	2890.6	3767.9	2578.6	1015.9	1002.4	1019.5
SDev	33.5	3.7	15.3	4.3	18.6	.9	5.3
%RSD	3.2720	.12808	.40547	.16680	1.8311	.08705	.52208
#1	991.34	2891.2	3776.5	2578.1	1007.3	1001.8	1025.6
#2	1024.9	2894.0	3776.8	2583.1	1003.1	1003.4	1016.3
#3	1058.4	2886.7	3750.2	2574.5	1037.2	1001.9	1016.6

KIBER ENVIRONMENTAL SERVICES

SAMPLE CHAIN-OF-CUSTODY RECORD

COC#

33336

3145 MEDLOCK BRIDGE ROAD
NORCROSS, GEORGIA 30071
(770) 242-4090 FAX (770) 242-9198

CLIENT NAME: Kiber	PROJECT NAME: PSA	KES PROJECT #: 3216-8913
TAT or DUE DATE: 4/26/00	CONTACT: GMZ	KES PROJECT MANAGER: GMZ
	PHONE#: EXT.	RECEIVING LAB: Hygeic — PO# 8913
SAMPLED BY: GMZ (PRINTED NAME)	SIGNATURE	COMPANY: Kiber

ANALYSES (indicate target list)

SAMPLE NUMBER	SAMPLE DESCRIPTION	SAMPLE DATE/TIME	Sample Matrix	Preservative	# / Size of Cont.	Total Lead	Total Arsenic							Remarks
PS-MS-2 Test	Wet/Dry Durability	4/18/00	W	HNO_3	1-250ML	X	X							248634
PS-MS-2 Control						X	X							635
~~PS~~ MS-3 Test						X	X							636
PS-MS-3 control						X	X							637

KIBER QA/QC LEVEL REQUESTED: I II III IV   CASE NARRATIVE REQUESTED: YES NO   PM INITIALS

SAMPLES RELINQUISHED BY:	DATE/TIME	SAMPLES ACCEPTED BY:	DATE/TIME	COMMENTS:
[signature]	4/19/00	Randy Brown	4/20/00	Full DATA Package Level IV
				RT, metals 8.10

REV 4 10/27/98   Dry Weight Results is Default for Soils/Applicable Wastes   h:\rea\coc1.wk4

Attachment F

Florida Power & Light Company Data

FPL

Florida Power & Light Company, Environmental Services Dept., P.O. Box 14000, Juno Beach, FL 33408

February 23, 2000

Ms. Pam Scully
U.S. Environmental Protection Agency
Atlanta Sam Nunn Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-3104

Re: Pepper's Steel & Alloys NPL Site
Medley, Dade County, Florida
Five Year Review Groundwater Monitoring Results

Dear Ms. Scully:

Please find enclosed the results of the Five-Year Review groundwater sampling that was conducted by Florida Power & Light Company (FPL) at the subject site on January 11-12, 2000. This sampling was conducted in accordance with your request dated October 8, 1999, our response to your request dated November 8, 1999, and your final correspondence on this matter dated November 19, 1999. A summary of the groundwater sampling and results follows.

Monitoring Wells Sampled

During this sampling event, all of the EPA requested wells were sampled with the exception of MW-1A and MW-1B. As you will recall from the site reconnaissance on January 11, 2000, these monitoring wells could not be located, and therefore, with your approval, were substituted with MW-4A and MW-4B. We were subsequently informed by the adjacent property owner that MW-1A and MW-1B were removed several years ago.

The final monitoring wells that were sampled included the following:

Well Name	Location
MO-2	Monolith
MO-3	Monolith
MW-4A	South of the Site
MW-4B	South of the Site
MW-5A	Southwest of the Site
MW-5B	Southwest of the Site
MW-6A	Northwest of the Site
MW-6B	Northwest of the Site
MW-9A	East of the Site

As requested, these wells were sampled and analyzed for arsenic, lead, and PCBs. The laboratory analyses were conducted by FPL's Central Laboratory in West Palm Beach, Florida. All sampling and analyses were conducted in accordance with FPL's approved Comprehensive Quality Assurance Plan (CompQAP No. 92-0041). A summary of the groundwater sampling protocol used, field sampling data sheets and a site map are provided in Attachment A.

It should be noted that with the exception of the monolith wells and MW-9A, all of the wells sampled were in poor physical condition. None of the wells had expansion seals or well caps, and several of the outer well casings were severely corroded. In fact, the outer casing of MW-4A was corroded and bent such that the well inside was open to the atmosphere.

Groundwater Results

The laboratory analytical results from the groundwater samples are provided in Attachment B. These results indicate that all parameters were undetected in all wells with one exception. Lead was detected in MW-4A at a concentration of 30 micrograms per liter (ug/L). This is below the site's action level for lead of 50 ug/L. In addition, based on historical and current groundwater flow information, MW-4A is located hydraulically upgradient of the Pepper's Steel Site.

Specifically, groundwater flow in the vicinity of the site has been observed to be to the north or north-northeast for at least a decade. References to this groundwater flow direction are provided in the following reports associated with the site:

(1) *Groundwater Monitoring, January 1987,* prepared by GeoTrans, Inc. (Appendix B, Page 7),
(2) *Final Report on Remedial Action, June 1989,* prepared by FPL (Section 4, Appendix D), and
(3) *Five Year Review Final Report, April 1994* prepared for EPA by Roy. F. Weston (Page 2-7).

Conclusion

In conclusion, PCBs and arsenic were not detected in any wells during the sampling event. Further, only one well had a detectable concentration of lead (MW4A), which was below the site's action level. Since that well is located upgradient of the site, the lead it is not considered attributable to Pepper's Steel. Furthermore, as described above, MW-4A was in poor condition and was exposed to the atmosphere at the time of sampling.

These results, as well as the previous results submitted to EPA by FPL in 1997 and 1998, demonstrate that the remedy employed at the Pepper's Steel site has been effective in eliminating the constituents of concern from the groundwater. As a result, FPL respectfully asks that EPA respond at this time to our request to terminate FPL's groundwater monitoring obligation. This request was formally presented to you in a letter from Ms. Diana Davis dated September 29, 1999. Your October 8, 1999 response to that letter indicated that this determination could be made once the Five Year Review was complete.

Finally, due the poor condition of many the wells, FPL recommends that EPA properly abandon of all the wells that have deteriorated in quality at this site.

If you have any questions about the information provided in this submittal, please do not hesitate to call me at (561) 691-7054. It has been a pleasure working with you, and we look forward to your response to our groundwater monitoring termination request.

Sincerely,

FLORIDA POWER & LIGHT COMPANY

Kathryn S. Salvador

Kathryn S. Salvador, P.E.
Senior Environmental Engineer

Attachments

cc w att: Diana Davis, FPL
Wilbur Mayorga, DERM
Marvin Collins, FDEP

WMD/SSMB
RECEIVED

FEB 28 2000

EPA-REGION 4
ATLANTA, GA

Summary of Groundwater Sampling
Pepper's Steel and Alloys NPL Site Five Year Review
January 11-12, 2000

Kathy Salvador and Jim Lindsay of Florida Power & Light Company (FPL) collected groundwater samples from the Pepper's Steel site on January 11-12, 2000 in response to a request by EPA for FPL to assist with the Five-Year Review that was being conducted at that time. Pam Scully from the EPA was present during the morning of January 11, 2000 and observed the initial groundwater sampling activities. Additional EPA oversight was provided by Kevin Brown of Black & Veatch, Inc. Mr. Brown remained onsite for the duration of groundwater sampling and collected split samples for EPA from select wells. Axel Salis of DERM was also present briefly to observe and collect split samples on January 12, 2000.

Each day, prior to initiation of groundwater sampling, the field meter was calibrated for pH and conductivity using appropriate standards and procedures as specified for the instrument. All calibration information was recorded on a field calibration data sheet for future reference. A copy of the field calibration data sheet is attached.

Groundwater sampling was conducted in monitoring wells MO-2, MO-3, MW-4A, MW-4B, MW-5A, MW-5B, MW-6A, MW-6B, and MW-9A. All sampling was conducted in accordance with FPL's approved Comprehensive Quality Assurance Plan (CompQAP No. 92-0041).

It should be noted that all monitoring wells (except MO-2, MO-3, and MW-9A) were in poor condition. In several instances, the outer well casings were severely corroded. In addition, none of these wells had caps or expansion seals, and one of the wells (MW-4A) was exposed due to the bent outer casing.

The groundwater sampling methodology consisted of measuring the depth to groundwater in each well and then using the total well depth to calculate the quantity of water constituting one well volume. Then, for each well, a total of three well volumes were purged using new teflon bailers. After each well volume was purged, the pH, temperature, and conductivity were measured to ensure stabilization of the field parameters prior to collection of the groundwater sample. This information was recorded on individual field data sheets prepared for each well. Copies of these data sheets are attached.

After purging was complete and field parameters verified to be stable, groundwater samples were collected. For each well, samples were collected for analysis of arsenic, lead, and PCBs. All metals samples were collected with a peristaltic pump and inert tubing.

For quality control, an equipment blank was collected from one of the new bailers using de-ionized water. Two duplicate samples were collected for additional quality control. DUP-1 was collected from monolith well MO-3 for PCBs and DUP-2 was collected from monitoring well MW-5B for arsenic and lead analysis. After the samples were collected, the sample time, name, and any observations were recorded on the individual field data sheet. The samples were then placed on ice.

Split samples were collected by Black and Veatch from monitoring wells MO-2 and MO-3 and by DERM from monitoring wells MW-5A and MW-5B.

The samples were hand delivered to FPL's Central Laboratory in West Palm Beach, Florida following all appropriate Chain-Of-Custody Procedures on January 12, 2000.

FIELD SAMPLER(S) JL/KS

FIELD CALIBRATION DATA SHEET

Pepper's Steel and Alloys Site
Medley, Florida

Parameter	Date/ Time	Standard Brand/Serial #	Standard Expiration	Standard Value	Sample Reading	Date/ Time	Standard Brand/Serial #	Standard Expiration	Standard Value	Sample Reading
pH	1/11/00 13:10	WTW 108708	10/02	8.00	6.93 -59.1 mV	1-12-00 4:55	WTW 108708	10/02	7.00	7.00
Conductivity	1-11-00 13:12	WTW 082362	9/02	1413	1410	1-12-00 4:55	WTW 082362	9/02	1413 µS/cm	1426
DO	NA	NA	NA	NA	NA					

Parameter	Date/ Time	Standard Brand/Serial #	Standard Expiration	Standard Value	Sample Reading	Date/ Time	Standard Brand/Serial #	Standard Expiration	Standard Value	Sample Reading
pH										
Conductivity										
DO										

WELL NO. MO-2

DATE 1/11/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = ~~15.32~~ KS 13.32

Depth to water (ft-TOC) = DTW = 10.15

Water Column (ft) = h = TWD-DTW = ~~5.17~~ KS 3.17

Well Diameter (in) = d = 2

One Well Volume (gals) = $V_g = 0.041d^2h$ = 0.52

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 1.97

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 2 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
13:23	2	2.10	27.7	9.24	723	NA
13:28	2	2.10	25.7	9.14	575	NA
13:34	2	2.10	26.0	8.92	560	NA

TIME SAMPLE COLLECTED: 13:40

SAMPLE NAME: PS-MO2

COMMENTS: Clear, yellow tint

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. M03

DATE 1/11/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

also collected
PS - DUP1 from this well ~ for PCBs

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 14.30

Depth to water (ft-TOC) = DTW = 10.88

Water Column (ft) = h = TWD-DTW = 3.42

Well Diameter (in) = d = 2

One Well Volume (gals) = $V_g = 0.041d^2h$ = 0.56

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 2.1

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 2 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
1545	2	2.1	25.7	7.83	520	NA
1550	2	2.1	25.3	7.77	520	
1555	2	2.1	25.1	7.74	523	

TIME SAMPLE COLLECTED: 1600

SAMPLE NAME: PS-M03

COMMENTS: Clear, no odor

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW4A

DATE 1/12/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

Pepper's Steel and Alloys Site
Medley, Florida

Arley Nieto
~~Fire~~ ~~Dept~~ Chief
Medley
305-885-2133

no well cap - casing was locked but had gap - well is pretty exposed

Well Volume Calculation

Total Well Depth (ft) = TWD = 19.1

Depth to water (ft-TOC) = DTW = 7.18

Water Column (ft) = h = TWD-DTW = 11.92

Well Diameter (in) = d = 4

One Well Volume (gals) = $V_g = 0.041d^2h$ = 7.82

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 29.6

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 29 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO
1419	29	30.4	25.7	7.65	526	
1438	29	30.4	25.1	7.60	536	
1455	29	30.4	24.6	7.64 ~~7.68~~ less	535	

TIME SAMPLE COLLECTED: 1500

SAMPLE NAME: PS - MW4A

COMMENTS: sample clear, no odor

41.9
9.1
51.0

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW4B

DATE 1/12/00

SAMPLER(S) JC/KS

GROUNDWATER SAMPLING DATA SHEET

outer well casing locked
no well cap.

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 51.00

Depth to water (ft-TOC) = DTW = 6.08

Water Column (ft) = h = TWD-DTW = 44.92

Well Diameter (in) = d = 4

One Well Volume (gals) = $V_g = 0.041d^2h$ = 29.5

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 111.7

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE — BAILERS PER WELL VOLUME

Use 5 gal bucket x 6 per well V

Well Purging Information

Time	Volume Purged: buckets ~~(# Bailers)~~	Volume Purged: gals ~~(liters)~~	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
14:37	6	30	24.4	7.57	508	
15:05	6	30	24.0	7.67	508	
15:30	6	30	24.2	7.67	506	

TIME SAMPLE COLLECTED: 15:32

SAMPLE NAME: PS-MW4B

COMMENTS: Sl. cloudy, no odor

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW5A

DATE 1/12/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

Outer casing locked but no well cap

DERM split sample

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 19.1

Depth to water (ft-TOC) = DTW = 5.85

Water Column (ft) = h = TWD-DTW = 13.25

Well Diameter (in) = d = 4

One Well Volume (gals) = $V_g = 0.041d^2h$ = 8.7

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 32.9

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): ~~3 ft~~ (1.05 l) 2 ft (0.700 l) N/A

PURGE 32 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
1035	32	33.6	26.2	7.32	506	
1105	32	33.6	27.0	7.21	522	
11:28	32	33.6	27.7	7.33	552	

TIME SAMPLE COLLECTED: 1130

SAMPLE NAME: PS- MW5A

COMMENTS: clear no odor

Frog in well!

WELL NO. MW-5B

DATE 1/12/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

outer casing locked but no well cap and outer casing corroded/disintegrating

DERM split sample

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 30.5

Depth to water (ft-TOC) = DTW = 5.77

Water Column (ft) = h = TWD-DTW = 24.73

Well Diameter (in) = d = 4

One Well Volume (gals) = $V_g = 0.041d^2h$ = 16.2

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 61.4

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 59 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
10:27	59	61.95	26.1	7.00	552	
10:48	59	61.95	26.7	7.24	513	
11:11	59	61.95	26.7	7.26	511	

TIME SAMPLE COLLECTED: 11:16

SAMPLE NAME: PS-MW5B

COMMENTS: Clear, No odor Metals dup2

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW-6A

DATE 1-12-00

SAMPLER(S) JRZ/KSS

GROUNDWATER SAMPLING DATA SHEET

outercasing locked
but no cap seal on well

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 13.60

Depth to water (ft-TOC) = DTW = 5.01

Water Column (ft) = h = TWD-DTW = 8.59

Well Diameter (in) = d = 4"

One Well Volume (gals) = $V_g = 0.041d^2h$ =

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 21.68

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 22 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
12:42	22	21.68	27.2	7.61	501	
12:56	22	21.68	26.4	7.61	494	
13:10	22	21.68	25.8	7.48	491	

TIME SAMPLE COLLECTED: 1313

SAMPLE NAME: PS-MW6A

COMMENTS: no odor, slightly cloudy

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW6B

DATE 1/12/00

SAMPLER(S) JL/KS

GROUNDWATER SAMPLING DATA SHEET

Outercasing locked but no seal/cap on well

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 30.0

Depth to water (ft-TOC) = DTW = 6.02

Water Column (ft) = h = TWD-DTW = 23.98

Well Diameter (in) = d = 4

One Well Volume (gals) = $V_g = 0.041d^2h$ = 15.73

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 59.5

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 57 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
12:24	57	59.9	27.4	7.28	507	
12:44	57	59.9	25.7	7.38	525	
13:10	57	59.9	25.4	7.35	507	

TIME SAMPLE COLLECTED: 1320

SAMPLE NAME: PS-MW6B

COMMENTS: Sl. cloudy, no odor

revised 1/5/00 3:48 PM
psteelGWFORM.XLS

WELL NO. MW9A

DATE 1-11-00

SAMPLER(S) JL|KS

GROUNDWATER SAMPLING DATA SHEET

Pepper's Steel and Alloys Site
Medley, Florida

Well Volume Calculation

Total Well Depth (ft) = TWD = 17.2

Depth to water (ft-TOC) = DTW = 4.92

Water Column (ft) = h = TWD-DTW = 12.28

Well Diameter (in) = d =

One Well Volume (gals) = $V_g = 0.041d^2h$ = 2.01

One Well Volume (liters) = $V_l = (V_g)(3.785)$ = 7.62

Purging Method

PURGE METHOD (circle): Bailer Peristaltic Pump

BAILER SIZE (circle): 3 ft (1.05 l) 2 ft (0.700 l) N/A

PURGE 8 BAILERS PER WELL VOLUME

Well Purging Information

Time	Volume Purged (# Bailers)	Volume Purged (liters)	Temp (deg C)	pH	Cond. (uS/cm)	DO (mg/L)
14:39	8	8.4	26.6	7.74	554	NA
14:53	8	8.4	25.5	7.43	530	NA
14:58	8	8.4	25.2	7.36	526	N

TIME SAMPLE COLLECTED: 15:00

SAMPLE NAME: PS-MW9A

COMMENTS: Clear, slight H_2S odor

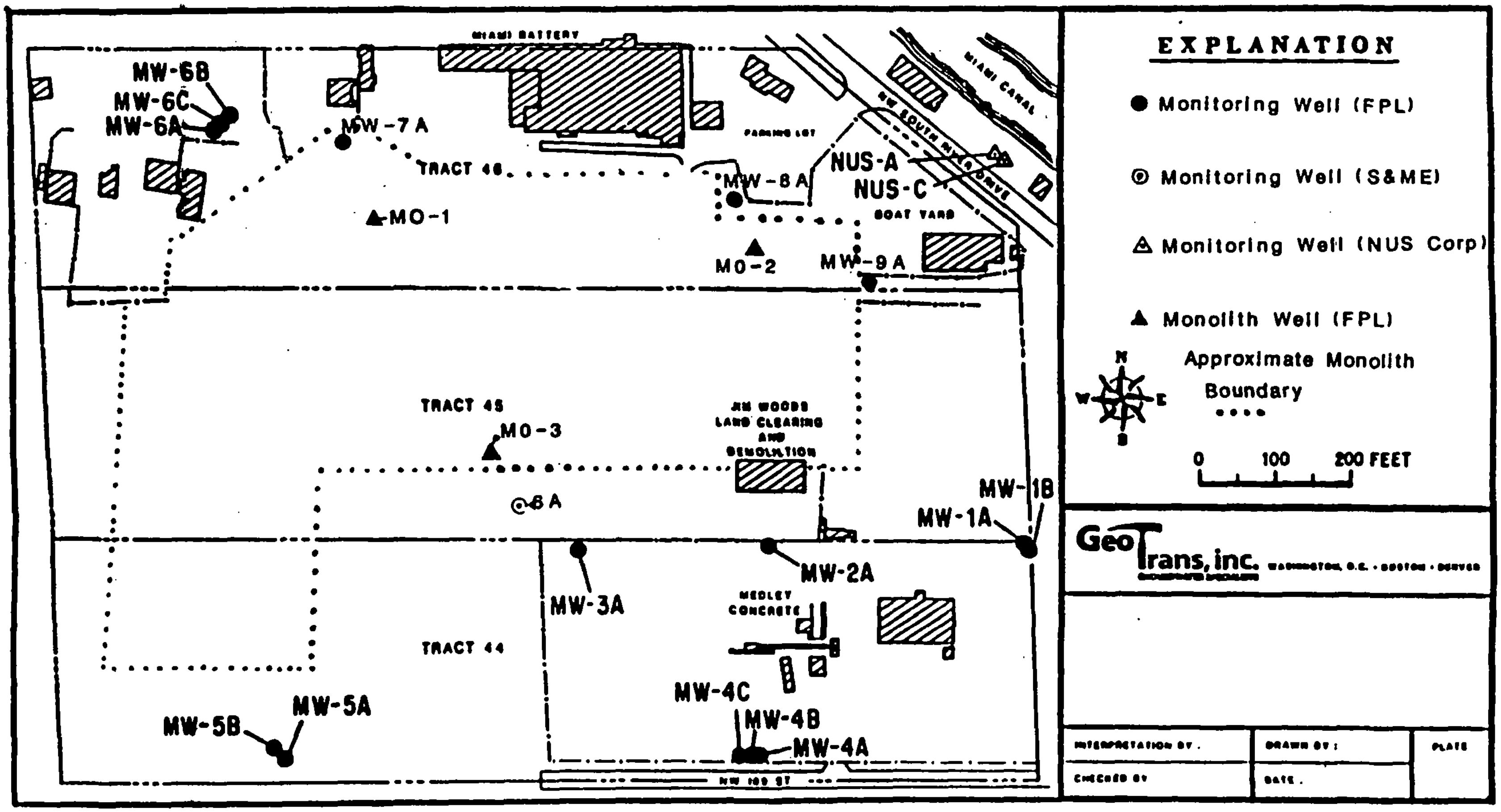


Figure 1. Approximate locations of Pepper Steel site monitoring wells.

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - Monolith 2

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0012	PS-MO2	Metals: Arsenic	01/11/2000 01:40:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0012	PS-MO2	Metals: Lead	01/11/2000 01:40:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0001	PS-MO2	PCB Aroclor 1016 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0001	PS-MO2	PCB Aroclor 1221 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0001	PS-MO2	PCB Aroclor 1232 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0001	PS-MO2	PCB Aroclor 1242 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0001	PS-MO2	PCB Aroclor 1248 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0001	PS-MO2	PCB Aroclor 1254 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0001	PS-MO2	PCB Aroclor 1260 in water	01/11/2000 01:40:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove

Samples Approved By: K M Donnell

Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.

Sample Comments:

Parameter Comments:

Routing: K.Salvador - GPA/JB
J. Lindsey - JES/JB

File Index: A-PSA-1

'esting Facility	State of Florida Certification Numbers	Customer Address
=PL Central Laboratory ;001A Village Blvd. Nest Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP #: 920041	Pepper Steel and Alloy

:eport of Analyses For: Pepper Steel and Alloy - Monolith 3

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
)0-PSA-01-0015	PS-MO3	Metals: Arsenic	01/11/2000 04:00:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
)0-PSA-01-0015	PS-MO3	Metals: Lead	01/11/2000 04:00:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1016 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1221 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1232 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1242 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1248 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1254 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
)0-PSA-01-0004	PS-MO3	PCB Aroclor 1260 in water			608	<0.1	ug/l	P2,U	0.1

;amples Analyzed By: Susie Adams, Howard Cosgrove
;amples Approved By: Kim Donell
:esult Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method ;08/8081/8082.
;ample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

'esting Facility
FPL Central Laboratory
;001A Village Blvd.
Nest Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

eport of Analyses For: Pepper Steel and Alloy - DUPLICATE 1

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1016 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1221 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1232 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1242 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1248 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1254 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0005	PS-DUP1	PCB Aroclor 1260 in water	01/11/2000 04:00:00 PM	01/20/2000	608	<0.1	ug/l	U	0.1

Samples Analyzed By: Howard Cosgrove
Samples Approved By: K. McDonnell
Result Comments: P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.; U - Analyzed but not detected.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - South Drainage 4A

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0021	PS-MW4A	Metals: Arsenic	01/12/2000 03:00:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0021	PS-MW4A	Metals: Lead	01/12/2000 03:00:00 PM	01/24/2000	6010	30	ug/l	R	3
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1016 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1221 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1232 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1242 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1248 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1254 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0010	PS-MW4A	PCB Aroclor 1260 in water	01/12/2000 03:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: Km Sidwell
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - South Drainage 4B

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0022	PS-MW4B	Metals: Arsenic	01/12/2000 03:32:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0022	PS-MW4B	Metals: Lead	01/12/2000 03:32:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1016 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1221 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1232 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1242 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1248 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1254 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0011	PS-MW4B	PCB Aroclor 1260 in water	01/12/2000 03:32:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: K m Tennell
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP #: 920041	Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - SW Drainage 5A

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0018	PS-MW5A	Metals: Arsenic	01/12/2000 11:30:00 AM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0018	PS-MW5A	Metals: Lead	01/12/2000 11:30:00 AM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1016 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1221 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1232 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1242 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1248 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1254 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0007	PS-MW5A	PCB Aroclor 1260 in water	01/12/2000 11:30:00 AM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove

Samples Approved By: K McDonnell

Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.

Sample Comments:

Parameter Comments:

Routing: K.Salvador

File Index: A-PSA-1

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - SW Drainage 5B

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0016	PS-MW5B	Metals: Arsenic	01/12/2000 11:16:00 AM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0016	PS-MW5B	Metals: Lead	01/12/2000 11:16:00 AM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1016 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1221 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1232 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1242 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1248 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1254 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0006	PS-MW5B	PCB Aroclor 1260 in water	01/12/2000 11:16:00 AM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: K McDonnell
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP #: 920041	Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - DUPLICATE 2

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0017	dup2	Metals: Arsenic	01/12/2000 11:16:00 AM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0017	dup2	Metals: Lead	01/12/2000 11:16:00 AM	01/24/2000	6010	<12	ug/l	R,U	3

Samples Analyzed By: Susie Adams
Samples Approved By: K McDonell
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.
Sample Comments:
Parameter Comments:
Routing: K.Salvador GPA/JB
Jim Lindsay JES/JB

File Index: A-PSA-1

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - NW Drainage 6A

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0019	PS-MW6A	Metals: Arsenic	01/12/2000 01:13:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0019	PS-MW6A	Metals: Lead	01/12/2000 01:13:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1016 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1221 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1232 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1242 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1248 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1254 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0008	PS-MW6A	PCB Aroclor 1260 in water	01/12/2000 01:13:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: [illegible]
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

Testing Facility	State of Florida Certification Numbers	Customer Address
FPL Central Laboratory 6001A Village Blvd. West Palm Beach, Fl 33407 Phone # (561) 640-2055	Environmental Chemistry: E56078 CompQAP #: 920041	Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - NW Drainage 6B

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0020	PS-MW6B	Metals: Arsenic	01/12/2000 01:20:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0020	PS-MW6B	Metals: Lead	01/12/2000 01:20:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1016 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1221 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1232 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1242 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1248 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1254 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0009	PS-MW6B	PCB Aroclor 1260 in water	01/12/2000 01:20:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: K Thornwell
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

'esting Facility
'PL Central Laboratory
i001A Village Blvd.
Nest Palm Beach, Fl 33407
'hone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

eport of Analyses For: Pepper Steel and Alloy - East Drainage

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
0-PSA-01-0013	PS-MW9A	Metals: Arsenic	01/11/2000 03:00:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
0-PSA-01-0013	PS-MW9A	Metals: Lead	01/11/2000 03:00:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1016 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1221 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1232 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1242 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1248 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1254 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
0-PSA-01-0002	PS-MW9A	PCB Aroclor 1260 in water	01/11/2000 03:00:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

iamples Analyzed By: Susie Adams, Howard Cosgrove
iamples Approved By: K m [illegible]
tesult Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 08/8081/8082.
iample Comments:
'arameter Comments:
touting: K.Salvador

File Index: A-PSA-1

Testing Facility
FPL Central Laboratory
6001A Village Blvd.
West Palm Beach, Fl 33407
Phone # (561) 640-2055

State of Florida Certification Numbers
Environmental Chemistry: E56078
CompQAP #: 920041

Customer Address
Pepper Steel and Alloy

Report of Analyses For: Pepper Steel and Alloy - Equipment Blank

Lab Sample Number	Field Sample Number	Parameter	Sample Collect. Date	Analysis Date	EPA Meth.	Result	Units	Qual.	MDL
00-PSA-01-0014	PS-EQB	Metals: Arsenic	01/11/2000 03:30:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0014	PS-EQB	Metals: Lead	01/11/2000 03:30:00 PM	01/24/2000	6010	<12	ug/l	R,U	3
00-PSA-01-0003	PS-EQB	PCB Aroclor 1016 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.3	ug/l	P2,U	0.3
00-PSA-01-0003	PS-EQB	PCB Aroclor 1221 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0003	PS-EQB	PCB Aroclor 1232 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0003	PS-EQB	PCB Aroclor 1242 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0003	PS-EQB	PCB Aroclor 1248 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1
00-PSA-01-0003	PS-EQB	PCB Aroclor 1254 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.2	ug/l	P2,U	0.2
00-PSA-01-0003	PS-EQB	PCB Aroclor 1260 in water	01/11/2000 03:30:00 PM	01/20/2000	608	<0.1	ug/l	P2,U	0.1

Samples Analyzed By: Susie Adams, Howard Cosgrove
Samples Approved By: [illegible]
Result Comments: R - Reported at Practical Quantification Limit (PQL); U - Analyzed but not detected.; P2 - PCB in groundwater analyzed by EPA method 608/8081/8082.
Sample Comments:
Parameter Comments:
Routing: K.Salvador

File Index: A-PSA-1

CHAIN-OF-CUSTODY FORM CC-00-PSA-0001

FPL

Site Name and Address: Peppers Steel and Alloys Site

Sampler PRINT & SIGN: Kathy Salvador / Jim Lindsay
Telephone No.: 691-7054 / 691-7032

Containers (Describe and identify source using A-Z): ICHEM pre cleaned containers: (12) amber glass (WM) bottles (950ml) Lot# 353725; (11) 500ml Nalgene HDPE bottles Lot# 171013

Sample Container Source:

CompQAP Information of Sampler:
CHECK ONE:
✓ FPL CompQAP Number: 920041
Approval Date 7/29/99
___ Other CompQAP Number
Approval Date

Analyses Required/Preservation

No. of Containers; Matrix: S=soil; W=water; SS=saline water; GW=groundwater; SD=sediment; SW=surface water; O = other (describe in remarks); Grab (G) or Composite (C)

Sample Number	Sample Location	Date 2000	Time	Grab (G) or Composite (C)	Matrix	No. of Containers	PCBs (A)	As	Pb (B)		A	B
PS-MO2	Monolith	1/11	1340	G	GW	2	✓	✓	✓	00-PSA-01	0001	0012
PS-MW9A	East Drainage	1/11	1500	G	GW	2	✓	✓	✓		0002	0013
PS-EQB	Equipment Blank	1/11	1530	G	W	2	✓	✓	✓		0003	0014
PS-MO3	Monolith	1/11	1600	G	GW	2	✓	✓	✓		0004	0015
PS-DUP1		1/11	1600	G	GW	1	✓				0005	
PS-MW5B	SW Drainage	1/12	1116	G	GW	2	✓	✓	✓		0006	0016
PS-MWDUP2		1/12	1116	G	GW	1		✓	✓			0017
PS-MW5A	SW Drainage	1/12	1130	G	GW	2	✓	✓	✓		0007	0018
PS-MW6A	NW Drainage	1/12	1313	G	GW	2	✓	✓	✓		0008	0019

Remarks: EPA splits taken for MO-2 and MO-3
DERM splits taken for MW5A and MW5B
No well seals on MW5A, MW5B, MW6A, MW6B

Send Lab Report To: Kathy Salvador JES/JB

Clean Sample Containers Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	Clean Sample Containers Received By:	Date/Time	Custody Seal(s) Intact?
Linda Pinkney	1/11/00	NA	Hand Delivered	Kathy Salvador	1/11/00 0800	NA
Relinquished By: Kathy Salvador	1/12/00 1850	yes	Hand	**Received By:** Linda Pinkney	1/13/00 0830	yes
Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	**Received By:**	Date/Time	Custody Seal(s) Intact?
Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	**Received By:**	Date/Time	Custody Seal(s) Intact?

Laboratory Remarks:

Cooler Temperature Checks: ICE

FPL

CHAIN-OF-CUSTODY FORM

CC-00-PSA-0004.

Site Name and Address: Peppers Steel & Alloy Site

Sampler PRINT & SIGN: Kathy Salvador / Jim Lindsay

Telephone No.: 691-7034 691-7032

Page 2 **of** 2

Containers (Describe and identify source using A-Z):
ICHEM pre cleaned containers: (12) amber glass (NPA) bottles (950ml) Lot# 353125; (11) 500ml Nalgene HDPE bottles Lot# 171013

CompQAP Information of Sampler:
CHECK ONE:
✓ FPL CompQAP Number: 920041
Approval Date 7/29/99
___ Other CompQAP Number ________
Approval Date ________

Sample Container Source:

Analyses Required/Preservation

Sample Number	Sample Location	Date 2000	Time	Grab (G) or Composite (C)	Matrix (S=soil; W=water; SS=saline water; GW=groundwater; SD=sediment; SW=surface water; O = other (describe in remarks))	No. of Containers	PCBs (A)	Pb (B)	As (B)					A	B
PS-MW6B	NW Drainage	1/12	1320	G	GW	2	✓	✓	✓		00-PSA-01			0009	0020
PS-MW4A	South Drainage	1/12	1500	G	GW	2	✓	✓	✓					0010	0021
PS-MW4B	South Drainage	1/12	1532	G	GW	2	✓	✓	✓					0011	0022

Remarks:

Send Lab Report To: K. Salvador JES/JB

Clean Sample Containers Relinquished By:	Date/Time	Custody Seal(s) Intact?	Method of Shipment	Clean Sample Containers Received By:	Date/Time	Custody Seal(s) Intact?
Ronda Pinkney	1/11/00	NA	Hand Delivered	Kathy Salvador	1/11/00 0800	NA
Relinquished By: Kathy Salvador	**Date/Time** 1/12/00 1850	**Custody Seal(s) Intact?** yes	**Method of Shipment** Hand	**Received By:** Ronda J. Pinkney	**Date/Time** 1/13/00 0930	**Custody Seal(s) Intact?** yes
Relinquished By:	**Date/Time**	**Custody Seal(s) Intact?**	**Method of Shipment**	**Received By:**	**Date/Time**	**Custody Seal(s) Intact?**
Relinquished By:	**Date/Time**	**Custody Seal(s) Intact?**	**Method of Shipment**	**Received By:**	**Date/Time**	**Custody Seal(s) Intact?**

Laboratory Remarks:

Cooler Temperature Checks: Ice

7/15/98

Attachment G

Department of Environmental Resources Management
Miami-Dade County
Data

DERMFAX

Main Switchboard
33 SW 2nd Avenue, 12th Floor
Miami FL 33130-1540
Phone (305) 372-6789

SEND TO: Carol King

Name:

Company/Department:

Phone Number:

Fax Number:

Message:

FROM: INDUSTRIAL FACILITIES SECTION

Name: Axel Solis

Phone Number (305)372-6600

Fax Number (305)372-6545

Date 3/14/00

Number of Pages (including this one) 8

MIAMI-DADE

DERM

Pollution Control Division
Industrial Facilities Sampling Event Report Form

Facility/Project Name: Pepper's Steel and Alloy **Date:** 01/12/2000
Facility/Project Address: 10900 NW S. River Dr. **Time:** 11:45 am
Permit # / File #: HWR-165 / 14813
Cost Center Code: 992204 **(Mandatory if conducting a sampling event for another division/section)**
Inspector/Tech. Name(s): Axel Salis
Site Contact: Cathy Glasgow **Phone Number:** N/A

Description of event and location of sampling activities:

Type of Sampling – **Monitoring Well(s), Soil, Sanitary Sewer, Septic Tank, Other** ____
Number of Samples 4
Split Sampling Y/N **(Consultant, Lab:** James R. Lindsay **)**

Blue Card	Parameter(s)	Location
229434	PCB	MW-5A
229433	Lead	MW-5A
229432	PCB	MW-5B
229431	Lead	MW-5B

Comments: ____

Mater List Updated: Y/N **Status #:** ____ **Reviewed by:** ____ **Date :** ____

Revised 07/23/99

6

MIAMI-DADE

METROPOLITAN MIAMI-DADE COUNTY, FLORIDA

DERM

Office of Laboratory Services
Miami, Florida 33128-1547

LABORATORY ANALYSIS RECORD
ENFORCEMENT

RECEIVED
FEB 01 2000
DERM
INDUSTRIAL FACILITIES
SECTION

Site: Pepper's Steel + Alloy

Address: 10900 NW S River Dr

Sample #: 229434

Collection Point: MW-5A

Date: 1/12/00 Time: 12:11

Sampled by/Section: A. Salis

Phone: 372-6605 Permit: HWR-165

Delivered by/Section: A. Salis

S.C#: 992209

Return Analysis to/Section: A. Salis

BAR Code:

Observation/Known Hazards:

031145 Ref # ___ Iced? Y_N_

12 JAN '00 PM 3:02 — E. Carrero

*Clock-In Date/Inspector — *w/ Lab Custodian / Fridge # — *Laboratory ID #

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Sample Disposal Date/Lab

*Extraction Date/Lab

*Analyzed Date/Lab

Requirements: SDWA _ NPDES _ Other _

Matrix: H2O ✓ Soil/Sludge _ Product _ Layer _ Sewage _ DW _ Other _

Preservation: None ✓ Acid _ Base _ Thermal

Comments:

Sample Bottle:

Prepared Date By Lab: 12-23-99 Picked-Up Date By Inspector: 01-12-00

Split Sample? Yes ✓ No _ Consultant/Lab: James R. Lindsay

**Contract Lab:

Delivered By/Company/Date: Brisco 16:30 01.13.00 STL

Received By/Lab/Date:

Extracted By/Lab/Date:

Analyzed By/Lab/Date: Jane Taylor 1-14-00

Returned By/Company/Date:

*Extracted By/DERM Lab

*Analyzed By/DERM Lab

Test(s) Run/Method #	*Result / Date Analyzed	Test(s) Run/Method #	*Result / Date Analyzed
PCB	LAB RESULTS ATTACHED		

Return For TCLP? Yes _ No _ Date Requested

Comments

* To Be Completed By Lab ** To Be Completed By Contract Lab

EPA # FL00025 HRS #E46126 1-31-00 SP CQAP #870238

DERM00000276
Ed Gancher
Dept. Environ. Resource Mgmt.
Lab: 211 W. Flagler Street
Miami, FL 33130-1510

Page 3
January 18, 2000
Submission # 1000522
Order # 3143
FDEP CompQAP# 990102
HRS Certification# E86349, 86413, 86565

Site Location/Project
Pepper's Steel & Alloy
Analysis

Sample I.D.: 229434
Collected: 01/12/00 12:11
Received: 01/13/00 16:30
Collected by: Client

PARAMETER	RESULT	UNITS	METHOD	DETECTION LIMIT	DATE EXT.	DATE ANALY.	ANALYST
608 PCBs (ONLY) in Water			MEDF	1			
Arochlor 1016	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1221	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1232	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1242	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1248	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1254	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1260	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1262	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1268	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Total PCB	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT

BDL: Indicates Analyte is Below Detection LimitMEDF: Matrix Effected Dilution Factor***
Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field
Qualifier following result conforms to FAC 62-160 Table 7***Unless otherwise noted, mg/Kg denotes wet weight***
***62-770: If the MDL using the most sensitive and currently available technology is higher than a specific criterion, the PQL shall be used.
Certs: Al. =#41180, Ct. =#PH0217, Ks. =#E270 + E1245, Ky. =#90087, La. =#9601, Md. =#271, Ma. =#M-FL535
NC. =#539, ND. =#R163, OK. =#9523, SC. =#96023, Tn. =#TN02826

Michael Spitzer

Michael A. Spitzer, Laboratory Director

MIAMI-DADE

METROPOLITAN MIAMI-DADE COUNTY, FLORIDA

DERM
Office of Laboratory Services
Miami, Florida 33128-1547

LABORATORY ANALYSIS RECORD
ENFORCEMENT

Site : Pepper's Steel + Alloy
Address: 10900 NW Shiver Dr
Sample #: 229433
Collection Point : MW-5A
Date : 1/12/00 Time: 12:09
Sampled by/Section: A. Solis
Phone : 372-6605 Permit: HWR-165
Delivered by/Section: A. Solis
C.C.#: 992204
Return Analysis to/Section: A. Solis
BAR Code:
Observation/Known Hazards:

12 JAN '00 PM 3:02 — E. Carrero — 031144 Ref # ___ Iced? Y_N_

*Clock-In Date/Inspector — *w/ Lab Custodian / Fridge # — *Laboratory ID #

Requirements: SDWA _ NPDES _ Other _
Matrix: H2O ✓ Soil/Sludge _ Product _ Layer _ Sewage _ DW _ Other _
Preservation: None _ Acid ✓ Base _ Thermal
Comments:
Sample Bottle :
Prepared Date By Lab: 12-15-99 Picked-Up Date By Inspector: 1-12-00
Split Sample? Yes ✓ No _ Consultant/Lab: James Lindsay

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Sample Disposal Date/Lab

*Extraction Date/Lab

1-19-00
*Analyzed Date/Lab

**Contract Lab:
Delivered By/Company/Date:
Received By/Lab/Date:
Extracted By/Lab/Date:
Analyzed By/Lab/Date:
Returned By/Company/Date:

RECEIVED
JAN 24 2000
DERM
INDUSTRIAL FACILITIES
SECTION

*Extracted By/DERM Lab
*Analyzed By/DERM Lab

Test(s) Run/Method #	*Result / Date Analyzed	Test(s) Run/Method #	*Result / Date Analyzed
lead	U mdl= 2 ug/l	m-239.2	

Return For TCLP? Yes _ No _ Date Requested
Comments

* To Be Completed By Lab ** To Be Completed By Contract Lab

EPA # FL00025 HRS #E46126 1-20-00 SP CQAP #870238

IND FAC SEC

METROPOLITAN MIAMI-DADE COUNTY, FLORIDA

LABORATORY ANALYSIS RECORD
ENFORCEMENT

DERM
Office of Laboratory Services
Miami, Florida 33128-1547

Site: Pepper's Steel + Alloy
Address: 10900 NW S River Dr
Collection Point: MW-5B
Sampled by/Section: A. Salis
Delivered by/Section: A. Salis
Return Analysis to/Section: A. Salis
Observation/Known Hazards:

RECEIVED
FEB 0 1 2000
DERM
INDUSTRIAL FACILITIES SECTION

Sample #: 229432
Date: 1/12/00 Time: 12:07
Phone: 372-6605 Permit: HWR-
C.C.#: 992204
BAR Code:

12 JAN '00 PM3:02
12 JAN '00

*Clock-In Date/Inspector

E. Carrero

*w/ Lab Custodian / Fridge #

031143 Ref # ___
Iced? Y_ N_

*Laboratory ID #

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Sample Disposal Date/Lab

*Extraction Date/Lab

*Analyzed Date/Lab

Requirements: SDWA __ NPDES __ Other __
Matrix: H2O ✓ Soil/Sludge __ Product __ Layer __ Sewage __ DW __
Preservation: None ✓ Acid __ Base __ Thermal __ Other __
Comments:
Sample Bottle:
Prepared Date By Lab: 12-23-99 Picked-Up Date By Inspector: 1/12/00
Split Sample? Yes ✓ No __ Consultant/Lab: James R. Lindsay

**Contract Lab:
Delivered By/Company/Date: [signature]
Received By/Lab/Date: 16:30 01.13.00 STL
Extracted By/Lab/Date:
Analyzed By/Lab/Date: Jane Taylor
Returned By/Company/Date: 1-14-00

*Extracted By/DERM Lab
*Analyzed By/DERM Lab

Test(s) Run/Method #	*Result / Date Analyzed	Test(s) Run/Method #	*Result / Date Analyzed
PCB	LAB RESULTS ATTACHED		

Return For TCLP? Yes __ No __ Date Requested
Comments

* To Be Completed By Lab ** To Be Completed By Contract Lab

EPA # FL00025

HRS #E46126

1-31-00 SP

CQAP #87[illegible]

DERM00000276
Ed Gancher
Dept. Environ. Resource Mgmt.
Lab: 211 W. Flagler Street
Miami, FL 33130-1510

Page 4
January 18, 2000
Submission # 1000522
Order # 3144
FDEP CompQAP# 990102
HRS Certification# E86349, 86413, 86565

Site Location/Project
Pepper's Steel & Alloy
Analysis

Sample I.D.: 229432
Collected: 01/12/00 12:07
Received: 01/13/00 16:30
Collected by: Client

PARAMETER	RESULT	UNITS	METHOD	DETECTION LIMIT	DATE EXT.	DATE ANALY.	ANALYST
608 PCBs (ONLY) in Water			MEDF	1			
Arochlor 1016	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1221	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1232	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1242	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1248	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1254	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1260	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1262	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Arochlor 1268	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT
Total PCB	BDL	ug/L	EPA 608/8082	0.070	01/14/2000	01/14/2000	JT

BDL: Indicates Analyte is Below Detection LimitMEDF: Matrix Effected Dilution Factor***
Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field
Qualifier following result conforms to FAC 62-160 Table 7***Unless otherwise noted, mg/Kg denotes wet weight***
***62-770: If the MDL using the most sensitive and currently available technology is higher than a specific criterion, the PQL shall be used.
Certs:Al.=#41180, Ct.=#PH0217, Ks.=#E270 + E1245, Ky.=#90087, La.=#9601, Md.=#271, Ma.=#M-FL535
NC.=#539, ND.=#R163, OK.=#9523, SC.=#96023, Tn.=#TN02826

Michael Spitzer

Michael A. Spitzer, Laboratory Director

DERM IND FAC SEC

METROPOLITAN MIAMI-DADE COUNTY, FLORIDA

MIAMI-DADE

DERM

Office of Laboratory Services
Miami, Florida 33128-1547

LABORATORY ANALYSIS RECORD
ENFORCEMENT

Sample # : 229431

Site : Pepper's Steel + Alloy

Date : 1/12/00 Time: 12:05

Address: 10900 NW S River Dr

Phone : 372-6605 Permit: HWR-165

Collection Point : MW-5B

C.C.#: 992204

Sampled by/Section: A. Salis

BAR Code:

Delivered by/Section: A. Salis

031142 Rcf # ___ Iced? Y_N_

Return Analysis to/Section: A. Salis

Observation/Known Hazards:

E. Carrero

12 JAN '00 PM3:01

*Laboratory ID #

*w/ Lab Custodian / Fridge #

*Clock-In Date/Inspector

Requirements: SDWA ___ NPDES ___ Other ___ Sewage ___ DW ___ Other ___

Matrix: H2O ✓ Soil/Sludge ___ Product ___ Layer ___ Thermal ___

Preservation: None ___ Acid ✓ Base ___

Comments: 1-12-00

Sample Bottle:

Prepared Date By Lab: 12-15-99 James Lindsay

Split Sample? Yes ✓ No ___ Consultant Lab:

RECEIVED
JAN 24 2000
D E R M
INDUSTRIAL FACILITIES
SECTION

*Take-Out Date/Lab

*Returned-Date/Lab

*Take-Out Date/Lab

*Returned-Date/Lab

**Contract Lab:
Delivered By/Company/Date:

*Take-Out Date/Lab

Received By/Lab/Date:

Extracted By/Lab/Date:

Analyzed By/Lab/Date:

*Sample Disposal Date/Lab

Returned By/Company/Date:

*Extraction Date/Lab

*Extracted By/DERM Lab

1-19-00

*Analyzed By/DERM Lab

*Analyzed Date/Lab

Test(s) Run/Method #	*Result / Date Analyzed	Test(s) Run/Method #	*Result / Date Analyzed
lead	2.3 ug/l	m-239.2	

Return For TCLP? Yes ___ No ___ Date Requested

Comments

1-20-00 SP

CQAP #870

* To Be Completed By Lab ** To Be Completed By Contract Lab

HRS #E46126

DOH # FL00025

Attachment H

Comments on Pepper's Steel and Alloys Drainage Collar and PRP Consultant's Design and Calculations

Memo

To: Carol King

From: Dave Russell, PE

CC: -

Date: 07/12/00

Re: Comments on Pepper's Steel and Alloys Drainage Collar and PRP Consultant's Design and Calculations

---

Carol,

I have completed my review of the drainage collar at the Pepper's Steel Site in Dade County, Florida. I focused my efforts on looking for weaknesses in the design of the drainage collar which would support the observation of failure of the drain collar due to overflowing. I began my review by first reviewing reports prepared by several consultants. These documents were provided by as follows:

<u>Evaluation of Drainage Structure</u>, Canonie Env. Services Corp, January 1989

<u>Proposed Drainage Design</u>, Tenera, October 1990

<u>Operations and Maintenance Guidelines for Drain Collar</u>, Peterson and Bernard, February 1990

I focused my efforts on the report by Canonie Env. The other reports acknowledged problems at the site and how to correct them. Canonie's report defended the design and stated there was no problem. In general, Canonie stated that the drain collar had a factor of safety of three against failure of the drain.

My first design check was of the hydrology calculations performed. I ran my own TR-55 analysis of the 100 year storm for the site. I came up with a value of 0.0628 cfs. This compared reasonably well with the value Canonie calculated, 0.071 cfs. See Attachment #1 for my drainage calculations.

My second design check was of the ability of runoff to enter the drainage collar. This calculation was ignored by Canonie. The minimum K value of the drainage trench required for **runoff from the 100 year storm to enter it is 0.76 cm/sec**. See Attachment #2.

Canonie proved that material described as 'silts to cobbles" could not be eroded. However, they failed to account for the fact that over 10% of the cover had material passing the #40 sieve. The velocities of 1 ft/sec that they arrived at are sufficient to move this material which is less than 0.425 mm in size.

Canonie stated that the final cover was solidified and would result in 90% runoff. However, this same material was used to create berms and cover the absorption trenches surrounding the monolith. It would stand to reason that some portion of the stabilization reaction is taking place resulting in solidifying of the limestone. This would result in a loss of pore space and a reduction in permeability.

Vegetation is growing vigorously on the surface of the monolith in an organic medium. This organic medium is subject to erosion quite easily. These particles are believed to be entering the pore spaces of the trench.

Therefore, a more reasonable value for the permeability of the absorption trench is approaching that of beach sand, based on available information, which would have **a permeability of approximately 0.1 cm/sec.** The drainage collar is failing because it does not have the proper permeability to handle the flow into it.

These findings set the stage for my analysis of why the drainage collar at Pepper's Steel is not functioning. The reasons for the drainage collar not working are as follows:

- Erosion of fines (#4 sieve material and down to # 200) from the original unwashed limestone cover.

- Solidifying of the limestone due to chemical stabilization of the limestone resulting in binding of the particles.

- Introduction of organic particles into the void spaces of the drainage collar.

The solution to correct the drainage problem was covered adequately by the other consultants. One answer provided was the removal of the drainage collar, removal of fines, and replacement of the coarse material. This solution while effective, will require repeated use over the years. I do not recommend it. The drainage collar will require frequent cleaning which is very expensive, time consuming, and intrusive on activities of landowners adjacent to the property.

Another solution proposed by the other consultant was the establishment of drainage channels around the perimeter and routing the flows to drainage fields. I recommend this solution. The drainage fields would be much like detention ponds which we are all more familiar with. The fields would be designed to detain the runoff of a storm event and release it through absorption into the soil or evaporation. The advantage of the fields is that they would allow frequent and cheap maintenance of the bottom of the fields to overcome the effects of plugging of the pore spaces. They would also be much easier to visually inspect.

The Canonie report and other consultants reports are attached as Attachment #3.

BLACK & VEATCH

Owner: EPA R IV — Computed By: DAR
Plant: Peppers Steel — Unit: — Date: 7/8 2000
Project No.: — File No.: — Verified By: [illegible]
Title: Hydrology Check — Date: 7/18 2000
Page 1 of 10

OBJ: Check Hydrology Calcs of Previous Engineers

	Area	Length Flow	Length Drain C
Site #1	50,830 ft² 0.00182 mi²	219 slope 0.021	231
Site #2	5663 SF 0.000203 mi²	90	63

Site #1 $\frac{14.5 \text{ cfs}}{231 \text{ LF}} = 0.0628 \frac{\text{ft}^2}{\text{sec}}$

$0.0628 \frac{\text{ft}^2}{\text{sec}} * 1 \text{ LF of Trench} = 0.0628 \text{ cfs}$ per LF of trench

This checks out OK.

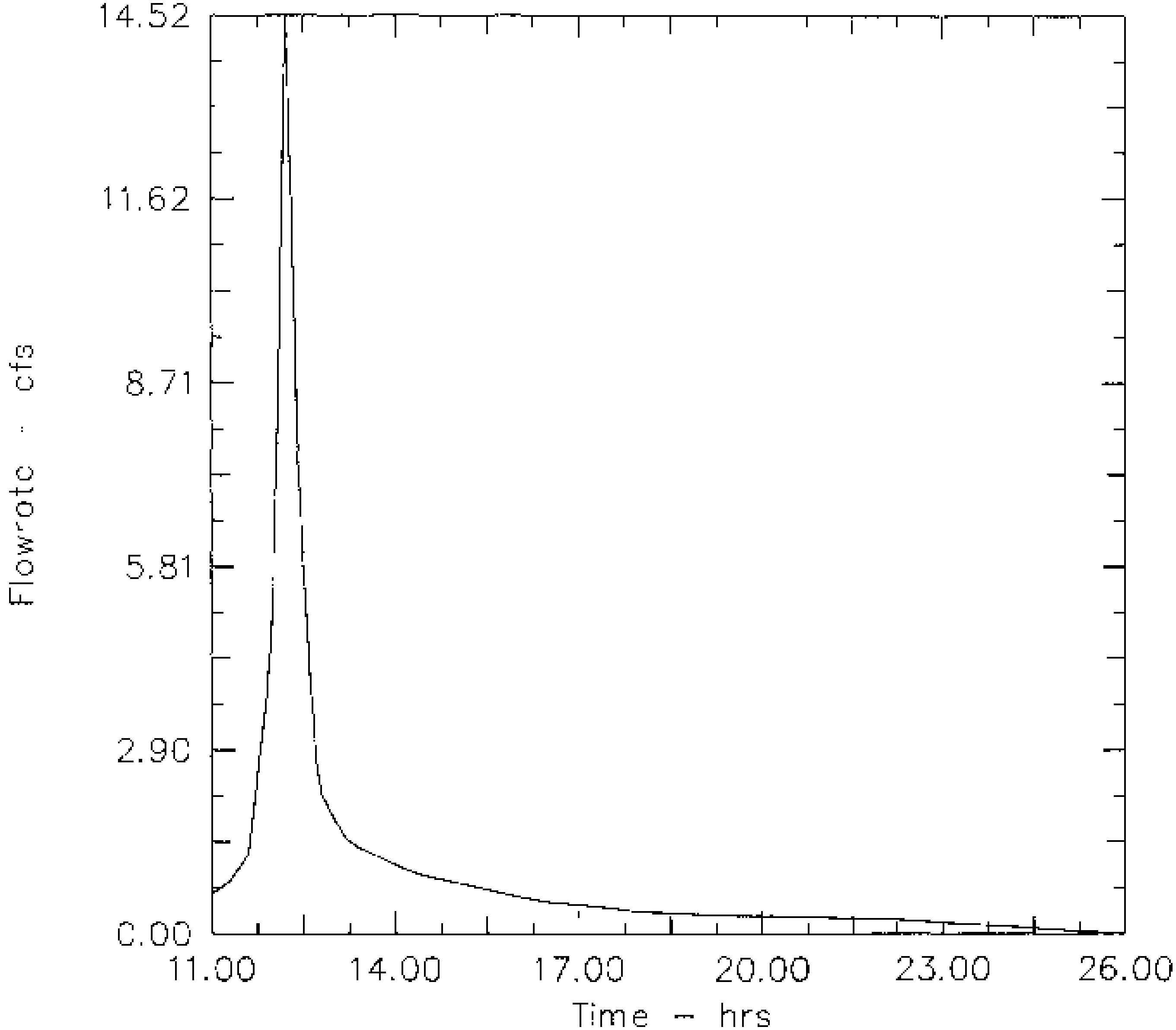
See Cummings and Tampa references

DO NOT WRITE IN THIS SPACE

PGN-172B

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED, INITIALED, AND DATED BY THE RESPONSIBLE INDIVIDUAL.

PEPPERS STEEL, SITE #1
Tabular Hydrograph
Peak Flow 14.522751 cfs – Time 12.200000 hrs



TR-55 Tabular Hydrograph Method
Input Summary

Description ....
Peppers Steel Site #1
Rainfall Distribution .... Type III
Ia/P Interpolation .... On
Total Area 0.001820 mi2

Peak Time .... 12.200000 hrs
Peak Flow .... 14.322751 cfs

Given Input Data:

Subarea Description	D/S Subareas	Area (mi2)	CN	Tc (hrs)	Tt (hrs)	Rainfall (in)
Site #1		0.001820	90	0.100000	0.100000	13.300000

Support Data:

Pg 4 of 13

tmp#1.hdc

```
#Units=Time,hrs,Flowrate,cfs
#Tabular Hydrograph Data
#Time - hrs    Flowrate    cfs
#------------ ------------
11.00000000,0.63619301
11.30000000,0.83363224
11.60000000,1.25044636
11.90000000,3.77328276
12.00000000,8.28690347
12.10000000,9.32351050
12.20000000,14.52275117
12.30000000,11.54891371
12.40000000,7.56850326
12.50000000,5.81348801
12.60000000,4.19009090
12.70000000,2.85189978
12.80000000,2.21570675
13.00000000,1.82002032
13.20000000,1.49176246
13.40000000,1.36013687
13.60000000,1.27238605
13.80000000,1.18463529
14.00000000,1.09688453
14.30000000,0.96525839
14.60000000,0.89944531
15.00000000,0.81169455
15.50000000,0.70200610
16.00000000,0.59231765
16.50000000,0.50456680
17.00000000,0.46069150
17.50000000,0.41681612
18.00000000,0.35100305
19.00000000,0.30712767
20.00000000,0.28518998
22.00000000,0.24131460
26.00000000,0.00000000
```

Pg 5 of 10

Graphical Peak Discharge method

```
Given Input Data:
     Description ......................  PEPPERS STEEL, SITE #1
     Rainfall distribution ...........  Type III
     Frequency ........................  100 years
     Rainfall, P (24-hours) ..........  13.300000 in
     Drainage area ...................  0.001820 mi2
     Runoff curve number, CN .........  90
     Time of concentration, Tc .......  0.100000 hrs
     Pond and Swamp Areas ............  0.000000 % of Area

Computed Results:
     Initial abstraction, Ia .........  0.222222 in
     Ia/P ............................  0.100000
     Unit peak discharge, qu .........  661.942095 csm/in
     Runoff, Q .......................  12.053676 in
     Pond and swamp adjustment, Fp ...  1.000000
     Peak discharge, qp ..............  14.521481 cfs
```

P. 6 of 10


```
SITE #1 PEPPERS STEEL
  Sheet Flow
  --------- -
     Description ................. ....
     Manning's n .....................        0.0330
     Flow Length .....................      219.0000 ft
     Two Yr, 24 hr Rainfall ..........        5.5000 in
     Land Slope ......................        0.0200 ft/ft
     Computed Sheet flow time . .....................> 0.0694 hrs

  ***************************

  Total Time of Concentration .........................> 0.0694 hrs
  ****************************
```

SITE 41 PEPPERS STEEL
Sheet Flow

```
    Description ......................
    Manning's n ......................      0.0330
    Flow Length ......................    219.0000 ft
    Two Yr, 24 hr Rainfall ...........      5.5000 in
    Land Slope .......................      0.0200 ft/ft
    Computed Sheet flow time ........................> 0.0694 hrs
```

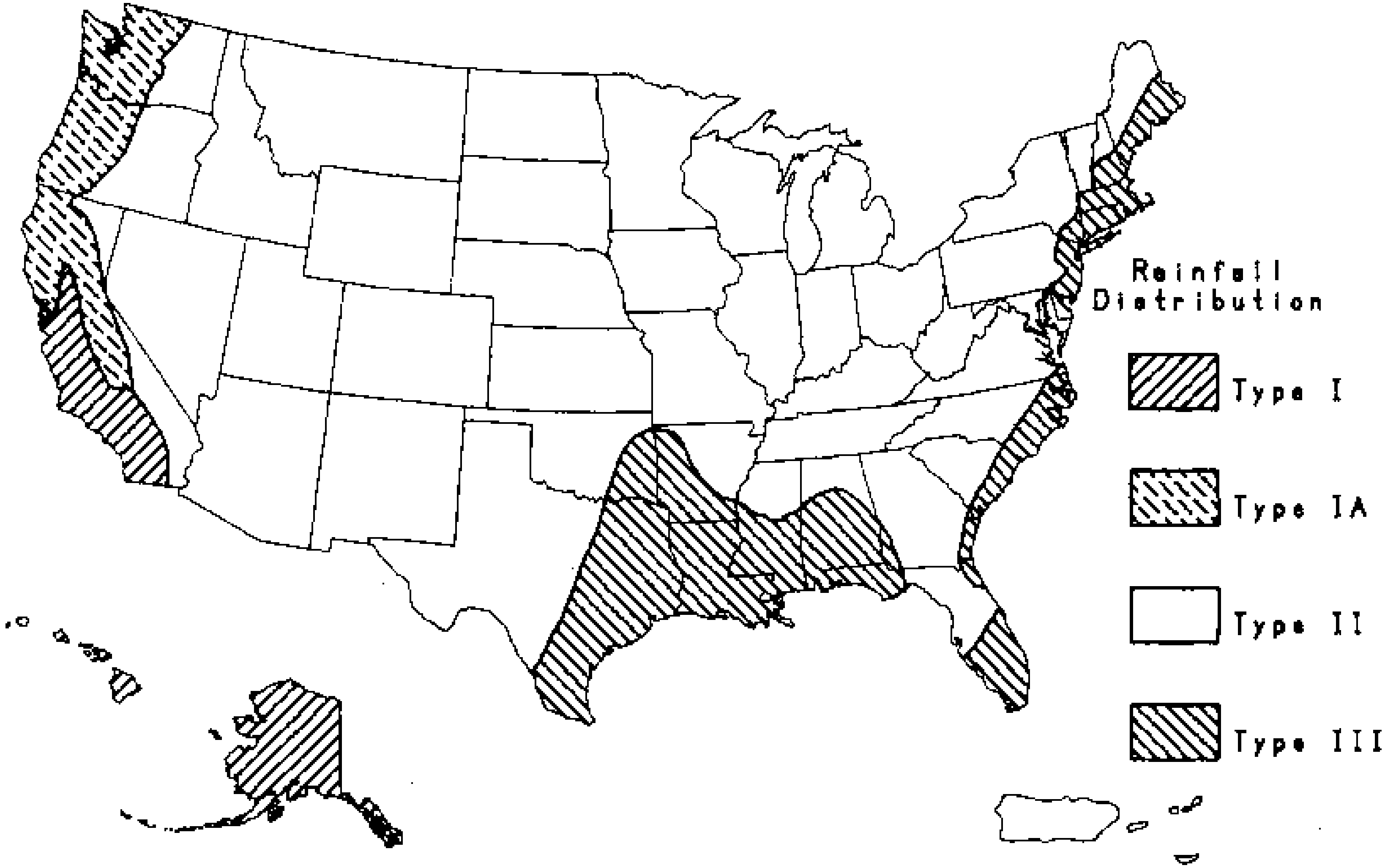


Figure B-2.—Approximate geographic boundaries for SCS rainfall distributions.

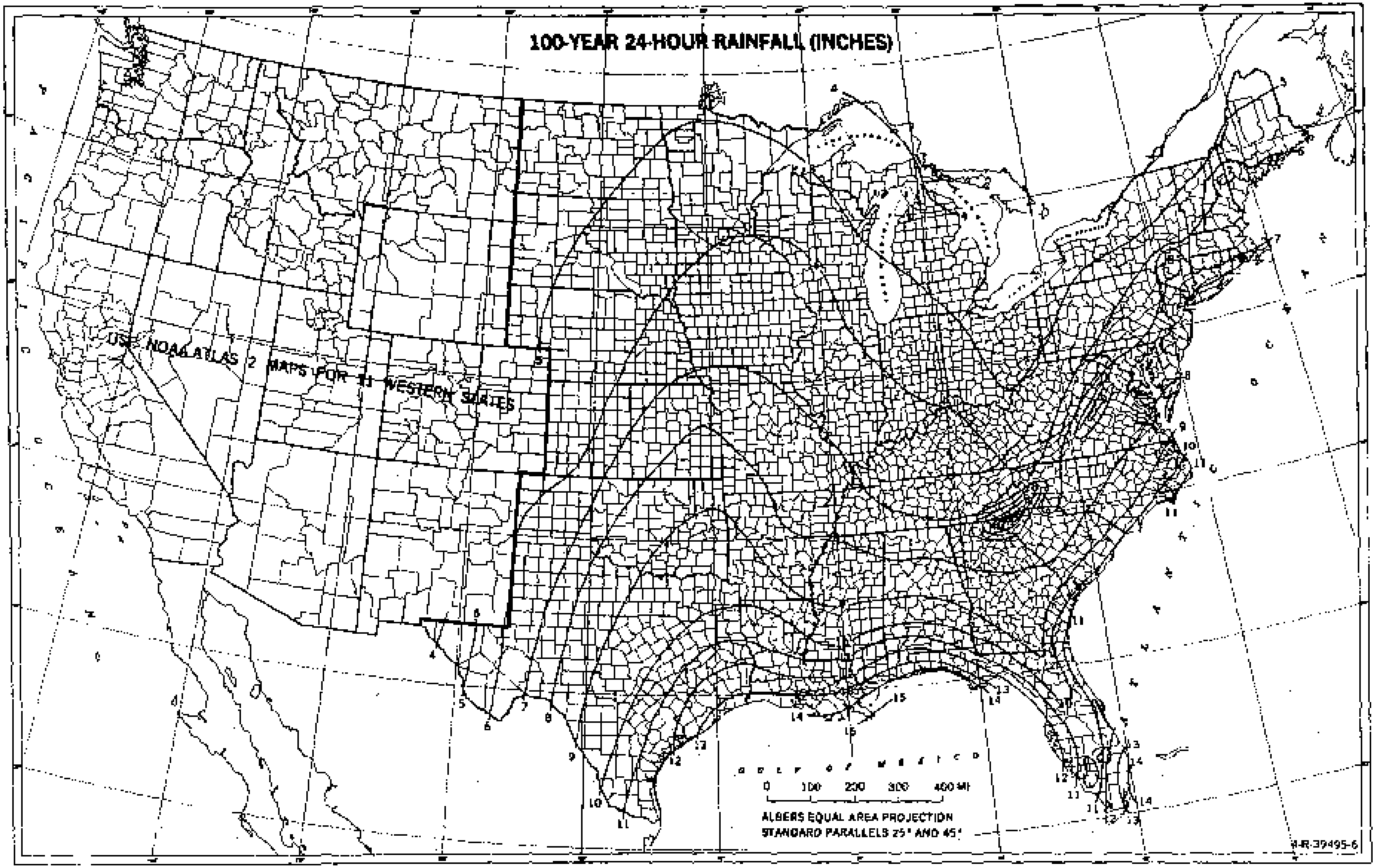
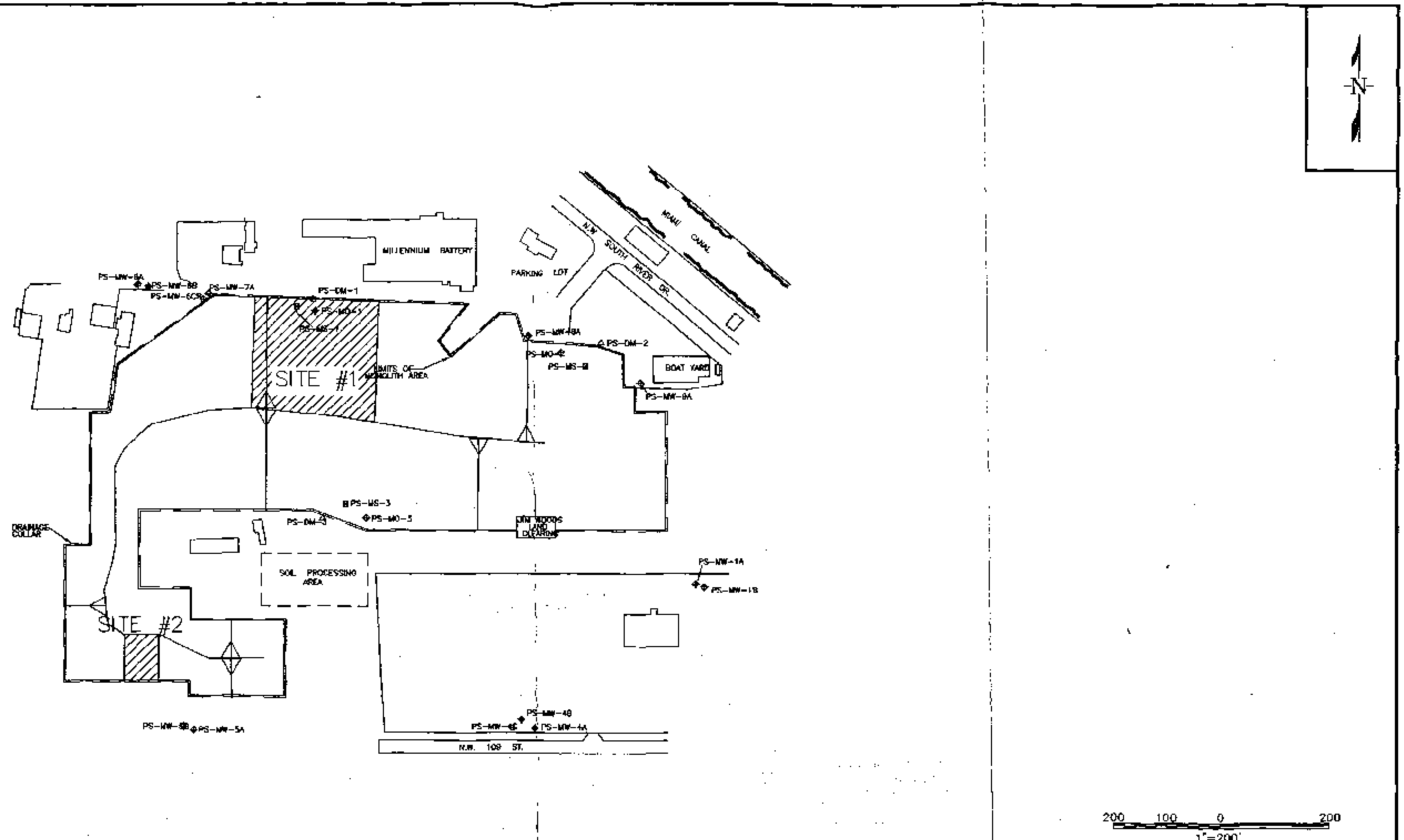


Figure B-8.—One-hundred-year, 24-hour rainfall.

ORIGINAL DWG SIZE 17 x 11
FILE: 40894.700
CAD DWG NO: -
DATE: 7/11/00
PLOT SCALE: 1=200

R:\ACAD\48103\PEPPERS DRAINAGE FIGURE FOR COLLAR INVESTIGATION



LEGEND

	CROWN OF MONOLITH
	DRAINAGE COLLAR
	FENCE LINE
◆ PS-MW-1A	EXISTING GROUND WATER MONITORING WELL
⊠ PS-MS-1	MONOLITH SAMPLE
△ PS-DM-1	DRAINAGE MATERIAL SAMPLE

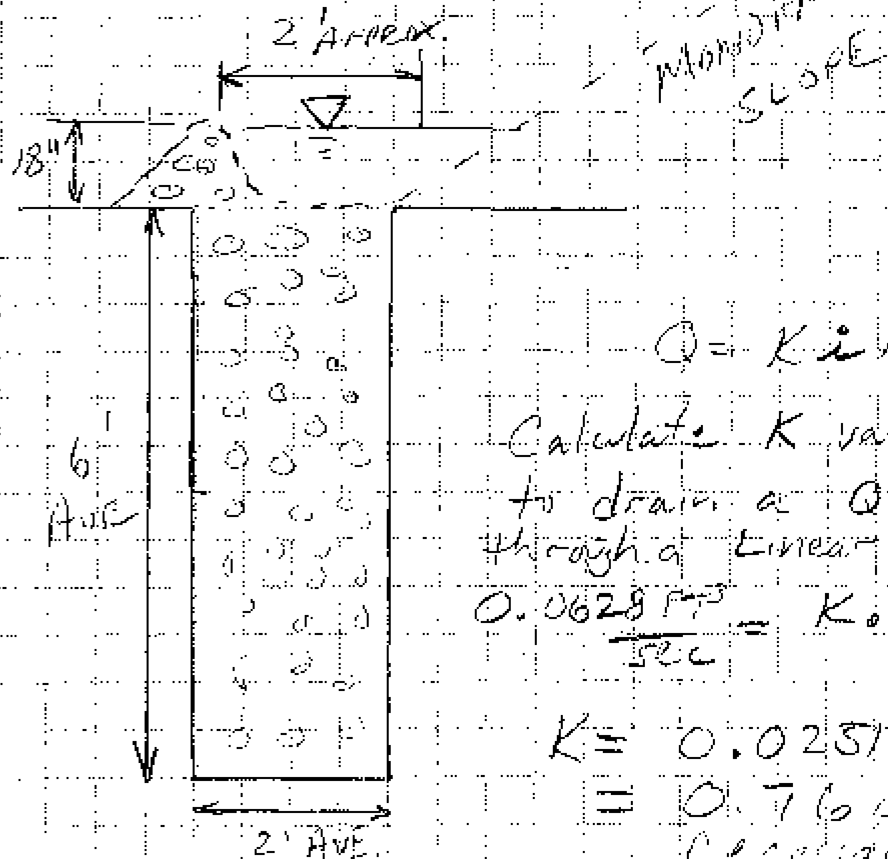
PEPPER'S STEEL AND ALLOYS SITE MEDLEY, DADE COUNTY, FLORIDA	DRAINAGE STUDY MAP	FIGURE 1

BLACK & VEATCH

Owner	EPA R III	Computed By	DAC
Plant	Pepper Steel	Unit	
Date	7/5 20 00		
Project No.		File No.	
Verified By			
Title	Permeability Test	Date	7/10 20 00
		Page	1 of 2

DO NOT WRITE IN THIS SPACE

Permeability Check



$$Q = K i A$$

Calculate K value necessary to drain a Q of 0.0628 cfs through a Linear Foot of Trench.

$$0.0628 \frac{FT^3}{sec} = K \cdot \frac{7.5 \, Ft}{6 \, Ft} \cdot 2 \, FT \cdot 1 \, FT$$

$$K = 0.02512 \, FT/sec$$

$$= 0.76 \, cm/sec$$

necessary minimum trench material permeability

PGN-172B

REVISED, SUPERSEDED, AND VOID CALCULATIONS MUST BE CLEARLY IDENTIFIED.

2 of 2

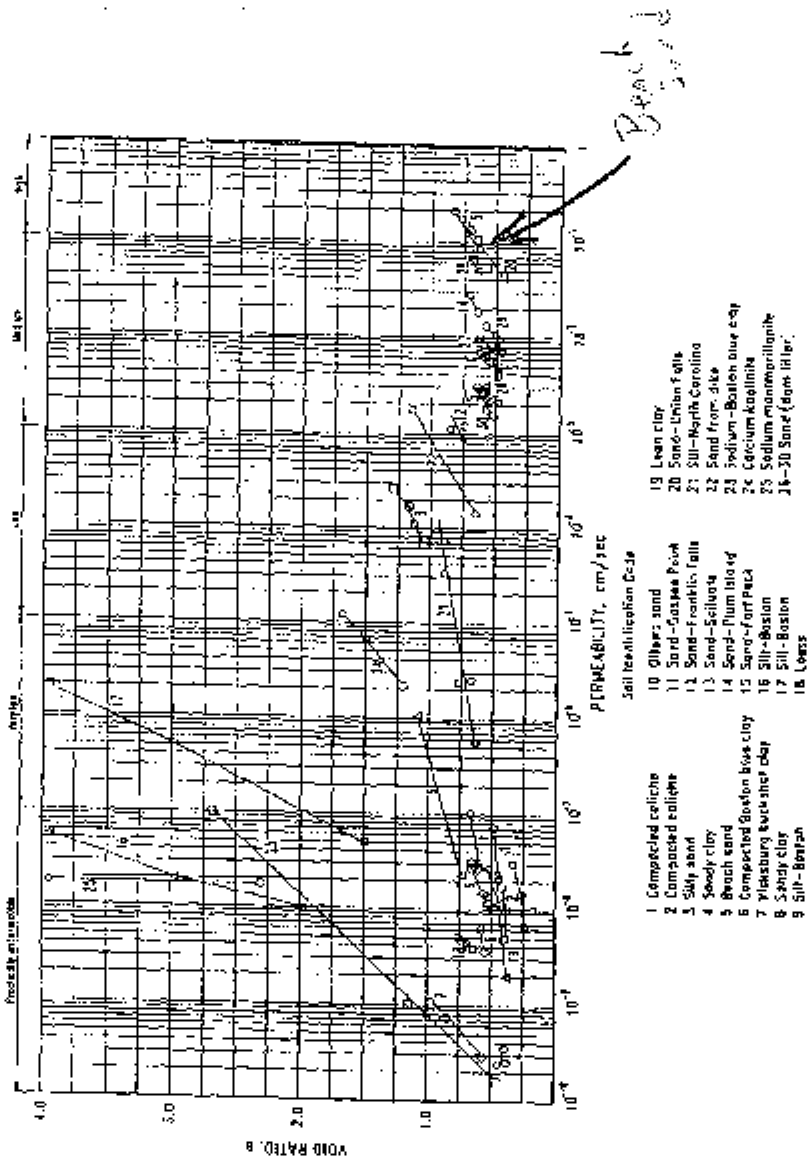


Figure 4.6 Void ratio versus coefficient of permeability (*Lambe and Whitman 1969*). [*Soil Mechanics*, W. T. Lambe and R. V. Whitman, Copyright © 1969. Reprinted by permission of John Wiley and Sons.]

Copied from Geotechnical Materials in Construction McGraw Hill, 1996

TABLE 4.5 Typical Permeability Values for Construction Materials

Material	Permeability, cm/s
Portland cement concrete	$<10^{-9}$
Asphalt concrete	4×10^{-3} to 4×10^{-8}
Compacted clays	$<10^{-7}$
Compacted silts	7×10^{-6} to 7×10^{-8}
Silty and clayey sands	10^{-5} to 10^{-7}
Concrete sand with fines	7×10^{-4} to 7×10^{-6}
Clean concrete sands	7×10^{-2} to 7×10^{-4}
Well-graded aggregate without fines	10^{-1} to 10^{-3}
Uniformly graded coarse aggregate	10^{2} to 10^{-1}

SOURCE: Adapted from Carter and Bentley, 1991.

dation of the specimen or sand boils/piping; in either case the specimen is destroyed and permeability test results are invalid.

- Dissolved air in water flowing into the specimen
- Leakage of water between sides of specimen and container. This potential problem is minimized by use of the triaxial compression chamber for permeability tests.
- Densification of the specimen before permeability is determined

TABLE 4.6 Coefficient of Permeability of Common Natural Soil Formations

Formation	Value of k, cm/s
River deposits	
Rhone at Genissiat	Up to 0.40
Small streams, eastern Alps	0.02–0.16
Missouri	0.02–0.20
Mississippi	0.02–0.12
Glacial deposits	
Outwash plains	0.05–2.00
Esker, Westfield, Mass.	0.01–0.13
Delta, Chicopee, Mass.	0.0001–0.015
Till	<0.0001
Wind deposits	
Dune sand	0.1–0.3
Loess	0.001 ±
Loess loam	0.0001 ±
Lacustrine and marine offshore deposits	
Very fine uniform sand, C_u = 5 to 2	0.0001–0.0064
Bull's liver, 6th Ave., N.Y., C_u = 5 to 2	0.0001–0.0050
Bull's liver, Brooklyn, C_u = 5	0.00001–0.0001
Clay	<0.0000001

SOURCE: From *Soil Mechanics in Engineering Practice*, K. Terzaghi and R. Peck, Copyright © 1965. Reprinted by permission of John Wiley and Sons.

As-Built Designers

1. What Purpose Drainage Collector
2. Flood Previously
3. Not work in making Flooding worst

PEPPER'S STEEL & ALLOYS SITE
MEDLEY, FLORIDA

EVALUATION OF DRAINAGE STRUCTURE

Canonie Environmental Services Corp.

January 1989

CanonieEnvironmental

January 9, 1989

88-166

Mr. H. G. Seher, P.E.
Manager, Transmission/Substation Construction
Florida Power & Light Company
9419 Northwest 109th Street
Medley, FL 33166

<u>Evaluation of Drainage Structure</u>
<u>Pepper's Steel and Alloys Site</u>
<u>Medley, Florida</u>

Dear Mr. Seher:

Canonie Environmental Services Corp. (Canonie) has evaluated the perimeter drainage structure for the as-built fixed soil monolith at the Pepper's Steel and Alloys Site (PSA). Canonie understands that the volume of soil processed was greater than originally anticipated resulting in an increase of the monolith crown from the original design elevation of 8.8 feet to 11.9 feet. The elevation at the edge of the monolith remains as originally designed. In a letter to Qualtec, Inc. dated November 10, 1988, the United States Environmental Protection Agency (U.S. EPA) expressed concern that the increased slope of the monolith will increase the velocity of water runoff such that runoff bypasses the drain and that the higher velocity might erode the cover and silt up the surface of the drain.

<u>Drainage Structure Capacity</u>

Canonie visited the PSA Site on November 22, 1988 to observe existing conditions at the site. During the site visit, it was noted that the crushed limestone monolith cover had formed a solidified mass that is not easily penetrated. Based on this observation, Canonie is conservatively assuming that approximately 90 percent of the precipitation from a rainfall event will be surface runoff. It was also observed that a small berm was built between the drainage structure and the adjacent property along the north side of the monolith. The berm extended approximately two feet above existing ground and will act as an impediment to surface flow moving beyond the drainage structure.

Canonie based the evaluation of the drainage structure on the following parameters:

1. Bedrock Permeability = 1.0 cm/sec (GeoTrans Report, January 1987);
2. One-Hundred Year 24-Hour Storm: I = 13.6 in (NOAA T.P. 40);

Used 13.3 for BV check

3. Roughness Coefficient: $n = .033$;

4. Monolith Cover: Crushed limestone (see Appendix A);

5. Drainage Structure Material: Florida D.O.T., Code #06 Rock (see Appendix A).

The drainage structure capacity was analyzed by considering runoff from unit width of monolith discharging into a unit length of drainage trench. A cross section at Station 2+40 was selected for analysis because:

1. The distance between the monolith crown and the drainage trench is longer at Station 2+40 than at most other points on-site. Therefore, the watershed area will be larger at Station 2+40 than at other locations.

2. The drainage trench at Station 2+40 is two feet wide. The drainage trench from Station 3+40 westward is three feet wide along the north side of the monolith.

The Soil Conservation Service TR-55 method for a Type III storm was used for determining the maximum discharge into a unit width of drain structure, from a 100-year precipitation event. The results are summarized on Sheet 6 of Appendix B. The results for a 25-year storm and a 10-year storm are shown for comparison. The peak discharge occurs at 12.2 hours hydrograph time. The peak overland discharge is:

For Site #1 computed 0.0628 cfs.

Peak discharge into trench: $Q_{in} = 0.071$ CFS

The maximum flow from the drainage trench into the ground water was determined by considering a two-foot by two-foot flow element in the trench. Flow out of the trench is restricted to a direction perpendicular to the trench. Water cannot flow out of the trench along the trench alignment because an adjacent flow element would restrict the flow. The flow calculations are presented in Appendix B. The peak trench discharge is:

Why not 2'x1'?

Peak discharge out of trench: $Q_{out} = 0.225$ CFS

The calculations indicate that there is a factor of safety of 3.1 against overflowing of the drainage trench if a storm with a recurrence interval of 100 years occurs.

Erosion

The calculation for erosion of the monolith was based on the ability of precipitation runoff to transport fine-grained particles into the drainage structure. The controlling factor is the velocity of the overland discharge towards the drainage ditch. The velocity of the runoff was determined using the Manning formula. The roughness coefficient (n) was determined from the following equation from the Nuclear Regulatory Commission Technical Document CR-4651:

$$n = 0.0395\,(D_{50})^{1/6}$$

Where: D_{50} = soil grain diameter at which 50 percent of the material is smaller

The D50 value for the limestone cover is approximately 8 millimeters or 0.31 inches, see Appendix A. The value of n becomes 0.33. The Manning formula can now be used to calculate the velocity of runoff over the crushed limestone cover:

Runoff velocity: V = 1.1 ft/sec

This value can be compared to the maximum fluid velocity allowed without hydraulic transport of soil. Chow (in <u>Open-Channel Hydraulics</u>) provides a table of allowable velocities and tractive forces for clear water, see Appendix B. The crushed limestone cover most closely resembles the graded silts to cobbles when colloidal. The permissible velocity is:

Allowable velocity: V = 4.0 ft/sec

There is a factor of safety of approximately four against erosion of the limestone cover. Therefore, the possibility of siltation of the drain collar is minimal and with basic maintenance will continue to perform as designed.

A similar set of calculations can be performed for tractive forces. Tractive force is the force flowing water imparts to the soil particles on a channel surface. The results of tractive force consideration are:

1. Calculated Tractive Force: 0.09 PSF;

2. Allowable Tractive Force: 0.43 PSF.

Therefore, the flow precipitation runoff does not apply a sufficient force to suspend and transport soil particles to the drainage trench. The velocity and tractive force calculations are presented in Appendix B.

The allowable velocity and tractive force values presented by Chow are conservative. The values assume that the soil grains that comprise the channel surface are not bound together. This assumption is not true because cementation of the crushed limestone particles is occurring, creating a hard continuous surface as opposed to a loose permeable surface. Therefore, the cemented or bound particles of the crushed limestone will be more resistant to erosion than is accounted for by the calculations.

The calculations indicate that the drainage structure is adequate to handle a 100-year storm with the increased slope of the monolith surface. The factor of safety against overflowing of the drain onto adjacent property for the 100-year storm is 3.1. The velocity of the precipitation runoff towards the drainage structure was found to be less than the velocity required for sediment transport.

Canonie trusts that this letter adequately addresses the concerns raised by the U.S. EPA in their November 10, 1988 letter. If you have any questions, please call.

Very truly yours,

Kevin M. Brissette

Kevin M. Brissette
Project Engineer

Timothy J. Harrington

Timothy J. Harrington
Vice President - Midwest

KMB/TJH/tl

Attachments

cc: John Barkett, Coll, Davidson, Carter, Smith, Salter & Barkett
Fred Mullins, FPL Qualtec

REFERENCES

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U.S. Department of Agriculture, "Urban Hydrology for Small Watersheds", Technical Release No. 55, June 1986, 2 ed.

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APPENDIX A

LIMESTONE ROCK GRAIN SIZES

White Rock Quarries

January 5, 1989

Mr. Seher
Florida Power & Light Company
9419 N.W. 109th Street
Medley, Florida 33166

Dear Mr. Seher:

Listed below is the additional Sieves you requested on the gradation of our limerock base material which was previously sent to Mr. Locklier August 15, 1988.

We are an approved source by the Florida Department of Transportation for the production and sales of this material. Our DOT source # is 87-339. Average test results are as follows:

Gradation

Sieve	% Pass
6"	100
3 1/2"	100
3/4"	58.0
#4	44.0
#40	13.0
#200	5.0

$D_{50} \approx 8.6$ mm

If you need any other information, please let me know.

Sincerely,

WHITE ROCK QUARRIES

Ronnie VanLandingham, Jr. (dm)

Ronnie VanLandingham, Jr.
Quality Control Supervisor

RV/dm

P.O. Box 15065 West Palm Beach Florida 33416
305/793-2102

White Rock Quarries

PRODUCT: (ASTM #4) STONE
D.O.T. CODE #06

AVERAGE GRADATION:

Sieve	%Ret	%Pass	Specs.
2"	0	100	100
1 1/2"	5.0	95.0	90/100
1"	61.0	39.0	20/55
3/4"	92.0	8.0	0/15
1/2"	96.0	4.0	-
3/8"	97.0	3.0	0/5

Total Minus 200:	0.50%
Bulk Specific Gravity:	2.44
Absorption:	3.3%
L.A. Abrasion "G":	37.0%
Lbs/cu. ft.	81.2

TESTED BY:

Ronnie Vanlandingham, Jr.
Quality Control Supervisor
WHITE ROCK QUARRIES

By KMB Date 12/6/88 Subject DRAINAGE TRENCH CALCULATIONS Sheet No. 1 of ___

Chkd. By CC Date 12-12-88 Proj. No. 88-161

1/4" X 1/4"

CONSIDER A UNIT WIDTH SECTION OF THE MONOLITH AT STATION 2+40. A CROSS SECTION AT STATION 2+40 IS SHOWN ON SHEET 2.

THE STORM RUNOFF CALCULATIONS WERE PERFORMED BY COMPUTER USING THE SCS TR-55 METHOD, WITH A TYPE III STORM. 24 HOUR STORMS WITH A RECURRENCE INTERVAL OF 10 YEARS, 25 YEARS AND 100 YEARS WERE CONSIDERED. THE RESULTS ARE SUMMARIZED ON SHEET 6. THE RAINFALL INTENSITY IN A 100 YEAR STORM IS 13.6 IN. THE PEAK DISCHARGE FOR THE STORM IS Q = .071 CFS. WHICH OCCURS AT 12.2 HOURS ON THE STORM HYDROGRAPH.

DETERMINE THE OUTFLOW FROM THE DRAINAGE STRUCTURE CONSIDERING A 2 FT. LENGTH OF TRENCH

$$K_v = \left[\frac{Q}{(5.50)(r)(H)}\right]^2 \frac{1}{K_H} (929)$$

REF: DESIGN OF SMALL DAMS, P. 19[illegible]

WHERE:

K_v, K_H = VERTICAL AND HORIZONTAL PERMEABILITY IN CM/SEC

r = DRAINAGE ELEMENT RADIUS IN FT.

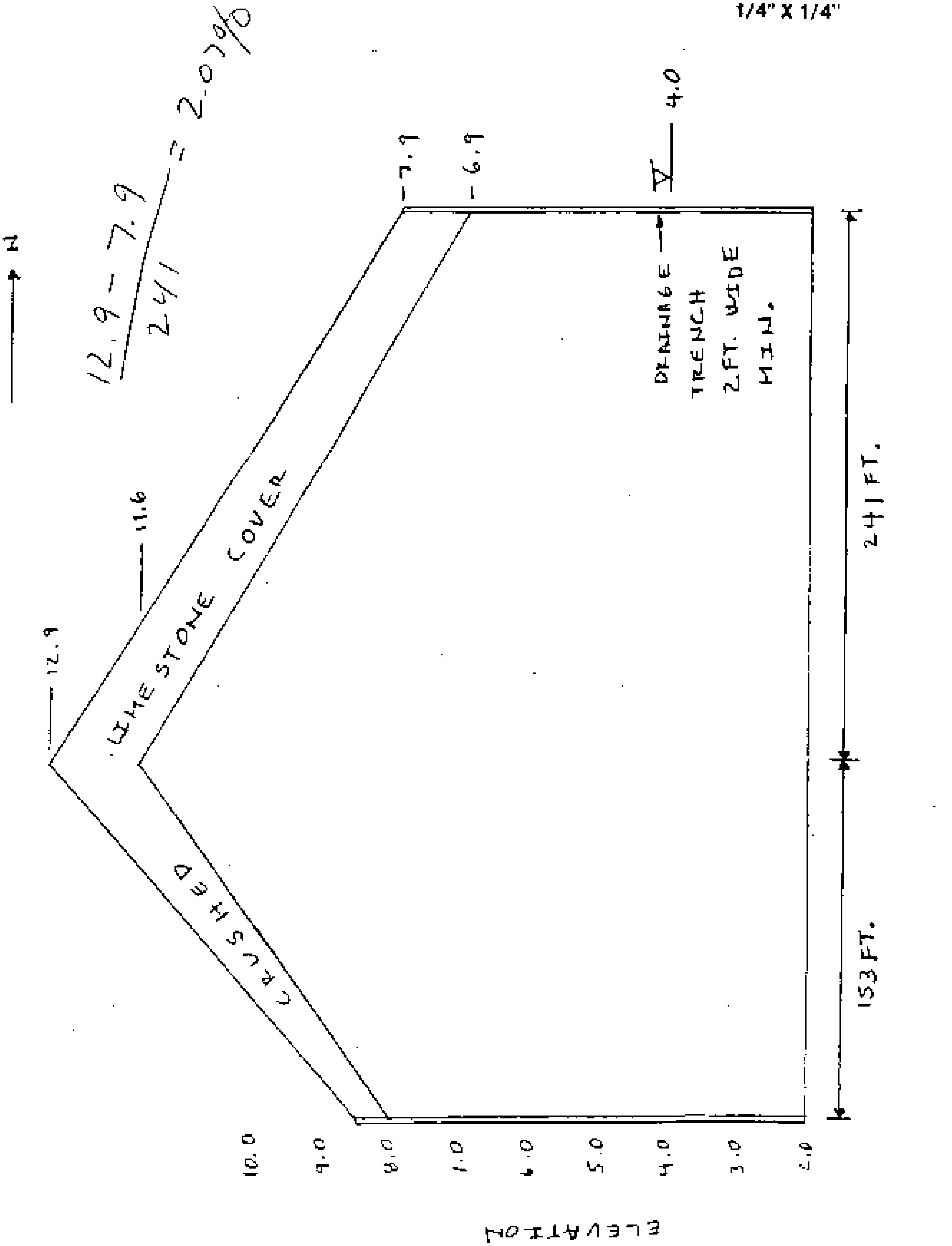
H = HYDRAULIC HEAD IN FT.

Canonie

By KMB Date 12/6/88 Subject DRAINAGE TRENCH Sheet No. 2 of ___

Chkd. By CC Date 12-12-88 CALCULATIONS Proj. No. 88-166

1/4" X 1/4"



In order to determine which storm distribution to use, the following values needed to be determined

1) ratio of initial abstraction to rainfall.
$I_a(in) / P(in)$

I_a - from table 5-1 pg 5-2: 0.198

P (from graphs presented in TR-55):
10yr flood = 9.1 in
25yr flood = 10.8 in
100 yr flood = 12.6 in

10 yr Ratio: $\frac{0.198}{9.1} = 0.022$

25 yr Ratio: $\frac{0.198}{10.8} = 0.018$

100 yr Ratio: $\frac{0.198}{12.6} = 0.015$

Since the tables of TYPE III-storm distribution have I_a/P ratios ranging from 0.1 to 0.5, an $I_a/P = 0.1$ was chosen.

2) Travel time (T_t) - this value refers to the travel time through one subarea of a watershed.

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5}\, S^{0.4}}$$

n - Manning's roughness coef
L - flow length
P_2 - 2yr-24hr rainfall
S - Slope

CanonieEnvironmental

B-4

By TJD Date 1-6-89 Subject HYDROGRAPH DETERMINATION Sheet No. 4 of ___

Chkd. By PHW Date 1-6-89 Proj. No. 88-166

1/4" X 1/4"

NORTH SIDE:

$$T_T = \frac{0.007[(0.038)(241)]^{0.8}}{(5.9)^{0.5}(0.021)^{0.4}} = 0.079$$

SOUTH SIDE:

$$T_T = \frac{0.007[(0.038)(153)]^{0.8}}{(5.9)^{0.5}(0.029)^{0.4}} = 0.049$$

3) TIME OF CONCENTRATION (T_c) - This value refers to the total travel time of the entire watershed. That is $T_c = T_{T1} + T_{T2} + T_{T3} \ldots$ (T_{T1} represents one subarea)

Since there are no subareas to this watershed, $T_c = T_T$.

For table selection T_c values vary from 0.1 to 2.0, therefore, $T_c = 0.1$ was chosen.

Development of composite flood hydrograph

This section describes the procedure for developing the peak discharge and selected discharge values of a composite flood hydrograph.

Selecting T_c and T_t

First, use worksheet 5a to develop a summary of basic watershed data by subarea. Then use worksheet 5b to develop a tabular hydrograph discharge summary; this summary displays the effect of individual subarea hydrographs as routed to the watershed point of interest. Use ΣT_t for each subarea as the total reach travel time from that subarea through the watershed to the point of interest. Compute the hydrograph coordinates for selected ΣT_t's using the appropriate sheets in exhibit 5. The flow at any time is

$$q = q_t A_m Q \qquad \text{[Eq. 5-1]}$$

where

- q = hydrograph coordinate (cfs) at hydrograph time t;
- q_t = tabular hydrograph unit discharge from exhibit 5 (csm/in);
- A_m = drainage area of individual subarea (mi^2); and
- Q = runoff (in).

Table 5-1.—I_a values for runoff curve numbers

Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	70	0.857
41	2.878	71	0.817
42	2.762	72	0.778
43	2.651	73	0.740
44	2.545	74	0.703
45	2.444	75	0.667
46	2.348	76	0.632
47	2.255	77	0.597
48	2.167	78	0.564
49	2.082	79	0.532
50	2.000	80	0.500
51	1.922	81	0.469
52	1.846	82	0.439
53	1.774	83	0.410
54	1.704	84	0.381
55	1.636	85	0.353
56	1.571	86	0.326
57	1.509	87	0.299
58	1.448	88	0.273
59	1.390	89	0.247
60	1.333	90	0.222
61	1.279	91	0.198
62	1.226	92	0.174
63	1.175	93	0.151
64	1.125	94	0.128
65	1.077	95	0.105
66	1.030	96	0.083
67	0.985	97	0.062
68	0.941	98	0.041
69	0.899		

Since the timing of peak discharge changes with T_c and T_t, interpolation of peak discharge for T_c and T_t values for use in exhibit 5 is not recommended. Interpolation may result in an estimate of peak discharge that would be invalid because it would be lower than either of the hydrographs. Therefore, round the actual values of T_c and T_t to values presented in exhibit 5. Perform this rounding so that the sum of the selected table values is close to the sum of actual T_c and T_t. An acceptable procedure is to select the results of one of three rounding operations:

1. Round T_c and T_t separately to the nearest table value and sum;
2. Round T_c down and T_t up to nearest table value and sum; and
3. Round T_c up and T_t down to nearest table value and sum.

From these three alternatives, choose the pair of rounded T_c and T_t values whose sum is closest to the sum of the actual T_c and T_t. If two rounding methods produce sums equally close to the actual sum, use the combination in which rounded T_c is closest to actual T_c. An illustration of the rounding procedure is as follows:

RUNOFF HYDROGRAPHS BY THE SCS TR-55 METHOD SECOND EDITION

PROGRAM SCSHYD.3

TYPE-III STORM DISTRIBUTION

10, 25, & 100-YEAR STORM
TIME OF CONCENTRATION = 0.1 HOURS
TRAVEL TIME = 0.0 HOURS

03-JAN-89
03:13 PM

HYDROGRAPH TIME IN HOURS

CATCHMENT DESIGNATION	DRAINAGE AREA (AC)	DRAINAGE AREA (SQ MI)	CURVE NUMBER	PPT AMT (IN)	RUNOFF (IN)	(TIME)	11.0	11.3	11.6	11.9	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	13.0	13.2	13.4
						(CSM/IN)	25	31	57	132	281	425	462	331	345	265	111	131	103	73	65	62
HONOLULU NORTH 10 YR	0.0055	8.59E-06	93.0	9.3	6.81	(CFS)	0.002	0.003	0.004	0.017	0.037	0.025	0.046	0.037	0.024	0.016	0.051	0.009	0.007	0.006	0.005	0.004
HONOLULU NORTH 25 YR	0.0055	8.59E-06	93.0	10.4	5.74	(CFS)	0.002	0.003	0.005	0.014	0.020	0.035	0.055	0.044	0.025	0.022	0.016	0.016	0.008	0.007	0.006	0.005
HONOLULU NORTH 100 YR	0.0055	8.59E-06	93.0	13.6	12.40	(CFS)	0.003	0.004	0.006	0.018	0.026	0.046	0.071	0.057	0.037	0.029	0.028	0.010	0.011	0.009	0.007	0.011
HONOLULU SOUTH 10 YR	0.0025	5.47E-06	93.0	9.1	6.81	(CFS)	0.001	0.002	0.002	0.010	0.031	0.019	0.029	0.023	0.015	0.012	0.008	0.016	0.014	0.004	0.003	0.005
HONOLULU SOUTH 25 YR	0.0035	5.47E-06	93.0	10.4	4.36	(CFS)	0.002	0.002	0.005	0.009	0.013	0.023	0.035	0.020	0.010	0.114	0.020	0.007	0.005	0.004	0.004	0.003
HONOLULU SOUTH 100 YR	0.0035	5.47E-06	91.0	13.6	12.40	(CFS)	0.002	0.003	0.004	0.012	0.016	0.029	0.045	0.036	0.024	0.018	0.013	0.019	0.181	0.006	0.005	0.014

CATCHMENT DESIGNATION	13.6	13.8	14.0	14.3	14.6	15.0	15.5	16.0	16.5	17.0	17.5	18.0	19.0	20.0	22.0	26.0
	55	54	50	44	41	37	32	27	23	20	19	16	14	13	11	
HONOLULU NORTH 10 YR	0.004	0.004	0.003	0.013	0.003	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	[illegible]
HONOLULU NORTH 25 YR	0.005	0.005	0.004	0.014	0.003	0.004	0.003	0.012	0.012	0.012	0.002	0.001	0.002	[illegible]	[illegible]	[illegible]
HONOLULU NORTH 100 YR	0.006	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.002	0.002	0.002	0.002	[illegible]	0.002	[illegible]	[illegible]
HONOLULU SOUTH 10 YR	0.003	0.007	0.012	0.002	0.002	0.002	0.001	0.001	0.011	0.016	0.001	0.001	[illegible]	0.001	[illegible]	[illegible]
HONOLULU SOUTH 25 YR	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.011	0.005	0.001	[illegible]	0.001	0.002	[illegible]
HONOLULU SOUTH 100 YR	0.001	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.003	0.003	[illegible]	[illegible]	[illegible]	[illegible]

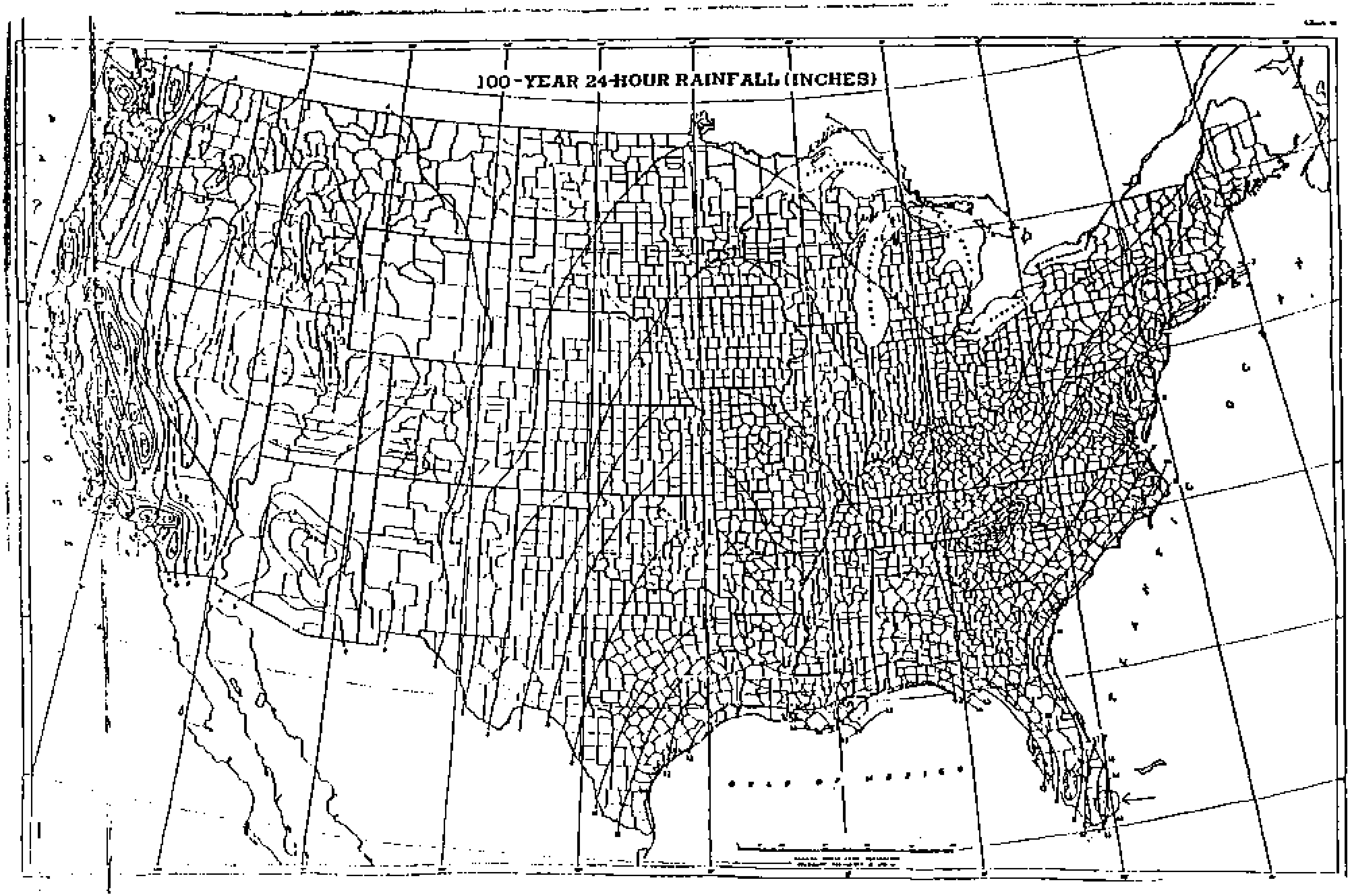

100-YEAR 24-HOUR RAINFALL (INCHES)

Table 2-2.--Runoff curve numbers for selected agricultural, suburban, and urban land use. (Antecedent moisture condition II, and $I_a = 0.2S$)

LAND USE DESCRIPTION		HYDROLOGIC SOIL GROUP			
		A	B	C	D
Cultivated land[1]: without conservation treatment		72	81	88	91
: with conservation treatment		62	71	78	81
Pasture or range land: poor condition		68	79	86	89
good condition		39	61	74	80
Meadow: good condition		30	58	71	78
Wood or Forest land: thin stand, poor cover, no mulch		45	66	77	83
good cover[2]		25	55	70	77
Open Spaces, lawns, parks, golf courses, cemeteries, etc.					
good condition: grass cover on 75% or more of the area		39	61	74	80
fair condition: grass cover on 50% to 75% of the area		49	69	79	84
Commercial and business areas (85% impervious)		89	92	94	95
Industrial districts (72% impervious)		81	88	91	93
Residential:[3]					
Average lot size	Average % Impervious[4]				
1/8 acre or less	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
Paved parking lots, roofs, driveways, etc.[5]		98	98	98	98
Streets and roads:					
paved with curbs and storm sewers[5]		98	98	98	98
gravel		76	85	89	91
dirt		72	82	87	89

[1] For a more detailed description of agricultural land use curve numbers refer to National Engineering Handbook, Section 4, Hydrology, Chapter 9, Aug. 1972.

[2] Good cover is protected from grazing and litter and brush cover soil.

[3] Curve numbers are computed assuming the runoff from the house and driveway is directed towards the street with a minimum of roof water directed to lawns where additional infiltration could occur.

[4] The remaining pervious areas (lawn) are considered to be in good pasture condition for these curve numbers.

[5] In some warmer climates of the country a curve number of 95 may be used.

SOLVING FOR Q

$$Q = \sqrt{\frac{(K_H)(K_V)}{929}}\,(5.50)(r)(H)$$

$$= \sqrt{\frac{(1\ cm/sec)(1\ cm/sec)}{929}}\,(5.50)(1\ FT)(7.9\ FT - 4.0\ FT)$$

$$= 0.70\ CFS$$

HOWEVER THE DRAINAGE DITCH FLOW ELEMENT CONSIDERED IS A 2FT BY 2FT SQUARE NOT A 2FT. DIAMETER CIRCLE AS THE EQUATION IMPLIES. A SECOND CONSIDERATION IS THAT DISCHARGE FROM THE TRENCH INTO THE GROUND WATER CAN ONLY OCCUR PERPINDICULAR TO THE TRENCH NOT PARALLEL. THEREFORE THE DISCHARGE MUST BE REDUCED BY A FACTOR OF 2. THUS THE ACTUAL DISCHARGE CAPACITY OF THE TRENCH BECOMES

$$\frac{1}{2}\left[\frac{\text{AREA OF SQUARE}}{\text{AREA OF CIRCLE}}\right] Q$$

$$= \frac{1}{2}\left[\frac{(2\ FT)(2\ FT)}{\pi\ (1\ FT)^2}\right](.70\ CFS)$$

$$= 0.45\ CFS$$

DIVIDE VALUE BY 2 FOR A UNIT WIDTH TRENC

$$\frac{1}{2}(0.45\ CFS) = .225\ CFS$$

FACTOR OF SAFETY AGAINST FLOODING

$$F.S. = \frac{Q_{OUT}}{Q_{IN}} \quad \frac{0.225\ CFS}{0.071\ CFS} = 3.1$$

Canonie Environmental

By LSA Date 1/6/89 Subject FPL - [illegible] Sheet No. 1 of 6

Chkd. By [illegible] Date 1/6/89 Tractive Forces Proj. No. 83-[illegible]

for 10-yr-24 hr & 100yr 1/4" X 1/4"

Purpose: The purpose of this calc brief is to determine the velocities + tractive forces of the surface water runoff that will [illegible] during the 10 yr. & 100yr-24hr storm events.

Method: In order to calculate velocity + tractive force, the depth of overland flow must first be calculated. To calc. this a roughness coefficient of 0.038 was determined according to NUREG/CR-4651.

After these values are found, they are compared to the maximum permissible velocities given in table 7-3 pg 6.

RESULTS:

North Side VALUES

10yr - V = 0.899 ft/sec
T.F = 0.067 lbs/ft²

100yr - V = 1.07 FPS
TF = 0.086 lbs/ft²

SOUTH Side values

10yr - V = 0.824 FPS
TF - 0.063 lbs/ft²

100 yr - V = 0.982 FPS
TF = 0.083 lbs/ft²

These values are all way below the permissible values given for graded silts to cobbles when colloidal (similar material).

Canonie Environmental

B-12

By TLA Date 1/6/89 Subject EFL - VELOCITIES Sheet No. 2 of 6
Chkd. By PWW Date 1/6/89 & TRACTIVE FORCES Proj. No. 82-166
10-yr-24 hr
1/4" X 1/4"

According to NUREG/CR-4651 pg 64 mannings n can be calculated by:

$$n = 0.0395 (D_{50})^{1/6}$$

D_{50} = 8mm according to Kevin Bluzette

$$8mm \times 0.039 = 0.312\ in$$

$$n = 0.0395 (0.312)^{1/6} = \underline{0.033}$$

Depth of flow on the north side:

$$D = \left(Q_{peak} \times n \right) / \left(1.486 \times s^{.25} \right))^{0.6}$$

$$D = \left(\frac{0.046 \times 0.033}{1.486 \times 0.021^{0.5}} \right)^{0.6}$$

$$= \underline{0.051\ ft}$$

s = Slope
= 5'/241' = 0.021
(Ref: pg 95, NUREG CR-4620)
(Qpeak from Drainage Tran inflow-outflow calc brief

Velocity of runoff on north side:

$$V = C / \text{Depth} \times \text{width}$$

Where C = Concentrated Discharge
= Qpeak / flow conc.
flow conc = 1
W = 1 ft

$$V = \frac{0.046\ cf/sec}{0.051\ ft^2} = \boxed{0.899\ ft/sec}$$

Tractive Force of runoff on north side

$$TF = BW \times D \times S$$

where: BW = bulk weight of water
D = Depth, S = slope

$TF = (62.4 \text{ lbs/cf})(0.051 \text{ ft})(0.021 \text{ ft/ft})$

$= \boxed{0.067 \text{ lbs/ft}^2}$

Depth of flow on the south side:

$D = (Q_{peak} \times n / (1.486 \times S^{0.5}))^{0.6}$

$S = \text{Slope} = 4.4/153 = 0.029$

$D = \left(\dfrac{0.029 \times 0.033}{1.486 \times 0.029^{0.5}}\right)^{0.6} = \underline{0.035 \text{ ft}}$

(Q_{peak} from Drainage Tren Inflow-Outflow calc brief)

$\text{Velocity} = C / \text{depth} \times \text{width}$

$C = Q_{peak} / \text{flow} \ldots = 0.029/1 = 0.029$

$V = 0.029 \text{ cfs} / 0.035 \text{ ft}^2 = \boxed{0.824 \text{ fps}}$

$W = 1 \text{ ft}$

TRACTIVE FORCE OF RUNOFF ON SOUTH SIDE

$TF = (62.4 \text{ lbs/cf})(0.035 \text{ ft})(0.029 \text{ ft/ft}) = \boxed{0.063 \text{ lbs/ft}^2}$

The velocities & tractive forces compared to those on table 7-3 (Maximum Permissible Velocities) are below those of a similar material:

Graded silts to cobbles when colloidal -

$n = 0.030$, $V = 4.00$ fps, $TF = 0.43 \text{ lb/ft}^2$

CanonieEnvironmental

By ZBD Date 1/6/89 Subject 100-YR - 24 hr STORM Sheet No. 4 of 6
Chkd. By RJW Date 1/6/89 Proj. No. 88-166

1/4" X 1/4"

Depth of flow on north side according to pg 75 NUREG/cr-4620:

$D = (Q_{peak} \times n)/(1.486 \times s^{0.5}))^{0.6}$ s = Slope
5/241 = 0.021

$D = \left(\frac{0.071 \times 0.033}{1.486 \times 0.021^{0.5}}\right)^{0.6} = 0.066$ ft

Velocity on north side

$V = Q/D \times w$ $w = 1$

$V = 0.071/0.066 \times 1$

$\boxed{V = 1.070 \text{ ft/sec}}$

Tractive force on north side

$TF = Bw \times D \times S$

$= (62.4 \text{ lbs/cf})(0.066 \text{ ft})(0.021)$

$\boxed{TF = 0.086 \text{ lb/ft}^2}$

Depth of flow on south side

$$D = \left(\frac{0.045 \times 0.033}{1.486 \times 0.029^{0.5}}\right)^{0.6} = 0.046 \text{ ft}$$

Velocity on north side

$$V = 0.045/0.046 \; \boxed{= 0.982 \text{ ft/sec}}$$

TRACTIVE FORCE ON SOUTH SIDE:

$$TF = (62.4 \text{ lbs/cf})(0.046 \text{ ft})(0.029)$$

$$\boxed{TF = 0.083 \text{ lbs/ft}^2}$$

of Reclamation and is tentatively recommended for design of erodible channels. It should be noted that either method at the present stage will serve only as a guide and will not supplant experience and sound engineering judgment.

7-9. The Maximum Permissible Velocity. The *maximum permissible velocity*, or the *nonerodible velocity*, is the greatest mean velocity that will not cause erosion of the channel body. This velocity is very uncertain and variable, and can be estimated only with experience and judgment. In general, old and well-seasoned channels will stand much higher velocities than new ones, because the old channel bed is usually better stabilized, particularly with the deposition of colloidal matter. When other conditions are the same, a deeper channel will convey water at a higher mean velocity without erosion than a shallower one. This is probably because the scouring is caused primarily by the bottom velocities and, for the same mean velocity, the bottom velocities are greater in the shallower channel.

TABLE 7-3. MAXIMUM PERMISSIBLE VELOCITIES RECOMMENDED BY FORTIER AND SCOBEY AND THE CORRESPONDING UNIT-TRACTIVE-FORCE VALUES CONVERTED BY THE U.S. BUREAU OF RECLAMATION*
(For straight channels of small slope, after aging)

Material	n	Clear water		Water transporting colloidal silts	
		V, fps	τ_0, lb/ft^2	V, fps	τ_0, lb/ft^2
Fine sand, colloidal	0.020	1.50	0.027	2.50	0.075
Sandy loam, noncolloidal	0.020	1.75	0.037	2.50	0.075
Silt loam, noncolloidal	0.020	2.00	0.048	3.00	0.11
Alluvial silts, noncolloidal	0.020	2.00	0.048	3.50	0.15
Ordinary firm loam	0.020	2.50	0.075	3.50	0.15
Volcanic ash	0.020	2.50	0.075	3.50	0.15
Stiff clay, very colloidal	0.025	3.75	0.26	5.00	0.46
Alluvial silts, colloidal	0.025	3.75	0.26	5.00	0.46
Shales and hardpans	0.025	6.00	0.67	6.00	0.67
Fine gravel	0.020	2.50	0.075	5.00	0.32
Graded loam to cobbles when noncolloidal	0.030	3.75	0.38	5.00	0.66
Graded silts to cobbles when colloidal	0.030	4.00	0.43	5.50	0.80
Coarse gravel, noncolloidal	0.025	4.00	0.30	6.00	0.67
Cobbles and shingles	0.035	5.00	0.91	5.50	1.10

* The Fortier and Scobey values were recommended for use in 1926 by the Special Committee on Irrigation Research of the American Society of Civil Engineers.

(9)

February 21, 1990

John Wilcox, Esquire
Rudnick & Wolfe
Suite 2000
101 East Kennedy Boulevard
Tampa, Florida 33602-5133

Dear Mr. Wilcox:

Pepper's Steel and Alloy
Medley, Florida

Enclosed is my analysis of the requirements of an operation and maintenance program for the drain collar around the soil/grout monolith at Pepper's Steel and Alloy Site in Medley, Florida. This report reflects cost estimates for the renovation of the drain collar.

To verify basic assumptions and prior to providing testimony, I should visit the site in question. I'll call you to arrange a schedule for the visit for March 15th, if possible.

If you have any questions, please advise.

Sincerely,

Jesse L. Hicks

Jesse L. Hicks, P. E.

JH/pm

Enclosure

cc: Hugh Lumpkin, Esq., Keith Mack
Bill Martin, Esq., Peterson & Bernard
Miami Battery File

5898

OPERATION AND MAINTENANCE GUIDELINES
FOR DRAIN COLLAR
PEPPER'S STEEL AND ALLOYS SITE
MEDLEY, FLORIDA

Prepared for:

Peterson and Bernard
707 Southeast Third Avenue Suite 500,
Blackstone Building
Ft. Lauderdale, Florida 33302

Prepared by:

Jesse L. Hicks, P. E.

February 1990

OPERATION AND MAINTENANCE GUIDELINES
PEPPER'S STEEL AND ALLOY SITE

This document presents guidelines for continuous operation and maintenance of the drain collar encompassing the perimeter of the stabilized soil/grout monolith at the Pepper's Steel and Alloy Site, in Medley, Florida. The term operation does not literally apply to the drain collar since it is a passive device that functions merely by its presence and structural integrity. The activities recommended in this document can be described as maintenance activities since they are directed toward maintaining the structural and functional integrity of the drain collar.

DESCRIPTION OF THE DRAIN COLLAR

The drain collar consists of a recharge trench situated between the outer edge of the stabilized soil/grout monolith and the neighboring soil strata outside of the remediation area (Reference 1). The width of the trench is a nominal 2 feet and the depth varies with the distance below the surface to the top of the bedrock. The trench is completely filled with 1 to 3-inch nominal diameter washed limestone-base aggregate. This fill material is mounded above the surface of the limestone cap by an approximate height of 1.5 feet. The height of the mounded fill material appears to be approximately three feet above the ground level of the undisturbed areas. A cross sectional view of the drain collar is shown in Figure 1. The perimeter of the drain collar around the monolith is shown in Figure 2. Additional details and "As-Built" survey information for the drum collar can be found in Reference 2.

In most areas, there appear to be two berms separated by a shallow furrow. The lateral positioning of the inside and outside berms with respect to the filled trench is not known. For this discussion, it is assumed that the inside berm was originally situated directly over the filled trench and that the outer berm was pushed up against it by earth-moving equipment, thus creating the furrow.

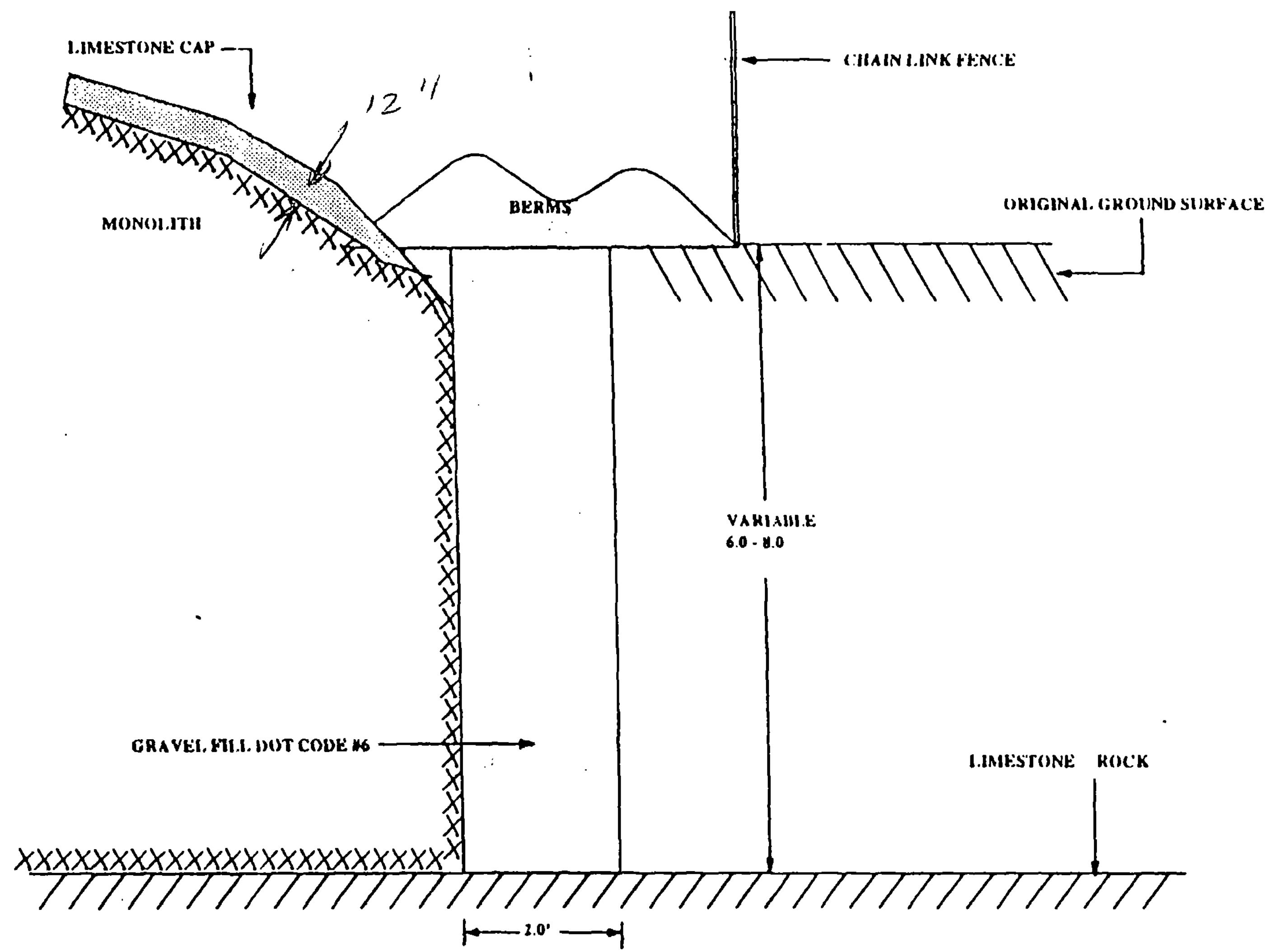
In certain areas, the berms have been disrupted, resulting in irregular cross-sections and reduced effective berm height. Areas of disruption are associated with access gates and monitoring wells. In these areas, the furrow can no longer be seen and the materials of the two berms have undergone mixing during the berm repair work that follows ingress and egress.

Some other areas of berm disruption show evidence of berm movement. One area where the drain collar closely parallels the security fence, the chain link fence material has been pushed outward along the bottom, between fence posts. It is not known whether the berms impinged upon the fence at the time that they were constructed or have been moved into the fence subsequently.

Tall grasses and weeds indigenous to southern Florida have already started to encroach the outer berm in some areas. The inner berm appears to be free of vegetation, at present. The areas where the outer berm has thick vegetative cover, coincidentally, show no evidence of berm movement or disruption.

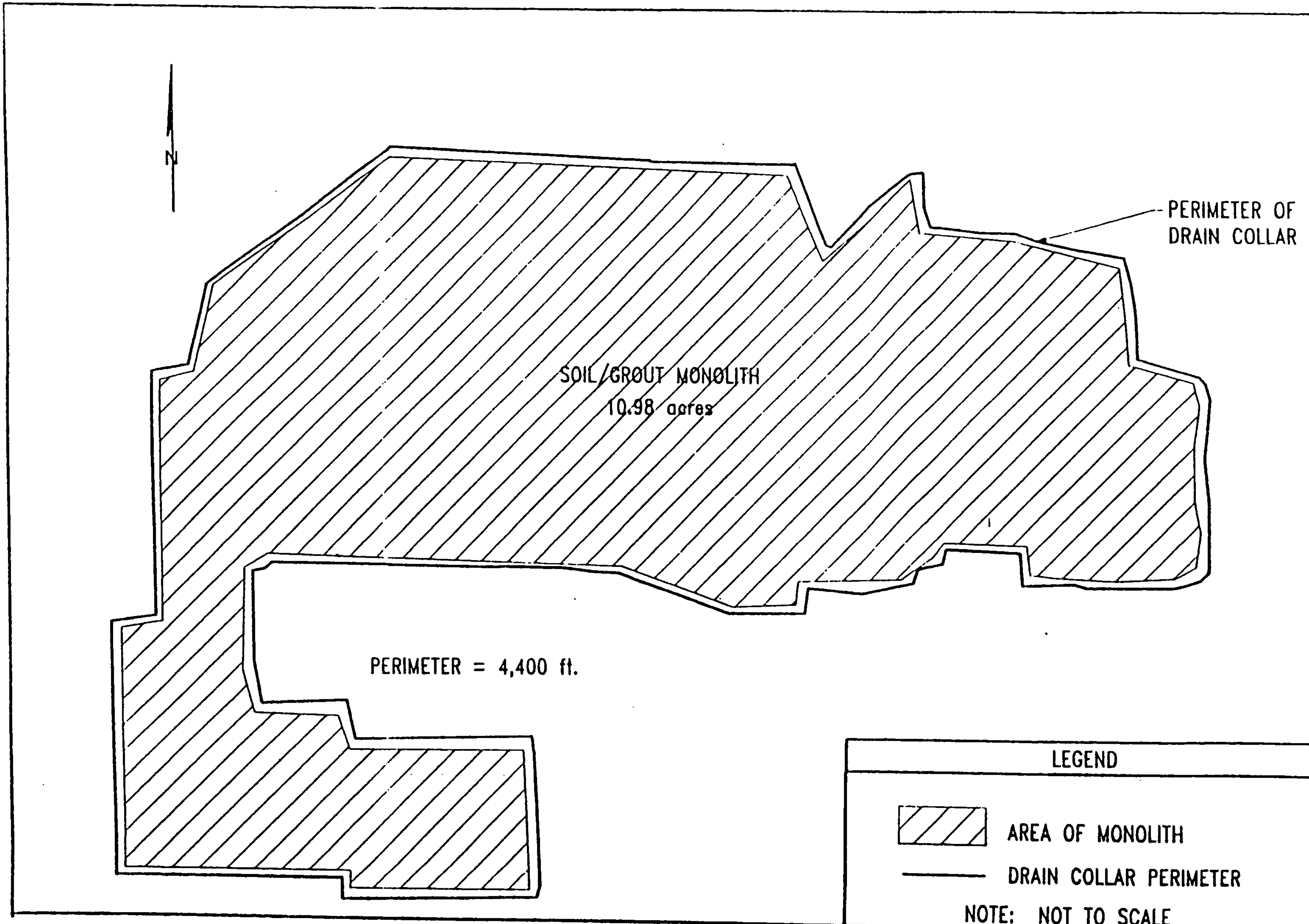
REQUIREMENTS OF A FUNCTIONAL DRAIN COLLAR

The functional objective of the drain collar is to receive rainfall runoff from the top of the monolith, via the crushed limestone cover, and expeditiously convey the runoff water into the aquifer by means of gravity recharge through the bottom of the trench. As a corollary to this main objective, the berms were included in the design of the drain collar to minimize flooding in the area immediately surrounding the monolith, and to retain runoff waters in the region of the trench long



CROSS SECTION OF DRAIN COLLAR
PEPPER'S STEEL & ALLOY SITE
MEDLEY, FLORIDA

FIGURE 1



PEPPER'S STEEL AND ALLOY SITE
MEDLEY, FLORIDA

FIGURE 2

enough for the recharge to take place. Any change in the condition of the recharge trench or berms that impairs the drain collar's capability to perform the capture and recharge functions, would be detrimental to the remedial efforts that have been expended at the Pepper's Steel and Alloy site.

Listed below are some possible scenarios in which the functioning of the drain collar could be impaired. These processes include (1) migration of fines, (2) chemical blinding, (3) vegetative plugging, or (4) a combination of the three. All of these processes proceed slowly with detrimental effects taking years to manifest themselves. The drain collar was designed for a ten-year life.

Migration of Fines

The migration of fine particles into the recharge trench from the limestone cap or from the outer berm will cause a gradual decline in the overall permeability of the fill materials in the trench. Fines in the limestone cap can result from wind deposition of airborne dust and from natural weathering of the limestone cover. Fines are already present in the berm and cap materials. Rainfall on the outer berm results in the washing of fine materials downslope from the upper extremities of the outer berm. Fines from the outer slope are transported off site in runoff water. Fines from the inner slope migrate first into the furrow between the berms and then into the recharge trench by way of the void spaces in the inner berm.

Chemical Blinding

Dr. Leslie R. Dole described in detail, in his April 7, 1986 letter to Mr. Fred Mullins (with attachments), the mechanism by which calcium bicarbonate (resulting from acid rain) will react with free lime (a by-product of Portland Cement curing) to produce new calcium carbonate (limestone) in the surface pores of the monolith (Reference 3). This same reaction will proceed to some extent in the recharge trench with the result being a gradually declining permeability.

Vegetative Plugging

Over a long period of time (in excess of ten years), continued growth of grasses and weeds on the limestone berm can result in the production of a humus layer in the upper six inches of the berm depth. This layer would cause a significantly reduced permeability as more fines are created and organic plant matter develops in this layer. If allowed to continue to grow indefinitely, the plants will produce conditions in the surface layers of the inner berm that resemble the natural soil surrounding the site. Further, plant growth can extend on to the monolith itself. In that event, roots will eventually penetrate the monolith surface and compromise its remedial capacity.

OPERATION AND MAINTENANCE PROCEDURES

In order to maximize the functional life of the drain collar and address the three long-term threats previously discussed, the following maintenance procedures should be initiated.

Discourage Vegetation of the Berm

Monthly inspections should be undertaken to determine the progress of vegetative colonization on the berm. The lack of soil may prevent such growth for several more years, but eventually invasion of the berm by grasses growing on adjacent land will take place. While the drain collar is a rapid recharge zone for the aquifer, the use of special herbicides for weed and grass control should be investigated. The special herbicide recommended for use is "Kleen-up" manufactured by the Ortho Division of Chevron Chemical Company. Table 1 shows the estimated costs of weed control using this special herbicide. It is anticipated that the weeds will need to be mowed prior to herbicide application to minimize the amount of herbicide that will have to be sprayed.

Minimize Traffic on the Limestone Cover

The production of fines from vehicular traffic on the limestone cover should be minimized. A system to reduce the number of tour vehicles and other unnecessary traffic, should be initiated. This will decrease the production of fines and minimize the disruption of the berms at the access gates.

Monitor for Standing Water

An indication of the long-term losses of permeability in the recharge trench can be obtained by comparing rainfall data with the depth and the length of time that water is observed to stand in the recharge trench. In order to track permeability trends, it is recommended that a monitoring station be constructed and checked after each rainfall event. The station should be equipped with a standard rain gage and a perforated well casing extending to the bottom of the recharge trench at a location adjacent to the Miami Battery fence line. The well casing should contain a level sensor/transmitter which will provide data over the entire range of water level elevations expected. The transmitter output signal should be received and recorded by a strip-chart recorder. It would be the responsibility of the land owners to maintain the operability and calibration of the level recording system and analyze and archive the data. The estimated labor and capital costs to monitor rainfall and permeability of the recharge trench are shown in Table 2.

Measures to Restore Permeability

This section presents some remedies that may be capable of resolving a permeability problem, if it occurs. For the purposes of the cost estimation, it is assumed that the interval between permeability improvement efforts will be ten years. Permeability in the recharge trench will be determined by the monitoring program. Permeability improvement by mechanical fracturing and acidizing techniques has been thoroughly demonstrated in petroleum production, but were rejected for this application due to the potential for damage to the monolith.

The most likely remedial action is the removal, screening, and replacement of the gravel fill material. This operation would require one 3-cu. yd. front end loader, a backhoe, a portable, vibrating screen, and equipment operators. The backhoe will remove all of the fill material from the berm and trench. The removed fill materials will be stockpiled alongside the trench to dry. The portable vibrating screen (Reed or equivalent) then will be brought in to process the fill material. The front end loader will pick up the unscreened fill material from the piles and place it onto the vibrating screen for processing. After the material is processed, the loader will push the fill material back into the trench and rebuild the berm. It is probable that screening will result in a net loss of fill/berm material that will have to be replaced. The estimated costs of this work are shown in Table 3.

TABLE 1

ESTIMATED COSTS OF WEED CONTROL BY MOWING/HERBICIDE

Cost Item	Man days	Rate	Total Cost
Labor			
Monthly inspections	6	$200/md	$ 1,200
Mowing (once per year)	16	$ 78/md	1,248
Herbicide application	16	$ 78/md	1,248
Material and Equipment			
Herbicide - 10 gal/yr @ $120 gal			$ 1,200
Mowing equipment rental - 16 days @ $60/day			960
		TOTAL	$ 5,856

TABLE 2
ESTIMATED COSTS TO MONITOR PERMEABILITY OF THE DRAIN COLLAR

Cost Item	Man days	Rate	Total Cost
INSTALLATION			
Labor			
Well installation	4	$120/md	$ 480
Rain gauge installation	1	$120/md	120
Level Transmitter installation	1	$120/md	120
Capital Expenditures			
Well materials			$ 100
Rain Gauge			$ 250
Level Transmitter			$2,000
Recorder			$ 800
SUBTOTAL INSTALLATION			$3,870
MONITORING			
Labor			
1 Man/day per month	12 md/yr	$200/md	$2,400/yr
RECORD KEEPING			
Labor			
2 Man/days per month	24 md/yr	$200/md	$4,800/yr
SUBTOTAL MONITORING AND RECORD KEEPING			$7,200/yr

Pepper's Steel & Alloy Company, Medley, FL.

Activity Description	Quantity	Units	Rates	Units	Fees Base Cost	Material Base Cost	Labor Base Cost	Equipment Base Cost	Total Base Cost	Total Cost Including O&P	References
I. PROJECT MANAGEMENT & OVERSIGHT											
A. Labor	120	Hours	27	$/Hr			3240		3240	7614	
B. Expenses	14	Days	100	$/Day					1400	1680	
II. MOBILIZATION/DEMOBILIZATION											
A. Transportation	1	ea.	1100	$/ea					1100	1320	
B. Contr. Permits & Bonds	1	ea.	1320	$/ea					1320	1584	
C. Equipment Mob/Demob.	3	pieces								2000	
III. SITE CLEARING											
A. Removal and Replacement of Fences											
Labor:	4400	Ln Ft	7.5	$/Ln Ft			33000		33000	39600	A
IV. DRAINAGE COLLAR RENOVATION											
A. Excavation, Processing and Replacement of Drain Collar Fill Material. Use 1 1/2 cu. yd. Backhoe to Excavate, Front End Loader and Portable Screen to Process											
Labor and Equipment	4675	Cu Yd	7	$/Cu Yd						32725	B
B. Disposal of Screenings											
Transportation	882	Tons	5.1	$/Ton						4498	A
Disposal Fee	882	Tons	27	$/Ton	23814				23814	28577	
C. Purchase and Hauling of New Fill and Berm Material Back to Trench Use 3 cu. yd. wheel loader, 16 cu. yd. dump trailer				3 mi RT							
Labor and Equipment	200	Tons	1.63	$/Ton			326		326	301	C
Material	200	Tons	3.4	$/Ton		680			680	816	C
GRAND TOTAL										120806	

References:

A Telephone conversation between J. L. Hicks, P. E. and Stan Pierson, Estimator, American Engineering and Development Corporation, Miami, FL.

B Telephone Quotation From Mr. Charles Munz, Redland Construction Company

C Telephone Quotation From Supplier.

REFERENCES

1. Final Report on Remedial Action, published by Florida Power & Light Company, June 1989, Section 6, "Evaluation of Drainage Structure", Canonie Environmental Services Corporation. January 1989.

2. Final Report on Remedial Action, published by Florida Power 4 Light Company, June 1989, Section 7, "As-Built Surveys", Pepper's Steel and Alloys Site, Medley, Florida. April 1989.

3. Letter from Dr. L. R. Dole to Mr. Fred Mullins, April 7, 1986.

PROPOSED DRAINAGE DESIGN

DRAINAGE VIA OPEN CHANNELS TO DRAINAGE FIELDS

DRAINAGE IMPROVEMENTS NEEDED
FOR FLOOD CONTROL AT THE
PEPPER'S STEEL AND ALLOYS SITE

BACKGROUND

When the remediation project was completed, on the Pepper's Steel and Alloys Site, in Medley Florida, a Drain Collar was installed around the perimeter of the soil/grout monolith. This structure consisted of a trench varying between 2 and 3 feet wide and extending vertically downward to the top of the limestone. The trench was filled with graded limestone rock, and an earthen berm was built at the ground surface immediately outside the trench. The purpose of the Drain Collar was to divert surface runoff from the monolith into the groundwater system in the same manner as a "French Drain." Despite claims that the Drain Collar was capable of containing and diverting the 100-year, 24-hour storm event with a 3.0 factor of safety, it has never successfully contained the smaller storm events that recur with frequencies measured in weeks.

OBJECTIVE

The objective of this proposal is to provide an alternative means of controlling storm runoff from the monolith and the land immediately adjacent to it.

DESCRIPTION OF THE ALTERNATIVE DESIGN

Prior to the construction of the monolith, storm runoff traveled overland to large low-lying areas where it was stored until it either evaporated or percolated into the groundwater. Now, these impoundments are covered by the monolith and the new areas of impoundment are on adjacent property where they interfere with the landowners use of their property.

DRAINAGE TO EXISTING WATERWAYS- DESIGN BASIS

The proposed drainage system design employs a network of drainage channels to collect runoff and convey it to two drain fields, excavated as shown in Figure 1. Each of the drain fields would be excavated to a bottom elevation of 0.0 feet MSL and then filled to an elevation of 0.5 feet above high water table with an appropriate aggregate. Side slopes of drainage channels and drainage fields will be 1 foot vertical to 2 feet horizontal. The excavated soil would be stockpiled on-site in compacted embankments until it can be sold for use as clean fill. The acreage of each drain field was determined from the drainage areas designated by letter in Figure 1 and the peak flow for the 10-year, 24-hour rainfall event (184.1 cfs). The convoluted shapes of the drain fields were necessitated by the storage volumes, available land and obstructions such as the monolith and existing monitoring wells. The following is a condensed summary of the design particulars for the drainage channels and the drainage fields. The cross-section and bottom slope of all ditches are designed to collect and convey the peak flow of the 10 year-24 hour storm event without on-site flooding. The design average water velocity is 2.0 feet per second.

SUMMARY OF DRAIN FIELD #1 DESIGN

- Drain Field #1 serves drainage areas A, B, and E, totaling 13.1 acres of watershed
- Drain Field #1 covers a bottom area of 0.67 acres
- Drain Field #1 has a design water surface elevation of 6.5 feet MSL
- Drain Field #1 is served by two drainage channels as shown in Figure 1
- Total soil volume excavated is 6,750 BCY.

SUMMARY OF DRAIN FIELD #2 DESIGN

- Drain Field #2 serves drainage areas C and D, totaling 6.00 acres of watershed
- Drain Field #2 has a bottom area of 0.24 acres
- Drain Field #2 has a design water surface elevation of 6.5 feet MSL
- Drain Field #2 is served by two shallow drainage channels
- Total soil volume excavated is 2,640 BCY.

SUMMARY OF DRAINAGE CHANNEL #1 DESIGN

- Overall length: 650 feet
- Width at upper end: 12 feet
- Water depth at upper end: 1.5 feet
- Bottom elevation at upper end: 5.25 feet MSL
- Width at lower end: 15.5 feet
- Water depth at lower end: 2.5 feet
- Bottom elevation at lower end: 3.65 feet MSL
- Volume of excavation: 1,050 BCY
- One culvert crossing near upper end.

SUMMARY OF DRAINAGE CHANNEL #2 DESIGN

- Overall length: 925 feet
- Width at upper end: 23 feet
- Water depth at upper end: 14 inches
- Bottom elevation at upper end: 5.7 feet MSL
- Width at lower end: 22.5 feet
- Water depth at lower end: 2.5 feet
- Bottom elevation at lower end: 3.25 feet MSL
- Volume of excavation: 1,506 BCY
- Paved for truck traffic: 575 feet

SUMMARY OF DRAINAGE CHANNEL #3 DESIGN

- Overall length: 425 feet
- Width at upper end: 10 feet
- Water depth at upper end: 1.5 feet
- Bottom elevation at upper end: 6.4 feet MSL
- Width at lower end: 14 feet
- Water depth at lower end: 2.0 feet
- Bottom elevation at lower end: 4.2 feet MSL
- Volume of excavation: 320 BCY.

SUMMARY OF DRAINAGE CHANNEL #4 DESIGN

- Overall length: 225 feet
- Width at upper end: 10 feet
- Water depth at upper end: 1.5 feet
- Bottom elevation at upper end: 4.0 feet MSL
- Width at lower end: 10 feet
- Water depth at lower end: 1.5 feet
- Bottom elevation at lower end: 3.2 feet MSL
- Volume of excavation 167 BCY.

SUMMARY OF OPERATION AND MAINTENANCE ACTIVITIES

- Labor

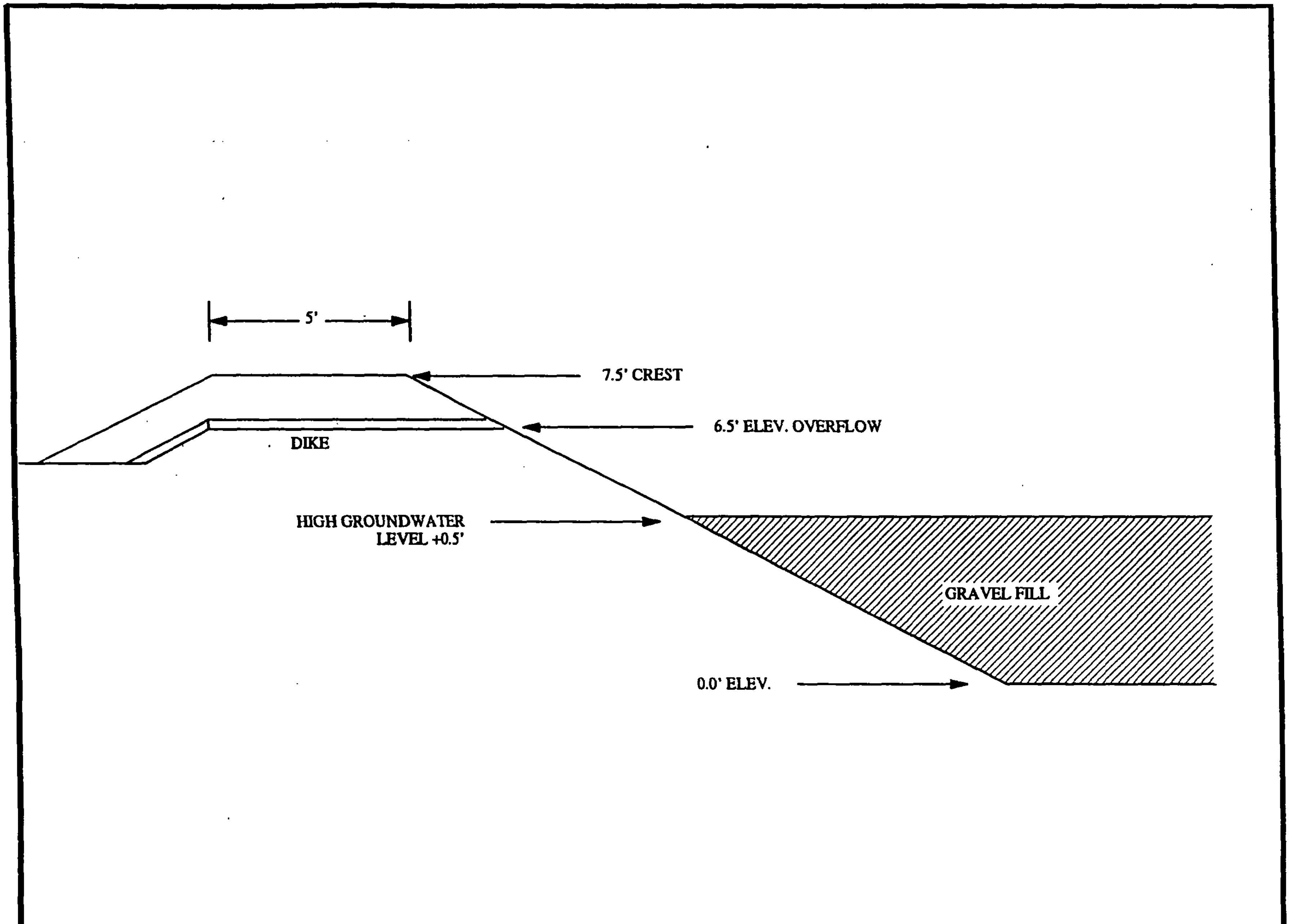
  Monthly inspections
  Mowing (once per month)
  Herbicide application

- Material and Equipment

  Herbicide
  Mowing equipment rental

- Maintenance of structures

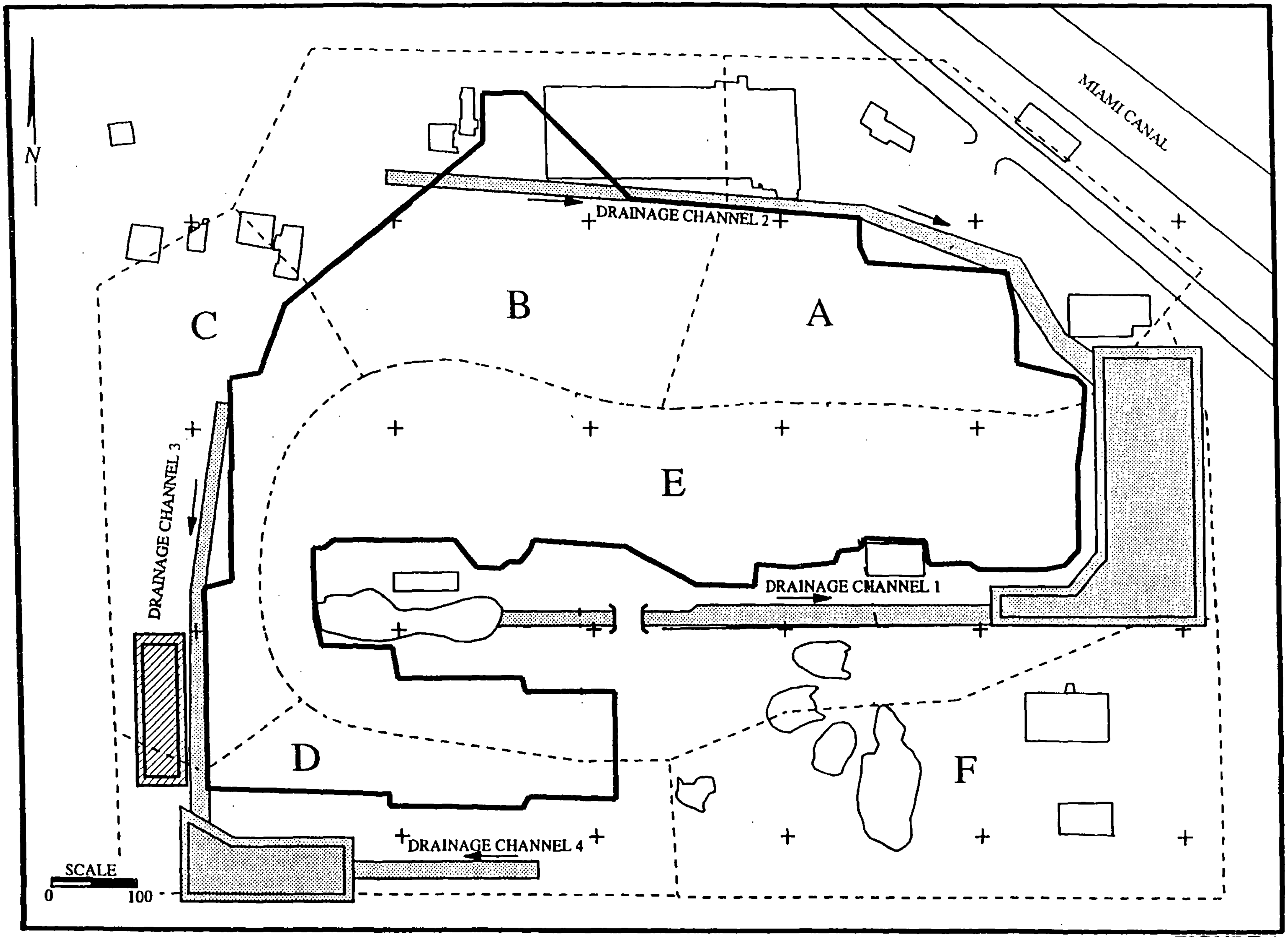
- Renovation of drain field material



TYPICAL DRAINAGE FIELD
PEPPER'S STEEL AND ALLOYS SITE

FIGURE 5

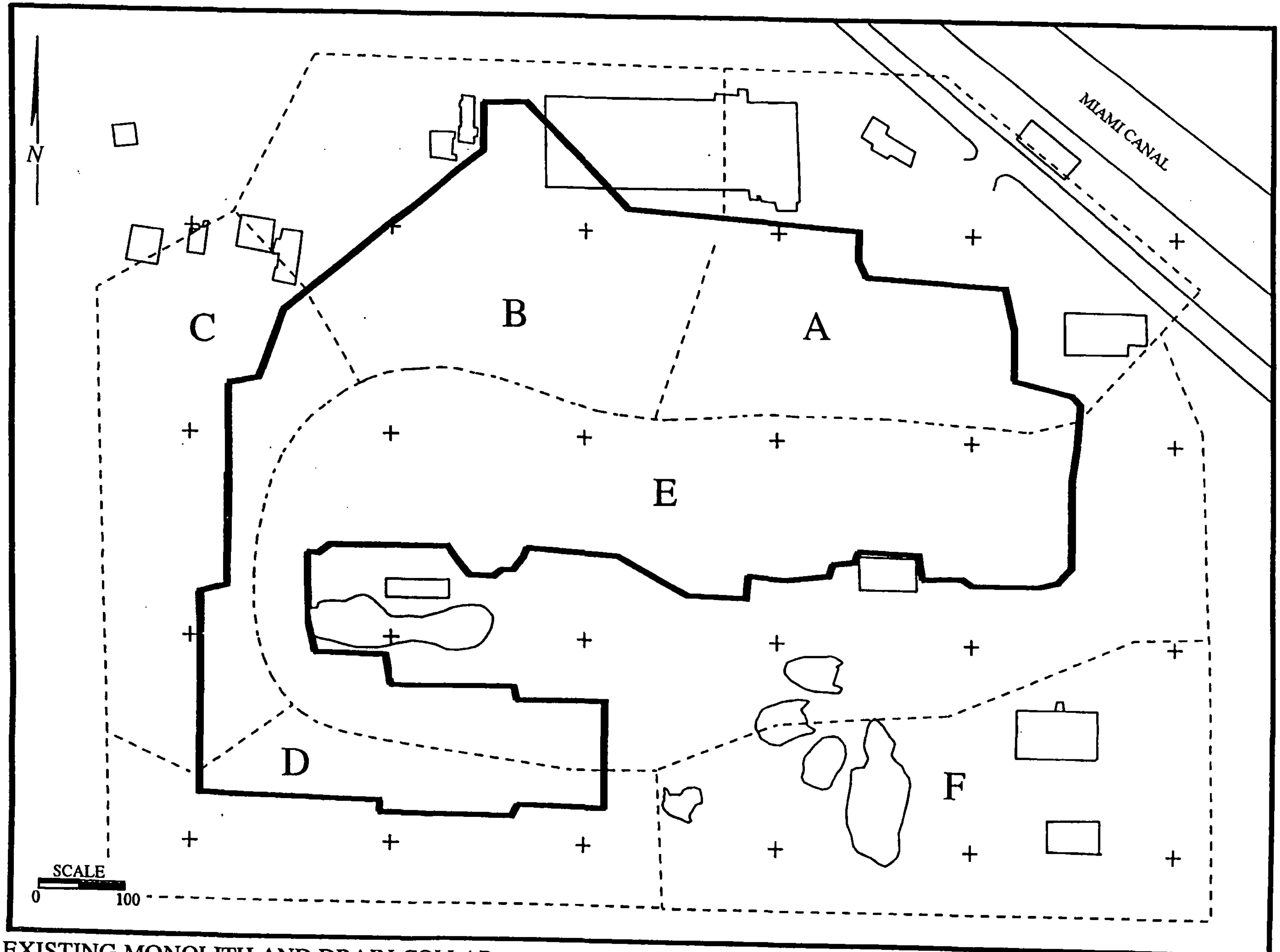
TENERA



PROPOSED DRAINAGE IMPROVEMENTS
PEPPER'S STEEL AND ALLOYS SITE

FIGURE 1

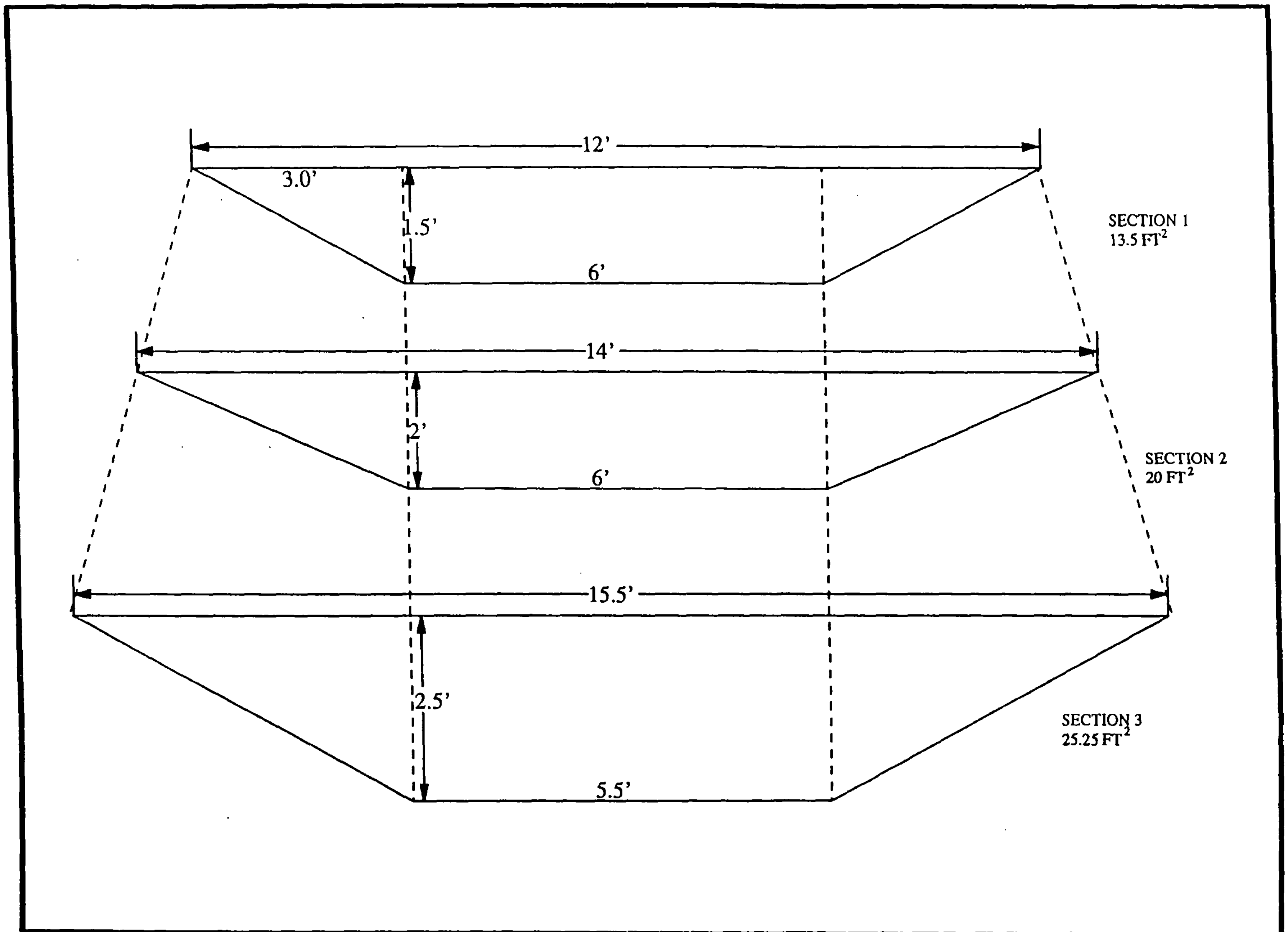
TENERA



EXISTING MONOLITH AND DRAIN COLLAR
PEPPER'S STEEL AND ALLOYS SITE

FIGURE 2

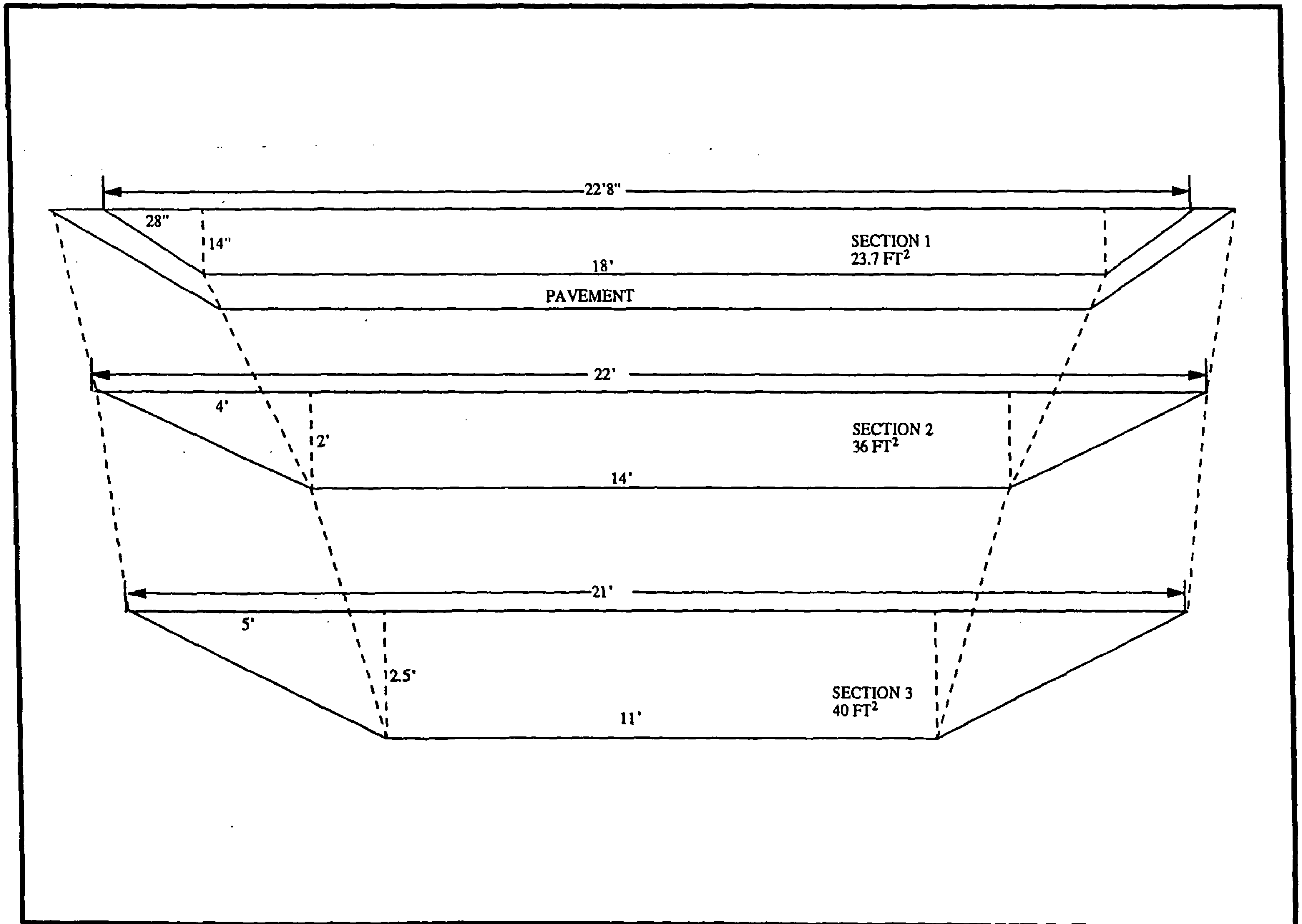
TENERA



DRAINAGE CHANNEL #1
PEPPER'S STEEL AND ALLOYS SITE

FIGURE 3

TENERA



DRAINAGE CHANNEL #2
PEPPER'S STEEL AND ALLOYS SITE

FIGURE 4

TENERA