40259

9300 Lee Highway
Fairfax, Virginia
22031-1207

703/934-3000

ICF TECHNOLOGY INCORPORATED

April 6, 1990

Ms. Nora Okusu
Department of Waste Management
101 N. 14th Street, 11th Floor
Richmond, VA 23219

Dear Nora:

Enclosed for your review is the first progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. Please note that the reporting period was extended, for this time only, to incorporate February's activities as well as those accomplished in March. The reason for the one-time extended period is that we did not start work until February 17, and therefore, during a conversation we had around that time, you and I agreed it was not necessary to send a report for the relatively few days remaining in February.

Should you have any comments or questions, feel free to call me.

Sincerely,

Claudia A. Brand
Senior Associate

cc: Jim Kuszaj
Gary Dietrich

APR 1990
FEDERAL
SUPERFUND
(REMEDIAL)

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: February 5 -- April 6, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: April 6, 1990

Special Comments: This first monthly report, prepared in accordance with Paragraph VII.K of the Consent Agreement, encompasses a two-month period in order to address the startup of the project. February's activities are included herein because of the project schedule and based on a verbal understanding between Claudia Brand and Nora Okusu. Hereafter, all progress reports will be on a monthly basis. The sequence of start-up events was as follows:

- Virginia Department of Waste Management (VADWM) approved ICF Technology's Work Plan in a letter dated February 5, 1990 contingent on several proposed changes. Gary Dietrich of ICF Technology (ICF) accepted those changes and signed VADWM's letter on February 7, 1990.

- ICF began the Planning task on February 11, 1990 within ten days of Work Plan approval.

- ICF notified Nora Okusu of VADWM, on February 12, 1990, of initial schedule, i.e., for start-up activities. On February 22, 1990, ICF confirmed schedule with Ms. Okusu for geophysical survey (February 26), start-up activities (March 6 -- 16), and drilling (March 19).

Specific Accomplishments in Reporting Period:

- On February 26 and 27, Park Gilmore and Kent Boler of ICF conducted a ground penetrating radar (GPR) and electromagnetic induction (EM) survey to assist in the location of the proposed soil borings/monitoring wells and to determine the possible presence of a plinthite (ironstone) layer. The results of the survey included identification of 1) the locations of underground piping and the abandoned fuel oil tank, 2) optimum locations for drilling, and 3) approximate depth of the water table. No observable anamolies attributable to a plinthite layer were found.

- Claudia Brand and Jennifer Tilghman visited the site on March 15, 1990 to prepare for the following weeks activities. Preparations included checking for evidence of buried lines at the selected boring locations with a magnet detector, preparing the decontamination station, reviewing the project tasks with the current site manager (Phylis McKenzie), and checking access to the stream sampling locations.

AR300896

Specific Accomplishments in Reporting Period (CONTINUED):

- Hardin-Huber Inc. (HHI) completed twelve soil borings and installed 11 monitoring wells at the site between March 19 and March 30, 1990. Claudia Brand, Jennifer Tilghman, and Geoff Back of ICF conducted soil sampling, field screening, and soil classification during drilling. The wells were developed by HHI between March 27 and 30, 1990. A total of 25 soil samples were sent to Versar Inc. for laboratory analyses.

- Geoff Back, Jennifer Tilghman, and Claudia Brand collected 16 surface soil samples (SS21-28 and SS32-39) using a hand auger and submitted them to laboratory for analyses on March 29, 1990.

Projected Tasks to Be Completed in Upcoming Month:

- On April 9, 11, and 13 surface water and sediment samples will be collected from the proposed locations along Scates Branch and Weavers Millpond.

- On April 9, ICF's ecologist, Judi Durda, will initiate the ecological assessment task by conducting the one-day site reconnaissance.

- Groundwater samples will be collected from the 11 on-site wells on April 16 and 17.

- Pond closure activities will begin on approximately April 16. These activities will be conducted by Scovill's contractors, Weston Services Inc., and will include pumping and treating the accumulated rainwater in the ponds, earthwork to backfill and grade the pond areas, and final seeding. ICF will have a representative on site during portions of this work. This work is expected to take approximately six weeks.

Problems Encountered and Solutions:

- A hydraulic oil line broke on the drill rig during the installation of MW7 (on March 23, at approximately 1530) spilling approximately three gallons of hydraulic oil around the well area. HHI shoveled all visible oil and soils into a 55-gallon drum and the area was covered with plastic for the weekend. (The rig was inoperable so none of the equipment or well materials could be removed from the ground at that time.) On March 26, the drill rig was fixed, the PVC piping at MW7 was removed from the borehole, the PVC was discarded, and the hole was grouted to the surface. A new location for the well was selected approximately 12 feet to the southeast in an area unaffected by the spilled hydraulic oil. (The new MW7 was completed at 1330 on March 26.)

- During the installation of MW11 on March 28, problems arose with bridging of the sands during installation of the filter pack. After significant effort, the well was installed, however, only three bags of sand were used in comparison to the average of six bags per well at the other

Problems Encountered and Solutions (CONTINUED):

locations. During well development on March 30, it was evident that the well was not performing properly (i.e., yielding only 12 gallons of water in an hour compared to over twice that in most locations). Hence, HHI and ICF agreed on April 3, that the well would be replaced by HHI at the time of additional drilling (sometime in the end of May or early June). At that time HHI will also install MW4, which was postponed so it would not be destroyed during pond closure.

- Geese were found to be nesting near the ponds during the week of April 3. Ms. Nora Okusu of the VADWM arranged with the Department of Agriculture to have the nest moved. However, no date for the move has been set at this time.

9300 Lee Highway
Fairfax, Virginia
22031-1207

703/934-3000

ICF TECHNOLOGY INCORPORATED

MAY 1990
FEDERAL
SUPERFUND
(REMEDIAL)

May 10, 1990

Ms. Nora Okusu
Department of Waste Management
101 N. 14th Street, 11th Floor
Richmond, VA 23219

Dear Nora:

Enclosed for your review is the second progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from April 7 through April 30, 1990. Should you have any comments or questions, feel free to call me.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Associate

cc: Jim Kuszaj
Gary Dietrich

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: April 7, 1990 -- April 30, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: May 9, 1990

Specific Accomplishments in Reporting Period:

- On April 9, 1990, Claudia Brand and Jennifer Tilghman of ICF collected surface water samples from 5 locations along Scates Branch and from the inflow and outflow to Weavers Millpond. On April 11 and 13, additional water was collected to replenish the 7-day chronic bioassay tests. The analytical results are not available at this time. However, an initial stream assessment (conducted by the VADWM's biologist using a benthic survey method) indicates that the stream water quality is generally good.

- ICF's ecologist, Judi Durda, conducted a one-day site reconnaissance on April 9, 1990. The purpose of this visit was to identify the major types of flora and fauna species inhabiting the area. The remaining tasks of the eclogical assessment will be undertaken upon receipt of the analytical data for surface water and sediment samples.

- Additional miscellaneous samples were collected including: surface soil samples from near the drainage lines; a sample of stained soil from near Mattatuck's outdoor waste oil accumulation area; and a sample of water from the decontamination tank. Samples from the drainage line were collected in accordance with the Work Plan; the stained soil sample was taken to gather more information in the vicinity of one of the soil borings/monitoring wells (SB8/MW8) where VOCs were found in soils; and the tank sample was collected to determine disposal options.

- On April 16 and 17, the first round of groundwater samples were collected from 11 of the wells installed in March. The wells were purged prior to sampling using a hand pump, and all of the wells (with the exception of MW11 which was not sampled) performed adequately. Samples were sent to the laboratory for analyses, but results are not yet available.

- On April 19, pond closure activities began, and ICF was on-site periodically to collect treated pond water samples (on the first and fifth days) and to observe the progress of the earthwork operations.

- ICF began researching private and public water well locations by reviewing documents and interviewing officials at the County Health Department, the Town Clerk, and the Building and Zoning Department.

AR300900

Projected Tasks to Be Completed in Upcoming Month:

- On May 14 through 16, six borings will be installed, one in each of the former pond areas, and soil samples will be collected to gather information on concentrations of selected compounds in subsurface soils following pond closure.

- On May 17, two additional monitoring wells will be installed. One well (MW-4) will be installed in a background location to the north, and MW-11A will replace MW-11 (located east of the southeast pond) installed in March.

- The second round of ground water, surface water, and sediment samples will be collected from selected locations some time between May 17 and May 21.

- Ongoing data evaluation and organization will be conducted as the data begin to be received from the laboratory.

- Confirmatory surface soil sampling over the former pond areas may also be conducted during the upcoming month, in accordance with the Work Plan.

Problems Encountered and Solutions:

None.

AR300901

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

June 6, 1990

Mr. Timothy Longe, Ph.D.
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr. Longe:

Enclosed for your review is the third progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from May 1 through May 31, 1990. Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Associate

cc: Jim Kuszaj
Gary Dietrich

AR300902

MONTHLY PROGRESS REPORT FOR
ARROWHEAD PLATING SITE RI/FS
MONTROSS, VA

REPORTING PERIOD: May 1, 1990 -- May 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: June 6, 1990

Specific Accomplishments in Reporting Period:

- On May 2 and 10, ICF visited the site to review pond closure activities conducted by Weston Services Incorporated. Work appeared to be progressing successfully and in a timely manner. Significant efforts had been made to attempt to control silt runoff after the initial heavy rain in April.

- During the week of May 14, two monitoring wells were installed (MW4 and the replacement for MW2) and six borings over the former pond area were completed by Hardin-Huber Inc. and ICF staff, Geoffrey Back and Jennifer Tilghman. Additionally, the second round of groundwater samples were collected (one month after the initial round) from every well except the two new wells and MW3. These remaining wells are scheduled to be sampled the week of June 4.

- On May 23 and 24, Eric Lillyblad, Jennifer Tilghman, and Kevin Koepenick collected the second round of surface water and sediment samples from Scates Branch and from the inflow and outflow to Weavers Millpond.

- ICF continued researching private and public water well locations. Additionally, ICF interviewed employees and reviewed files in several county offices to look for any record of a release or complaint associated with the facility. No records of releases or spills were found for the period Scovill operated of the plant; however, Chief Sisson of the Fire Department recalled responding to a leaking 55-gallon drum incident 4-5 years ago. The Chief did not believe the incident had resulted in a release to the environment.

- Numerous data packages from Versar Laboratory were received during the month of May, and ICF immediately began to organize the data. Data validation procedures were also begun to ensure usable data and identify any invalid results.

Projected Tasks to Be Completed in Upcoming Month:

- On June 8, ICF will visit the site to sample the remaining groundwater monitoring wells. Also at that time, we will meet with the manager of the Mattatuck operation to research their processes and waste management

AR300903

practices.

- The confirmatory surface soil sampling in the former pond area will be conducted sometime toward the end of the month. The scheduling for this task is dependent on the status of soil and vegetation in the area, i.e., ideally, plants will have taken hold and the area will reflect the conditions that will exist in the future.

- Ongoing data evaluation and organization will be conducted as the data begin to be received from the laboratory.

Problems Encountered and Solutions:

- An electrical line (running to the chlorination building at the wastewater treatment plant) was found to have been damaged during drilling operations at SB11. Although a geophysical survey had been run in the vicinity of the boring location, access problems encountered at the time of drilling required that the location be moved. Other information, such as flags marking underground utilities, other geophysical information, and direct observations were used at the time to site the new location. As soon as the location of the damage was identified, Weston Services repaired the line.

- The Virginia Department of Waste Management (VADWM) expressed concern that soil cuttings from borings SB10 - SB13 were wrapped in plastic and not drummed, therefore with the exception of SB13, the cuttings were moved and placed in drums during the week of May 14. At SB13, problems with access prevent the material from being moved, however, arrangements were made for Weston to take care of this location before they complete their work at the site.

- The VADWM expressed concern that the same bucket of decontamination water was being used for the split spoon sampler at two borings. Fresh water and alconox were already being added to the bucket to freshen it, but to further reduce any concerns, additional equipment blank samples were collected to verify that there was not a problem. (For all other drilling activities, i.e., SB1-SB14, a dedicated batch of decontamination water was used to wash the split spoon.)

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

July 9, 1990

JUL 1990
FEDERAL
SUPERFUND
(REMEDIAL)

Mr. Timothy Longe, Ph.D.
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr. Longe:

Enclosed for your review is the fourth progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from June 1 through June 30, 1990. Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand
Senior Associate

cc: Jim Kuszaj
Gary Dietrich

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: June 1, 1990 -- June 30, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: July 9, 1990

Specific Accomplishments in Reporting Period:

- On June 8, Eric Lillyblad and Kevin Koepenick collected ground-water samples from MW3 (which had not yet been resampled) and from the newly installed MW4 and MW11 (first round). Samples were sent to the laboratory for analyses of volatile, semivolatile, cyanide, selected total metal, and dissolved metal compounds.

- On June 8, Eric Lillyblad visited Mattatuck's manufacturing operations currently located in the southwest portion of the building. Mr. Joe Cacciatore, General Manager, was interviewed to determine if past processes or incidents may have contributed to the problems at the site. According to Mr. Cacciatore, in the past, waste hydraulic oil was stored outside in drums located next to a 500 gallon tank (used to store new product). The tank and drums were reportedly removed in the summer of 1989 after production of accelerator cables was discontinued. Four additional drums were removed in late spring of this year. Based on this discussion, it appears that Mattatuck's former waste oil storage area was the cause of the stained surficial soils that are visible to the east of the building (just north of Mattatuck's side entrance).

- On June 26, Claudia Brand visited the site to view the former pond area with Kim Hummel of EPA, Tim Longe of VADWM, Chuck Moore of Weston, and Muriel Taylor of Potomac Seeding. The meeting was held at the request of the EPA, and the purpose was to address soil erosion problems that resulted from surface water runoff. According to Ms. Taylor, the poor seeding problem was due, in part, to the occurrence of 8 inches of rain which fell within 3 days of the seeding. Kim Hummel indicated that a local soil conservation specialist, Ken Harper, had viewed the site and made recommendations for stabilizing the area. It was agreed that a plan should be developed by Chuck Moore, with the assistance of Mr. Harper, and presented to the EPA around the end of July. No further seeding or grading activities would take place until the plan was completed. Also, confirmatory surface soil sampling activities would be postponed, since the existing conditions may change based on the new plan.

AR300906

During the visit, a broken fire water line was observed to be draining across the site. The line had apparently been broken for several weeks and the water had created a pool and rivulets on the east side of the building and in the former pond area. Furthermore, it appears that the water is flowing directly over the stained surface soils (in Mattatuck's former oil storage area) and probably transporting those compounds as it flows across the site. Melvin Lewis, the maintenance man for A.R. Winarick, confirmed that the stained area is the result of significant oil spillage which accumulated around storage drums and a tank during the years that Mattatuck's accelarator cable operation was on site.

- Additional data packages were received from Versar Laboratory during the month of June, and ICF KE continued to organize the data. Data validation efforts (to ensure viable data and identify any invalid results) also neared completion.

Projected Tasks to Be Completed in Upcoming Month:

- During the week of July 9, ICF KE will visit the site to resample 2 monitoring wells (MW4 and MW11). If A.R. Winarick's approval is received, we will also sample 3 wells that were installed by Winarick in the vicinity of the exisiting sewage ponds. Additionally, composite samples of the soil cuttings and purge water will be collected to assist Scovill with their decision regarding the handling of wastes generated during this RI/FS.

- The confirmatory surface soil sampling in the former pond area will not be conducted as noted above. The scheduling for this task is dependent on the status of soil and vegetation in the area, i.e., ideally, plants will have taken hold and the area will reflect the conditions that will exist in the future.

- Ongoing data evaluation and organization will be conducted as the data continue to be received from the laboratory. Copies of the summary data tables, that are currently being generated, will most likely be provided to the State with the submittal of the next monthly progress report.

Problems Encountered and Solutions:

- As previously discussed, the EPA expressed concern about inadequate surface water control measures at the site. As a result, a plan is being developed by Weston (during the month of July) to address the problem.

- The EPA also expressed concern about data availability. As mentioned, summary data tables will be provided when they are complete and will most likely accompany the next monthly report.

AR300907

Drew

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

August 7, 1990

Mr. Timothy Longe, Ph.D.
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr. Longe:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from July 1 through July 31, 1990. Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Environmental Scientist

cc: Jim Kuszaj
Gary Dietrich
Kim Hummel

AR300908

HERE WHEN I ARRIVED
AT HWMD DETAIL [8/27/90].
— RDLII —

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: July 1, 1990 -- July 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: August 7, 1990

Specific Accomplishments in Reporting Period:

- On July , Geoff Back and Jay Kuhn of ICF KE collected the second round of ground-water samples from MW4 and MW11 and from A.R. Winarick's wells (designated AR1, AR2, and AR3). Samples were sent to the laboratory for analyses of volatile, semivolatile, cyanide, selected total metal, and dissolved metal compounds. ICF KE staff observed that leaking water from the fire line had not yet been repaired.

- On July , ICF KE also collected composite samples from the drums of soil cuttings and purge water (including decontamination water) generated during this RI/FS. The samples were submitted to Wadsworth Laboratory and to Clean Harbors of Baltimore for the purposes of evaluating disposal options. The results of Wadsworth's analyses are presented in Attachment 1, along the analyses from a 1,000-gallon tank also used to store purge water. Review of the data reveals that the analytes of concern were not detected in any of the samples (tank water, composite water, or composite soil). Clean Harbors also reported the absence of any contaminants of concern in the water sample they analyzed. Therefore, it should be possible to give consideration to alternatives other than a hazardous waste facility for the disposal of this material.

- Richard B. Allison Jr. and Associates conducted a survey of the elevation and location of the ground-water monitoring wells and one surface water station. The data from this survey and water level measurements collected by ICF KE will be used to develop a potentiometric map to determine direction of ground-water flow across the site.

- Additional data packages were received from Versar Laboratory during the month of July, and ICF KE organized and validated the data. At this time, only a few data packages which were just received have not been validated. Summary tables of the validated data were developed to present the results for each matrix and each type of analysis. These tables are provided in Attachment 2 along with the Form I sheets for miscellaneous data that are not included on the table (i.e.,

AR300909

because the data were either just received or are general parameters such as geotechnical tests).

Projected Tasks to Be Completed in Upcoming Month:

- The following tasks are scheduled for August: intiation of the risk assessment and ecological assessment; possibly resampling of two or more wells to confirm intial data; preparation of the potentiometric map; determination of the need for and location of slug testing.

- A tentative schedule for the confirmatory surface soil sampling in the former pond area should be determined based on the status of the erosion control plan.

- Data validation and organization will be completed.

Problems Encountered and Solutions:

- The EPA reiterated concern about data availability. As promised in our June monthly report and in a June 26 conversation with Kim Hummel of EPA, summary data tables are provided as an attachment to this monthly report.

- The VADWM expressed concern that insufficient notice was provided to them prior to the field activities conducted the week of July 9. This incident has never occurred previously during this RI/FS and should not be repeated.

AR300910

ATTACHMENT 1

SOIL CUTTING AND PURGE WATER DATA

AR300911

Since 1938
WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Dr. N.W.
North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. 30119-00000

ARROWHEAD PLATING MONTROSS, VA.

Presented to :

ICF KAISER ENGINEERS

WADSWORTH/ALERT LABORATORIES, INC.

Jeff Smith
Jeff Smith
Project Manager

Marvin W Stephens
Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

July 30, 1990

AR300912

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Pittsburgh, Pennsylvania (412) 826-5477
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE (216) 497-9338

WADSWORTH/ALERT
LABORATORIES, INC.

NARRATIVE

The following report contains the analytical results for one water sample submitted to Wadsworth/ALERT Laboratories, Inc. by ICF Kaiser Engineers from the Arrowhead Plating Montross, Virginia Site, project number 30119-00000. The sample was received on July 13, 1990, according to documented sample acceptance procedures. One additional sample was placed in archive as requested on the chain-of-custody.

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this study was analyzed for the parameters listed in the following table in accordance with the methods indicated. A summary of QC data for these analyses is included at the rear of the report.

ANALYTICAL METHODS

Parameters	Methods
Volatile Organic Compounds	SW846 8240
Base/Neutral/Acid Compounds	SW846 8270
Extraction Procedure (TCLP)	SW846 1311
Methanol	SW846 8015 (modified)

Reference:

SW846. "Test methods for Evaluating Solid Waste Physical/Chemical Methods," Third Edition, September, 1986.

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/18/90
DATE ANALYZED: 7/19/90
DATE ANALYZED*: 7/18/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

VOLATILE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

Acetone	ND*	2-Butanone (MEK)	ND*
n-Butyl alcohol	ND***	4-Methyl-2-pentanone (MIBK)	ND*
Carbon disulfide	ND	1,2-Dichlorobenzene	ND
Carbon tetrachloride	ND	Tetrachloroethylene	ND
Chlorobenzene	ND	Toluene	ND
Cyclohexanone	ND**	1,1,1-Trichloroethane	ND
Ethyl acetate	ND*	Trichlorotrifluoroethane	ND
Ethyl benzene	ND	Trichloroethylene	ND
Ethyl ether	ND	Trichlorofluoromethane	ND
Isobutanol	ND***	Xylene	ND
Methanol *	ND****		
Methylene chloride	ND		

NOTE:
ND (None Detected, lower detectable limit = 0.025 mg/l)
ND* (None Detected, lower detectable limit = 0.05 mg/l)
ND** (None Detected, lower detectable limit = 0.12 mg/l)
ND*** (None Detected, lower detectable limit = 1 mg/l)
ND**** (None Detected, lower detectable limit = 0.37 mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	88	(76-114)	(70-121)
Toluene-d8	100	(88-110)	(81-117)
Bromofluorobenzene	96	(86-115)	(74-121)

AR300914

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/19/90
DATE ANALYZED: 7/20/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

BASE/NEUTRAL EXTRACTABLE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

Nitrobenzene	ND
Pyridine	ND

NOTE:
- ND (None Detected, lower detectable limit = 0.01 mg/l)
- ND* (None Detected, lower detectable limit = 0.05 mg/l)
- ND** (None Detected, lower detectable limit = mg/l)
- J (Detected, but below quantitation limit; estimated value)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

AR300915

SURROGATE RECOVERY:	%	**ACCEPTABLE LIMITS** WATER
Nitrobenzene-d5	63	(35-114)
2-Fluorobiphenyl	61	(43-116)
Terphenyl-d14	54	(33-141)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/19/90
DATE ANALYZED: 7/20/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

ACID EXTRACTABLE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

o-Cresol	ND
m-Cresol	ND
p-Cresol	ND
Cresylic acids	ND*
Pentachlorophenol	ND*
2,3,4,6-Tetrachlorophenol	ND*
2,4,5-Trichlorophenol	ND
2,4,6-Trichlorophenol	ND

NOTE:
ND (None Detected, lower detectable limit = 0.01 mg/l)
ND* (None Detected, lower detectable limit = 0.05 mg/l)
ND** (None Detected, lower detectable limit = mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER
2-Fluorophenol	48	(21-100)
Phenol-d5	31	(10-94)
2,4,6-Tribromophenol	47	(10-123)

AR300916

WADSWORTH/ALERT
LABORATORIES, INC.

July 27, 1990

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The volatile compound matrix spike (MS) analyzed by GC/MS shows one compound to be out of control. Since the check sample associated with the MS is in control, the method is in control.

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
	GC/MS VOLATILE COMPOUNDS				
900718	1,1-Dichloroethene	83	80	WATER	(59-118)
	Trichloroethene	103	90		(75-120)
	Chlorobenzene	109	100		(86-115)
	Toluene	113	101		(77-119)
	Benzene	114	101		(77-112)

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/ALERT Laboratories
LAB #: 8490-84718
MATRIX: WATER

DATE RECEIVED: 7/18/90
DATE EXTRACTED: 7/18/90
DATE ANALYZED: 7/26/90
DATE ANALYZED*: 7/18/90

SAMPLE ID: ZERO HEAD SPACE EXTRACTION BLANK , 7 /18/90

VOLATILE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

Acetone	ND*	2-Butanone (MEK)	ND*
n-Butyl alcohol	ND***	4-Methyl-2-pentanone (MIBK)	ND*
Carbon disulfide	ND	1,2-Dichlorobenzene	ND
Carbon tetrachloride	ND	Tetrachloroethylene	ND
Chlorobenzene	ND	Toluene	ND
Cyclohexanone	ND**	1,1,1-Trichloroethane	ND
Ethyl acetate	ND*	Trichlorotrifluoroethane	ND
Ethyl benzene	ND	Trichloroethylene	ND
Ethyl ether	ND	Trichlorofluoromethane	ND
Isobutanol	ND***	Xylene	ND
Methanol *	ND****		
Methylene chloride	ND		

NOTE:
ND (None Detected, lower detectable limit = 0.005 mg/l)
ND* (None Detected, lower detectable limit = 0.05 mg/l)
ND** (None Detected, lower detectable limit = 0.12 mg/l)
ND*** (None Detected, lower detectable limit = 1 mg/l)
ND**** (None Detected, lower detectable limit = 0.37 mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	110	(76-114)	(70-121)
Toluene-d8	109	(88-110)	(81-117)
Bromofluorobenzene	108	(86-115)	(74-121)

AR300919

WADSWORTH/ALERT LABORATORIES

4101 SHUFFEL DRIVE N.W./NORTH CANTON, OHIO 44720
(216) 497-9396

Chain-of Custody Record

№ 13231

PROJ. NO. 3011900000

PROJECT NAME/LOCATION ARROWHEAD PLATING MONTROSS, VA

SAMPLERS: (Signature) Geoffrey J. Back

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	BNA	VOA					REMARKS
—	7/12/90	2:00		X	Water Composite #1	2	✓		✓				for TCLP extraction
—	7/12/90	2:01		X	Water Composite #1	2		✓					for TCLP extraction
—	7/12/90	2:07		X	Water Composite #3	2	✓		✓				—HOLD—
—	7/12/90	2:08		X	Water Composite #3	2		✓					—HOLD—

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Geoffrey J. Back	7/12/90 3:00				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		James M. Adams	7-13-90 10:00	Analyze / set to provide TCLP data to Laidlaw-Pinewood-Hold other set until notified

Distribution Original Accompanies Shipment. Copy returned with Report.

AR300920

Since 1938
WADSWORTH/ALERT
LABORATORIES, INC.
Sampling, testing, mobile labs
4101 Shuffel Dr. N.W.
North Canton, Ohio 44720

ANALYTICAL REPORT

PROJECT NO. 30119-00000

ARROWHEAD PLATING MONTROSS, VA.

Presented to :

ICF KAISER ENGINEERS

WADSWORTH/ALERT LABORATORIES, INC.

Jeff Smith
Project Manager

Marvin W Stephens

Marvin W. Stephens, Ph.D.
Vice President & Corporate Technical Director

July 30, 1990

AR300921

CORPORATE AND LABORATORY: North Canton, Ohio (216) 497-9396
LABORATORY: Cleveland, Ohio (216) 642-9151
LABORATORY: Pittsburgh, Pennsylvania (412) 826-5477
LABORATORY: Bartow, Florida (813) 533-2150
SOUTHEAST REGIONAL OFFICE: Lexington, South Carolina (803) 957-6590
24-HOUR ALERT LINE (216) 497-9338

WADSWORTH/ALERT
LABORATORIES, INC.

NARRATIVE

The following report contains the analytical results for one water sample submitted to Wadsworth/ALERT Laboratories, Inc. by ICF Kaiser Engineers from the Arrowhead Plating Montross, Virginia Site, project number 30119-00000. The sample was received on July 13, 1990, according to documented sample acceptance procedures. One additional sample was placed in archive as requested on the chain-of-custody.

Wadsworth/ALERT Laboratories, Inc. utilizes only USEPA approved methods and instrumentation in all analytical work. The sample presented in this study was analyzed for the parameters listed in the following table in accordance with the methods indicated. A summary of QC data for these analyses is included at the rear of the report.

ANALYTICAL METHODS

Parameters	Methods
Volatile Organic Compounds	SW846 8240
Base/Neutral/Acid Compounds	SW846 8270
Extraction Procedure (TCLP)	SW846 1311
Methanol	SW846 8015 (modified)

Reference:

SW846. "Test methods for Evaluating Solid Waste Physical/Chemical Methods," Third Edition, September, 1986.

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/18/90
DATE ANALYZED: 7/19/90
DATE ANALYZED*: 7/18/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

VOLATILE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

Acetone	ND*	2-Butanone (MEK)	ND*
n-Butyl alcohol	ND***	4-Methyl-2-pentanone (MIBK)	ND*
Carbon disulfide	ND	1,2-Dichlorobenzene	ND
Carbon tetrachloride	ND	Tetrachloroethylene	ND
Chlorobenzene	ND	Toluene	ND
Cyclohexanone	ND**	1,1,1-Trichloroethane	ND
Ethyl acetate	ND*	Trichlorotrifluoroethane	ND
Ethyl benzene	ND	Trichloroethylene	ND
Ethyl ether	ND	Trichlorofluoromethane	ND
Isobutanol	ND***	Xylene	ND
Methanol *	ND****		
Methylene chloride	ND		

NOTE:
ND (None Detected, lower detectable limit = 0.025 mg/l)
ND* (None Detected, lower detectable limit = 0.05 mg/l)
ND** (None Detected, lower detectable limit = 0.12 mg/l)
ND*** (None Detected, lower detectable limit = 1 mg/l)
ND**** (None Detected, lower detectable limit = 0.37 mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	**ACCEPTABLE LIMITS** WATER	SOLID
1,2-Dichloroethane-d4	88	(76-114)	(70-121)
Toluene-d8	100	(88-110)	(81-117)
Bromofluorobenzene	96	(86-115)	(74-121)

AR300923

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/19/90
DATE ANALYZED: 7/20/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

BASE/NEUTRAL EXTRACTABLE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

Nitrobenzene	ND
Pyridine	ND

NOTE:
- ND (None Detected, lower detectable limit = 0.01 mg/l)
- ND* (None Detected, lower detectable limit = 0.05 mg/l)
- ND** (None Detected, lower detectable limit = mg/l)
- J (Detected, but below quantitation limit; estimated value)
- B (Compound detected in method blank associated with this sample)
- -- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS WATER
Nitrobenzene-d5	63	(35-114)
2-Fluorobiphenyl	61	(43-116)
Terphenyl-d14	54	(33-141)

AR300924

WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY: ICF KAISER ENGINEERS
LAB #: 2747-71685
MATRIX: WATER

DATE RECEIVED: 7/13/90
DATE EXTRACTED: 7/19/90
DATE ANALYZED: 7/20/90

SAMPLE ID: WATER COMPOSITE #1 7-12-90 2:00

ACID EXTRACTABLE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

Analysis performed in accordance with USEPA Toxicity Characteristic Leachate Procedure.

TCLP EXTRACTION DATE: 7/18/90

o-Cresol	ND
m-Cresol	ND
p-Cresol	ND
Cresylic acids	ND*
Pentachlorophenol	ND*
2,3,4,6-Tetrachlorophenol	ND*
2,4,5-Trichlorophenol	ND
2,4,6-Trichlorophenol	ND

NOTE:
ND (None Detected, lower detectable limit = 0.01 mg/l)
ND* (None Detected, lower detectable limit = 0.05 mg/l)
ND** (None Detected, lower detectable limit = mg/l)
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	**%**	**ACCEPTABLE LIMITS** WATER
2-Fluorophenol	48	(21-100)
Phenol-d5	31	(10-94)
2,4,6-Tribromophenol	47	(10-123)

AR300925

WADSWORTH/ALERT
LABORATORIES, INC.

July 27, 1990

QUALITY CONTROL NARRATIVE

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with the exception of those items noted.

The volatile compound matrix spike (MS) analyzed by GC/MS shows one compound to be out of control. Since the check sample associated with the MS is in control, the method is in control.

WADSWORTH/ALERT
LABORATORIES, INC.

MATRIX SPIKE DATA

LAB ID	PARAMETER	SPIKE PERCENT RECOVERY	SPK/DUP PERCENT RECOVERY	SPIKE MATRIX	QC CONTROL LIMITS
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WADSWORTH/ALERT
LABORATORIES, INC.

COMPANY : Wadsworth/ALERT Laboratories
LAB #: 8490-84718
MATRIX: WATER

DATE RECEIVED: 7/18/90
DATE EXTRACTED: 7/18/90
DATE ANALYZED: 7/26/90
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SAMPLE ID: ZERO HEAD SPACE EXTRACTION BLANK , 7 /18/90

VOLATILE ORGANICS
TCLP LAND DISPOSAL CHARACTERISTIC LIST

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Chlorobenzene	ND	Toluene	ND
Cyclohexanone	ND**	1,1,1-Trichloroethane	ND
Ethyl acetate	ND*	Trichlorotrifluoroethane	ND
Ethyl benzene	ND	Trichloroethylene	ND
Ethyl ether	ND	Trichlorofluoromethane	ND
Isobutanol	ND***	Xylene	ND
Methanol *	ND****		
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Bromofluorobenzene	108	(86-115)	(74-121)

AR300928

WADSWORTH/ALERT LABORATORIES

4101 SHUFFEL DRIVE N.W./NORTH CANTON, OHIO 44720
(216) 497-9396

Chain-of Custody Record

№ 13231

PROJ. NO.: 3011900000

PROJECT NAME/LOCATION: ARROWHEAD PLATING MONTROSS, VA

SAMPLERS: (Signature) Geoffrey Y. Back

STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION	NO. OF CONTAINERS	BNA	VOA					REMARKS
—	7/12/90	2:00		X	Water Composite #1	2	✓		✓				for TCLP extraction
—	7/12/90	2:01		X	Water Composite #1	2		✓					for TCLP extraction
—	7/12/90	2:07		X	Water Composite #3	2	✓		✓				—HOLD—
—	7/12/90	2:08		X	Water Composite #3	2		✓					—HOLD—

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Geoffrey Y. Back	7/12/90 3:00				

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
		James M. Adams	7-13-90 10:00	Analyze 1 set to provide TCLP data to Laidlaw-Pinewood-Hold other set until notified

Distribution Original Accompanies Shipment. Copy returned with Report.

AR300929

WADSWORTH/ALERT LABORATORIES, INC.

DATA SUMMARY

CLIENT: ICF/Kaiser

PROJECT: Arrowhead Plating

PARAMETER: TCLP metals

SAMPLE ID	RESULTS	
Water Composite #1	Arsenic	<.005 mg/L
	Barium	.28
	Cadmium	.08
	Chromium	<.02
	Lead	<.05
	Mercury	<.005
	Selenium	<.005
	Silver	<.01
Soil Composite #1	Arsenic	<.005 mg/L
	Barium	.57
	Cadmium	.10
	Chromium	.02
	Lead	.10
	Mercury	<.005
	Selenium	<.005
	Silver	<.01

TANK SAMPLE
PURGE + DECON WATER

Versar INC.

ANALYTICAL DATA PACKAGE
General Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2452
CLIENT: ICF, Fairfax
SITE: Arrowhead Plating
PROJECT / BATCH: 420.58 / 7

AR300931

Versar INC.

ANALYTICAL NARRATIVE
General Inorganic Chemistry Section

DATE : 11-May-90
CODE / CONTROL # : ICFARROW / 2452
CLIENT / SITE : ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH : 420.58 / 7

This task consisted of one water sample which was analyzed for TSS, alkalinity, and hardness according to methods #160.2, 310.1, and 130.2, respectively, from Methods for the Chemical Analysis of Water and Wastes, 1983 (MCAWW).

Samples were received April 11, and were analyzed from April 13 through 21. No quality assurance problems were encountered, and holding times were met. All blank results were below method detection limits, and check standard recoveries, duplicate precision results, and hardness spike recovery were within acceptable limits.

Release of this data has been authorized by laboratory management.

Sincerely,

Melanie J. Dillman

Melanie J. Dillman
General Chemistry
Laboratory Operations

C. Thompson

Approved for Release
Chris Thompson, Section Chief

AR300932

Versar INC.

ANALYSIS REPORT
General Inorganic Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2452
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 7

LAB #	FIELD #	TSS (mg/L)	Alkalinity as CaCO3 (mg/L)	Hardness as CaCO3 (mg/L)			
14534	TANK 1	293.	349.				
14535	TANK 1			85.0			

C. Thompson
LABORATORY MANAGER

AR300933

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 11-May-90 PAGE: 1
CODE / CONTROL #: ICFARROW / 2452
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 7

	TSS	Alkalinity as CaCO3	Hardness as CaCO3		
INITIAL CALIBRATION VERIFICATION					
Source	class s weight	EPA WP 987	EPA WP 987		
Units	g	mg/L	mg/L		
True Value	1.0000	27.3	72.2		
Found	1.0000	26.1	76.0		
Recovery	100%	96%	105%		
METHOD DETECTION					
Limit (mg/L)	4.	5.0	5.0		
Limit (mg/kg)					
1. Calib. Blank					
2. Calib. Blank					
1. Reagent Blank	<4.	2.1	<5.0		
2. Reagent Blank					
3. Reagent Blank					
CONTINUING CALIBRATION VERIFICATION					
Source	ERA Hardness Std.	EPA WP 987	EPA WP 987		
Units	mg/L	mg/L	mg/L		
True Value	29	27.3	72.2		
1. Found	28	27.1	72.0		
Recovery	97%	99%	100%		
2. Found					
Recovery					
3. Found					
Recovery					
LABORATORY CONTROL STANDARD					
Source					
Units					
1. True Value					
Found					
Recovery					
2. Found					
Recovery					

AR300934

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2452
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 7

	TSS (mg/L)	Alkalinity as CaCO3 (mg/L)	Hardness as CaCO3 (mg/L)		
DUPLICATE PRECISION SAMPLE RESULTS					
Duplicate 1 :					
Sample ID	TANK 1	TANK 1	TANK 1		
Lab #	14534	14534	14535		
Sample Result	295	346	80.0		
Duplicate Result	291	352	90.0		
RPD	1.4%	1.7%	11.8%		
Duplicate 2 :					
Sample ID					
Lab #					
Sample Result					
Duplicate Result					
RPD					
SPIKED SAMPLE RESULTS					
Spike 1:					
Sample ID	NA	NA	TANK 1		
Lab #			14535		
$\bar{X}$ Sample Result			85.0		
Spike Result			180		
Spike Added			90.0		
Recovery			106%		
Spike 2:					
Sample ID					
Lab #					
$\bar{X}$ Sample Result					
Spike Result					
Spike Added					
Recovery					

AR000935

ATTACHMENT 2

SUMMARY DATA TABLES AND MISCELLANEOUS FORM I REPORTS

AR300936

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	1,2-Dichloroethene	Methylene Chloride	1,1,1-Trichloroethane	Carbon Tetrachloride	Trichloroethene	Tentatively Identified Compounds	Comments
SS21	0-6		11								
SS22	0-6										
SS23	0-6		13								
SS24	0-6	97	50	21		4(c)	32	6	29		
SS25	0-6										
SS26	0-6										
SS27	0-6										
SS28	0-6									Beta-Pinene	
SS29	0-6										
SS30	0-6									3-Carene	
SS31	0-6									3-Carene	
SS32	0-6										
SS33	0-6										
SS34	0-6		(8)			(5)					
SS35	0-6		98	16(e)		(12)				Ethanol	
SS36	0-6	3300	3200	(1600)							Note A
SS37	0-6	600					20(d)				Note B
SS38	0-6	27									
SS39	0-6	19									
SP1	0-6	150(h)			580(h)						

Blank space indicates the compound was not detected.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Sample analyzed using medium level protocol which results in higher method detection limits.
Note B: Dilution of the sample in order to quantitate target compounds results in a increase in the method detection limit by a factor of five.

300937

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Di-n-butylphthalate	Bis(2-ethylhexyl)phthalate	Phenanthrene	Number of Tentatively Identified Compounds	Tentative Identification	Comments
SS21	0-6				12	Unknown Hydrocarbons; Unknowns	
SS22	0-6				12	Unknown Hydrocarbons; Unknowns	
SS23	0-6	490			14	Unknown Hydrocarbons; Unknowns	Note B
SS24	0-6				20	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
SS25	0-6				10	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
SS26	0-6		310 (c)		18	Molecular Sulfur; Unknown Hydrocarbons	Note C
SS27	0-6				7	2,4-Dimethyl-3-heptanone; Unknowns	Note C
SS28	0-6				9	Unknown Hydrocarbons; Unknowns; Unknown Ketone	Note C
SS29	0-6				3	Unknown Ketone; Unknowns	Note E
SS30	0-6				5	Substituted Benzene; Unknowns; Unknown Ketone	Note E
SS31	0-6				5	Caryophyllene; Substituted Benzene; Unknowns	Note E
SS32	0-6		200 (c)		13	Unknowns	Note B
SS33	0-6		190 (c)		4	Unknown Hydrocarbons; Unknowns	Note A,B
SS34	0-6				19	Unknown Hydrocarbons; Unknowns; Aldehydes	Note B
SS35	0-6				5	Unknown Hydrocarbons; Unknowns	Note C
SS36	0-6			140 (c)	15	Hexadecanoic Acid; Organic Acids; Unknowns	Note B
SS37	0-6				10	Unknown Hydrocarbons; Unknowns	Note C
SS38	0-6				1	Unknown Ketone	Note C
SS39	0-6				7	Unknown Hydrocarbons; Unknowns	Note C
SP1	0-6		1200		15	Benzenesulfonamide; Substituted Phenols; Unknowns	Note D

Blank space indicates the compound was not detected.
(c) The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: Non-detect data for Di-n-octylphthalate, Benzo(b)flouranthene, Benzo(k)flouranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene,and Benzo(g,h,i)perylene should be rejected.
Note B: Non-detect data for 3,3'-Dichlorobenzidene should be rejected.
Note C: Non-detect data for Benzyl Alcohol and 4-Chloroaniline should be rejected.
Note D: Due to a substantial deviation of the first internal standard area, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropyl)ether, 2-Methylphenol, Hexachloroethane, 4-Methylphenol, and n-Nitroso-di-n-propylamine.
Note E: Sample extract was incorrectly diluted prior to analysis. This results in the method detection limit being increased by a factor of 1.1.

300938

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	Aniline	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentative Identification	Comments
SB1-S4	15-17					
SB2-S7	12-14					
SB3-S4	15-17					
SB4-SS3	10-12			4	Unknowns	
SB4-SS3A	10-12			5	Unknowns	
SB5-S1	0-2			3	Unknowns	
SB5-S4	15-17					
SB6-S1	0-2			3	2,4-Dimethyl-3-heptanone, Unknown Alcohol, and Unknown	
SB6-S2	5-7					
SB6-S4 RE	15-17					See Note A,B
SB7-S3	10-12					
SB7-S4	15-17					
SB8-S2	6-7			1	Unknown	
SB8-S3	10-12			5	Ketones and Unknowns	
SB8-S3A (Dup)	10-12	290(c)		2	Unknowns	
SB9-S1	0-2			4	2,4-Dimethyl-3-Heptanone and Unknowns	
SB10-S3	10-12					
SB11-S2	5-7		210(c)			
SB12-S2	5-7			8	Unknowns	
SB12-S2A (Dup)	5-7			9	Unknowns	
SB13-S1	0-2			10	Unknowns, Unknown Hydrocarbon, and Molecular Sulfur	

Blank space indicates compound was not detected.
RE=Reextraction
(c)=The compound is tentatively identified, and quantitated at less than the method detection limit.
Note A: Due to a recovery of an acid surrogate at less than 10% for this sample, method detection limits for acid compounds should be rejected.
Note B: Due to the low response of 3,3-Dichlorobenzidene the method detection limit should be rejected.

00939

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	Toluene	1,2-Dichloroethene (total)	Total Xylenes	Methylene Chloride
SB1-S4	15-17							
SB2-S7	12-14							
SB3-S4	15-17							
SB4-SS3	10-12							12
SB4-SS3A	10-12							9
SB5-S1	0-2							
SB5-S4	15-17		17 (e)					
SB6-S1	0-2	22	120 (e)					
SB6-S2	5-7							
SB6-S4	15-17							
SB7-S3	10-12							
SB7-S4	15-17							
SB8-S2	6-7	140000	11000 (d)					
SB8-S3 RE	10-12	7	200	17	4 (c)			[5] (c)
SB8-S3A (Dup) RE	15-17	26	100	9 (c)	2 (c)	1 (c)		
SB9-S1 RE	0-2							
SB9-S3	10-12							
SB9-S3A (Dup) RE	10-12							
SB9-S4	15-17							
SB10-S3	10-12							(5)
SB11-S2	5-7							
SB12-S2	5-7	7 (c)						
SB12-S2A (Dup)	5-7	9						
SB13-S1	0-2							
SB20-SS7	12-14		[16] (e)				4 (c)	

ank space indicates compound was not detected.
)=The compound is tentatively identified, and quantitated at less than the method detection limit.
)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.

AR300940

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR GROUNDWATER (Round 2)
in units of ug/L

Sample ID	1,1-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Carbon Disulfide	Methylene Chloride	Chloroform
Federal Standards	NA	200	5 (f)	5 (g)	NA	NA	
MW1-GW2							
MW2-GW2			94		39		
MW3-GW2						5	
MW4-GW2	Data has not been delievered by the laboratory						
MW5-GW2							
MW6-GW2				22			
MW7-GW2			6 (c)	110			17
MW8-GW2	510	530	800	5,400			
MW9-GW2	2,600	36,000		6,800			
MW10-GW2	1,900 (d)	5,200	4,700	14,000			
MW11-GW2	Data has not been delievered by the laboratory						
MW12-GW2		600 (d)	700 (d)	7,700			
MW13-GW2			670 (d)	5,800			

Blank space indicates that compound was not detected.

NA = Not Available
DL = Dilution
RE = Reextraction
(c)=The compound is tentaively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed

AR300941

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUNDWATER (Round 2)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW2	ND			
MW2-GW2	ND			
MW3-GW2	ND	2	Dodecanamide and Unknown	
MW4-GW2	Data has not been delievered by the laboratory			
MW5-GW2	ND			
MW6-GW2	ND			
MW7-GW2	ND	2	Phosphoric Acid Ester and Unknown Substituted Benzene	
MW8-GW2	ND	2	Substituted 2-Propanols and Unknowns	Note A
MW9-GW2	ND	2	Unknowns	
MW10-GW2	ND	5	Substituted 2-Propanols and Unknowns	
MW11-GW2	Data has not been delievered by the laboratory			
MW12-GW2	ND	4	Substituted 2-Propanols, Unknown, and Unknown Substituted Benzene	
MW13-GW2	ND	7	Unknown and Unknown Substituted Benzene	

ND=No target compounds detected
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.

AR300942

TABLE
BLANK SUMMARY FOR VOLATILE ORGANIC ANALYSIS OF GROUNDWATER (Round 1, 4/17/90)
UG/KG

					MW2-GW1RE	MW2-GW1RE	
					MW3-GW1RE	MW3-GW1RE	MW2-GW1RE
					MW5-GW1RE	MW5-GW1RE	MW3-GW1RE
					MW6-GW1RE	MW6-GW1RE	MW5-GW1RE
				Epuipment Blank 2RE	MW7-GW1	MW7-GW1	MW6-GW1RE
				MW10-GW1RE	MW8-GW1	MW8-GW1	MW7-GW1
			MW2-GW1RE	MW12-GW1RE	MW9-GW1DL	MW9-GW1DL	MW8-GW1
			MW3-GW1RE	MW13-GW1RE	MW9-GW1ADL	MW9-GW1ADL	MW9-GW1DL
	MW7-GW1		MW5-GW1RE	MW9-GW1ADL	MW10-GW1RE	MW10-GW1RE	MW9-GW1ADL
	MW8-GW1		MW6-GW1RE	MW9-GW1DL	MW12-GW1RE	MW12-GW1RE	MW10-GW1RE
	Trip Blank 10		MW6-GW1MS	Trip Blank 11RE	MW13-GW1RE	MW13-GW1RE	MW12-GW1RE
Associated Samples	MW1-GW1	MW1-GW1	MW6-GW1MSD	Trip Blank 12RE	Equipment Blank 2RE	Equipment Blank 2RE	MW13-GW1RE
Blank Indenification	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equipment Blank 2RE

Compounds Detected (ug/L)	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equip Blank 2RE
Methylene Chloride	1			5	5	6	4
Acetone		15			9	10	10

AR300943

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR GROUNDWATER (Round 1)
in units of ug/L

Sample ID	Acetone	2-Butanone	1,1-Dichloroethene	1,2-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Methylene Chloride	1,1-Dichloroethane	Comment
Federal Standards ug/L	NA	NA	NA	NA	200	5(f)	5(g)			
MW1-GW1	190(e)	100(b)								Note A
MW2-GW1RE						120(a)				Note B
MW3-GW1RE										Note B
MW4-GW1								(5)		
MW5-GW1RE										Note B
MW6-GW1RE							17(a)			Note B
MW7-GW1			4(c)		4(c)	9	48			Note C
MW8-GW1	1,300(e)		710		620	1,100	8,200			Note A
MW9-GW1DL			9,900(d,a)		150,000(a)		26,000(a)	(14,000)		Note B
MW9-GW1ADL(Dup)			9,800(d,a)		140,000(a)		26,000(a)	(15,000)		Note B
MW10-GW1RE			1,300(a)		1,900(a)	4,200(a)	12,000(a)	(700)		Note B
MW11-GW1			280	33	320	480	8,000	(30)	42	Note D
MW12-GW1RE			390(d)		520(a)	980(a)	16,000(a)	(470)		Note B
MW13-GW1RE				560(a)	320(a,d)	1,300(a)	12,000(a)	(430)		Note B

NA=Not Available
DL=Dilution
RE=Reextraction
Blank space indicates compound was not detected
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(a)=Due to laboratory data recording problems the original analysis is not usable.
The reanalysis exceeded the holding time; therefore, the value is considered estimated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
Note A: Non-detected data for Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
Note B: As a result of not meeting holding time, the method quantitation limits are considered estimated for all target compounds.
Note C: Non-detect data for Acetone, Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
Note D: The value for Tetrachloroethene was determined from a dilution.

AR300944

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUNDWATER (Round 1)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW1	ND			
MW2-GW1	ND			
MW3-GW1	ND	1	2-Cyclohexen-1-one	
MW4-GW1	ND			
MW5-GW1	ND	1	2-Cyclohexen-1-one	
MW6-GW1	ND			
MW7-GW1	ND	6	Tetrachloroethene, Cyclic Compounds, Phosphoric Acid Ester, and Unknowns	
MW8-GW1	ND	12	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	
MW9-GW1	ND	15	Tetrachloroethene, Sub. 2-Propanol, Unknown Hydrocarbons, and Unknowns	
MW9-GW1A	ND	14	Tetrachloroethene, Unknown Hydrocarbons, and Unknowns	
MW10-GW1	ND	10	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	Note A
MW11-GW1	ND	6	Substituted 2-Propanol, 1H-Benzotriazole, and Unknowns	Note B
MW12-GW1	ND	6	Tetrachloroethene, Substituted 2-Propanol, and Unknowns	
MW13-GW1	ND	10	Tetrachloroethene and Unknowns	

Blank space indicates compound was not detected
ND=No target compounds detected
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.
Note B: No surrogate compounds detected; all non-detect data should be rejected.

AR300945

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene
Background Federal ug/L	ND		2.8	ND	0.88
ST1-SW1		23	34		39
ST2-SW1	(7)(c)	5	6	[5]	7
ST2-SW1A	(8)(c,e)	6	8	[5]	9
ST3-SW1				[5]	
ST4-SW1					
ST5-SW1	[7](c)			[4](c)	
ST6-SW1	[7](c)				
ST7-SW1	[9](c)				

Blank space indicates the compound was not detected.
ND=Not Developed
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to substantial deviation in the response for the daily calibration, this value is considered estimated.

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L				Note A
ST1-SW1	18	1	1H-Benzotriazole	
ST2-SW1				
ST2-SW1A				
ST3-SW1				
ST4-SW1				
ST5-SW1				
ST6-SW1				
ST7-SW1				

Blank space indicates the compound was not detected.
Note A: No Federal Background Criteria Developed

AR300947

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene	Tentatively Identified Compounds
Background Federal ug/L	ND		2.8	ND	0.88	
ST1-SW2	[8](c)	30	38		41	Unknown Hydrocarbon
ST1-SW2A	[10]	24	30		32(f)	
ST2-SW2	[8](c)	5	6		7(f)	
ST3-SW2				[2]		
ST4-SW2				[3]		
ST5-SW2				[2]		
ST6-SW2				[3]		
ST7-SW2				[2]		

Blank space indicates the compound was not detected.
ND=Not Developed
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=Mass spectral criteria was not met for the identification of this compound; therefore, the compound is tentatively identified.

AR300948

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L				Note A
ST1-SW2		4	Substituted Propanol; Substituted Benzene; Unknown	
ST1-SW2A		2	Substituted Propanol; Unknown	
ST2-SW2		4	Substituted Propanol; Unknown	
ST3-SW2				
ST4-SW2	(9)(c)			
ST5-SW2	(18)			
ST6-SW2	(18)			
ST7-SW2	(15)			

Blank space indicates the compound was not detected.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: No Federal Background Criteria Developed

AR300949

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	1,2-Dichloroethene ug/kg	Trichloroethene ug/kg	Tetrachloroethene ug/kg	Acetone ug/kg	2-Butanone ug/kg	Tentatively Identified Compounds	Comments
ST1-SD1	6 (c)	7 (b)	18				
ST2-SD1				9 (c,e)			
ST2-SD1A							
ST3-SD1							
ST4-SD1				20 (e)			
ST5-SD1				56 (e,h)			Note A
ST6-SD1				120 (e)	21		
ST7-SD1							

Blank space indicates the compound was not detected.

(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to the substantial deviation in the response for the daily calibration, this value is considered estimated.
(h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Due to a substantial deviation for all internal standard areas, the method detection limit is considered estimated for all target compounds.

AR300950

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Number of Tentatively Idenified Compounds	Tentative Identification	Comments
ST1-SD1			6	Unknown Ketones; Unknown Organic Acid; Unknowns	
ST2-SD1			12	Unknown Ketones, Hydrocarbons, and Alcohols; Unknowns	
ST2-SD1A			8	Unknown Ketones, Hydrocarbons, and Alcohols; Hexanedioic Acid	
ST3-SD1			3	Ketones and Unknowns	
ST4-SD1			13	Ketones and Unknown Hydrocarbons	
ST5-SD1	730(c)	640	23	Ketones; Tetrahydronapththalene; Substituted Napthalenes; Unknowns	
ST6-SD1			17	Hexadecanoic Acid; Unknown Hydrocarbon; Unknowns	Note A
ST7-SD1	500(c)	190(c)	23	Ketones; Organic Acids; Hydrocarbons; Unknowns	

Blank space indicates the compound was not detected.

(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

Note A: Due to a sustantial deviation for the first and second internal standards areas, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropylether), 2-Methylphenol, Hexachloroethane, 4-Methylphenol, n-Nitroso-di-n-propylamine, Nitrobenzene, Isophorone, 2-Nitrophenol, 2,4-Dimethylphenol, Bis(2-chloroethoxy)methane, 2,4-Dichlorophenol, 1,2,4-Trichlorobenzene, Naphthalene, Benzoic Acid, 4-Chloroaniline, Hexachlorobutadiene, 4-Chloro-3-methylphenol, and 2-Methylnaphthalene

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Acetone	Tentatively Identified Compounds	Comments
ST1-SD2			
ST1-SD2A			
ST2-SD2			
ST3-SD2			
ST4-SD2	[18]		
ST5-SD2	[7](c)		
ST6-SD2	[32]		
ST7-SD2	[13]		

Blank space indicates the compound was not detected.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

AR300952

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Target Compound List Detected	Number of Tentatively Idenified Compounds	Tentative Identification
ST1-SD2	ND	8	Unknown Ketones; Unknown Hydrocarbons
ST1-SD2A	ND	7	Unknown Ketones; Unknown Hydrocarbons
ST2-SD2	ND	4	Unknown Ketones; Unknowns
ST3-SD2	ND	6	Molecular Sulfur; Unknown Ketones; Unknowns
ST4-SD2	ND	3	Molecular Sulfur; Unknown Ketones; Unknowns
ST5-SD2	ND	10	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST6-SD2	ND	11	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST7-SD2	ND	9	Molecular Sulfur; Tetrahydronaphthalene; Unknown Hydrocarbons; Unknowns

ND=No target compounds were detected.

SOIL BORING

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBERS 2289,2309

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SB1-S4	0.23(a)	8.4(b)	ND	15.3(a)	3.9	3.7	20600	ND	ND	3.1	198(a)	ND	16.5(c,d)	7.2(a,c)	ND
SB2-S7	0.36(a)	12.2(b)	ND	23.5(a)	5.5	2.7	12400	ND	ND	2.3	274(a)	ND	14.8(c,d)	5.2(a,c)	ND
SB3-S4	0.45(a)	8.5(b)	ND	25.2(a)	7.0	4.5	26800	4.8	ND	3.2	ND(a)	ND	13.6(c,d)	9.7(a,c)	ND
SB5-S1	1.23(a)	51.0(b)	ND	5.86(a)	14.4	6.0	12400	9.1	ND	6.6	490(a,c)	ND	26.1(c,d)	17.1(a,c)	ND
SB5-S4	0.42(a)	14.1(b)	ND	30.7(a)	10.1	3.2	49200	ND	ND	4.3	191(a)	ND	220(c)	12.7(a,c)	ND
SB6-S1	0.74(a)	31.2(b)	ND	29600(a)	11.4	30.4	7160	13.4	ND	6.1	927(a)	ND	194(c)	24.6(a,c)	0.83
SB6-S2	1.04(a)	26.9(b)	ND	225(a)	8.7	4.0	8320	6.3	ND	3.7	317(a)	ND	45.1(c)	10.4(a,c)	ND
SB6-S4	0.36(a)	10.2(b)	ND	134(a)	4.8	1.8	14200	ND	ND	3.0	137(a)	ND	11.1(c,d)	6.0(a,c)	ND
SB7-S3	0.45(a)	11.9(b)	ND	18.4(a)	9.5	50.1	30100	ND	ND	3.0	172(a)	ND	42.8(c)	11.1(a,c)	ND
SB7-S4	0.56(a)	12.1(b)	ND	131(a)	10.5	7.3	12100	6.2	ND	3.5	990(a)	ND	952(c)	22.6(a,c)	ND
* EQUIP BLK	8.5	ND	ND	0.00	ND	ND	29.1	ND	ND	ND	ND	ND	8.00	ND	NR

* in units of ug/L

LEGEND:

ND - Not Detected
NR - Not Required
(a) - Estimate value due to low bias associated with matrix spike assessment.
(b) - Estimate value due to poor laboratory precision.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Value is less than five times the concentration in the associated blank.

AR300954

SOIL BORING + SURFACE SOILS

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBERS 2327,2338,2349

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
SB10-S3	0.40(a)	19.2(d)	ND	0.01(d)	6.5(d)	5.8(b,e)	54100(d)	ND(d)	ND	2.4	157	ND	0.05(c,d,e)	13.6	ND
SB11-S2	0.62(a)	9.5(d)	ND	0.01(d)	18.4(d)	5.9(b,e)	18100(d)	ND(d)	ND	1.4	499	ND	0.06(c,d,e)	6.2	ND
SB12-S2	0.50(a)	13.2(d)	ND	0.00(b,d)	13.8(d)	6.4(b,e)	8680(d)	6.4(d)	ND	2.1	1020	ND	0.01(c,d,e)	13.6	ND
SB12-S2A	0.72(a)	21.5(d)	ND	0.01(d)	14.4(d)	8.5(b,e)	10700(d)	13.0(d)	ND	2.6	1210	ND	0.02(c,d,e)	19.5	ND
SB13-S1	0.45(a)	18.7(d)	ND	0.04(d)	6.2(d)	3.5(b,e)	13500(d)	ND(d)	ND	2.3	156	ND	0.01(c,d,e)	7.7	ND
SB8-S2	0.83(a)	47.1(d)	ND	0.06(d)	11.5(d)	4.3(b,e)	11000(d)	6.3(b,d)	ND	3.3	191	ND	0.02(c,d,e)	9.8	ND
SB8-S3A	0.56(a)	49.7(d)	ND	0.03(d)	5.7(d)	2.5(b,e)	5420(d)	ND(d)	ND	2.3	205	ND	0.00(c,d,e)	8.9	ND
SB8-S3	0.75(a)	32.3(d)	ND	0.03(d)	9.2(d)	3.2(b,e)	11400(d)	5.1(d)	ND	3.3	236	ND	0.00(c,d,e)	9.5	ND
SB9-S1	0.73(a)	22.0(d)	ND	0.03(d)	10.0(d)	5.3(b,e)	10900(d)	5.7(b)	ND	2.1	202	ND	0.00(c,d,e)	7.7	ND
SS21	0.63(c)	50.6	ND	0.05	8.6(c)	88.0	7010(c)	6.5(b)	ND	5.2	237(c)	ND	0.03(c)	23.8	ND
SS22	0.64(c)	30.9	ND	0.94	9.4(c)	116.0	7610(c)	4.9(b)	ND	4.4	494(c)	ND	0.01(c)	31.4	0.62
SS23	0.67(c)	40.9	ND	1.93	10.6(c)	156.0	8480(c)	8.6(b)	ND	5.9	860(c)	ND	0.02(c)	48.4	4.40
SS24	0.54(c)	47.7	ND	0.05	7.2(c)	12.8(b)	6430(c)	7.2	ND	3.2	173(c)	ND	0.02(c)	19.6	2.20
SS25	0.98(c)	40.8	ND	0.77	12.3(c)	181.0	10500(c)	8.3	ND	6.3	750(c)	0.67	0.03(c)	45.6	8.70
SS26	0.85(c)	33.7	ND	1.59	10.4(c)	160.0	8670(c)	7.9	ND	3.7	456(c)	ND	0.03(c)	76.7	1.30
SS27	0.57(c)	18.5	ND	0.40	7.7(c)	31.8	4970(c)	5.2	ND	2.4	428(c)	ND	0.01(c)	17.2	1.20
SS28	0.43(c)	42.1	ND	0.10	6.8(c)	10.1(b)	6910(c)	9.0	ND	2.4	212(c)	ND	0.01(c)	14.9	0.79
SS32	1.46(c)	67.5	ND	0.07	19.0(c)	35.0	NR(c)	10.4	0.15	9.5	524(c)	ND	0.00(c)	33.0	ND
SS33	0.69(c)	17.6	ND	0.03	7.1(c)	10.9(b)	6510(c)	ND	ND	2.5	257(c)	ND	0.00(c)	51.3	ND
SS34	0.67(c)	35.2	ND	0.19	11.6(c)	36.8	15900(c)	8.6	ND	5.2	461(c)	ND	0.01(c)	20.7	0.74
SS35	0.10(c)	52.0	ND	0.01	3.0(c)	2.7(b)	564(c)	6.6	ND	ND	150(c)	ND	0.01(c)	1.9	ND
SS36	0.85(c)	137.0	1.0	0.42	13.3(c)	7800.0	12300(c)	18.6	6.4	14.6	312(c)	0.49	0.01(c)	862.0	ND
SS37	0.71(c)	56.7	ND	0.07	9.7(c)	36.4	8360(c)	9.7	ND	3.9	222(c)	ND	0.00(c)	20.4	ND
SS38	0.58(c)	48.8	ND	0.06	7.7(c)	31.4	6920(c)	10.7	ND	3.7	221(c)	ND	0.01(c)	19.2	ND
SS39	0.68(c)	36.5	ND	0.07	8.7(c)	8.3(b)	8720(c)	6.9	ND	2.5	195(c)	ND	0.01(c)	11.7	ND

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE (continued)
CONTROL NUMBERS 2327,2338,2349

ND - Not Detected
NR - Not Requested
(a) - Estimate as high biased due to precision problems associated with the matrix spike.
(b) - Sample results were less than five times the contaminant concentration found in the blanks and should be considered artifacts contributed by the blank.
(c) - Estimate due to precision problems associated with the matrix spike.
(d) - Duplicate results tended to have variances greater than 35%.
(e) - Potential chemical or physical interferences associated with ICP analysis.

SURFACE SOILS

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2549

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
SS29	0.95	34.6	ND	0.03	10.5	4.3	8350	8.2	ND	4.8	319	ND(a)	0.00	14.4(b)	ND
SS30	1.07	34.3	ND	0.02	12.5	5.1	9600	6.0	ND	4.5	400	ND(a)	0.00	14.9(b)	ND
SS31	0.87	29.7	ND	0.02	10.1	4.3	13500	6.0	ND	5.6	342	ND(a)	0.00	12.9(b)	ND
* TW1	NR	NR	ND	NR	NR	33.7	NR	2.4	ND	NR	NR	ND(a)	NR	26.8(b,c)	ND(d)

* in units of ug/L

SS - Surface Soil
ND - Not Detected
NR - Not Required

(a) - Reject data based upon high potential for false negatives.
(b) - Estimated due to potential chemical or physical interferences associated with ICP analysis.
(c) - Result may be an artifact from blank contamination and may not be real.
(d) - Reject data based upon extended holding times.

Soil Borings (Former Pond Area)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2753

Sample ID	Copper mg/kg	Zinc mg/kg	Cyanide mg/kg
SB15-SS1	3.7	3.6	ND
SB15-SS2	3.6	7.7	ND
SB15-SS3	2.3	8.2	ND
SB15-SS4	2.5	7.0	ND
SB16-SS1	6.9(b)	15.2(c)	ND
SB16-SS10	4.7(b)	13.1(c)	ND
SB16-SS2	6.5(b)	17.1(c)	ND
SB16-SS3	117(b)	45.0(c)	0.71(a)
SB16-SS4	9.9(b)	15.6(c)	ND
SB16-SS5	1.9(b)	8.1(c)	ND
SB16-SS6	4.1(b)	6.2(c)	ND
SB16-SS7	11.7(b)	14.5(c)	ND
SB16-SS8	4.5(b)	7.2(c)	ND
SB16-SS9	3.9(b)	8.2(c)	ND
SB17-SS1	9.6	14.8	ND
SB17-SS2	6.9	9.4	ND
SB17-SS3	5.3	15.8	ND
SB17-SS4	15.3	15.3	ND
SB17-SS5	1060	226	1.5(a)
SB17-SS6	860	267	2.6(a)
SB18-SS1	54.2	51.5	ND
SB18-SS2	10.4	12.6	ND
SB18-SS3	51.9	28.9	0.46(a)
SB18-SS4	71.0	30.7	ND
SB18-SS5	5.5	9.8	ND
SB18-SS6	7.0	9.1	ND

Sample ID	Copper ug/L	Zinc ug/L	Cyanide ug/L
EQUIP. BLK 3	ND	ND	ND
EQUIP. BLK 4	ND	ND	ND

LEGEND:

SB - Soil Boring
ND - Not Detected
(a) - Estimate value due to low bias associated with extended holding times.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.

AR300958

SOIL BORINGS (FORMER POND AREA

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2749

Sample ID	Copper mg/kg	Zinc mg/kg	Cyanide mg/kg
SB19-SS1	5.4(a)	15.4(b)	ND(c)
SB19-SS2	1.9(a)	12.8(b)	ND(c)
SB19-SS3	4.2(a)	14.3(b)	ND(c)
SB19-SS4	5.2(a)	16.5(b)	ND(c)
SB19-SS5	57.8	25.3(b)	0.45(d)
SB19-SS6	12.4	18.3(b)	ND(c)
SB19-SS7	5.0(a)	17.9(b)	ND(c)
SB20-SS1	5.6(a)	12.3(b)	ND(c)
SB20-SS2	4.0(a)	12.4(b)	ND(c)
SB20-SS3	9.9(a)	15.6(b)	ND(c)
SB20-SS4	192.0	53.7(b)	2.6(d)
SB20-SS5	82.2	36.1(b)	1.6(d)
SB20-SS5A	81.1	39.5(b)	2.0(d)
SB20-SS6	8.6(a)	11.6(b)	1.6(d)
SB20-SS7	25.2	39.0(b)	0.72(d)

LEGEND:

SB - Soil Boring

ND - Not Detected

(a) - Reported concentration is less than five times the concentration reported in the associated blank and should be considered an artifact.

(b) - Estimate value due to potential chemical or physical interences associated with ICP analysis.

(c) - Estimate detection limit due to extended holding time.

(d) - Estimate value due to extended holding time.

GROUNDWATER (RI)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBERS 2452,2502,2516

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
EQUIP BLK #2	ND	ND	ND	44.8(d)	ND	ND	17.1(b,d)	ND	ND	ND	ND	ND	212	3.1	ND
MW1 GW1	7750(b)	74.0	ND	27800(d)	16.2	5.5	14100(b,d)	5.4	ND	ND	3700	ND	24500	30.6(c,d)	ND(e)
MW1 GW1 F	34.9(a,b)	58.7	ND	23500(d)	ND	6.0	65.8(a,b,d)	6.4	ND	ND	2150	ND	26300	19.6(c,d)	NR
MW10 GW1	49600(b)	124	ND	138000(d)	40.5	17400	62300(b,d)	33.4	ND	530	15400	ND	255000	4060(c,d)	19.9(f)
MW10 GW1 F	7700(b)	25.2	ND	160000(d)	ND	2550	53.8(a,b,d)	ND	ND	597	11500	ND	277000	4550(c,d)	NR
MW12 GW1	6730(b)	44.8	ND	6610(d)	10.9	3.4	12700(b,d)	12.8	ND	ND	1930	ND	139000	18.3(c,d)	ND(e)
MW12 GW1 F	22.6(a,b)	15.0	ND	7590(d)	ND	2.0	352(b,d)	ND	ND	ND	1010	ND	156000	11.9(a,c,d)	NR
MW13 GW1	2960(b)	28.0	ND	26900(d)	ND	3.4	8320(b,d)	2.6	ND	12.1	3580	ND	229000	47.5(c,d)	ND(e)
MW13 GW1 F	384(b)	19.3	ND	25400(d)	ND	2.1	1800(b,d)	ND	ND	ND	1700	ND	243000	44.6(c,d)	NR
MW2 GW1	21900(b)	105	6.2	7930(d)	42.5	10.7	61800(b,d)	13.2	ND	13.1	5050	ND	7830	41.0(c,d)	ND(e)
MW2 GW1 F	35.3(a,b)	29.1	ND	6940(d)	ND	5.2	38.2(a,b,d)	ND	ND	ND	1770	ND	8670	3.4(a,c,d)	NR
MW3 GW1	5700(b)	53.7	ND	4290(d)	7.6	3.4	10900(b,d)	4.5	ND	ND	2900	ND	10100	15.7(a,c,d)	ND(e)
MW3 GW1 F	26.3(a,b)	25.2	ND	3750(d)	ND	ND	16.9(a,b,d)	ND	ND	ND	1580	ND	10100	7.2(a,c,d)	NR
MW5 GW1	45900(b)	93.0	ND	4110(d)	72.0	19.5	96100(b,d)	28.7	ND	ND	9040	ND	115000	69.8(c,d)	ND(e)
MW5 GW1 F	31.1(a,b)	2.2	ND	943(d)	ND	3.2	29.5(a,b,d)	ND	ND	ND	ND	ND	112000	3.1(a,c,d)	NR
MW6 GW1	16100(b)	74.9	ND	10800(d)	22.8	8.8	35400(b,d)	16.4	ND	ND	4040	ND	9710	37.5(c,d)	ND(e)
MW6 GW1 F	ND(b)	16.0	ND	9140(d)	ND	2.6	16.2(a,b,d)	ND	ND	ND	1710	ND	10700	3.6(a,c,d)	NR
MW7 GW1	36700(b)	92.8	ND	3510(d)	48.3	66.3	56900(b,d)	26.4	0.34	24.4	5640	ND	265000	70.0(c,d)	78.4(f)
MW7 GW1 F	197(a,b)	6.6	ND	2180(d)	ND	16.3	1440(b,d)	ND	ND	ND	ND	ND	266000	4.6(a,c,d)	NR
MW8 GW1	12900(b)	106	7.7	19600(d)	15.5	8.3	27600(b,d)	7.9	ND	13.3	5500	ND	63400	28.3(c,d)	ND(e)
MW8 GW1 F	34.4(a,b)	57.6	ND	20200(d)	ND	3.1	216(b,d)	ND	ND	11.8	3880	ND	72100	10.9(a,c,d)	NR
MW9 GW1	11300(b)	222	ND	5360(d)	12.5	10.6	23300(b,d)	8.1	ND	ND	4290	ND	6720	33.0(c,d)	ND(e)
MW9 GW1 F	138(a,b)	161	ND	5050(d)	ND	2.9	90.9(a,b,d)	ND	ND	ND	2610	ND	6160	15.2(a,c,d)	NR
MW9 GW1A	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND(e)
MW9 GW1A F	185(a,b)	199	ND	6400(d)	ND	4.1	56.3(a,b,d)	ND	ND	ND	3590	ND	6640	20.5(c,d)	NR
* SP1	7730(b)	31.6	0.87	1550(c,d)	11.2	108	8510(b,d)	12.8	NR	7.2	416	ND	58.9	205	15.4(f)

AR300960

Groundwater (Rd 2)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2769

Sample ID	Aluminum %	Barium ug/L	Cadmium ug/L	Calcium %	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium %	Zinc ug/L	Cyanide ug/L
FIELD BLK 5	0.00	ND	ND	0.01	ND	1.5	11.0	ND	ND	ND	ND	ND	0.00	15.4(a)	ND
MW10-GW2	3.25	70.2	7.5	15.30	22.4	730.0	29400	11.6	ND	550	11500	ND	24.60	4080(a)	ND(b)
MW10-GW2 F	0.98	22.3	7.2	15.30	ND	653.0	276	ND	ND	567	8920	ND	24.70	4100(a)	NR
MW12-GW2	0.10	17.6	ND	0.62	ND	1.8	2160	ND	ND	ND	ND	ND	15.00	17.4(a)	ND(b)
MW12-GW2 F	0.00	12.5	ND	0.58	ND	2.4	338	ND	ND	ND	ND	ND	15.70	10.6(a)	NR
MW13-GW2	0.25	23.4	ND	2.63	5.0	326.0	5560	ND	ND	ND	2720	1.3	22.70	69.4(a)	ND(b)
MW13-GW2 F	0.05	11.8	ND	1.67	ND	3.1	778	ND	ND	ND	1460	ND	23.50	41.5(a)	NR
MW5-GW2	1.81	40.9	ND	0.11	28.2	10.4	34500	11.6	ND	ND	3480	ND	11.90	36.2(a)	ND(b)
MW5-GW2 F	0.01	2.9	ND	0.04	ND	5.8	154	ND	ND	ND	ND	ND	11.60	10.2(a)	NR
MW6-GW2	2.20	104	ND	1.05	30.7	10.5	46700	19.5	ND	ND	3660	ND	1.05	46.3(a)	ND(b)
MW6-GW2 F	0.00	20.5	ND	0.86	ND	4.0	25.0	ND	ND	ND	896	ND	1.04	10.1(a)	NR
MW7-GW2	2.62	70.2	ND	0.28	31.1	53.3	31200	23.1	ND	14.6	3070	ND	22.90	63.0(a)	77.0(c)
MW7-GW2 F	0.03	3.7	ND	0.18	ND	15.6	161	11.0	ND	ND	ND	ND	22.90	10.1(a)	NR
MW8-GW2	0.89	110	7.4	1.10	16.3	2.8	17500	10.5	ND	10.1	3650	ND	6.00	45.3(a)	16.0(c)
MW8-GW2 F	0.01	39.6	6.4	1.04	ND	5.2	51.0	ND	ND	ND	1970	ND	6.23	24.9(a)	NR
MW9-GW2	0.39	241	ND	0.50	5.2	ND	6980	ND	ND	ND	2290	ND	0.43	28.6(a)	ND(b)
MW9-GW2 F	0.06	251	ND	0.56	ND	4.7	89.0	ND	ND	ND	2320	ND	0.51	35.0(a)	NR

F = Filtered
ND - Not Detected
NR - Not Requested
(a) - Estimate values due to precision problems associated with the laboratory duplicate.
(b) - Reject value due to extended holding times.
(c) - Estimate value due to extended holding times.

R300961

Ground Water (MW4+11 Rd1, MW3 Rd2)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2885

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
FIELD BLK T	21.2	ND	ND	19.8	ND	ND	14.6	ND	ND	ND	ND	ND	62.7	ND	ND
MW11 GW1 D	24.3	29.7	ND	34100	ND	2.9(a)	501	ND	ND	24.7	3950(a)	ND	119000	158	NR
MW11 GW1 T	2950	40.5	ND	34000	5.5	2.4(a)	8470	2.6	ND	31.2	4750(a)	ND	116000	167	ND
MW3 GW2 D	26.2	14.5	ND	4470	ND	6.0(a)	17.1(a)	4.6	ND	ND	979(a)	ND	4350	4.5	NR
MW3 GW2 T	1520	26.1	ND	4120	ND	4.7(a)	2570	1.9	ND	ND	ND(b)	ND	3690	6.3	ND
MW4 GW1 D	391	ND	ND	1830	ND	5.1(a)	574	ND	ND	ND	ND	ND	110000	4.5	NR
MW4 GW1 T	58600	128.0	ND	5850	83.1	62.9(a)	137000	40.7	ND	19.3	6980	1.1	11100	70.1	ND

F = Filtered
ND - Not Detected
NR - Not Requested
(a) - Value is less than five times the blank concentration and should not be considered real.
(b) - Reject the result due to problems associated with the analysis.

AR300962

MW1 + MW2 RA2
Ground Water - (+ Two Soil Borings)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2763

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	%	ug/L	ug/L	%	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	%	ug/L	ug/L
MW1-GW2	0.36	79.1	ND	1.89	11.1	3.4	6070	3.9	ND	15.2(a)	2270(a)	ND(d)	2.44	44.3	ND
MW1-GW2 F	0.00	71.1	ND	1.91	ND	3.6	16.2	ND	ND	19.3(a)	1120(a)	ND(d)	2.46	35.3	NR
MW2-GW2	0.51	52.0	ND	0.90	4.9	3.0	13400	ND	ND	ND(a)	1180(a)	ND(d)	0.66	42.9	ND
MW2-GW2 F	ND	35.2	ND	0.96	ND	4.0	7.6	ND	ND	ND(a)	1840(a)	ND(d)	0.73	10.2	NR
	%	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg
S84-SS3	0.35	12.1	ND	0.02(b)	33.3(b)	1.5	103000	ND	ND	6.7(b)	232	ND(d)	0.01(b,c)	21.2(b,c)	ND
S84-SS3A	0.51	11.7	ND	0.03(b)	13.5(b)	1.2	43000	ND	ND	3.8(b)	185	ND(d)	0.02(b,c)	8.3(b,c)	ND

F = Filtered
ND - Not Detected
NR - Not Required
(a) - Estimate value due to large variances associated with laboratory precision.
(b) - Duplicate analysis result varies by more than 35%. Sample results should be considered.
(c) - Potential chemical or physical interferences associated with ICP analysis.
(d) - Reject data due to the potential for false negatives determined by the matrix spike analysis.
(e) - Reject due to extended holding times.

SURFACE WATER (RUN 1)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2440-SW

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
ST1-SW1	157(a)	17.6	ND	5240	ND	3.4	788	ND	ND	ND	ND(a)	ND	94300	21.0(a,c)	NR
ST1-SW1	1190	21.2	ND	5750	ND	6.3	2640	ND	ND	ND	2780(a)	ND	99100	20.6(a,c)	ND(d)
ST2-SW1	696	91.8	ND	22800	ND	3.2	5570	ND	ND	ND	11000(a)	ND	46800	20.1(a,c)	ND(d)
ST2-SW1 F	44.0(a)	132.0	ND	34000	ND	1.7	4520	ND	ND	ND	14500(a)	ND	17300	9.6(a,c)	NR
ST2-SW1A	643(a)	91.8	ND	21100	ND	3.0	5230	ND	ND	ND	8920(a)	ND	42200	9.6(a,c)	ND(d)
ST2-SW1A F	161(a)	63.6	ND	16300	ND	2.9	2060	ND	ND	ND	7260(a)	ND	58400	10.1(a,c)	NR
ST3-SW1	547(a)	67.1	ND	10900	ND	2.7	2350	1.1	ND	ND	6460(a)	ND	20200	10.1(a,c)	16.2(e)
ST3-SW1 F	76.5(a)	56.5	ND	10800	ND	2.8	728	ND	ND	ND	6120(a)	ND	21000	10.4(a,c)	NR
ST4-SW1	440(a)	56.5	6.9	3550	ND	1.5	1360	1.1	ND	ND	2680(a)	ND	9000	18.2(a,c)	ND(d)
ST4-SW1 F	76.3(a)	49.4	4.0	3440	ND	3.1	305	ND	ND	ND	2570(a)	ND	9120	60.8(a,c)	NR
ST5-SW1	533(a)	49.4	8.0	5120	ND	4.1	1780	ND	ND	ND	3660(a)	ND	11800	15.5(a,c)	ND(d)
ST5-SW1 F	23.6(a)	44.1	8.0	5300	ND	4.2	418	ND	ND	ND	3670(a)	ND	12800	15.7(a,c)	NR
ST6-SW1	305(a)	25.2	7.9	3910	ND	3.4	1410	ND	ND	ND	3970(a)	ND	8300	10.3(a,c)	ND(d)
ST6-SW1 F	16.7(a)	23.8	4.0	3600	ND	7.4	365	2.4	ND	ND	ND(a)	ND	8720	10.4(a,c)	NR
ST7-SW1	350(a)	28.2	ND	3140	ND	1.3	1750	ND	ND	ND	3900(a)	ND	4490	20.9(a,c)	ND(d)
ST7-SW1 F	14.5(a)	24.7	4.0	2840	ND	3.3	302	ND	ND	ND	ND(b)	ND	4760	10.5(a,c)	NR

F = Filtered
ND - Not Detected
NR - Not Required
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate results deviated by greater than 20% indicating precision problems.
(d) - Detection limits should be estimated due to extended holding times.
(e) - Estimate value due to extended holding time.

SURFACE WATER (RR2)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2800

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
FIELD BLK 5	ND	2.9	ND	0.00	ND	ND	9.9	ND	ND	ND	ND	ND	ND	ND	ND
ST1-SW2	3570	26.8(d)	ND	6100	ND	16.8	5190	3.5(a)	ND	ND	1140(c)	ND	113000	14.8(a,c)	ND(f)
ST1-SW2 F	126(a)	12.1(d)	ND	6270	ND	5.3	495	ND	ND	ND	2230(c)	ND	115000	5.3(a,c)	NR
ST1-SW2A	3630	26.5(d)	ND	6640	6.7	13.7	5750	2.9(a)	ND	ND	2320(c)	ND	116000	25.1(a,c)	ND(f)
ST1-SW2A F	55.7(a)	15.4(d)	ND	6690	ND	3.8	343	ND	ND	ND	3190(c)	ND	117000	5.2(a,c)	NR
ST2-SW2	2400	81.6(d)	ND	17300	ND	9.9	6960	3.1	ND	ND	5830(c)	ND	67900	19.6(a,c)	ND(f)
ST2-SW2 F	159	35.3(d)	ND	11200	ND	2.9	1060	ND	ND	ND	3820(c)	ND	95700	10.3(a,c)	NR
ST3-SW2	1370	75.8(d)	ND	12100	7.3	4.7	3670	ND	ND	ND	5410	ND	26100	9.8(a,c)	10.5(g)
ST3-SW2 F	50.9(a)	64.0(d)	ND	12500	ND	3.1	738	ND	ND	ND	6190	ND	27200	10.3(a,c)	NR
ST4-SW2	319	61.4(d)	ND	3720	5.2	ND	1340	2.1(a)	ND	ND	3040	ND	10500	23.4(a,c)	ND(f)
ST4-SW2 F	37.7(a)	53.0(d)	ND	3450	ND	1.6	369	ND	ND	ND	ND	ND	10700	12.5(a,c)	NR
ST5-SW2	1060	64.7(d)	ND	6940	ND	5.9	3490	1.6(a)	ND	ND	3440	ND	16500	20.3(a,c)	ND(f)
ST5-SW2 F	53.8(a)	50.8(d)	ND	6340	ND	3.4	676	ND	ND	ND	3360	ND	16300	12.4(a,c)	NR
ST6-SW2	638	38.2(d)	ND	5060	ND	3.4	6070	ND	ND	ND	1000	ND	11100	9.4(a,c)	ND(f)
ST6-SW2 F	24.4(a)	28.0(d)	ND	5230	ND	3.7	1620	ND	ND	ND	2050	ND	12200	9.8(a,c)	NR
ST7-SW2	211	32.4(d)	ND	3590	ND	ND	4480	2.1(a)	ND	ND	2190	ND	4320	9.7(a,c)	ND(f)
ST7-SW2 F	26.6(a)	25.8(d)	ND	3560	ND	1.8	1620	ND	ND	ND	1700	ND	4730	7.3(a,c)	NR

LEGEND:
F = Filtered
ND - Not Detected
NR - Not Required
(a) - Sample result is less than five times the concentration of the associated blank and should not be considered real.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(e) - Estimate detection limits due to extended holding times.
(f) - Reject value due to extended holding time.
(g) - Estimate value due to extended holding times.

300965

SEDIMENT (RD1)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2440-SD

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron %	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
ST1-SD1	0.21	14.1	0.59	0.09	7.5	4.4(a)	0.94(a)	ND	ND	6.4	1090(b)	0.79	0.02	23.1(c)	ND(d)
ST2-SD1	0.16	23.0	0.63	0.06	5.2	2.5(a)	1.29(a)	ND	ND	ND	716(b)	0.87	0.01	15.6(c)	ND(d)
ST2-SD1A	0.16	17.8	0.51	0.07	7.0	2.5(a)	0.35(a)	ND	ND	ND	948(b)	0.50	0.01	10.7(c)	ND
ST3-SD1	0.05	4.5	0.53	0.01	3.4	1.8(a)	0.29(a)	ND	ND	ND	ND(b)	ND	0.00	6.2(c)	ND(d)
ST4-SD1	0.72	37.5	0.52	0.03	16.3	4.4(a)	0.13(a)	5.5	ND	ND	1010(b)	0.71	0.01	18.6(c)	ND(d)
ST5-SD1	0.44	32.0	ND	0.03	7.4	2.5(a)	0.78(a)	ND	ND	ND	366(b)	0.44	0.01	11.3(c)	ND(d)
ST6-SD1	1.21	92.2	0.98	0.06	14.5	7.2(a)	3.98(a)	8.5	ND	6.5	711(b)	1.5	0.01	31.3(c)	ND(d)
ST7-SD1	0.55	48.4	ND	0.04	8.9	2.4(a)	0.63(a)	3.3	ND	3.6	412(b)	0.42	0.00	14.9(c)	ND(d)

ND - Not Detected
NR - Not Required
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate result deviated by greater than 20% indicating precision problems.
(d) - Detection limit should be estimated due to extended holding time.

AR300966

SEDIMENT (202)

ARROWHEAD PLATING SITE
SUMMARY OF METALS AND CYANIDE
CONTROL NUMBER 2800

Sample ID	Aluminum %	Barium ug/L	Cadmium ug/L	Calcium %	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium %	Zinc ug/L	Cyanide ug/L
ST1-SD2	0.26(b,c)	13.2(c)	ND	0.07	9.1(c)	2.4	10200(b)	3.7	ND	5.2	854(c)	ND	0.01	20.4(c,d)	ND(e)
ST1-SD2A	0.34(b,c)	10.9(c)	ND	0.02	5.7(c)	2.1	7710(b)	3.2	ND	1.8	303(c)	ND	0.01	9.7(c,d)	ND(e)
ST2-SD2	0.19(b,c)	38.0(c)	ND	0.06	7.0(c)	1.9	4920(b)	5.4	ND	ND	1030(c)	ND	0.01	6.8(c,d)	ND(e)
ST3-SD2	0.10(b,c)	7.0(c)	ND	0.01	4.1(c)	1.3	3770(b)	2.0	ND	ND	213(c)	ND	0.00	6.3(c,d)	ND(e)
ST4-SD2	1.32(b,c)	78.6(c)	ND	0.02	30.9(c)	6.2	22800(b)	9.2	ND	3.8	2120(c)	ND	0.01	21.4(c,d)	ND(e)
ST5-SD2	0.57(b,c)	37.0(c)	ND	0.02	8.2(c)	2.0	9240(b)	4.1	ND	4.0	432(c)	ND	0.00	11.6(c,d)	ND(e)
ST6-SD2	1.97(b,c)	118(c)	ND	0.03	19.9(c)	6.9	19200(b)	6.6	ND	11.9	1040(c)	ND	0.01	37.7(c,d)	ND(e)
ST7-SD2	0.53(b,c)	63.5(c)	ND	0.03	14.0(c)	2.2	6520(b)	4.6	ND	3.2	731(c)	ND	0.00	20.3(c,d)	ND(e)

LEGEND:

ND - Not Detected
NR - Not Required
(a) - Sample result is less than five times the concentration of the associated blank and should not be considered real.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(e) - Estimate detection limits due to extended holding times.
(f) - Reject value due to extended holding time.
(g) - Estimate value due to extended holding times.

VOHs & DNA for GW from MW4, MW11, & AR3

Versar Laboratories INC.

August 2, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control No. 3065
Site: Arrowhead Plating

Dear Claudia:

Enclosed are volatile and semivolatile organics data for the above batch. These samples were received on July 12, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Versar Laboratories, Inc.

Kenneth M. Ives

Kenneth M. Ives
Program Director

KMI/mar

Enclosure

AR300968

6850 Versar Center • P. O. Box 1549 • Springfield, Virginia 22151 • Telephone: (703) 750-3000 • 1-800-283-7727

Versar INC.

GC/MS ORGANIC ANALYSIS
DATA SUMMARY PACKAGE

CLIENT : ICF-FAIRFAX
SITE : ARROWHEAD PLATING
PROJECT: 420.58.0 B#18
CONTROL: 3065
DATE : 08/01/90

Versar INC.

August 1, 1990

Narrative
ICF-FAIRFAX/ARROWHEAD PLATING
GC/MS Organic Analysis - EPA OSW Methods 8240/8270
Versar Project 420.58 - Batch 18/Control 3065

This report contains the analytical data for the volatile organic analysis of five (5) water samples. Four (4) of the water samples were also analyzed for semivolatile organic compounds. The samples listed below arrived at Versar on July 12, 1990. Sample extractions and analyses were performed using procedures outlined in the the EPA Office of Solid Waste (OSW) Method 8240 for volatile organic compounds and Method 8270 for semivolatile organic compounds. Although results for volatiles (VOA) and semivolatiles (BNA) are reported individually, this narrative applies to both fractions. Results for additional analytical parameters are provided separately.

SAMPLE LIST

AR3-GW1
MW4-GW2
MW11-GW2
EQUIPMENT BLANK
TRIP BLANK +

+ - Volatile Organic Analysis only

//

GC/MS instrument calibrations using BFB and DFTPP met requirements for volatile and semivolatile organic analyses, respectively. SPCC and CCC criteria were met for the volatile and semivolatile initial calibration curves and the continuing calibration standards. Internal standard area abundances and associated relative retention times were within specified QC windows for both volatile and semivolatile analyses. All GC/MS analyses occurred during the twelve hour period following daily instrument calibration. All sample extractions and analyses were completed prior to expiration of sample holding times.

All volatile surrogate standard recovery values met specified QC limits. Semivolatile surrogate standard recovery values also met specified requirements with the exception of sample MW11-GW2. The method specifies that no more than one acid surrogate and one base-neutral surrogate outlier value can exceed the QC limits in any field sample and all recovery values must not be less than ten percent. Recovery of 2-fluorophenol in sample MW11-GW2 was less than ten percent and will be reextracted if enough sample volume remains. The additional data will be submitted separately as soon as it becomes available.

Versar INC.

One set of volatile matrix spike and matrix spike duplicate (MS/MSD) QC analyses were performed. All recovery and relative percent difference (RPD) values met specified QC limits. Trichloroethene and 1,1-dichloroethene were detected in the water sample used for the MS and MSD QC analyses. These compounds have been reported on the MS and MSD Form 1A with a "Y" flag which indicates that the compounds are present in both the matrix spike standard and the unspiked sample. One set of semivolatile MS/MSD QC analyses were also performed. Most recovery and all RPD values met specified QC limits. Method protocol does not require corrective action for MS and MSD QC outlier values.

Chlorinated solvents confirmed present in the volatile fraction were the predominant organic compounds detected in the field samples. Few semivolatile target analytes were confirmed present in the field samples. Samples AR3-GW1 and MW11-GW2 each required dilution by a factor of fifty prior to instrumental analysis for volatile organic compounds in order to quantify the target analytes within the established range of the standard calibration curve. The dilutions were also required in order to prevent instrument saturation. All additional samples analyzed for volatile organic compounds and all semivolatile organic analyses were performed without dilution. Nontarget compounds have been tentatively identified using the EPA/NBS Mass Spectral Database Library.

Mass spectra of target analytes that did not meet all EPA CLP mass spectral identification criteria have been flagged with an "X". Coeluting ions not characteristic of the compound or missing ions result in the use of this flag.

Additional definitions of data qualifier flags used on the individual data summary pages are provided in the listing which follows this case narrative.

Please contact either Ken Ives, Laboratory Project Manager, or me, should you have any questions or require additional information pertaining to the analyses of these water samples for volatile and semivolatile organic compounds.

Data Release Approved By:

Lawrence P. Pollack
GC/MS Quality Assurance Manager
Laboratory Operations

Narrative Reviewed By:

Linda E. Bock
GC/MS Data Quality Manager

AR300971

Versar INC

Data Qualifier Flags

J For Target Compounds: This flag is used when mass spectral data indicates the presence of a compound but the result is less than the specified detection limit but still greater than zero.

For Non Target Compounds: This flag indicates that the concentration is an estimated value, assuming a 1 to 1 response with the internal standard.

B This flag is used when the analyte is found in the blank as well as in the sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

u This flag states that the compound was analyzed for but was not detected. The number is the minimum attainable detection limit for the sample.

X or T This flag states that the mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.

E This flag is used to indicate that the quantitation of the analyte is outside the linear calibration of the curve and that dilution was required in order to properly quantitate.

D This flag is used to indicate the value for the target analyte was calculated from a dilution (see "E" flag above).

Y This flag is used when a matrix spike compound is also confirmed present in the unspiked sample.

Flags excerpted from and established by the US EPA Contract Lab Program (CLP) protocol.

2A
WATER VOLATILE SURROGATE RECOVERY

Lab Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	AR3GW1	100	94	106	0	0
02	EQUIP_BLANK	99	95	103	0	0
03	MW11GW2	97	89	80	0	0
04	MW4GW2	98	91	78	0	0
05	TRIP_BLANK	100	98	105	0	0
06	MW11GW2MS	98	93	77	0	0
07	MW11GW2MSD	99	92	78	0	0
08	VBLK43	101	97	102	0	0
09	VBLK38	98	95	95	0	0

	QC LIMITS
S1 (TOL) = Toluene-d8	(88-110)
S2 (BFB) = Bromofluorobenzene	(86-115)
S3 (DCE) = 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

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FORM II VOA-1 1/87 Rev.

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix Spike - EPA Sample No.: MW11GW2

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	2500	263	2560	92	61-145
Trichloroethene	2500	565	3100	101	71-120
Benzene	2500	0	2720	109	76-127
Toluene	2500	0	2590	104	76-125
Chlorobenzene	2500	0	2630	105	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	2500	2560	92	0	14	61-145
Trichloroethene	2500	3100	101	0	14	71-120
Benzene	2500	2800	112	-3	11	76-127
Toluene	2500	2690	108	-4	13	76-125
Chlorobenzene	2500	2630	105	0	13	75-130

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS: CLP,,,VSTD20,L,W,17503,V,CC-020,25ML
INST R: SP1000 60/80 CARBOPACK 2M@45C > 225C@8C/M > 30M@225C

AR300974

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Lab File ID: U4443 Lab Sample ID: VBLK43

Date Analyzed: 07/13/90 Time Analyzed: 0808

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

Instrument ID: U

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	AR3GW1	26129	U4450	1318
02	EQUIP_BLANK	26132	U4445	0952
03	TRIP_BLANK	26133	U4447	1114

COMMENTS: CLP,,,VSTD20,L,W,17503,V,CC-020,25ML
INST R: SP1000 60/80 CARBOPACK 2M@45C > 225C@8C/M > 30M@225C

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FORM IV VOA 1/87 Rev.

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Lab File ID: Y2438 Lab Sample ID: VBLK38

Date Analyzed: 07/19/90 Time Analyzed: 0825

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

Instrument ID: Y

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	MW11GW2	26131	Y2444	1348
02	MW4GW2	26130	Y2443	1324
03	MW11GW2MS	26131	Y2445	1416
04	MW11GW2MSD	26131	Y2446	1445

COMMENTS: CLP,,,VSTD20,L,W,17503,V,CC-020,25ML
INST R: SP1000 60/80 CARBOPACK 2M@45C > 225C@8C/M > 30M@225C

AR300976

FORM IV VOA 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR3GW1

L Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26129

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U4450

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/13/90

Column: (pack/cap) PACK Dilution Factor: 50

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	500	U
74-83-9	Bromomethane	500	U
75-01-4	Vinyl chloride	500	U
75-00-3	Chloroethane	500	U
75-09-2	Methylene chloride	180	J
67-64-1	Acetone	500	U
75-15-0	Carbon disulfide	250	U
75-35-4	1,1-Dichloroethene	250	U
75-34-3	1,1-Dichloroethane	250	U
540-59-0	1,2-Dichloroethene (total)	4400	
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
78-93-3	2-Butanone	500	U
71-55-6	1,1,1-Trichloroethane	900	
56-23-5	Carbon tetrachloride	250	U
108-05-4	Vinyl acetate	500	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	4200	
124-48-1	Dibromochloromethane	250	U
79-00-5	1,1,2-Trichloroethane	250	U
71-43-2	Benzene	250	U
10061-02-6	Trans-1,3-dichloropropene	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-pentanone	500	U
591-78-6	2-Hexanone	500	U
127-18-4	Tetrachloroethene	4300	
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
100-42-5	Styrene	250	U
1330-20-7	Total xylenes	250	U

AR300977

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR3GW1

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26129

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U4450

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/13/90

Column (pack/cap) PACK Dilution Factor: 50

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR300978

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW4GW2

Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26130

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2443

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/19/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	J
67-64-1	Acetone	18	
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR300979

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW4GW2

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26130

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2443

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/19/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.28	8.7	J B
2.	UNKNOWN	6.28	3.8	J B
3. 79-20-9	ACETIC ACID, METHYL ESTER	7.90	3.8	J

AR300980

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11GW2

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26131

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2444

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/19/90

Column: (pack/cap) CAP Dilution Factor: 50

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	500	U
74-83-9	Bromomethane	500	U
75-01-4	Vinyl chloride	500	U
75-00-3	Chloroethane	500	U
75-09-2	Methylene chloride	200	JX
67-64-1	Acetone	600	
75-15-0	Carbon disulfide	250	U
75-35-4	1,1-Dichloroethene	260	
75-34-3	1,1-Dichloroethane	250	U
540-59-0	1,2-Dichloroethene (total)	250	U
67-66-3	Chloroform	250	U
107-06-2	1,2-Dichloroethane	250	U
78-93-3	2-Butanone	500	U
71-55-6	1,1,1-Trichloroethane	310	
56-23-5	Carbon tetrachloride	250	U
108-05-4	Vinyl acetate	500	U
75-27-4	Bromodichloromethane	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	cis-1,3-Dichloropropene	250	U
79-01-6	Trichloroethene	560	
124-48-1	Dibromochloromethane	250	U
79-00-5	1,1,2-Trichloroethane	250	U
71-43-2	Benzene	250	U
10061-02-6	Trans-1,3-dichloropropene	250	U
75-25-2	Bromoform	250	U
108-10-1	4-Methyl-2-pentanone	500	U
591-78-6	2-Hexanone	500	U
127-18-4	Tetrachloroethene	6800	
79-34-5	1,1,2,2-Tetrachloroethane	250	U
108-88-3	Toluene	250	U
108-90-7	Chlorobenzene	250	U
100-41-4	Ethylbenzene	250	U
100-42-5	Styrene	250	U
1330-20-7	Total xylenes	250	U

AR300981

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW11GW2

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26131

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2444

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. _____ Date Analyzed: 07/19/90

Column (pack/cap) CAP Dilution Factor: 50

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.47	300	JB

AR300982

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EQUIP_BLANK

Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26132

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U4445

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/13/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR300983

FORM I VOA 1/87 Rev.

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EQUIP_BLANK

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26132

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U4445

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/13/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 124-38-9	CARBON DIOXIDE (ACN)	9.87	4.2	J

AR300984

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP_BLANK

Name: VERSAR INC. Contract: _____

ab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

atrix: (soil/water) WATER Lab Sample ID: 26133

ample wt/vol: 5.0 (g/mL) ML Lab File ID: U4447

evel: (low/med) LOW Date Received: 07/12/90

Moisture: not dec. ____ Date Analyzed: 07/13/90

olumn: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR300985

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP_BLANK

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065A SAS No.: _____ SDG No.: B18

Matrix: (soil/water) WATER Lab Sample ID: 26133

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U4447

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ Date Analyzed: 07/13/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	34.71	4.0	JB

AR300986

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR3GW1

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26125

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5292

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR300987

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR3GW1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26125

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5292

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR300988

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR3GW1

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26125

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5292

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR300989

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW4GW2

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26126

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5295

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR300990

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW4GW2

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26126

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5295

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR300991

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW4GW2

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26126

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5295

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR300992

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11GW2

1 Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26127

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5296

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR300993

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

MW11GW2

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26127

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5296

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR300994

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

MW11GW2

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26127

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5296

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 2

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	8.17	9.6	J
2. 95-14-7	1H-BENZOTRIAZOLE	11.00	75	J

AR300995

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EQUIPBLK

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26128

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5297

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AP300696

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EQUIPBLK

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26128

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5297

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR300997

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

EQUIPBLK

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3065B SAS No.: _____ SDG No.: 18

Matrix: (soil/water) WATER Lab Sample ID: 26128

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5297

Level: (low/med) LOW Date Received: 07/12/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/12/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN KETONE	4.53	9.6	BJ
2. 119-61-9	BENZOPHENONE	12.62	15	J

AR300998

ARI + ARZ
VOAs + BNA

Versar Laboratories INC.

August 1, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control No. 3082
Site: Arrowhead Plating

Dear Claudia:

Enclosed are volatile and semivolatile organics data for the above batch. These samples were received on July 13, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Versar Laboratories, Inc.

Kenneth M. Ives

Kenneth M. Ives
Program Director

KMI/mar

Enclosure

AR300999

6850 Versar Center • P. O. Box 1549 • Springfield, Virginia 22151 • Telephone: (703) 750-3000 • 1-800-283-7727

Versar INC.

GC/MS ORGANIC ANALYSIS
DATA SUMMARY PACKAGE

CLIENT : ICF-FAIRFAX
SITE : ARROWHEAD PLATING
PROJECT: 420.58.0 B#20
CONTROL: 3082
DATE : 07/31/90

Versar INC.

July 31, 1990

Narrative
ICF-FAIRFAX/ARROWHEAD PLATING
GC/MS Organic Analysis - EPA OSW Methods 8240/8270
Versar Project 420.58 - Batch 20/Control 3082

This report contains the analytical data for the volatile organic analysis of four (4) water samples. Three (3) of the water samples were also analyzed for semivolatile organic compounds. The samples listed below arrived at Versar on July 13, 1990. Sample extractions and analyses were performed using procedures outlined in the the EPA Office of Solid Waste (OSW) Method 8240 for volatile organic compounds and Method 8270 for semivolatile organic compounds. Although results for volatiles (VOA) and semivolatiles (BNA) are reported individually, this narrative applies to both fractions. Results for additional analytical parameters are provided separately.

SAMPLE LIST

AR2-GW1
AR2-GW1A
AR1-GW1
TRIP BLANK +

+ - Volatile Organic Analysis only

//

GC/MS instrument calibrations using BFB and DFTPP met requirements for volatile and semivolatile organic analyses, respectively. SPCC and CCC criteria were met for the volatile and semivolatile initial calibration curves and the continuing calibration standards. Internal standard area abundances and associated relative retention times were within specified QC windows for both volatile and semivolatile analyses. All GC/MS analyses occurred during the twelve hour period following daily instrument calibration.

All volatile surrogate standard recovery values met specified QC limits. Semivolatile surrogate standard recovery values also met specified requirements. The method specifies that no more than one acid surrogate and one base-neutral surrogate outlier value can exceed the QC limits and all recovery values must not be less than ten percent. One set of semivolatile matrix spike and matrix spike duplicate (MS/MSD) QC analyses were performed. Most recovery and all relative percent difference values met specified QC limits. Method protocol does not require corrective action for MS and MSD QC outlier values.

AR301001

Internal standard area abundance values and associated relative retention times met specified criteria for all volatile and semivolatile organic analyses.

Versar INC.

Chlorinated solvents confirmed present in the volatile fraction were the predominant organic compounds detected in the field samples. Few semivolatile target analytes were confirmed present in the field samples. Samples AR2-GW1 and AR2-GW1A each required dilution prior to instrumental analysis in order to quantify the target analytes within the established range of the standard calibration curve. The dilutions were also required in order to prevent instrument saturation. Sample AR1-GW1, the Trip Blank, and all semivolatile analyses were performed without dilution. Nontarget compounds have been tentatively identified using the EPA/NBS Mass Spectral Database Library. The nontarget compound detected in the semivolatile fraction of sample AR2-GW1A was quantified using the peak height method.

Definitions of data qualifier flags used on the individual data summary pages are provided in the listing which follows this case narrative.

Please contact either Ken Ives, Laboratory Project Manager, or me, should you have any questions or require additional information pertaining to the analyses of these samples for volatile and semivolatile organic compounds.

Data Release Approved By:

Lawrence P. Pollack
GC/MS Quality Assurance Manager
Laboratory Operations

Narrative Reviewed By:

Linda E. Bock
GC/MS Data Quality Manager

Versar INC.

Data Qualifier Flags

J For Target Compounds: This flag is used when mass spectral data indicates the presence of a compound but the result is less than the specified detection limit but still greater than zero.

For Non Target Compounds: This flag indicates that the concentration is an estimated value, assuming a 1 to 1 response with the internal standard.

B This flag is used when the analyte is found in the blank as well as in the sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

u This flag states that the compound was analyzed for but was not detected. The number is the minimum attainable detection limit for the sample.

X or T This flag states that the mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.

E This flag is used to indicate that the quantitation of the analyte is outside the linear calibration of the curve and that dilution was required in order to properly quantitate.

D This flag is used to indicate the value for the target analyte was calculated from a dilution (see "E" flag above).

Y This flag is used when a matrix spike compound is also confirmed present in the unspiked sample.

Flags excerpted from and established by the US EPA Contract Lab Program (CLP) protocol.

2A
WATER VOLATILE SURROGATE RECOVERY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

	EPA SAMPLE NO.	S1 (TOL) #	S2 (BFB) #	S3 (DCE) #	OTHER	TOT OUT
01	AR1GW1	98	102	102	0	0
02	AR2GW1	96	102	100	0	0
03	AR2GW1A	98	103	102	0	0
04	TRIP_BLANK	98	103	101	0	0
05	VBLK86	98	101	98	0	0

		QC LIMITS
S1 (TOL)	= Toluene-d8	(88-110)
S2 (BFB)	= Bromofluorobenzene	(86-115)
S3 (DCE)	= 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogates diluted out

AR301004

FORM II VOA-1 1/87 Rev.

4A
VOLATILE METHOD BLANK SUMMARY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Lab File ID: Y2386 Lab Sample ID: VBLK86

Date Analyzed: 07/16/90 Time Analyzed: 1026

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

Instrument ID: Y

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	AR1GW1	26236A	Y2393	1418
02	AR2GW1	26234A	Y2391	1325
03	AR2GW1A	26235A	Y2392	1350
04	TRIP_BLANK	26246A	Y2387	1134

COMMENTS: CLP,,,VSTD20,L,W,17503,V,CC-020,25ML
INST R: SP1000 60/80 CARBOPACK 2M@45C > 225C@8C/M > 30M@225C

AR301005

FORM IV VOA 1/87 Rev.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26234A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2391

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column: (pack/cap) CAP Dilution Factor: 20

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	200	U
74-83-9	Bromomethane	200	U
75-01-4	Vinyl chloride	200	U
75-00-3	Chloroethane	200	U
75-09-2	Methylene chloride	100	U
67-64-1	Acetone	200	U
75-15-0	Carbon disulfide	100	U
75-35-4	1,1-Dichloroethene	200	
75-34-3	1,1-Dichloroethane	100	U
540-59-0	1,2-Dichloroethene (total)	100	U
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
78-93-3	2-Butanone	200	U
71-55-6	1,1,1-Trichloroethane	260	
56-23-5	Carbon tetrachloride	100	U
108-05-4	Vinyl acetate	200	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	990	
124-48-1	Dibromochloromethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
71-43-2	Benzene	100	U
10061-02-6	Trans-1,3-dichloropropene	100	U
75-25-2	Bromoform	100	U
108-10-1	4-Methyl-2-pentanone	200	U
591-78-6	2-Hexanone	200	U
127-18-4	Tetrachloroethene	880	
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
100-42-5	Styrene	100	U
1330-20-7	Total xylenes	100	U

AR301006

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR2GW1

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26234A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2391

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column (pack/cap) CAP Dilution Factor: 20

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.47	250	JB

AR301007

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1A

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26235A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2392

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column: (pack/cap) CAP Dilution Factor: 20

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	200	U
74-83-9	Bromomethane	200	U
75-01-4	Vinyl chloride	200	U
75-00-3	Chloroethane	200	U
75-09-2	Methylene chloride	100	U
67-64-1	Acetone	200	U
75-15-0	Carbon disulfide	100	U
75-35-4	1,1-Dichloroethene	280	
75-34-3	1,1-Dichloroethane	100	U
540-59-0	1,2-Dichloroethene (total)	100	U
67-66-3	Chloroform	100	U
107-06-2	1,2-Dichloroethane	100	U
78-93-3	2-Butanone	200	U
71-55-6	1,1,1-Trichloroethane	350	
56-23-5	Carbon tetrachloride	100	U
108-05-4	Vinyl acetate	200	U
75-27-4	Bromodichloromethane	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	cis-1,3-Dichloropropene	100	U
79-01-6	Trichloroethene	1300	
124-48-1	Dibromochloromethane	100	U
79-00-5	1,1,2-Trichloroethane	100	U
71-43-2	Benzene	100	U
10061-02-6	Trans-1,3-dichloropropene	100	U
75-25-2	Bromoform	100	U
108-10-1	4-Methyl-2-pentanone	200	U
591-78-6	2-Hexanone	200	U
127-18-4	Tetrachloroethene	1200	
79-34-5	1,1,2,2-Tetrachloroethane	100	U
108-88-3	Toluene	100	U
108-90-7	Chlorobenzene	100	U
100-41-4	Ethylbenzene	100	U
100-42-5	Styrene	100	U
1330-20-7	Total xylenes	100	U

AR301008

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR2GW1A

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26235A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2392

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. _____ Date Analyzed: 07/16/90

Column (pack/cap) CAP Dilution Factor: 20

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.37	220	JB

AR301009

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR1GW1

L Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26236A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2393

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	3	J
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	19	
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301010

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR1GW1

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26236A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2393

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.37	12	JB

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP_BLANK

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26246A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2387

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301012

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP_BLANK

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082A SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26246A

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: Y2387

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ Date Analyzed: 07/16/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	5.37	10	JB

AR301013

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR1GW1

L Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26233

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5288

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR301014

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR1GW1

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26233

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5288

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR001015

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR1GW1

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26233

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5288

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301016

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1

L. Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26231

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5286

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR301017

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26231

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5286

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

AR301018

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR2GW1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26231

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5286

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301019

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1A

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26232

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5287

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
108-95-2	Phenol	10	U
111-44-4	bis(2-Chloroethyl)ether	10	U
95-57-8	2-Chlorophenol	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
100-51-6	Benzyl alcohol	10	U
95-50-1	1,2-Dichlorobenzene	10	U
95-48-7	2-Methylphenol	10	U
108-60-1	bis(2-Chloroisopropyl)ether	10	U
106-44-5	4-Methylphenol	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
88-75-5	2-Nitrophenol	10	U
105-67-9	2,4-Dimethylphenol	10	U
65-85-0	Benzoic Acid	48	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-83-2	2,4-Dichlorophenol	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
59-50-7	4-Chloro-3-methylphenol	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
88-06-2	2,4,6-Trichlorophenol	10	U
95-95-4	2,4,5-Trichlorophenol	48	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	48	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U

AR301020

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AR2GW1A

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26232

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5287

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
99-09-2	3-Nitroaniline	48	U
83-32-9	Acenaphthene	10	U
51-28-5	2,4-Dinitrophenol	48	U
100-02-7	4-Nitrophenol	48	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	48	U
534-52-1	4,6-Dinitro-2-methylphenol	48	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
87-86-5	Pentachlorophenol	48	U
85-01-8	Phenanthrene	10	U
120-12-7	Anthracene	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	19	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octyl phthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

AR2GW1A

L. Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3082B SAS No.: _____ SDG No.: B20

Matrix: (soil/water) WATER Lab Sample ID: 26232

Sample wt/vol: 1040 (g/mL) ML Lab File ID: Z5287

Level: (low/med) LOW Date Received: 07/13/90

% Moisture: not dec. ____ dec. ____ Date Extracted: 07/17/90

Extraction: (SepF/Cont/Sonc) CONT Date Analyzed: 07/25/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN SUBSTITUTED BENZENE	10.94	18	J

AR301022

Versar INC.

Reanalyses for QA/QC purpose of SB6 + SB12 Soils (2 samples

July 12, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control Nos. 2309 and 2338
Site: Arrowhead Plating

Dear Claudia:

Enclosed are semivolatile organics reanalysis data for the above batches. These samples were received on March 23 and 29, 1990. The original data reports were submitted on April 27 and May 4, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Versar Laboratories, Inc.

Kenneth M. Ives

Kenneth M. Ives
Program Director

KMI/mar

Enclosure

AR301023

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

SEMIVOLATILE ANALYSIS
DATA SUMMARY PACKAGE

CLIENT : ICF FAIRFAX
SITE : ARROWHEAD
PROJECT: 420.58 B#2&4-RE
CONTROL: 2338
DATE : 07/11/90

AR301024

Versar INC.

July 11, 1990

Narrative
ICF Fairfax - Arrowhead Plating
Semivolatile Organic Reextraction and Analysis
EPA CLP Protocol
Versar Project 420.58 - Batches 2 and 4
Control 2309/2338

This report contains the analytical data for the semivolatile organic reextraction and reanalysis of two (2) soil samples. The samples listed below arrived at Versar in two batch shipments on March 23 and 29, 1990. Results from the initial semivolatile organic analyses of these samples have been previously reported.

SAMPLE LIST

DATE RECD:	03/23/90	03/29/90
	SB6-S4 15-17	SB12-S2A

//

GC/MS instrument calibrations using DFTPP met requirements for semivolatile organic analyses. SPCC and CCC criteria were met for the initial calibration curve and the continuing calibration standards. All GC/MS analyses occurred during the twelve hour period that followed daily instrument calibration.

Semivolatile surrogate standard recovery values did not meet specified QC limits for sample SB6S4 15-17RE. All other analyses were compliant with regard to surrogate recovery values. Internal standard area abundances and associated relative retention times were within specified QC windows for all analyses. The semivolatile organic reextractions occurred after expiration of sample holding times. The samples were analyzed without dilution. Sample SB6S4 15-17RE and the associated extraction blank were cleaned using the Gel Permeation Chromatography (GPC) procedure. Use of this procedure increases the detection limits by a factor of two.

Detection limits and concentrations of semivolatile organic compounds in the soil samples are reported on a "dry weight" basis which accounts for the moisture content of the sample.

Nontarget compounds were tentatively identified using the EPA/NBS Mass Spectral Database Library.

AR301025

Continued.....

Versar INC.

Explanations of data qualifier flags used on the individual data summary pages are provided in the listing which immediately follows this case narrative.

Please contact Ken Ives, Laboratory Project Manager, should you have any questions or require additional information pertaining to the semivolatile organic analysis of these samples.

Data Release Approved By:

Linda E. Bock
GC/MS Data Quality Manager
Laboratory Operations

Narrative Reviewed By:

Lawrence P. Pollack
GC/MS Quality Assurance Manager

Versar INC.

Data Qualifier Flags

J For Target Compounds: This flag is used when mass spectral data indicates the presence of a compound but the result is less than the specified detection limit but still greater than zero.

For Non Target Compounds: This flag indicates that the concentration is an estimated value, assuming a 1 to 1 response with the internal standard.

B This flag is used when the analyte is found in the blank as well as in the sample. It indicates possible/probable contamination and warns the data user to take appropriate action.

u This flag states that the compound was analyzed for but was not detected. The number is the minimum attainable detection limit for the sample.

X or T This flag states that the mass spectrum does not meet EPA CLP criteria for confirmation, but compound presence is strongly suspected.

E This flag is used to indicate that the quantitation of the analyte is outside the linear calibration of the curve and that dilution was required in order to properly quantitate.

D This flag is used to indicate the value for the target analyte was calculated from a dilution (see "E" flag above).

Y This flag is used when a matrix spike compound is also confirmed present in the unspiked sample.

Flags excerpted from and established by the US EPA Contract Lab Program (CLP) protocol.

2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2_4

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	OTHER	TOT OUT
01	SB12S2ARE	82	78	83	82	86	82	0	0
02	SB6S4_15_17R	12 *	13 *	19	12 *	12 *	12 *	0	5
03	SBLK05	85	78	81	80	88	75	0	0
04	SBLK90	40	39	49	41	40	34	0	0

	QC LIMITS
S1 (NBZ) = Nitrobenzene-d5	(23-120)
S2 (FBP) = 2-Fluorobiphenyl	(30-115)
S3 (TPH) = Terphenyl	(18-137)
S4 (PHL) = Phenol-d5	(24-113)
S5 (2FP) = 2-Fluorophenol	(25-121)
S6 (TBP) = 2,4,6-Tribromophenol	(19-122)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

AR301028

FORM II SV-2

1/87 Rev.

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Lab File ID: Z5001 Lab Sample ID: SBLK05

Date Extracted: 05/02/90 Extraction:(SepF/Cont/Sonc) SONC

Date Analyzed: 06/14/90 Time Analyzed: 0036

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

Instrument ID: Z

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SB12S2ARE	12559RE	Z5002	06/14/90

COMMENTS: CLP,ICFARROW,2338,SBLK05,L,S,SBLK05,B,BLANK,420.58,4,1UL,
INST. Z:RESTEK RTX-5/30M, 2MIN@5>275@8C/MIN>302@10C/MIN

AR301029

4B
SEMIVOLATILE METHOD BLANK SUMMARY

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2_4

Lab File ID: Z5006 Lab Sample ID: SBLK90

Date Extracted: 05/30/90 Extraction:(SepF/Cont/Sonc) SONC

Date Analyzed: 06/14/90 Time Analyzed: 1109

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

Instrument ID: Z

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	SB6S4_15_17R	11797RE	Z5007	06/14/90

COMMENTS: CLP,ICFARROW,2309,SBLK90,L,S,SBLK90,B,BLANK,420.58,2,1UL
INST. Z:RESTEK RTX-5/30M, 2MIN@5>275@8C/MIN>302@10C/MIN

AR301030

FORM IV SV 1/87 Rev.

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB6S4_15_17RE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2_4

Matrix: (soil/water) SOIL Lab Sample ID: 11797RE

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5007

Level: (low/med) LOW Date Received: 03/23/90

% Moisture: not dec. 12 dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: 4.70 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	750	U
111-44-4	bis(2-Chloroethyl)ether	750	U
95-57-8	2-Chlorophenol	750	U
541-73-1	1,3-Dichlorobenzene	750	U
106-46-7	1,4-Dichlorobenzene	750	U
100-51-6	Benzyl alcohol	750	U
95-50-1	1,2-Dichlorobenzene	750	U
95-48-7	2-Methylphenol	750	U
108-60-1	bis(2-Chloroisopropyl)ether	750	U
106-44-5	4-Methylphenol	750	U
621-64-7	N-Nitroso-di-n-propylamine	750	U
67-72-1	Hexachloroethane	750	U
98-95-3	Nitrobenzene	750	U
78-59-1	Isophorone	750	U
88-75-5	2-Nitrophenol	750	U
105-67-9	2,4-Dimethylphenol	750	U
65-85-0	Benzoic Acid	3600	U
111-91-1	bis(2-Chloroethoxy)methane	750	U
120-83-2	2,4-Dichlorophenol	750	U
120-82-1	1,2,4-Trichlorobenzene	750	U
91-20-3	Naphthalene	750	U
106-47-8	4-Chloroaniline	750	U
87-68-3	Hexachlorobutadiene	750	U
59-50-7	4-Chloro-3-methylphenol	750	U
91-57-6	2-Methylnaphthalene	750	U
77-47-4	Hexachlorocyclopentadiene	750	U
88-06-2	2,4,6-Trichlorophenol	750	U
95-95-4	2,4,5-Trichlorophenol	3600	U
91-58-7	2-Chloronaphthalene	750	U
88-74-4	2-Nitroaniline	3600	U
131-11-3	Dimethylphthalate	750	U
208-96-8	Acenaphthylene	750	U
606-20-2	2,6-Dinitrotoluene	750	U

AR301010

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB6S4_15_17RE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2_4

Matrix: (soil/water) SOIL Lab Sample ID: 11797RE

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5007

Level: (low/med) LOW Date Received: 03/23/90

% Moisture: not dec. 12 dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: 4.70 Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	3600	U
83-32-9	Acenaphthene	750	U
51-28-5	2,4-Dinitrophenol	3600	U
100-02-7	4-Nitrophenol	3600	U
132-64-9	Dibenzofuran	750	U
121-14-2	2,4-Dinitrotoluene	750	U
84-66-2	Diethylphthalate	750	U
7005-72-3	4-Chlorophenyl-phenylether	750	U
86-73-7	Fluorene	750	U
100-01-6	4-Nitroaniline	3600	U
534-52-1	4,6-Dinitro-2-methylphenol	3600	U
86-30-6	N-nitrosodiphenylamine (1)	750	U
101-55-3	4-Bromophenyl-phenylether	750	U
118-74-1	Hexachlorobenzene	750	U
87-86-5	Pentachlorophenol	3600	U
85-01-8	Phenanthrene	750	U
120-12-7	Anthracene	750	U
84-74-2	Di-n-butylphthalate	750	U
206-44-0	Fluoranthene	750	U
129-00-0	Pyrene	750	U
85-68-7	Butylbenzylphthalate	750	U
91-94-1	3,3'-Dichlorobenzidine	1500	U
56-55-3	Benzo(a)anthracene	750	U
218-01-9	Chrysene	750	U
117-81-7	bis(2-Ethylhexyl)phthalate	750	U
117-84-0	Di-n-octyl phthalate	750	U
205-99-2	Benzo(b)fluoranthene	750	U
207-08-9	Benzo(k)fluoranthene	750	U
50-32-8	Benzo(a)pyrene	750	U
193-39-5	Indeno(1,2,3-cd)pyrene	750	U
53-70-3	Dibenz(a,h)anthracene	750	U
191-24-2	Benzo(g,h,i)perylene	750	U

(1) - Cannot be separated from Diphenylamine

RR301032

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB6S4_15_17RE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2_4

Matrix: (soil/water) SOIL Lab Sample ID: 11797RE

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5007

Level: (low/med) LOW Date Received: 03/23/90

% Moisture: not dec. 12 dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: 4.70 Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN KETONE	5.27	300	BJ

AR301033

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB12S2ARE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: 12559RE

Sample wt/vol: 30.1 (g/mL) G Lab File ID: Z5002

Level: (low/med) LOW Date Received: 03/29/90

% Moisture: not dec. 38 dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	530	U
111-44-4	bis(2-Chloroethyl)ether	530	U
95-57-8	2-Chlorophenol	530	U
541-73-1	1,3-Dichlorobenzene	530	U
106-46-7	1,4-Dichlorobenzene	530	U
100-51-6	Benzyl alcohol	530	U
95-50-1	1,2-Dichlorobenzene	530	U
95-48-7	2-Methylphenol	530	U
108-60-1	bis(2-Chloroisopropyl)ether	530	U
106-44-5	4-Methylphenol	530	U
621-64-7	N-Nitroso-di-n-propylamine	530	U
67-72-1	Hexachloroethane	530	U
98-95-3	Nitrobenzene	530	U
78-59-1	Isophorone	530	U
88-75-5	2-Nitrophenol	530	U
105-67-9	2,4-Dimethylphenol	530	U
65-85-0	Benzoic Acid	2600	U
111-91-1	bis(2-Chloroethoxy)methane	530	U
120-83-2	2,4-Dichlorophenol	530	U
120-82-1	1,2,4-Trichlorobenzene	530	U
91-20-3	Naphthalene	530	U
106-47-8	4-Chloroaniline	530	U
87-68-3	Hexachlorobutadiene	530	U
59-50-7	4-Chloro-3-methylphenol	530	U
91-57-6	2-Methylnaphthalene	530	U
77-47-4	Hexachlorocyclopentadiene	530	U
88-06-2	2,4,6-Trichlorophenol	530	U
95-95-4	2,4,5-Trichlorophenol	2600	U
91-58-7	2-Chloronaphthalene	530	U
88-74-4	2-Nitroaniline	2600	U
131-11-3	Dimethylphthalate	530	U
208-96-8	Acenaphthylene	530	U
606-20-2	2,6-Dinitrotoluene	530	U

AR301034

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SB12S2ARE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: 12559RE

Sample wt/vol: 30.1 (g/mL) G Lab File ID: Z5002

Level: (low/med) LOW Date Received: 03/29/90

% Moisture: not dec. 38 dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	2600	U
83-32-9	Acenaphthene	530	U
51-28-5	2,4-Dinitrophenol	2600	U
100-02-7	4-Nitrophenol	2600	U
132-64-9	Dibenzofuran	530	U
121-14-2	2,4-Dinitrotoluene	530	U
84-66-2	Diethylphthalate	530	U
7005-72-3	4-Chlorophenyl-phenylether	530	U
86-73-7	Fluorene	530	U
100-01-6	4-Nitroaniline	2600	U
534-52-1	4,6-Dinitro-2-methylphenol	2600	U
86-30-6	N-nitrosodiphenylamine (1)	530	U
101-55-3	4-Bromophenyl-phenylether	530	U
118-74-1	Hexachlorobenzene	530	U
87-86-5	Pentachlorophenol	2600	U
85-01-8	Phenanthrene	530	U
120-12-7	Anthracene	530	U
84-74-2	Di-n-butylphthalate	530	U
206-44-0	Fluoranthene	530	U
129-00-0	Pyrene	530	U
85-68-7	Butylbenzylphthalate	530	U
91-94-1	3,3'-Dichlorobenzidine	1100	U
56-55-3	Benzo(a)anthracene	530	U
218-01-9	Chrysene	530	U
117-81-7	bis(2-Ethylhexyl)phthalate	530	U
117-84-0	Di-n-octyl phthalate	530	U
205-99-2	Benzo(b)fluoranthene	530	U
207-08-9	Benzo(k)fluoranthene	530	U
50-32-8	Benzo(a)pyrene	530	U
193-39-5	Indeno(1,2,3-cd)pyrene	530	U
53-70-3	Dibenz(a,h)anthracene	530	U
191-24-2	Benzo(g,h,i)perylene	530	U

(1) - Cannot be separated from Diphenylamine

AR301035

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SB12S2ARE

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: 12559RE

Sample wt/vol: 30.1 (g/mL) G Lab File ID: Z5002

Level: (low/med) LOW Date Received: 03/29/90

% Moisture: not dec. 38 dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.0

Number TICs found: 6

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	4.90	1700	BJ
2.	UNKNOWN	5.40	480	BJ
3.	UNKNOWN KETONE	5.78	590	BJ
4.	UNKNOWN KETONE	6.62	210	J
5.	UNKNOWN	7.20	430	J
6.	UNKNOWN	7.77	370	BJ

AR301036

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK90

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK90

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5006

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	660	U
111-44-4	bis(2-Chloroethyl)ether	660	U
95-57-8	2-Chlorophenol	660	U
541-73-1	1,3-Dichlorobenzene	660	U
106-46-7	1,4-Dichlorobenzene	660	U
100-51-6	Benzyl alcohol	660	U
95-50-1	1,2-Dichlorobenzene	660	U
95-48-7	2-Methylphenol	660	U
108-60-1	bis(2-Chloroisopropyl)ether	660	U
106-44-5	4-Methylphenol	660	U
621-64-7	N-Nitroso-di-n-propylamine	660	U
67-72-1	Hexachloroethane	660	U
98-95-3	Nitrobenzene	660	U
78-59-1	Isophorone	660	U
88-75-5	2-Nitrophenol	660	U
105-67-9	2,4-Dimethylphenol	660	U
65-85-0	Benzoic Acid	3200	U
111-91-1	bis(2-Chloroethoxy)methane	660	U
120-83-2	2,4-Dichlorophenol	660	U
120-82-1	1,2,4-Trichlorobenzene	660	U
91-20-3	Naphthalene	660	U
106-47-8	4-Chloroaniline	660	U
87-68-3	Hexachlorobutadiene	660	U
59-50-7	4-Chloro-3-methylphenol	660	U
91-57-6	2-Methylnaphthalene	660	U
77-47-4	Hexachlorocyclopentadiene	660	U
88-06-2	2,4,6-Trichlorophenol	660	U
95-95-4	2,4,5-Trichlorophenol	3200	U
91-58-7	2-Chloronaphthalene	660	U
88-74-4	2-Nitroaniline	3200	U
131-11-3	Dimethylphthalate	660	U
208-96-8	Acenaphthylene	660	U
606-20-2	2,6-Dinitrotoluene	660	U

AR301037

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK90

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK90

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5006

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: _____ Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	3200	U
83-32-9	Acenaphthene	660	U
51-28-5	2,4-Dinitrophenol	3200	U
100-02-7	4-Nitrophenol	3200	U
132-64-9	Dibenzofuran	660	U
121-14-2	2,4-Dinitrotoluene	660	U
84-66-2	Diethylphthalate	660	U
7005-72-3	4-Chlorophenyl-phenylether	660	U
86-73-7	Fluorene	660	U
100-01-6	4-Nitroaniline	3200	U
534-52-1	4,6-Dinitro-2-methylphenol	3200	U
86-30-6	N-nitrosodiphenylamine (1)	660	U
101-55-3	4-Bromophenyl-phenylether	660	U
118-74-1	Hexachlorobenzene	660	U
87-86-5	Pentachlorophenol	3200	U
85-01-8	Phenanthrene	660	U
120-12-7	Anthracene	660	U
84-74-2	Di-n-butylphthalate	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
85-68-7	Butylbenzylphthalate	660	U
91-94-1	3,3'-Dichlorobenzidine	1300	U
56-55-3	Benzo(a)anthracene	660	U
218-01-9	Chrysene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
117-84-0	Di-n-octyl phthalate	660	U
205-99-2	Benzo(b)fluoranthene	660	U
207-08-9	Benzo(k)fluoranthene	660	U
50-32-8	Benzo(a)pyrene	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
191-24-2	Benzo(g,h,i)perylene	660	U

(1) - Cannot be separated from Diphenylamine

AR301038

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK90

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK90

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5006

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/30/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) Y pH: _____ Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN KETONE	5.27	330	J

AR301039

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK05

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5001

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
100-51-6	Benzyl alcohol	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	bis(2-Chloroisopropyl)ether	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
65-85-0	Benzoic Acid	1600	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	1600	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	1600	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U

AR301040

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SBLK05

La Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5001

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
99-09-2	3-Nitroaniline	1600	U
83-32-9	Acenaphthene	330	U
51-28-5	2,4-Dinitrophenol	1600	U
100-02-7	4-Nitrophenol	1600	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	1600	U
534-52-1	4,6-Dinitro-2-methylphenol	1600	U
86-30-6	N-nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	1600	U
85-01-8	Phenanthrene	330	U
120-12-7	Anthracene	330	U
84-74-2	Di-n-butylphthalate	330	U
206-44-0	Fluoranthene	330	U
129-00-0	Pyrene	330	U
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	660	U
56-55-3	Benzo(a)anthracene	330	U
218-01-9	Chrysene	330	U
117-81-7	bis(2-Ethylhexyl)phthalate	330	U
117-84-0	Di-n-octyl phthalate	330	U
205-99-2	Benzo(b)fluoranthene	330	U
207-08-9	Benzo(k)fluoranthene	330	U
50-32-8	Benzo(a)pyrene	330	U
193-39-5	Indeno(1,2,3-cd)pyrene	330	U
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	330	U

(1) - Cannot be separated from Diphenylamine

HR301041

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SBLK05

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 2309 SAS No.: _____ SDG No.: 2 4

Matrix: (soil/water) SOIL Lab Sample ID: SBLK05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: Z5001

Level: (low/med) LOW Date Received: _____

% Moisture: not dec. ____ dec. ____ Date Extracted: 05/02/90

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 06/14/90

GPC Cleanup: (Y/N) N pH: _____ Dilution Factor: 1.00

Number TICs found: 4

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	4.90	33	J
2.	UNKNOWN	5.38	33	J
3.	UNKNOWN KETONE	5.77	300	J
4.	UNKNOWN	7.75	100	J

AR301042

2nd Treated Water Sample (during Pond Closure) -

Versar INC.

June 7, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control No. 2580
Site: Arrowhead Plating

Dear Claudia:

Enclosed are trace metals data for the above batch. This sample was received on April 24, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Kenneth M. Ives

Kenneth M. Ives
Program Director
Laboratory Operations

KMI/dlm

AR301043

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

ANALYTICAL DATA PACKAGE
Metals Analysis

Versar Code ICFARROW - 11
Control No(s) 2580
Client ICF Fairfax
Site Arrowhead Plating
Date Reported 6-5-90

AR301044

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

TRACE METALS SECTION
ANALYSIS NARRATIVE

Versar Code: ICFARROW - 11
Client: ICF-FAIRFAX
Control Number: 2580

Date: June 5, 1990
Site: Arrowhead Plating

This report contains metals analytical results for one water sample received at Versar, Inc. on April 24, 1990. The sample was analyzed for the following elements:

Water:

Cadmium	Chromium(VI)	Copper	Lead
Nickel	Silver	Zinc	Cyanide

Analytical Methods

The samples were prepared and analyzed by the US EPA Test Methods for Evaluating Solid Waste, SW 846, third edition. The following is a summary of the methods:

Water Preparation	Method: Water - 3010/3020
ICP Analysis	Method: 6010
GFAA Analysis	Method:
Copper	7211
Lead	7421
Silver	7761
Chromium (VI)	Method: 7197
Mercury - Water Preparation/Analysis	Method: 7470
Cyanide - Water Preparation/Analysis	Method: Water - 335.1 CLP-M

AR301045

Versar INC.

Analytical Results

The report is divided into the following sections. A description of each part and any comments concerning them is provided below:

Cover Page - Cross reference list of the laboratory sample numbers and the field sample numbers.

Form I - Summary of results for each sample. The water sample TW2 was split into three aliquots (lab no. 17423 for metals, lab no. 17422 for cyanide, lab no. 17421 for chromium VI).

Form IIA - Initial and continuing calibration verification results. All ICP recoveries were within the 10 % control limits. All graphite furnace, cold vapor, and flame atomic absorption recoveries were within the 20 % control limits. All cyanide recoveries were within the 15% control limits.

Form III - Initial and continuing calibration blanks and preparation blank results. All blanks were less than the instrumental detection limit except for:

Water Preparation Blank - Pb

Form IV - ICP interference check sample. All recoveries were within the 20 % control limits.

Form VA - Spike sample recovery results. All spike recoveries were within the 25% control limits for all applicable elements except for:

TW2 - Pb

Form VI - Duplicate results. All relative percent differences (RPD) between the sample and the duplicate that were greater than 20% were:

TW2 - Cr VI, Pb, Zn

Form IX - ICP serial dilution results. Serial dilution percent differences were not calculable.

Raw Data - Copies of all raw data associated with this report.

AR301046

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

General Discussion

If you have any questions concerning this report, please contact Ken Ives at (703) 750-3000.

Prepared by: _____

Reviewed by: _____

AR301047

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATE_____

Lab Name: VERSAR_INC. Control No.: 2580____ Code: ICFARROW Batch: 11_____

SOW No. : SW-846,_3RD_ED.

Field Sample No.	Lab Sample ID.
__TW2_____	____17423_____
__TW2_____D_____	____17423D____
__TW2_____S_____	____17423S____

Were ICP interelement corrections applied ? Yes/No YES

Were ICP background corrections applied ? Yes/No YES

If yes - were raw data generated before application of background corrections ? Yes/No NO_

Comments:

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 6-5-90

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

TW2

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLA

Lab Name: VERSAR_INC. Control No.: 2580____ Code: ICFARROW Batch: 11__

Matrix : WATER_____ Lab Sample ID: 17423____

Level (low/med): _____ Date Received: 04/24/90_

% Solids: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum				NR
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium				NR
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	2.0	U		P
7440-70-2	Calcium				NR
7440-47-3	Chromium				NR
	ChromiumVI	7.4			A
7440-50-8	Copper	16.1			F
7439-89-6	Iron				NR
7439-92-1	Lead	3.2			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury				NR
7440-02-0	Nickel	18.0	U		P
7440-09-7	Potassium				NR
7782-49-2	Selenium				NR
7440-22-4	Silver	1.0	U		F
7440-23-5	Sodium				NR
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	11.4			P
	Cyanide	5.0	U		AS

Color Before: COLORLESS Clarity Before: CLOUDY Texture: _____

Color After : COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:
CHROMIUM_VI_ALIQUOT_LAB_NO._=_17421
CYANIDE_ALIQUOT_LAB_NO._=_17422

FINGERPRINT
5B8
SP1 - Surface Soil from near oil stained area (composite)

Versar INC.

May 1, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control Nos. 2327 and 2452
Site: Arrowhead Plating

Dear Claudia:

Enclosed are the petroleum hydrocarbon GC fingerprint analyses you requested on the above batches. Results were negative for gasoline, kerosene, and diesel fuel.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Kenneth M. Ives

Kenneth M. Ives
Program Director
Laboratory Operations

KMI/mar

Enclosures

AR301050

Versar INC.

FID Hydrocarbon Fingerprint Analysis Narrative
Project Number 420.058 B# 3, 7 - Soil
Control# 2327, 2452; Client: ICF Technologies: Arrow
April 27, 1990

Please find attached the analytical data package for the analysis of the sample received on 28 March and 11 April, 1990. The package includes calculated and summarized results, as well results for any QC samples processed with the batch.

Neither of the samples were determined to contain gasoline, kerosene, or diesel fuel at detectable levels (10ppm). All standard data would indicate that the analysis is valid and representative for the samples without further qualification.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.

Reza Karimi

Dr. Reza Karimi
Section Chief
Applied Chromatography
Laboratory Operations

AR301051

Versar INC.

FID FINGERPRINT
TPH

April 27, 1990

Control# 2327,2452
Lab Operations Job No.420.058 B#3,7
Client: ICFARROW ; MATRIX: SOIL

FIELD ID #	LAB ID #	RESULTS POS/NEG	ID	COMMENTS
SB8-S2 6-7	12364	NEG	_ _ _ _ _ _	B#3
SP1	14540	NEG	_ _ _ _ _ _	B#7

QC Data Summary

Reagent Blank Analysis:

RB7959 No TPH or significant interference in blank.

All standard and QC results would indicate that the analysis is representative and valid for these samples without further qualification.

P Chinyawong
04/27/90

AR301052

Versar INC.

SURFACE WATER
pH, TSS, ALK, HDNSS

SEDIMENT
HDNSS

May 14, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control Nos. 2440 and 2452
Site: Arrowhead Plating

Dear Claudia:

Enclosed are the general chemistry data for the above batches. These samples were received at Versar on April 10 and 11, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Kenneth M. Ives

Kenneth M. Ives
Program Director
Laboratory Operations

KMI/mar

Enclosures

AR301053

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

ANALYTICAL DATA PACKAGE
General Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2440
CLIENT: ICF, Fairfax
SITE: Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

Versar INC.

ANALYTICAL NARRATIVE
General Inorganic Chemistry Section

DATE : 11-May-90
CODE / CONTROL # : ICFARROW / 2440
CLIENT / SITE : ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH : 420.58 / 6

This task consisted of eight water samples which were analyzed for pH, TSS, alkalinity, and hardness according to methods #150.1, 160.2, 310.1, and 130.2, respectively, from Methods for the Chemical Analysis of Water and Wastes, 1983 (MCAWW). In addition, particle size distribution (PSD) was determined for air-dried aliquots of seven sediment samples according to ASTM method #D422. Please note that, due to an instrument malfunction, TOC analysis has not yet been completed for the seven sediment samples. Data for this particular parameter will be reported at a later date.

Samples were received April 10, and were analyzed from April 10 through May 9. No quality assurance problems were encountered, and holding times were met. All blank results were below method detection limits, and check standard recoveries, duplicate precision results, and hardness spike recovery were within acceptable limits.

Release of this data has been authorized by laboratory management.

Sincerely,

Melanie J. Dillman

Melanie J. Dillman
General Chemistry
Laboratory Operations

C. Thompson

Approved for Release
Chris Thompson, Section Chief

AR301055

Versar INC.

ANALYSIS REPORT
General Inorganic Chemistry Section

DATE: 11-May-90 PAGE: 1
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

LAB #	FIELD #	pH	TSS (mg/L)	Alkalinity as CaCO3 (mg/L)	Hardness as CaCO3 (mg/L)
14364	ST1-SW1	7.26	7.	60.6	
14365	ST2-SW1	7.11	16.	119.	
14366	ST2-SW1A	7.09	4.	108.	
14367	ST3-SW1	7.12	16.	53.4	
14368	ST4-SW1	5.82	9.	3.2	
14369	ST5-SW1	6.50	22.	18.9	
14370	ST6-SW1	6.72	11.	12.8	
14371	ST7-SW1	6.40	7.	11.7	
14287	ST1-SW1				40.0
14288	ST2-SW1				80.0
14289	ST2-SW1A				84.0
14290	ST3-SW1				56.0
14291	ST4-SW1				28.8
14292	ST5-SW1				36.0
14293	ST6-SW1				29.6
14294	ST7-SW1				24.0

C. Thompson
LABORATORY MANAGER

AR301056

Versar INC.

ANALYSIS REPORT
General Inorganic Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

Particle Size Distribution

LAB #	FIELD #	>4.75 mm (%)	<4.75 mm >2 mm (%)	<2mm, >.425 mm (%)	<.425 mm, >.075 mm (%)	<.075 mm, >.005 mm (%)	<.005 mm (%)
14333	ST1-SD1	2.24	2.44	15.75	62.80	10.48	6.29
14333 dp	ST1-SD1			15.24	62.87	10.71	6.51
14334	ST2-SD1	0.54	1.18	6.56	65.02	11.79	14.91
14335	ST3-SD1	0.31	1.52	34.78	46.98	15.46	0.96
14336	ST4-SD1	0.16	0.65	11.87	43.02	23.79	20.51
14337	ST5-SD1	0.56	1.05	13.03	45.82	28.90	10.64
14338	ST6-SD1	0.00	0.27	15.93	19.96	26.45	37.39
14339	ST7-SD1	0.54	0.63	6.66	34.00	32.82	25.35

C. Thompson
LABORATORY MANAGER

AR301057

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 11-May-90
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

	pH	TSS	Alkalinity as CaCO3	Hardness as CaCO3	
INITIAL CALIBRATION VERIFICATION					
Source	Versar	class s weight	EPA WP 987	EPA WP 987	
Units		g	mg/L	mg/L	
True Value	6.865	1.0000	27.3	72.2	
Found	6.88	1.0000	28.7	72.0	
Recovery	**	100%	105%	100%	
METHOD DETECTION					
Limit (mg/L)	NA	4.	5.0	5.0	
Limit (mg/kg)					
1. Calib. Blank					
2. Calib. Blank					
1. Reagent Blank		<4.	2.1	<5.0	
2. Reagent Blank					
3. Reagent Blank					
CONTINUING CALIBRATION VERIFICATION					
Source	Versar	ERA Hardness Std.	EPA WP 987	EPA WP 987	
Units		mg/L	mg/L	mg/L	
True Value	6.865	29	27.3	72.2	
1. Found	6.87	28	26.1	76.0	
Recovery	**	97%	96%	105%	
2. Found					
Recovery					
3. Found					
Recovery					
LABORATORY CONTROL STANDARD					
Source					
Units					
1. True Value					
Found					
Recovery					
2. Found					
Recovery					

** = Within +/- 0.10 pH units of true value

AR301058

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 11-May-90 PAGE: 2
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

	pH	TSS (mg/L)	Alkalinity as CaCO3 (mg/L)	Hardness as CaCO3 (mg/L)	
DUPLICATE PRECISION SAMPLE RESULTS					
Duplicate 1 :					
Sample ID	ST7-SW1	ST2-SW1	ST2-SW1	ST2-SW1	
Lab #	14371	14365	14365	14288	
Sample Result	6.40	17	119	80.0	
Duplicate Result	6.35	15	119	80.0	
RPD	**	12.5%	0.0%	0.0%	
Duplicate 2 :					
Sample ID					
Lab #					
Sample Result					
Duplicate Result					
RPD					
SPIKED SAMPLE RESULTS					
Spike 1:					
Sample ID	NA	NA	NA	ST2-SW1	
Lab #				14288	
$\bar{X}$ Sample Result				80.0	
Spike Result				159	
Spike Added				80.0	
Recovery				99%	
Spike 2:					
Sample ID					
Lab #					
$\bar{X}$ Sample Result					
Spike Result					
Spike Added					
Recovery					

** = Within +/- 0.10 pH units

AR301059

Versar INC.

IW1, IW2
(Treatment No 1 + 2)
Gen Chem.

May 23, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control Nos. 2549 and 2580
Site: Arrowhead Plating

Dear Claudia:

Enclosed are general chemistry data for the above batches. These samples were received at Versar on April 20 and 24, 1990.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Kenneth M. Ives

Kenneth M. Ives
Program Director
Laboratory Operations

KMI/mar

Enclosures

AR301060

6850 VERSAR CENTER • P.O. BOX 1549 • SPRINGFIELD, VIRGINIA 22151 • TELEPHONE: (703) 750-3000

Versar INC.

ANALYTICAL DATA PACKAGE
General Chemistry Section

DATE: 21-May-90
CODE / CONTROL #: ICFARROW / 2549,2580
CLIENT: ICF, Fairfax
SITE: Arrowhead Plating
PROJECT / BATCH: 420.58 / 10,11

Versar INC.

ANALYTICAL NARRATIVE
General Inorganic Chemistry Section

DATE : 22-May-90
CODE / CONTROL # : ICFARROW / 2549,2580
CLIENT / SITE : ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH : 420.58 / 10,11

This task consisted of two water samples which were analyzed for total suspended solids (TSS), ammonia, and total organic carboc (TOC), according to methods #160.2, 350.3, and 415.1, respectively, from Methods for the Chemical Analysis of Water and Wastes, 1983.

Samples were received April 20 and 24, and were analyzed from April 24 through May 9. No analytical or quality assurance problems were encountered, and holding times were met. All check standard recoveries, spike recoveries, and duplicate precision results were within acceptable limits, and blank results were below method detection limits.

Release of this data has been authorized by laboratory management.

Sincerely,

Melanie J. Dillman

Melanie J. Dillman
General Chemistry
Laboratory Operations

C. Thompson

Approved for Release
Chris Thompson, Section Chief

AR301062

Versar INC.

ANALYSIS REPORT
General Inorganic Chemistry Section

DATE: 21-May-90 PAGE: 1
CODE / CONTROL #: ICFARROW / 2549,2580
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 10,11

LAB #	FIELD #	TSS (mg/L)	TOC (mg/L)	NH3-N (mg/L)			
16713	TW1	40.					
16715	TW1		10.6				
16716	TW1			0.034			
17425	TW2	7.					
17420	TW2		9.02				
17424	TW2			<0.030			

C. Thompson
LABORATORY MANAGER

AR301063

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 21-May-90
CODE / CONTROL #: ICFARROW / 2549,2580
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 10,11

	TSS	TOC	NH3-N		
INITIAL CALIBRATION VERIFICATION					
Source	class "s" weight	EPA WP 1284 #3	Versar		
Units	g	mg/L	mg/L		
True Value	1.0000	6.12	3.00		
Found	1.0000	6.34	2.82		
Recovery	100%	104%	94%		
METHOD DETECTION					
Limit (mg/L)	4.	0.50	0.030		
Limit (mg/kg)					
1. Calib. Blank	0.0000 g	<0.50	<0.030		
2. Calib. Blank		<0.50	<0.030		
1. Reagent Blank	<4.				
2. Reagent Blank	<4.				
3. Reagent Blank					
CONTINUING CALIBRATION VERIFICATION					
Source	NA	EPA WP 1284 #3	Versar		
Units		mg/L	mg/L		
True Value		6.12	3.00		
1. Found		6.25	3.32		
Recovery		102%	111%		
2. Found		6.44			
Recovery		105%			
3. Found		6.47			
Recovery		106%			
LABORATORY CONTROL STANDARD					
Source	ERA Hardness Std.	NA	NA		
Units	mg/L				
1. True Value	29				
Found	28				
Recovery	97%				
2. Found	29				
Recovery	100%				

AR301064

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 21-May-90
CODE / CONTROL #: ICFARROW / 2549,2580
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 10,11

	TSS (mg/L)	TOC (mg/L)	NH3-N (mg/L)		
DUPLICATE PRECISION SAMPLE RESULTS					
Duplicate 1 :					
Sample ID	TW1	TW1	TW1		
Lab #	16713	16715	16716		
Sample Result	42	10.7	0.032		
Duplicate Result	39	10.6	0.037		
RPD	7.4%	0.9%	14.5%		
Duplicate 2 :					
Sample ID	TW2	TW2	TW2		
Lab #	17425	17420	17424		
Sample Result	7	9.50	<0.030		
Duplicate Result	7	8.53	<0.030		
RPD	0.0%	10.8%	*NC		
SPIKED SAMPLE RESULTS					
Spike 1:					
Sample ID		TW1	TW1		
Lab #		16715	16716		
Sample Result		10.6	0.034		
Spike Result		29.5	0.143		
Spike Added		20.0	0.100		
Recovery		95%	109%		
Spike 2:					
Sample ID		TW2	TW2		
Lab #		17420	17424		
Sample Result		9.02	<0.030		
Spike Result		17.9	0.092		
Spike Added		10.0	0.100		
Recovery		89%	92%		

*NC = Not Calculable

Rec'd 6/5/90
SEDIMENT
TOC

Versar INC.

May 29, 1990

Claudia Brand
Associate Scientist
ICF
9300 Lee Highway
Fairfax, Virginia 22031-1207

Reference: Versar Job No. 420.58
Versar Control No. 2440
Site: Arrowhead Plating

Dear Claudia:

Enclosed are TOC data for the above batch. These samples were received on April 10, 1990. These data were delayed by a laboratory instrument breakdown. In order to avoid inordinate delays, all other data associated with this batch have previously been reported.

If you have any questions concerning this data, please contact me at (703) 642-6761.

Sincerely,

Kenneth M. Ives

Kenneth M. Ives
Program Director
Laboratory Operations

KMI/mar

Enclosures

AR301066

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Versar INC.

ANALYTICAL DATA PACKAGE
General Chemistry Section

DATE: 25-May-90
CODE / CONTROL #: ICFARROW / 2440
CLIENT: ICF, Fairfax
SITE: Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

Versar INC.

ANALYTICAL NARRATIVE
General Inorganic Chemistry Section

DATE : 25-May-90
CODE / CONTROL # : ICFARROW / 2440
CLIENT / SITE : ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH : 420.58 / 6

This task consisted of eight sediment samples which were analyzed for TOC according to method #415.1 (modified for sediments) from Methods for the Chemical Analysis of Water and Wastes, 1983 (MCAWW). A Perkin-Elmer model #2400 was used. Analysis was performed on air-dried sample aliquots, and results have been reported on an oven-dried basis.

Samples were received April 10 and were analyzed May 24. No analytical or quality assurance problems were encountered. All check standard recoveries, spike recovery, and duplicate precision results were within acceptable limits, and blank results were below the instrument detection limit.

Release of this data has been authorized by laboratory management.

Sincerely,

Melanie J. Dillman

Melanie J. Dillman
General Chemistry
Laboratory Operations

C. Thompson

Approved for Release
Chris Thompson, Section Chief

AR301068

Versar INC.

ANALYSIS REPORT
General Inorganic Chemistry Section

DATE: 25-May-90 PAGE: 1
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

LAB #	FIELD #	TOC (mg/kg)
14340	ST1-SD1	3,100.
14341	ST2-SD1	1,530.
14342	ST2-SD1A	1,720.
14343	ST3-SD1	1,190.
14344	ST4-SD1	9,660.
14345	ST5-SD1	8,760.
14346	ST6-SD1	10,100.
14347	ST7-SD1	4,600.

C. Thompson
LABORATORY MANAGER

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 25-May-90
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

	TOC				
INITIAL CALIBRATION VERIFICATION					
Source	*Versar				
Units	mg/kg				
True Value	470,500				
Found	472,000				
Recovery	100%				
METHOD DETECTION					
Limit (mg/L)					
Limit (mg/kg)	100.				
1. Calib. Blank	<100.				
2. Calib. Blank					
1. Reagent Blank	<100.				
2. Reagent Blank					
3. Reagent Blank					
CONTINUING CALIBRATION VERIFICATION					
Source	*Versar				
Units	mg/kg				
True Value	470,500				
1. Found	482,000				
Recovery	102%				
2. Found					
Recovery					
3. Found					
Recovery					
LABORATORY CONTROL STANDARD					
Source					
Units					
1. True Value					
Found					
Recovery					
2. Found					
Recovery					

*Versar Std. = Potassium Hydrogen Phthalate

AR301070

Versar INC.

QUALITY ASSURANCE REPORT
General Chemistry Section

DATE: 25-May-90 PAGE: 2
CODE / CONTROL #: ICFARROW / 2440
CLIENT / SITE: ICF, Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 6

	TOC (mg/kg)				
DUPLICATE PRECISION SAMPLE RESULTS					
Duplicate 1 :					
Sample ID	ST6-SD1				
Lab #	14346				
Sample Result	9,890				
Duplicate Result	10,300				
RPD	4.1%				
Duplicate 2 :					
Sample ID					
Lab #					
Sample Result					
Duplicate Result					
RPD					
SPIKED SAMPLE RESULTS					
Spike 1:					
Sample ID	ST6-SD1				
Lab #	14346				
$\bar{X}$ Sample Result	10,100				
Spike Result	41,700				
Spike Added	27,500				
Recovery	115%				
Spike 2:					
Sample ID					
Lab #					
$\bar{X}$ Sample Result					
Spike Result					
Spike Added					
Recovery					

AR301071

Rec'd 9/10/90
- RDLII -

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

September 6, 1990

Mr. Timothy Longe, Ph.D.
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr. Longe:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from August 1 through August 31, 1990. Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Environmental Scientist

cc: Jim Kuszaj
Gary Dietrich
Kim Hummel/Drew Lausch

AR301072

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: August 1, 1990 -- August 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: September 6, 1990

Specific Accomplishments in Reporting Period:

- Data for the second round of ground-water samples from MW4 and MW11 and from A.R. Winarick's wells (designated AR1, AR2, and AR3) were validated and incorporated into summary tables. (See attached.) This activity completes the data validation process.

- The information from the elevation survey conducted by Richard B. Allison Jr. and Associates was used to draft a site plan and to begin drafting the preliminary ground-water contour plan.

- Weston Services, in conjunction with Allison and Associates, completed and submitted an erosion control plan to the VADWM, EPA, and Ken Harper (a Soil Conservation Specialist with Westmoreland County). Although, Weston reported that Ken Harper had verbally approved the plan, no written approval from the regulatory agencies has been received. Upon receipt of written approval, an implementation schedule will be developed, and work will begin as soon as possible.

- The risk assessment and ecological assessment were initiated and are currently in the data review stage.

- Research of private and public well usage was completed, and summary tables and maps were developed to present the information.

Projected Tasks to Be Completed in Upcoming Month:

- The following tasks are scheduled for September: continuation of the risk assessment and ecological assessment; possibly resampling of two or more wells to confirm intial data and slug testing; implementation of the erosion control plan; and completion of the potentiometric map.

AR301073

- Based on the potential changes to the ground surface over the former pond area associated with the proposed erosion controls, confirmatory surface soil sampling will be postponed until the earthwork is complete and the area is relatively stable.

Problems Encountered and Solutions:

- None.

ATTACHMENT 1

REVISED SUMMARY TABLES

AR301075

ARROWHEAD PLATING SI
VOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	Toluene	1,2-Dichloroethene (total)	Total Xylenes	Methylene Chloride
SB1-S4	15-17	6U	11	11U	6U	6U	6U	6U
SB2-S7	12-14	5U	11	11U	5U	5	5U	5U
SB3-S4	15-17	7U	14	14U	7U	7U	7U	7U
SB4-SS3	10-12	6U	13	13U	6U	6U	6U	12
SB4-SS3A	10-12	6U	13	13U	6U	6U	6U	9
SB5-S1	0-2	6U	13	13U	6U	6U	6U	6U
SB5-S4	15-17	6U	17 (e)	12U	6U	6U	6U	6U
SB6-S1	0-2	22	120 (e)	12U	6U	6U	6U	6U
SB6-S2	5-7	5U	11U	11U	5U	6U	6U	5U
SB6-S4	15-17	6U	11U	11U	6U	6U	6U	6U
SB7-S3	10-12	6U	11U	11U	6U	6U	6U	6U
SB7-S4	15-17	6U	13U	13U	6U	6U	6U	6U
SB8-S2	6-7	140000	11000 (d)	140000	7100U	7100U	7100U	7100U
SB8-S3 RE	10-12	7	200	17	4 (c)	6U	6U	[5] (c)
SB8-S3A (Dup) RE	15-17	26	100	9 (c)	2 (c)	1 (c)	6U	6U
SB9-S1 RE	0-2	6U	12U	12U	6U	6U	6U	6U
SB9-S3	10-12	6U	11U	11U	6U	6U	6U	6U
SB9-S3A (Dup) RE	10-12	5U	10U	10U	5U	5U	5U	5U
SB9-S4	15-17	6U	11U	11U	6U	6U	6U	6U
SB10-S3	10-12	11U	11U	11U	6U	6U	6U	(5)
SB11-S2	5-7	6U	13U	13U	6U	6U	6U	6U
SB12-S2	5-7	7 (c)	16U	16U	8U	8U	8U	8U
SB12-S2A (Dup)	5-7	9	16U	16U	8U	8U	8U	8U
SB13-S1	0-2	6U	11U	11U	6U	6U	6U	6U
SB20-SS7	12-14	6U	[16] (e)	11U	6U	6U	4 (c)	6U

U indicates compound was not detected. above the limit indicated
(c)=The compound i ntatively identified, and quantitated at less than the method detection limit.
(d)=Mass spectral suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a subst al deviation in the response for the daily calibration, this value is considered estimated.
[ ]=This detected entration is considered non-detected because it is within ten times the concentration detected in the trip blank.
( )=This detected entration is considered non-detected because it is within ten times the concentration detected in the reagent blank.

AR301076

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	Aniline	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentative Identification	Comments
SB1-S4	15-17		380 U			
SB2-S7	12-14		360 U			
SB3-S4	15-17		470 U			
SB4-SS3	10-12		420 U	4	Unknowns	
SB4-SS3A	10-12		430 U	5	Unknowns	
SB5-S1	0-2		840 U	3	Unknowns	
SB5-S4	15-17		780 U			
SB6-S1	0-2		820 U	3	2,4-Dimethyl-3-heptanone, Unknown Alcohol, and Unknown	
SB6-S2	5-7		720 U			
SB6-S4 RE	15-17		740 U			See Note A,B
SB7-S3	10-12		490 U			
SB7-S4	15-17		830 U			
SB8-S2	6-7		740 U	1	Unknown	
SB8-S3	10-12		740 U	5	Ketones and Unknowns	
SB8-S3A (Dup)	10-12	290(c)	770 U	2	Unknowns	
SB9-S1	0-2		750 U	4	2,4-Dimethyl-3-Heptanone and Unknowns	
SB10-S3	10-12		380 U			
SB11-S2	5-7		210(c)			
SB12-S2	5-7		510 U	8	Unknowns	
SB12-S2A (Dup)	5-7		520 U	9	Unknowns	
SB13-S1	0-2		370 U	10	Unknowns, Unknown Hydrocarbon, and Molecular Sulfur	

U indicates compound was not detected above the limit indicated
RE=Reextraction
(c)=The compound is tentatively identified, and quantitated at less than the method detection limit.
Note A: Due to recovery of an acid surrogate at less than 10% for this sample, method detection limits for acid compounds should be rejected.
Note B: Due to low response of 3,3-Dichlorobenzidene the method detection limit should be rejected.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SB1-S4	0.23(b)	8.4(e)	.54U	15.3(b)	3.9	3.7	20600	4.5U	.11U	3.1	198(b)	.33U	16.5(c,d)	7.2(b,c)	.40U
SB2-S7	0.36(b)	12.2(e)	.54U	23.5(b)	5.5	2.7	12400	4.5U	.11U	2.3	274(b)	.33U	14.8(c,d)	5.2(b,c)	.36U
SB3-S4	0.45(b)	8.5(e)	.54U	25.2(b)	7.0	4.5	26800	4.8	.11U	3.2	(b)	.33U	13.6(c,d)	9.7(b,c)	.36U
SB4-SS3	0.35	12.1	.50U	0.02(b)	33.3(b)	1.5	103000	4.5U	.11U	6.7(b)	232	.33(d)U	76.1(b,c)	21.2(b,c)	.36U
SB4-SS3A	0.51	11.7	.45U	0.03(b)	13.5(b)	1.2	43000	1.7U	.12U	3.8(b)	185	.23(d)U	164(b,c)	8.3(b,c)	.29U
SB5-S1	1.23(b)	51.0(e)	.52U	5.86(b)	14.4	6.0	12400	9.1	.10U	6.6	490(b,c)	.31U	26.1(c,d)	17.1(b,c)	.39U
SB5-S4	0.42(b)	14.1(e)	.54U	30.7(b)	10.1	3.2	49200	4.8U	.11U	4.3	191(b)	.35U	220(c)	12.7(b,c)	.45U
SB6-S1	0.74(b)	31.2(e)	.57U	29600(b)	11.4	30.4	7160	13.4	.11U	6.1	927(b)	.34U	194(c)	24.6(b,c)	0.83
SB6-S2	1.04(b)	26.9(e)	.53U	225(b)	8.7	4.0	8320	6.3	.10U	3.7	317(b)	.32U	45.1(c)	10.4(b,c)	.48U
SB6-S4	0.36(b)	10.2(e)	.56U	134(b)	4.8	1.8	14200	4.6U	.11U	3.0	137(b)	.34U	11.1(c,d)	6.0(b,c)	.55U
SB7-S3	0.45(b)	11.9(e)	.53U	18.4(b)	9.5	50.1	30100	4.3U	.11U	3.0	172(b)	.32U	42.8(c)	11.1(b,c)	.52U
SB7-S4	0.56(b)	12.1(e)	.60U	131(b)	10.5	7.3	12100	6.2	.11U	3.5	990(b)	.36U	952(c)	22.6(b,c)	.61U
SB8-S2	0.83(a)	47.1(d)	.56U	0.06(d)	11.5(d)	4.3(b,c)	11000(d)	6.3(b,d)	.11U	3.3	191	.33U	169(c,d)	9.8	.55U
SB8-S3A	0.56(a)	49.7(d)	.57U	0.03(d)	5.7(d)	2.5(b,c)	5420(d)	4.7U(d)	.11U	2.3	205	.34U	40.0(c,d)	8.9	.56U
SB8-S3	0.75(a)	32.3(d)	.55U	0.03(d)	9.2(d)	3.2(b,c)	11400(d)	5.1(d)	.095U	3.3	236	.33U	40.3(c,d)	9.5	.55U

LEGEND:

U - Not Detected above the limit indicated
NR - Not Required
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Value is less than five times the concentration in the associated blank.
(e) - Estimate value due to poor laboratory precision.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SB9-S1	0.73(a)	22.0(d)	.55 U	0.03(d)	10.0(d)	5.3(b,c)	10900(d)	5.7(b)	.11 U	2.1	202	.33 U	21.8(c,d)	7.7	.54 U
SB10-S3	0.40(a)	19.2(d)	.56 U	0.01(d)	6.5(d)	5.8(b,c)	54100(d)	4.6(d) U	.11 U	2.4	157	.34 U	495(c,d)	13.6	.52 U
SB11-S2	0.62(a)	9.5(d)	.62 U	0.01(d)	18.4(d)	5.9(b,c)	18100(d)	5.1(d) U	.12 U	1.4	499	.37 U	575(c,d)	6.2	.58 U
SB12-S2	0.50(a)	13.2(d)	.77 U	0.00(b,d)	13.8(d)	6.4(b,c)	8680(d)	6.4(d)	.16 U	2.1	1020	.46 U	98.3(c,d)	13.6	.67 U
SB12-S2A	0.72(a)	21.5(d)	.78 U	0.01(d)	14.4(d)	8.5(b,c)	10700(d)	13.0(d)	.14 U	2.6	1210	.47 U	177(c,d)	19.5	.76 U
SB13-S1	0.45(a)	18.7(d)	.63 U	0.04(d)	6.2(d)	3.5(b,c)	13500(d)	5.2(d) U	.13 U	2.3	156	.38 U	97.5(c,d)	7.7	.60 U
SB15-SS1	NR	NR	NR	NR	NR	3.7	NR	NR	NR	NR	NR	NR	NR	3.6	.45(d) U
SB15-SS2	NR	NR	NR	NR	NR	3.6	NR	NR	NR	NR	NR	NR	NR	7.7	.56(d) U
SB15-SS3	NR	NR	NR	NR	NR	2.3	NR	NR	NR	NR	NR	NR	NR	8.2	.60(d) U
SB15-SS4	NR	NR	NR	NR	NR	2.5	NR	NR	NR	NR	NR	NR	NR	7.0	.65(d) U
SB16-SS1	NR	NR	NR	NR	NR	6.9(b)	NR	NR	NR	NR	NR	NR	NR	15.2(c)	.55(d) U
SB16-SS10	NR	NR	NR	NR	NR	4.7(b)	NR	NR	NR	NR	NR	NR	NR	13.1(c)	.56(d) U
SB16-SS2	NR	NR	NR	NR	NR	6.5(b)	NR	NR	NR	NR	NR	NR	NR	17.1(c)	.46(d) U
SB16-SS3	NR	NR	NR	NR	NR	117(b)	NR	NR	NR	NR	NR	NR	NR	45.0(c)	0.71(a)
SB16-SS4	NR	NR	NR	NR	NR	9.9(b)	NR	NR	NR	NR	NR	NR	NR	15.6(c)	.44 U(d)
SB16-SS5	NR	NR	NR	NR	NR	1.9(b)	NR	NR	NR	NR	NR	NR	NR	8.1(c)	.47(d) U
SB16-SS6	NR	NR	NR	NR	NR	4.1(b)	NR	NR	NR	NR	NR	NR	NR	6.2(c)	.56(d) U
SB16-SS7	NR	NR	NR	NR	NR	11.7(b)	NR	NR	NR	NR	NR	NR	NR	14.5(c)	.52(d) U

LEGEND: U = not detected above limit indicated

AR 601079

AR301080

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
SB16-SS8	NR	NR	NR	NR	NR	4.5(b)	NR	NR	NR	NR	NR	NR	NR	7.2(c)	.49(d)U
SB16-SS9	NR	NR	NR	NR	NR	3.9(b)	NR	NR	NR	NR	NR	NR	NR	8.2(c)	.54(d)U
SB17-SS1	NR	NR	NR	NR	NR	9.6	NR	NR	NR	NR	NR	NR	NR	14.8	.56(d)U
SB17-SS2	NR	NR	NR	NR	NR	6.9	NR	NR	NR	NR	NR	NR	NR	9.4	.56(d)U
SB17-SS3	NR	NR	NR	NR	NR	5.3	NR	NR	NR	NR	NR	NR	NR	15.8	.52(d)U
SB17-SS4	NR	NR	NR	NR	NR	15.3	NR	NR	NR	NR	NR	NR	NR	15.3	.48(d)U
SB17-SS5	NR	NR	NR	NR	NR	1060	NR	NR	NR	NR	NR	NR	NR	226	1.5(a)
SB17-SS6	NR	NR	NR	NR	NR	860	NR	NR	NR	NR	NR	NR	NR	267	2.6(a)
SB18-SS1	NR	NR	NR	NR	NR	54.2	NR	NR	NR	NR	NR	NR	NR	51.5	.53(d)U
SB18-SS2	NR	NR	NR	NR	NR	10.4	NR	NR	NR	NR	NR	NR	NR	12.6	.52(d)U
SB18-SS3	NR	NR	NR	NR	NR	51.9	NR	NR	NR	NR	NR	NR	NR	28.9	0.46(a)
SB18-SS4	NR	NR	NR	NR	NR	71.0	NR	NR	NR	NR	NR	NR	NR	30.7	.51(d)U
SB18-SS5	NR	NR	NR	NR	NR	5.5	NR	NR	NR	NR	NR	NR	NR	9.8	.53(d)U
SB18-SS6	NR	NR	NR	NR	NR	7.0	NR	NR	NR	NR	NR	NR	NR	9.1	.55(d)U

LEGEND:

U - Not Detected above limit indicated
NR - Not Requested
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.

AR301081

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
SB19-SS1	NR	NR	NR	NR	NR	5.4(b)	NR	NR	NR	NR	NR	NR	NR	15.4(e)	.27 (d)U
SB19-SS2	NR	NR	NR	NR	NR	1.9(b)	NR	NR	NR	NR	NR	NR	NR	12.8(e)	.26 (d)U
SB19-SS3	NR	NR	NR	NR	NR	4.2(b)	NR	NR	NR	NR	NR	NR	NR	14.3(e)	.28 (d)U
SB19-SS4	NR	NR	NR	NR	NR	5.2(b)	NR	NR	NR	NR	NR	NR	NR	16.5(e)	.28 (d)U
SB19-SS5	NR	NR	NR	NR	NR	57.8	NR	NR	NR	NR	NR	NR	NR	25.3(e)	0.45(f)
SB19-SS6	NR	NR	NR	NR	NR	12.4	NR	NR	NR	NR	NR	NR	NR	18.3(e)	.27 (d)U
SB19-SS7	NR	NR	NR	NR	NR	5.0(b)	NR	NR	NR	NR	NR	NR	NR	17.9(e)	.29 (d)U
SB20-SS1	NR	NR	NR	NR	NR	5.6(b)	NR	NR	NR	NR	NR	NR	NR	12.3(e)	.28 (d)U
SB20-SS2	NR	NR	NR	NR	NR	4.0(b)	NR	NR	NR	NR	NR	NR	NR	12.4(e)	.27 (d)U
SB20-SS3	NR	NR	NR	NR	NR	9.9(b)	NR	NR	NR	NR	NR	NR	NR	15.6(e)	.20 (d)U
SB20-SS4	NR	NR	NR	NR	NR	192.0	NR	NR	NR	NR	NR	NR	NR	53.7(e)	2.6(f)
SB20-SS5	NR	NR	NR	NR	NR	82.2	NR	NR	NR	NR	NR	NR	NR	36.1(e)	1.6(f)
SB20-SS5A	NR	NR	NR	NR	NR	81.1	NR	NR	NR	NR	NR	NR	NR	39.5(e)	2.0(f)
SB20-SS6	NR	NR	NR	NR	NR	8.6(b)	NR	NR	NR	NR	NR	NR	NR	11.6(e)	1.6(f)
SB20-SS7	NR	NR	NR	NR	NR	25.2	NR	NR	NR	NR	NR	NR	NR	39.0(e)	0.72(f)

LEGEND:

SB - Soil Boring
U - Not Detected above limit indicated
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.
(e) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(f) - Estimate value due to extended holding time.

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	1,2-Dichloroethene	Methylene Chloride	1,1,1-Trichloroethane	Carbon Tetrachloride	Trichloroethene	Tentatively Identified Compounds	Comments
8821	0-6	6.0U	11	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8822	0-6	6.0U	11.0U	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8823	0-6	6.0U	13	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8824	0-6	97	50	21	6.0U	4(c)	32	6	29		
8825	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8826	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8827	0-6	6.0U	11.0U	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8828	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U	Beta-Pinene	
8829	0-6	6.0U	11.0U	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8830	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U	3-Carene	
8831	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U	3-Carene	
8832	0-6	6.0U	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8833	0-6	6.0U	11.0U	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8834	0-6	6.0U	(8)	11.0U	6.0U	(5)	6.0U	6.0U	6.0U		
8835	0-6	6.0U	98	16(e)	6.0U	(12)	6.0U	6.0U	6.0U	Ethanol	
8836	0-6	3300	3200	(1600)	930.0U	930U	930U	930U	930U		Note A
8837	0-6	600	60.0U	60.0U	30.0U	30.0U	20(d)	30.0U	30.0U		Note B
8838	0-6	27	11.0U	11.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
8839	0-6	19	12.0U	12.0U	6.0U	6.0U	6.0U	6.0U	6.0U		
121	0-6	150(h)	62.0U	62.0U	580(h)	31.0U	31.0U	31.0U	31.0U		

U indicates the compound was not detected above limit indicated
)=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
c)=The compound is tentatively identified and quantitated at less than the method detection limit.
d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Sample analyzed using medium level protocol which results in higher method detection limits.
Note B: Dilution of the sample in order to quantitate target compounds results in a increase in the method detection limit by a factor of five.

AR301082

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Di-n-butylphthalate	Bis(2-ethylhexyl)phthalate	Phenanthrene	Number of Tentatively Identified Compounds	Tentative Identification	Comments
S21	0-6	380U	380U	380U	12	Unknown Hydrocarbons; Unknowns	
S22	0-6	370U	370U	370U	12	Unknown Hydrocarbons; Unknowns	
S23	0-6	490	270U	370U	14	Unknown Hydrocarbons; Unknowns	Note B
S24	0-6	770U	770U	770U	20	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
S25	0-6	380U	380U	380U	10	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
S26	0-6	390U	310 (c)	390U	18	Molecular Sulfur; Unknown Hydrocarbons	Note C
S27	0-6	380U	380U	380U	7	2,4-Dimethyl-3-heptanone; Unknowns	Note C
S28	0-6	390U	390U	390U	9	Unknown Hydrocarbons; Unknowns; Unknown Ketone	Note C
S29	0-6	390U	390U	390U	3	Unknown Ketone; Unknowns	Note E
S30	0-6	400U	400U	400U	5	Substituted Benzene; Unknowns; Unknown Ketone	Note E
S31	0-6	400U	400U	400U	5	Caryophyllene; Substituted Benzene; Unknowns	Note E
S32	0-6	400U	200 (c)	400U	13	Unknowns	Note B
S33	0-6	350U	190 (c)	350U	4	Unknown Hydrocarbons; Unknowns	Note A,B
S34	0-6	370U	370U	370U	19	Unknown Hydrocarbons; Unknowns; Aldehydes	Note B
S35	0-6	390U	390U	390U	5	Unknown Hydrocarbons; Unknowns	Note C
S36	0-6	460U	460U	140 (c)	15	Hexadecanoic Acid; Organic Acids; Unknowns	Note B
S37	0-6	390U	390U	390U	10	Unknown Hydrocarbons; Unknowns	Note C
S38	0-6	370U	370U	370U	1	Unknown Ketone	Note C
S39	0-6	370U	370U	370U	7	Unknown Hydrocarbons; Unknowns	Note C
P1	0-6		1200		15	Benzenesulfonamide; Substituted Phenols; Unknowns	Note D

U indicates the compound was not detected above the limit indicated
(c) The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: Non-detect data for Di-n-octylphthalate, Benzo(b)flouranthene, Benzo(k)flouranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene should be rejected.
Note B: Non-detect data for 3,3'-Dichlorobenzidene should be rejected.
Note C: Non-detect data for Benzyl Alcohol and 4-Chloroaniline should be rejected.
Note D: Due to a substantial deviation of the first internal standard area, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropyl)ether, 2-Methylphenol, Hexachloroethane, 4-Methylphenol, and n-Nitroso-di-n-propylamine.
Note E: Sample extract was incorrectly diluted prior to analysis. This results in the method detection limit being increased by a factor of 1.1.

AR301084

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE SOIL SAMPLES

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
SS21	0.63(c)	50.6	.57U	0.05	8.6(c)	88.0	7010(c)	6.5(b)	.11U	5.2	237(c)	.34U	0.03(c)	23.8	.54U
SS22	0.64(c)	30.9	.55U	0.94	9.4(c)	116.0	7610(c)	4.9(b)	.11U	4.4	494(c)	.33U	0.01(c)	31.4	0.62
SS23	0.67(c)	40.9	.57U	1.93	10.6(c)	156.0	8480(c)	8.6(b)	.10U	5.9	860(c)	.34U	0.02(c)	48.4	4.40
SS24	0.54(c)	47.7	.58U	0.05	7.2(c)	12.8(b)	6430(c)	7.2	.12U	3.2	173(c)	.35U	0.02(c)	19.6	2.20
SS25	0.98(c)	40.8	.56U	0.77	12.3(c)	181.0	10500(c)	8.3	.098U	6.3	750(c)	0.67	0.03(c)	45.6	8.70
SS26	0.85(c)	35.7	.57U	1.59	10.4(c)	160.0	8670(c)	7.9	.095U	3.7	456(c)	.34U	0.03(c)	76.7	1.30
SS27	0.57(c)	18.5	.57U	0.40	7.7(c)	31.8	4970(c)	5.2	.11U	2.4	428(c)	.34U	0.01(c)	17.2	1.20
SS28	0.43(c)	42.1	.60U	0.10	6.8(c)	10.1(b)	8910(c)	9.0	.12U	2.4	212(c)	.36U	0.01(c)	14.9	0.79
SS29	0.95	34.6	.22U	0.03	10.5	4.3	8350	8.2	.10U	4.8	319	.33(f)U	0.00	14.4(e)	.52U
SS30	1.07	34.3	.22U	0.02	12.5	5.1	9600	6.0	.098U	4.5	400	.33(f)U	0.00	14.9(e)	.44U
SS31	0.87	29.7	.23U	0.02	10.1	4.3	13500	6.0	.10	5.6	342	.35(f)U	0.00	12.9(e)	.57U
SS32	1.46(c)	67.5	.58U	0.07	19.0(c)	35.0	NR(c)	10.4	0.15	9.5	524(c)	.35U	0.00(c)	33.0	.55U
SS33	0.69(c)	17.6	.56U	0.03	7.1(c)	10.9(b)	6510(c)	4.6U	.11U	2.5	257(c)	.33U	0.00(c)	51.3	.54U
SS34	0.67(c)	35.2	.56U	0.19	11.6(c)	36.8	15900(c)	8.6	.099U	5.2	461(c)	.34U	0.01(c)	20.7	0.74
SS35	0.10(c)	52.0	.59U	0.01	3.0(c)	2.7(b)	564(c)	6.6	.10U	1.3U	150(c)	.36U	0.01(c)	1.9	.53U
SS36	0.85(c)	137.0	1.0	0.42	13.3(c)	7800.0	12300(c)	18.6	6.4	14.6	312(c)	0.49	0.01(c)	862.0	.73U
SS37	0.71(c)	56.7	.57U	0.07	9.7(c)	36.4	8360(c)	9.7	.11U	3.9	222(c)	.34U	0.00(c)	20.4	.55U
SS38	0.58(c)	48.8	.56U	0.06	7.7(c)	31.4	6920(c)	10.7	.11U	3.7	221(c)	.34U	0.01(c)	19.2	.55U
SS39	0.68(c)	36.5	.58U	0.07	8.7(c)	8.3(b)	8720(c)	6.9	.11U	2.5	195(c)	.35U	0.01(c)	11.7	.56U

LEGEND:

U - Not Detected above limit indicated
NR - Not Requested
(a) - Estimate as high biased due to precision problems associated with the matrix spike.
(b) - Sample results were less than five times the contaminant concentration found in the blanks and should be considered artifacts contributed by the blank.
(c) - Estimate due to precision problems associated with the matrix spike.
(d) - Duplicate results tended to have variances greater than 35%.
(e) - Potential chemical or physical interferences associated with ICP analysis.
(f) - Reject data based upon high potential for false negatives.

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene
Background Federal ug/L	ND		2.8	ND	0.88
ST1-SW1	10.0U	23	34	5.0U	39
ST2-SW1	(7)(c)	5	6	[5]	7
ST2-SW1A	(8)(c,e)	6	8	[5]	9
ST3-SW1	10.0U	5.0U	5.0U	[5]	5.0U
ST4-SW1	10.0U	5.0U	5.0U	5.0U	5.0U
ST5-SW1	[7](c)	5.0U	5.0U	[4](c)	5.0U
ST6-SW1	[7](c)	5.0U	5.0U	5.0U	5.0U
ST7-SW1	[9](c)	5.0U	5.0U	5.0U	5.0U

U - indicates the compound was not detected. above the limit indicated
ND-Not Developed
( )-This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]-This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)-The compound is tentatively identified and quantitated at less than the method detection limit.
(e)-Due to substantial deviation in the response for the daily calibration, this value is considered estimated.

AR301085

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene	Tentatively Identified Compounds
Background Federal ug/L	ND		2.8	ND	0.88	
ST1-SW2	[8](c)	30	38	5.0U	41	Unknown Hydrocarbon
ST1-SW2A	[10]	24	30	5.0U	32(f)	
ST2-SW2	[8](c)	5	6	5.0U	7(f)	
ST3-SW2	10.0U	5.0U	5.0U	[2]	5.0U	
ST4-SW2	10.0U	5.0U	5.0U	[3]	5.0U	
ST5-SW2	10.0U	5.0U	5.0U	[2]	5.0U	
ST6-SW2	10.0U	5.0U	5.0U	[3]	5.0U	
ST7-SW2	10.0U	5.0U	5.0U	[2]	5.0U	

U indicates the compound was not detected above the limit indicated
ND=Not Developed
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=Mass spectral criteria was not met for the identification of this compound; therefore, the compound is tentatively identified.

AR301086

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L				Note A
ST1-SW1	18	1	1H-Benzotriazole	
ST2-SW1	10.0 U			
ST2-SW1A	10.0 U			
ST3-SW1	10.0 U			
ST4-SW1	10.0 U			
ST5-SW1	10.0 U			
ST6-SW1	10.0 U			
ST7-SW1	10.0 U			

U indicates the compound was not detected above the limit indicated
Note A: No Federal Background Criteria Developed

AR301087

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L				Note A
ST1-SW2	10.0U	4	Substituted Propanol; Substituted Benzene; Unknown	
ST1-SW2A	10.0U	2	Substituted Propanol; Unknown	
ST2-SW2	10.0U	4	Substituted Propanol; Unknown	
ST3-SW2	10.0U			
ST4-SW2	(9)(c)			
ST5-SW2	(18)			
ST6-SW2	(18)			
ST7-SW2	(15)			

U indicates the compound was not detected above the limit indicated
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: No Federal Background Criteria Developed

AR301088

AR301089

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE WATER SAMPLES
ROUND 1

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
ST1-SW1	157(a)	17.6	2.0U	5240	9.0U	3.4	788	1.0U	.2U	18.0U	(a)	1.0U	94300	21.0(a,c)	NR
ST1-SW1	1190	21.2	2.0U	5750	9.0U	6.3	2640	1.0U	.2U	18.0U	2780(a)	1.0U	99100	20.6(a,c)	10U (d)
ST2-SW1	696	91.8	2.0U	22800	9.0U	3.2	5570	1.0U	.2U	18.0U	11000(a)	1.0U	46800	20.1(a,c)	10U (d)
ST2-SW1 F	44.0(a	132.0	2.0U	34000	9.0U	1.7	4520	1.0U	.2U	18.0U	14500(a)	1.0U	17300	9.6(a,c)	NR
ST2-SW1A	643(a)	91.8	2.0U	21100	9.0U	3.0	5230	1.0U	.2U	18.0U	8920(a)	1.0U	42200	9.6(a,c)	10U (d)
ST2-SW1A	161(a)	63.6	2.0U	16300	9.0U	2.9	2060	1.0U	.2U	18.0U	7260(a)	1.0U	58400	10.1(a,c)	NR
ST3-SW1	547(a)	67.1	2.0U	10900	9.0U	2.7	2350	1.1	.2U	18.0U	6460(a)	1.0U	20200	10.1(a,c)	16.2(e)
ST3-SW1 F	76.5(a)	56.5	2.0U	10800	9.0U	2.8	728	1.0U	.2U	18.0U	6120(a)	1.0U	21000	10.4(a,c)	NR
ST4-SW1	440(a)	56.5	6.9	3550	9.0U	1.5	1360	1.1	.2U	18.0U	2680(a)	1.0U	9000	18.2(a,c)	10U(d)
ST4-SW1 F	76.3(a)	49.4	4.0	3440	9.0U	3.1	305	1.0U	.2U	18.0U	2570(a)	1.0U	9120	60.8(a,c)	NR
ST5-SW1	537(a)	49.4	8.0	5120	9.0U	4.1	1780	1.0U	.2U	18.0U	3660(a)	1.0U	11800	15.5(a,c)	10U(d)
ST5-SW1 F	23.6(a)	44.1	8.0	5300	9.0U	4.2	418	1.0U	.2U	18.0U	3670(a)	1.0U	12800	15.7(a,c)	NR
ST6-SW1	305(a)	25.2	7.9	3910	9.0U	3.4	1410	1.0U	.2U	18.0U	3970(a)	1.0U	8300	10.3(a,c)	10U (d)
ST6-SW1 F	16.7(a)	23.8	4.0	3600	9.0U	7.4	365	2.4	.2U	18.0U	(a)	1.0U	8720	10.4(a,c)	NR
ST7-SW1	350(a)	28.2	2.0U	3140	9.0U	1.3	1750	1.0U	.2U	18.0U	3900(a)	1.0U	4490	20.9(a,c)	10U (d)
ST7-SW1 F	14.5(a)	24.7	4.0	2840	9.0U	3.3	302	1.0U	.2U	18.0U	(b)	1.0U	4760	10.5(a,c)	NR

U - Not Detected above limit indicated
NR - Not Required
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate results deviated by greater than 20% indicating precision problems.
(d) - Detection limits should be estimated due to extended holding times.
(e) - Estimate value due to extended holding time.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE WATER SAMPLES
ROUND 11

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
ST1-SW2	3570	26.8(d)	5.0U	6100	5.0U	16.8	5190	3.5(a)	.2U	10.0U	1140(c)	1.0U	113000	14.8(a,c)	4.7(f)U
ST1-SW2 F	126(a)	12.1(d)	5.0U	6270	5.0U	5.3	495	3.5U	.20U	10.0U	2230(c)	1.0U	115000	5.3(a,c)	NR
ST1-SW2A	3630	26.5(d)	5.0U	6640	6.7	13.7	5750	2.9(a)	.20U	10.0U	2320(c)	1.0U	116000	25.1(a,c)	5.0(f)U
ST1-SW2A	55.7(a)	15.4(d)	5.0U	6690	5.0U	3.8	343	1.0U	.20U	10.0U	3190(c)	1.0U	117000	5.2(a,c)	NR
ST2-SW2	2400	81.6(d)	5.0U	17300	5.0U	9.9	6960	3.1	.20U	10.0U	5830(c)	1.0U	67900	19.6(a,c)	4.6(f)U
ST2-SW2 F	159	35.3(d)	5.0U	11200	5.0U	2.9	1060	1.0U	.20U	10.0U	3820(c)	1.0U	95700	10.3(a,c)	NR
ST3-SW2	1370	75.8(d)	5.0U	12100	7.3	4.7	3670	1.0U	.20U	10.0U	5410	1.0U	26100	9.8(a,c)	10.5(g)
ST3-SW2 F	50.9(a)	64.0(d)	5.0U	12500	5.0U	3.1	738	1.0U	.20U	10.0U	6190	1.0U	27200	10.3(a,c)	NR
ST4-SW2	319	61.4(d)	5.0U	3720	5.2	1.0	1340	2.1(a)	.20U	10.0U	3040	1.0U	10500	23.4(a,c)	2.5(f)U
ST4-SW2 F	37.7(a)	53.0(d)	5.0U	3450	5.0U	1.6	369	1.0U	.20U	10.0U	871	1.0U	10700	12.5(a,c)	NR
ST5-SW2	1060	64.7(d)	5.0U	6940	5.0U	5.9	3490	1.6(a)	.20U	10.0U	3440	1.0U	16500	20.3(a,c)	2.5(f)U
ST5-SW2 F	53.8(a)	50.8(d)	5.0U	6340	5.0U	3.4	676	1.0U	.20U	10.0U	3360	1.0U	16300	12.4(a,c)	NR
ST6-SW2	638	38.2(d)	5.0U	5060	5.0U	3.4	6070	1.0U	.20U	10.0U	1000	1.0U	11100	9.4(a,c)	2.5(f)U
ST6-SW2 F	24.4(a)	28.0(d)	5.0U	5230	5.0U	3.7	1620	1.0U	.20U	10.0U	2050	1.0U	12200	9.8(a,c)	NR
ST7-SW2	211	32.4(d)	5.0U	3590	5.0U	1.0	4480	2.1(a)	.20U	10.0U	2190	1.0U	4320	9.7(a,c)	3.4(f)U
ST7-SW2 F	26.6(a)	25.8(d)	5.0U	3560	5.0U	1.8	1620	1.0U	.20U	10.0U	1700	1.0U	4730	7.3(a,c)	NR

LEGEND:

U - Not Detected above limit indicated
NR - Not Required
(a) - Sample result is less than five times the concentration of the associated blank and should not be considered real.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(e) - Estimate detection limits due to extended holding times.
(f) - Reject value due to extended holding time.
(g) - Estimate value due to extended holding times.

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	1,2-Dichloroethene ug/kg	Trichloroethene ug/kg	Tetrachloroethene ug/kg	Acetone ug/kg	2-Butanone ug/kg	Tentatively Identified Compounds	Comments
ST1-SD1	6 (c)	7 (b)	18	15.0|	15.0|		
ST2-SD1	7.0|	7.0||	7.0|	9 (c,e)	14.0|		
ST2-SD1A	7.0|	7.0||	7.0||	14.0|	14.0|		
ST3-SD1	7.0|	7.0|	7.0||	13.0|	13.0|		
ST4-SD1	8.0|	8.0|	8.0||	20 (e)	16.0|		
ST5-SD1	7.0||	7.0|	7.0||	56 (e,h)	14.0||		Note A
ST6-SD1	9.0||	9.0|	9.0|	120 (e)	21		
ST7-SD1	7.0||	7.0|	7.0|	15.0||	15.0||		

\|\| indicates the compound was not detected above the limit indicated

(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to the substantial deviation in the response for the daily calibration, this value is considered estimated.
(h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Due to a substantial deviation for all internal standard areas, the method detection limit is considered estimated for all target compounds.

AR301091

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Acetone	Tentatively Identified Compounds	Comments
ST1-SD2	13.0 U		
ST1-SD2A	12.0 U		
ST2-SD2	14.0 U		
ST3-SD2	13.0 U		
ST4-SD2	[18]		
ST5-SD2	[7](c)		
ST6-SD2	[32]		
ST7-SD2	[13]		

U indicates the compound was not detected above the limit indicated
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Number of Tentatively Idenified Compounds	Tentative Identification	Comments
ST1-SD1	2400U	500 U	6	Unknown Ketones; Unknown Organic Acid; Unknowns	
ST2-SD1	2300U	470 U	12	Unknown Ketones, Hydrocarbons, and Alcohols; Unknowns	
ST2-SD1A	2300U	470 U	8	Unknown Ketones, Hydrocarbons, and Alcohols; Hexanedioic Acid	
ST3-SD1	2100 U	440 U	3	Ketones and Unknowns	
ST4-SD1	2500 U	520 U	13	Ketones and Unknown Hydrocarbons	
ST5-SD1	730(c)	640	23	Ketones; Tetrahydronapththalene; Substituted Napthalenes; Unknowns	
ST6-SD1	2800 U	590 U	17	Hexadecanoic Acid; Unknown Hydrocarbon; Unknowns	Note A
ST7-SD1	500(c)	190(c)	23	Ketones; Organic Acids; Hydrocarbons; Unknowns	

U : indicates the compound was not detected above the limit indicated

(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

Note A: Due to a sustantial deviation for the first and second internal standards areas, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropylether), 2-Methylphenol, Hexachloroethane, 4-Methylphenol, n-Nitroso-di-n-propylamine, Nitrobenzene, Isophorone, 2-Nitrophenol, 2,4-Dimethylphenol, Bis(2-chloroethoxy)methane, 2,4-Dichlorophenol, 1,2,4-Trichlorobenzene, Naphthalene, Benzoic Acid, 4-Chloroaniline, Hexachlorobutadiene, 4-Chloro-3-methylphenol, and 2-Methylnaphthalene

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Target Compound List Detected	Number of Tentatively Idenified Compounds	Tentative Identification
ST1-SD2	ND	8	Unknown Ketones; Unknown Hydrocarbons
ST1-SD2A	ND	7	Unknown Ketones; Unknown Hydrocarbons
ST2-SD2	ND	4	Unknown Ketones; Unknowns
ST3-SD2	ND	6	Molecular Sulfur; Unknown Ketones; Unknowns
ST4-SD2	ND	3	Molecular Sulfur; Unknown Ketones; Unknowns
ST5-SD2	ND	10	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST6-SD2	ND	11	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST7-SD2	ND	9	Molecular Sulfur; Tetrahydronaphthalene; Unknown Hydrocarbons; Unknowns

ND=No target compounds were detected.

AR301094

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SEDIMENT SAMPLES
ROUND I

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron %	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
ST1-SD1	0.21	14.1	0.59	0.09	7.5	4.4(a)	0.94(a)	3.0 U	.11 U	6.4	1090(b)	0.79	193	23.1(c)	.63(d) U
ST2-SD1	0.16	23.0	0.63	0.06	5.2	2.5(a)	1.29(a)	3.2 U	.13 U	2.5 U	716(b)	0.87	91.4	15.6(c)	.63(d) U
ST2-SD1A	0.16	17.8	0.51	0.07	7.0	2.5(a)	0.35(a)	2.9 U	.12 U	2.3 U	948(b)	0.50	109	10.7(c)	.56 U
ST3-SD1	0.05	4.5	0.53	0.01	3.4	1.8(a)	0.29(a)	2.9 U	.10 U	2.3 U	328(b)	.38 U	26.4	6.2(c)	.52(d) U
ST4-SD1	0.72	37.5	0.52	0.03	16.3	4.4(a)	0.13(a)	5.5	.13 U	2.6 U	1010(b)	0.71	48.4	18.6(c)	.64(d) U
ST5-SD1	0.44	32.0		0.03	7.4	2.5(a)	0.78(a)	3.0 U	.12 U	2.3 U	366(b)	0.44	51.9	11.3(c)	.64(d) U
ST6-SD1	1.21	92.2	0.98	0.06	14.5	7.2(a)	3.98(a)	8.5	.17 U	6.5	711(b)	1.5	69.9	31.3(c)	.70(d) U
ST7-SD1	0.55	48.4		0.04	8.9	2.4(a)	0.63(a)	3.3	.12 U	3.6	412(b)	0.42	31.9	14.9(c)	.43(d) U

U - Not Detected above limit indicated
NR - Not Required
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate result deviated by greater than 20% indicating precision problems.
(d) - Detection limit should be estimated due to extended holding time.

replace "ug/L" with "mg/kg"

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SEDIMENT SAMPLES
ROUND II

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	~~ug/L~~ mg/kg	~~ug/L~~	~~ug/L~~	%	~~ug/L~~	~~ug/L~~	~~ug/L~~	~~ug/L~~ mg/kg	~~ug/L~~ mg/kg	~~ug/L~~	~~ug/L~~ mg/kg	~~ug/L~~ mg/kg	mg/kg	~~ug/L~~	~~ug/L~~
ST1-SD2	0.26(b,c)	13.2(c)	<.65	0.07	9.1(c)	2.4	10200(b)	3.7	<.11	5.2	854(c)	<.26	140	20.4(c,d)	<.30(e)
ST1-SD2A	0.34(b,c)	10.9(c)	<.60	0.02	5.7(c)	2.1	7710(b)	3.2	<.12	1.8	303(c)	<.24	77.2	9.7(c,d)	<.30(e)
ST2-SD2	0.19(b,c)	38.0(c)	<.71	0.06	7.0(c)	1.9	4920(b)	5.4	<.12	<1.4	1030(c)	<.28	129	6.8(c,d)	<.33(e)
ST3-SD2	0.10(b,c)	7.0(c)	<.62	0.01	4.1(c)	1.3	3770(b)	2.0	<.12	<1.2	213(c)	<.25	18.7	6.3(c,d)	<.30(e)
ST4-SD2	1.32(b,c)	78.6(c)	<.68	0.02	30.9(c)	6.2	22800(b)	9.2	<.14	3.8	2120(c)	<.27	61.9	21.4(c,d)	<.32(e)
ST5-SD2	0.57(b,c)	37.0(c)	<.59	0.02	8.2(c)	2.0	9240(b)	4.1	<.12	4.0	432(c)	<.24	40.4	11.6(c,d)	<.32(e)
ST6-SD2	1.97(b,c)	118(c)	<.58	0.03	19.9(c)	6.9	19200(b)	6.6	<.14	11.9	1040(c)	<.23	71.2	37.7(c,d)	<.35(e)
ST7-SD2	0.53(b,c)	63.5(c)	<.57	0.03	14.0(c)	2.2	6520(b)	4.6	<.12	3.2	731(c)	<.23	29.9	20.3(c,d)	<.29(e)

LEGEND:

< - Not Detected, here limit indicated
NR - Not Required
(a) - Sample result is less than five times the concentration of the associated blank and should not be considered real.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(e) - Estimate detection limits due to extended holding times.
(f) - Reject value due to extended holding time.
(g) - Estimate value due to extended holding times.

AR301096

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR GROUNDWATER (Round 1)
in units of ug/L

Sample ID	Acetone	2-Butanone	1,1-Dichloroethene	1,2-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Methylene Chloride	1,1-Dichloroethane	Comment
Federal Standards ug/L	NA	NA	NA	NA	200	5(f)	5(g)			
MW1-GW1	190(e)	100(b)	25 U	25 U	25 U	25 U	25 U	25 U	25 U	Note A
MW2-GW1RE	10 U	10 U	5 U	5 U	5 U	120(a)	5 U	5 U	5 U	Note B
MW3-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	Note B
MW4-GW1	10 U	10 U	5 U	5 U	5 U	5 U	5 U	(5)	5 U	
MW5-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	Note B
MW6-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	17(a)	5 U	5 U	Note B
MW7-GW1	10 U	10 U	4(c)	4 U	4(c)	9	48	5 U	5 U	Note C
MW8-GW1	1,300(e)	1,000 U	710	500 U	620	1,100	8,200	500 U	500 U	Note A
MW9-GW1DL	20000 U	20000 U	9,900(d,a)	10,000 U	150,000(a)	10,000 U	26,000(a)	(14,000)	10,000 U	Note B
MW9-GW1ADL(Dup)	20,000 U	20,000 U	9,800(d,a)	10,000 U	140,000(a)	10,000 U	26,000(a)	(15,000)	10,000 U	Note B
MW10-GW1RE	1,000 U	1,000 U	1,300(a)	500 U	1,900(a)	4,200(a)	12,000(a)	(700)	500 U	Note B
MW11-GW1	50 U	50 U	280	33	320	480	8,000	(30)	42	Note D
MW12-GW1RE	1,000 U	1,000 U	390(d)	500 U	520(a)	980(a)	16,000(a)	(470)	500 U	Note B
MW13-GW1RE	1,000 U	1,000 U	500 U	560(a)	320(a,d)	1,300(a)	12,000(a)	(430)	500 U	Note B
AR1-GW1	10 U	10 U	5 U	5 U	5 U	3(c)	19(b)	5 U	5 U	
AR2-GW1	200 U	200 U	200(b)	100 U	260	990(b)	880(b)	100 U	100 U	
AR2-GW1A	200 U	200 U	280(b)	100 U	350	1300(b)	1200(b)	100 U	100 U	
AR3-GW1	500 U	500 U	250 U	4,400	900	4,200	4,300(e)	180(d)	250 U	

NA=Not Available
DL=Dilution
RE=Reextraction
Blank space indicates compound was not detected
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(a)=Due to laboratory data recording problems the original analysis is not usable.
The reanalysis exceeded the holding time; therefore, the value is considered estimated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
Note A: Non-detected data for Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
Note B: As a result of not meeting holding time, the method quantitation limits are considered estimated for all target compounds.
Note C: Non-detect data for Acetone, Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
Note D: The value for Tetrachloroethene was determined from a dilution.

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR GROUNDWATER (Round 2)
in units of ug/L

Sample ID	1,1-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Carbon Disulfide	Methylene Chloride	Chloroform	Acetone
Federal Standards	NA	200	5 (f)	5 (g)	NA	NA		
MW1-GW2	5 u	5 u	5 u	5 u	5 u	5 u	5 u	5 u
MW2-GW2	5	5	94	5 u	39	5 u	5 u	5 u
MW3-GW2	5 u	5 u	5 u	5 u	5 u	5	5 u	5 u
MW4-GW2	5 u	5 u	5 u	5 u	5 u	4 (c)	5 u	18
MW5-GW2	5 u	5 u	5 u	5 u	5 u	5 u	5 u	5 u
MW6-GW2	5 u	5 u	5 u	22	5 u	5 u	5 u	5 u
MW7-GW2	10 u	10 u	6 (c)	110	10 u	10 u	17	10 u
MW8-GW2	510	530	800	5,400	500 u	500 u	530 u	530 u
MW9-GW2	2,600	36,000	2,500 u	6,800	2500 u	2,500 u	2,500 u	2,500 u
MW10-GW2	1,900 (d)	5,200	4,700	14,000	2500 u	2,500 u	2,500 u	2,500 u
MW11-GW2	260 (b)	310	560 (b)	6,800 (b)	250 u	200 (d)	250 u	600
MW12-GW2	1,000 u	600 (d)	700 (d)	7,700	1,000 u	1,000 u	1,000 u	1,000 u
MW13-GW2	1,000 u	1,000 u	670 (d)	5,800	1,000 u	1,000 u	1,000 u	1,000 u

u - indicates that compound was not detected; above the limit indicated

NA = Not Available
DL = Dilution
RE = Reextraction
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587

AR301098

AR301099

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUNDWATER (Round 1)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW1	ND			
MW2-GW1	ND			
MW3-GW1	ND	1	2-Cyclohexen-1-one	
MW4-GW1	ND			
MW5-GW1	ND	1	2-Cyclohexen-1-one	
MW6-GW1	ND			
MW7-GW1	ND	6	Tetrachloroethene, Cyclic Compounds, Phosphoric Acid Ester, and Unknowns	
MW8-GW1	ND	12	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	
MW9-GW1	ND	15	Tetrachloroethene, Sub. 2-Propanol, Unknown Hydrocarbons, and Unknowns	
MW9-GW1A	ND	14	Tetrachloroethene, Unknown Hydrocarbons, and Unknowns	
MW10-GW1	ND	10	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	Note A
MW11-GW1	ND	6	Substituted 2-Propanol, 1H-Benzotriazole, and Unknowns	Note B
MW12-GW1	ND	6	Tetrachloroethene, Substituted 2-Propanol, and Unknowns	
MW13-GW1	ND	10	Tetrachloroethene and Unknowns	
AR1-GW1	ND			
AR2-GW1	ND			
AR2-GW1A	ND	1	Unknown Substituted Benzene	
AR3-GW1	ND			

Blank space indicates compound was not detected
ND=No target compounds detected
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.
Note B: No surrogate compounds detected; all non-detect data should be rejected.

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUNDWATER (Round 2)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW2	ND			
MW2-GW2	ND			
MW3-GW2	ND	2	Dodecanamide and Unknown	
MW4-GW2	ND			
MW5-GW2	ND			
MW6-GW2	ND			
MW7-GW2	ND	2	Phosphoric Acid Ester and Unknown Substituted Benzene	
MW8-GW2	ND	2	Substituted 2-Propanols and Unknowns	Note A
MW9-GW2	ND	2	Unknowns	
MW10-GW2	ND	5	Substituted 2-Propanols and Unknowns	
MW11-GW2RE	ND	4	Tetrachloroethene, Substituted Propanol, Substituted Benzene, and Unknown	Note B
MW12-GW2	ND	4	Substituted 2-Propanols, Unknown, and Unknown Substituted Benzene	
MW13-GW2	ND	7	Unknown and Unknown Substituted Benzene	

ND=No target compounds detected
RE=Reextraction
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.
Note B: Due to exceeding holding time, method detection limits should be considered estimated.

AR301100

AR301001

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND WATER SAMPLES
ROUND I

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW1 GW1	7750(b)	74.0	5.0U	27800(d)	16.2	5.5	14100(b,d)	5.4	0.2U	11.0U	3700	1.0U	24500	30.6(c,d)	2.5U(e)
MW1 GW1 F	34.9(a,b)	58.7	5.0U	23500(d)	5.0U	6.0	65.8(a,b,d)	6.4	0.2U	11.0U	2150	1.0U	26300	19.6(c,d)	NR
MW2 GW1	21900(b)	105	6.2	7930(d)	42.5	10.7	61800(b,d)	13.2	0.2U	13.1	5050	1.0U	7830	41.0(c,d)	2.5U(e)
MW2 GW1 F	35.3(a,b)	29.1	5.0U	6940(d)	5.0U	5.2	38.2(a,b,d)	1.0U	0.2U	11.0U	1770	1.0U	8670	3.4(a,c,d)	NR
MW3 GW1	5700(b)	53.7	5.0U	4290(d)	7.6	3.4	10900(b,d)	4.5	0.2U	11.0U	2900	1.0U	10100	15.7(a,c,d)	2.5U(e)
MW3 GW1 F	26.3(a,b)	25.2	5.0U	3750(d)	5.0U	1.0U	16.9(a,b,d)	1.0U	0.2U	11.0U	1580	1.0U	10100	7.2(a,c,d)	NR
MW4 GW1 D	391	2.0U	5.0U	1830	5.0U	5.1(a)	574	1.0U	0.2U	10.0U	937U	1.0U	110000	4.5	NR
MW4 GW1 T	58600	128.0	5.0U	5850	83.1	62.9(a)	137000	40.7	0.2U	19.3	6980	1.1	11100	70.1	ND
MW5 GW1	45900(b)	93.0	5.0U	4110(d)	72.0	19.5	96100(b,d)	28.7	0.2U	11.0U	9040	1.0U	115000	69.8(c,d)	2.5U(e)
MW5 GW1 F	31.1(a,b)	2.2	5.0U	943(d)	5.0U	3.2	29.5(a,b,d)	1.0U	0.2U	11.0U	937U	1.0U	112000	3.1(a,c,d)	NR
MW6 GW1	16100(b)	74.9	5.0U	10800(d)	22.8	8.8	35400(b,d)	16.4	0.2U	11.0U	4040	1.0U	9710	37.5(c,d)	2.5U(e)
MW6 GW1 F	ND(b)	16.0	5.0U	9140(d)	5.0U	2.6	16.2(a,b,d)	1.0U	0.2U	11.0U	1710	1.0U	10700	3.6(a,c,d)	NR
MW7 GW1	36700(b)	92.8	5.0U	3510(d)	48.3	66.3	56900(b,d)	26.4	0.34	24.4	5640	1.0U	265000	70.0(c,d)	78.4(f)
MW7 GW1 F	197(a,b)	6.6	5.0U	2180(d)	5.0U	16.3	1440(b,d)	1.0U	0.2U	11.0U	<937	1.0U	266000	4.6(a,c,d)	NR
MW8 GW1	12900(b)	106	7.7	19600(d)	15.5	8.3	27600(b,d)	7.9	0.2U	13.3	5500	1.0U	63400	28.3(c,d)	2.5U(e)
MW8 GW1 F	34.4(a,b)	57.6	5.0U	20200(d)	5.0U	3.1	216(b,d)	1.0U	0.2U	11.8	3880	1.0U	72100	10.9(a,c,d)	NR
MW9 GW1	11300(b)	222	5.0U	5360(d)	12.5	10.6	23300(b,d)	8.1	0.2U	11.0U	4290	1.0U	6720	33.0(c,d)	2.5U(e)
MW9 GW1 F	138(a,b)	161	5.0U	5050(d)	5.0U	2.9	90.9(a,b,d)	1.0U	0.2U	11.0U	2610	1.0U	6160	15.2(a,c,d)	NR
MW9 GW1A	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2.5U(e)
MW10 GW1	49600(b)	124	<5.0	138000(d)	40.5	17400	62300(b,d)	33.4	0.2U	530	15400	1.0U	255000	4060(c,d)	19.9(f)

U - Not detected above limmit indicated.
NR - Not Required
D - Dissolved Metals
F - Dissolved Metals
T - Total Metals
(a) - Value is less than five times the concentration of the contaminant in the associated blank and therefore may not be real.
(b) - Estimate value due to poor precision associated with matrix spike assessment.
(c) - Estimate value due to large variances between duplicate samples.
(d) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(e) - Reject value due to extended holding time.
(f) - Estimate value due to extended holding time.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND WATER SAMPLES
ROUND I (continued)

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW10 GW1 F	7700(b)	25.2	<5.0	160000(d)	<5.0	2550	53.8(a,b,d)	<1.0	<.2	597	11500	<1.0	277000	4550(c,d)	NR
MW11 GW1 D	24.3	29.7	ND	34100	ND	2.9(a)	501	ND	ND	24.7	3950(a)	ND	119000	158	NR
MW11 GW1 T	2950	40.5	ND	34000	5.5	2.4(a)	8470	2.6	ND	31.2	4750(a)	ND	116000	167	ND
MW12 GW1	6730(b)	44.8	<5.0	6610(d)	10.9	3.4	12700(b,d)	12.8	<.2	<11.0	1930	<1.0	139000	18.3(c,d)	<2.5(e)
MW12 GW1 F	22.6(a,b)	15.0	<5.0	7590(d)	<5.0	2.0	352(b,d)	<1.0	<.2	<11.0	1010	<1.0	156000	11.9(a,c,d)	NR
MW13 GW1	2960(b)	28.0	<5.0	26900(d)	<5.0	3.4	8320(b,d)	2.6	<.2	12.1	3580	<1.0	229000	47.5(c,d)	<2.5(e)
MW13 GW1 F	384(b)	19.3	<5.0	25400(d)	<5.0	2.1	1800(b,d)	<1.0	<.2	<11.0	1700	<1.0	243000	44.6(c,d)	NR
AR1 GW1	54900(c)	151	3.0U	5610	78.8	19.8	98500	39.9	0.2U	7.5	12400	1.0U	39100	117	10.0U
AR1 GW1 F	11.0U(c)	9.7	3.0U	2270	3.0U	5.5	17.8	1.0U	0.2U	5.0U	771	1.0U	40600	9.5	NR
AR2 GW1	25600(c)	86.6	3.0U	4690	53.2	16.8	88900	21.1	0.2U	5.0U	12600	1.0U	125000	54.7	11.6
AR2 GW1 F	35.4(a,c,f)	16.5	3.0U	3110(f)	3.0U	8.0(f)	198(f)	1.0U	0.2U	5.0U	7600	1.0U	137000	6.8	NR
AR2 GW1A	28000(c)	88.6	5.6(a)	4530	58.3	15.2	90600	22.4	0.2U	5.0U	13800	1.0U	120000	55.3	10.0U
AR2 GW1AF	470(c,f)	18.9	3.0U	3860(f)	3.0U	16.2(f)	1220(f)	1.0U	0.2U	5.0U	8320	1.0U	139000	5.8	NR
AR3 GW1	19700(c)	66.1	3.0U	6050	22.1	4.8	36300	14.8	0.2U	5.0U	2480	1.0U	118000	29.9	15.1
AR3 GW1 F	33.6(a,c)	6.8	3.0U	2420	5.9	2.9	51.6	1.0U	0.2U	5.0U	535	5.0U	120000	3.7	NR

U - Not detected above limit indicated.
NR - Not Required
D - Dissolved Metals
F - Dissolved Metals
T - Total Metals
(a) - Value is less than five times the concentration of the contaminant in the associated blank and therefore may not be real.
(b) - Estimate value due to poor precision associated with matrix spike assessment.
(c) - Estimate value due to large variances between duplicate samples.
(d) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(e) - Reject value due to extended holding time.
(f) - Estimate value due to extended holding time.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUNDWATER SAMPLES
ROUND II

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW1-GW2	3550	79.1	ND	18900	11.1	3.4	6070	3.9	ND	15.2(a)	2270(a)	ND(d)	24400	44.3	ND
MW1-GW2 F	30.6	71.1	ND	19100	ND	3.6	16.2	ND	ND	19.3(a)	1120(a)	ND(d)	24600	35.3	NR
MW2-GW2	5060	52.0	ND	9000	4.9	3.0	13400	ND	ND	ND(a)	1180(a)	ND(d)	6600	42.9	ND
MW2-GW2 F	11.0 U	35.2	ND	9620	ND	4.0	7.6	ND	ND	ND(a)	1840(a)	ND(d)	7280	10.2	NR
MW3 GW2 D	26.2	14.5	ND	4470	ND	6.0(a)	17.1(a)	4.6	ND	ND	979(a)	ND	4350	4.5	NR
MW3 GW2 T	1520	26.1	ND	4120	ND	4.7(a)	2570	1.9	ND	ND	ND(b)	ND	3690	6.3	ND
MW4 GW2	3.6(c)	82.8	ND	2900	ND	38.9	76500	28.0	ND	ND	4770	ND	1110000	56.6	10.0U
MW4 GW2 F	204(c)	26.1	ND	758	ND	6.2	224	2.0	ND	ND	1170	ND	108000	5.3	NR
MW5-GW2	18100	40.9	ND	1110	28.2	10.4	34500	11.6	ND	ND	3480	ND	119000	36.2(a)	ND(b)
MW5-GW2 F	89.8	2.9	ND	374	ND	5.8	154	ND	ND	ND	ND	ND	116000	10.2(a)	NR
MW6-GW2	22000	104	ND	10500	30.7	10.5	46700	19.5	ND	ND	3660	ND	10500	46.3(a)	ND(b)
MW6-GW2 F	48.6	20.5	ND	8630	ND	4.0	25.0	ND	ND	ND	896	ND	10400	10.1(a)	NR
MW7-GW2	26200	70.2	ND	2820	31.1	53.3	31200	23.1	ND	14.6	3070	ND	229000	63.0(a)	77.0(c)
MW7-GW2 F	332	3.7	ND	1830	ND	15.6	161	11.0	ND	ND	ND	ND	229000	10.1(a)	NR
MW8-GW2	8930	110	7.4	11000	16.3	2.8	17500	10.5	ND	10.1	3650	ND	60000	45.3(a)	16.0(c)
MW8-GW2 F	113	39.6	6.4	10400	ND	5.2	51.0	ND	ND	ND	1970	ND	62300	24.9(a)	NR
MW9-GW2	3910	243	ND	4960	5.2	ND	6980	ND	ND	ND	2290	ND	4280	28.6(a)	ND(b)
MW9-GW2 F	625	253	ND	5570	ND	4.7	89.0	ND	ND	ND	2320	ND	5130	35.0(a)	NR
MW10-GW2	32500	70.2	7.5	153000	22.4	730.0	29400	11.6	ND	550	11500	ND	246000	4080(a)	ND(b)
MW10-GW2 F	9810	22.3	7.2	153000	ND	653.0	276	ND	ND	567	8920	ND	247000	4100(a)	NR

LEGEND:

D - Dissolved Metals
T - Total Metals
F - Dissolved Metals
ND - Not Detected
NR - Not Requested
(a) - Estimate values due to precision problems associated with the laboratory duplicate.
(b) - Reject value due to extended holding times.
(c) - Estimate value due to extended holding times.

AR301103

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUNDWATER SAMPLES
ROUND II (continued)

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW11-GW2	1350	35.3	3.0 U	38500	4.1	3.4	5290	2.6	ND	18.4	4220	ND	100000	171	10 U
MW11-GW2 F	82.7	33.4	4.8	40200	ND	3.0	1670	ND	ND	11.9	3630	1.0 U	107000	175	NR
MW12-GW2	1040	17.6	ND	6190	ND	1.8	2160	ND	ND	ND	ND	ND	150000	17.4(a)	ND(b)
MW12-GW2 F	18.7	12.5	ND	5760	ND	2.4	338	ND	ND	ND	ND	ND	157000	10.6(a)	NR
MW13-GW2	2470	23.4	ND	26300	5.0	326.0	5560	ND	ND	ND	2720	1.3	227000	69.4(a)	ND(b)
MW13-GW2 F	494	11 8	ND	16700	ND	3.1	778	ND	ND	ND	1460	ND	235000	41.5(a)	NR

LEGEND:

D - Dissolved Metals
T - Total Metals
F - Dissolved Metals
ND - Not Detected
NR - Not Requested
(a) - Estimate values due to precision problems associated with the laboratory duplicate.
(b) - Reject value due to extended holding times.
(c) - Estimate value due to extended holding times.

TABLE
BLANK SUMMARY FOR VOLATILE ORGANIC ANALYSIS OF GROUNDWATER (Round 1, 4/17/90)
UG/KG

Associated Samples	MW7-GW1 MW8-GW1 Trip Blank 10 MW1-GW1	MW1-GW1	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW6-GW1MS MW6-GW1MSD	Epuipment Blank 2RE MW10-GW1RE MW12-GW1RE MW13-GW1RE MW9-GW1ADL MW9-GW1DL Trip Blank 11RE Trip Blank 12RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE Equipment Blank 2RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE Equipment Blank 2RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE
Blank Indenification	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equipment Blank 2RE

Compounds Detected (ug/L)	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equip Blank 2RE
Methylene Chloride	1			5	5	6	4
Acetone		15			9	10	10

AR301105

REC'D 10/12/90
-D. LAUSCH-

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

October 8, 1990

Ms. Sharon Wilcox
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Ms. Wilcox:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from September 1 through September 30, 1990. As indicated in the report, the soil erosion plan has not yet been implemented, due in part, to delays with the regulatory approval process. As a result of the delays, we have determined the need to extend the original schedule by possibly one to two additional months. I will be sending the new schedule to you before October 15, 1990, as you requested in our recent telephone conversation. Therefore, if VADWM would like to discuss the need for any additional field work, ICF KE should be informed as soon as possible in order to assist us in developing a realistic revised schedule. Additionally, we would greatly appreciate a copy of the wetland survey that was conducted at the site by Peter Stokely of EPA. Thank you for your time and attention in this matter.

Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Environmental Scientist

cc: Charles Perry
Gary Dietrich
Kim Hummel/Drew Lausch

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: September 1, 1990 -- October 30, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: October 4, 1990

Specific Accomplishments in Reporting Period:

- The summary tables for soils, ground water, surface water, and sediment data were revised to include detection limits, further improve consistency, and include minor changes to the last set of ground-water data (that were not incorporated into the September tables). The new tables are atttached for VADWM's review and should be used in place of the tables previously submitted.

- The site plan and ground-water contour plan were completed and are attached for your review.

- The erosion control plan developed by Weston Services, in conjunction with Allison and Associates, was approved by the VADWM, and the implementation planning process was initiated. However, delays in the approval process have resulted in delays to the overall RI/FS project.

- The risk assessment and ecological assessment continued and are currently in the calculation and data interpretation stage.

Projected Tasks to Be Completed in Upcoming Month:

- The following tasks are scheduled for October: continuation of the risk assessment and ecological assessment; possibly resampling of two or more wells to confirm intial data and slug testing; implementation of the erosion control plan; and start of the preliminary draft report.

- Based on the potential changes to the ground surface over the former pond area associated with the proposed erosion controls, confirmatory surface soil sampling will be postponed until the earthwork is complete and the area is relatively stable. As much as possible, remaining field tasks will be scheduled so as to combine efforts and maximize efficency.

Problems Encountered and Solutions:

- None.

AR301108

ATTACHMENT 1

REVISED SUMMARY TABLES

AR301109

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	1,2-Dichloroethene	Methylene Chloride	1,1,1-Trichloroethane	Carbon Tetrachloride	Trichloroethene	Tentatively Identified Compounds	Comments
SS21	0-6	6.0 U	11	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS22	0-6	6.0 U	11.0 U	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS23	0-6	6.0 U	13	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS24	0-6	97	50	21	6.0 U	4(c)	32	6	29		
SS25	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS26	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS27	0-6	6.0 U	11.0 U	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS28	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	Beta-Pinene	
SS29	0-6	6.0 U	11.0 U	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS30	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	3-Carene	
SS31	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U	3-Carene	
SS32	0-6	6.0 U	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS33	0-6	6.0 U	11.0 U	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS34	0-6	6.0 U	(8)	11.0 U	6.0 U	(5)	6.0 U	6.0 U	6.0 U		
SS35	0-6	6.0 U	98	16(e)	6.0 U	(12)	6.0 U	6.0 U	6.0 U	Ethanol	
SS36	0-6	3,300	3,200	(1,600)	930.0 U	930.0 U	930.0 U	930.0 U	930.0 U		Note A
SS37	0-6	600	60.0 U	60.0 U	30.0 U	30.0 U	20(d)	30.0 U	30.0 U		Note B
SS38	0-6	27	11.0 U	11.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SS39	0-6	19	12.0 U	12.0 U	6.0 U	6.0 U	6.0 U	6.0 U	6.0 U		
SP1	0-6	150(h)	62.0 U	62.0 U	580(h)	31.0 U	31.0 U	31.0 U	31.0 U		

U indicates the compound was not detected above limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Sample analyzed using medium level protocol which results in higher method detection limits.
Note B: Dilution of the sample in order to quantitate target compounds results in a increase in the method detection limit by a factor of five.

10/08/90

AR301011

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE SOIL SAMPLES

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SS21	0.63(c)	50.6	0.57 U	511	8.6(c)	88.0	7,010(c)	6.5(b)	0.11 U	5.2	237(c)	0.34 U	335(c)	23.8	0.54 U
SS22	0.64(c)	30.9	0.55 U	9,390	9.4(c)	116.0	7,610(c)	4.9(b)	0.11 U	4.4	494(c)	0.33 U	114(c)	31.4	0.62
SS23	0.67(c)	40.9	0.57 U	19,300	10.6(c)	156.0	8,480(c)	8.6(b)	0.10 U	5.9	860(c)	0.34 U	180(c)	48.4	4.40
SS24	0.54(c)	47.7	0.58 U	524	7.2(c)	12.8(b)	6,430(c)	7.2	0.12 U	3.2	173(c)	0.35 U	223(c)	19.6	2.20
SS25	0.98(c)	40.8	0.56 U	7,670	12.3(c)	181.0	10,500(c)	8.3	0.098 U	6.3	750(c)	0.67	339(c)	45.6	8.70
SS26	0.85(c)	35.7	0.57 U	15,900	10.4(c)	160.0	8,670(c)	7.9	0.095 U	3.7	456(c)	0.34 U	258(c)	76.7	1.30
SS27	0.57(c)	18.5	0.57 U	4,040	7.7(c)	31.8	4,970(c)	5.2	0.11 U	2.4	428(c)	0.34 U	53.3(c)	17.2	1.20
SS28	0.43(c)	42.1	0.60 U	1,010	6.8(c)	10.1(b)	6,910(c)	9.0	0.12 U	2.4	212(c)	0.36 U	107(c)	14.9	0.79
SS29	0.95	34.6	0.22 U	259	10.5	4.3	8,350	8.2	0.10 U	4.8	319	0.33 U(f)	43.6	14.4(e)	0.52 U
SS30	1.07	34.3	0.22 U	154	12.5	5.1	9,600	6.0	0.098 U	4.5	400	0.33 U(f)	15.7	14.9(e)	0.44 U
SS31	0.87	29.7	0.23 U	237	10.1	4.3	13,500	6.0	0.10 U	5.6	342	0.35 U(f)	34.7	12.9(e)	0.57 U
SS32	1.46(c)	67.5	0.58 U	671	19.0(c)	35.0	NR(c)	10.4	0.15	9.5	524(c)	0.35 U	37.3(c)	33.0	0.55 U
SS33	0.69(c)	17.6	0.56 U	316	7.1(c)	10.9(b)	6,510(c)	4.6 U	0.11 U	2.5	257(c)	0.33 U	29.9(c)	51.3	0.54 U
SS34	0.67(c)	35.2	0.56 U	1,930	11.6(c)	36.8	15,900(c)	8.6	0.099 U	5.2	461(c)	0.34 U	94.5(c)	20.7	0.74
SS35	0.10(c)	52.0	0.59 U	114	3.0(c)	2.7(b)	564(c)	6.6	0.10 U	1.3 U	150(c)	0.36 U	56.4(c)	1.9	0.53 U
SS36	0.85(c)	137.0	1.0	4,240	13.3(c)	7,800.0	12,300(c)	18.6	6.4	14.6	312(c)	0.49	138(c)	862.0	0.73 U
SS37	0.71(c)	56.7	0.57 U	667	9.7(c)	36.4	8,360(c)	9.7	0.11 U	3.9	222(c)	0.34 U	39.3(c)	20.4	0.55 U
SS38	0.58(c)	48.8	0.56 U	594	7.7(c)	31.4	6,920(c)	10.7	0.11 U	3.7	221(c)	0.34 U	60.2(c)	19.2	0.55 U
SS39	0.68(c)	36.5	0.58 U	742	8.7(c)	8.3(b)	8,720(c)	6.9	0.11 U	2.5	195(c)	0.35 U	81.5(c)	11.7	0.56 U

LEGEND:

U - Not detected above limit indicated.
NR - Not Requested
(b) - Sample results were less than five times the contaminant concentration found in the blanks and should be considered artifacts contributed by the blank.
(c) - Estimate due to precision problems associated with the matrix spike.
(e) - Potential chemical or physical interferences associated with ICP analysis.
(f) - Reject data based upon high potential for false negatives.

10/08/90

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE SOILS
in units of ug/kg

Sample ID	Depth	Di-n-butylphthalate	Bis(2-ethylhexyl)phthalate	Phenanthrene	Number of Tentatively Identified Compounds	Tentative Identification	Comments
SS21	0-6	380 U	380 U	380 U	12	Unknown Hydrocarbons; Unknowns	
SS22	0-6	370 U	370 U	370 U	12	Unknown Hydrocarbons; Unknowns	
SS23	0-6	490	270 U	370 U	14	Unknown Hydrocarbons; Unknowns	Note B
SS24	0-6	770 U	770 U	770 U	20	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
SS25	0-6	380 U	380 U	380 U	10	Unknown Hydrocarbons; Unknown Ketone; Unknowns	
SS26	0-6	390 U	310 (c)	390 U	18	Molecular Sulfur; Unknown Hydrocarbons	Note C
SS27	0-6	380 U	380 U	380 U	7	2,4-Dimethyl-3-heptanone; Unknowns	Note C
SS28	0-6	390 U	390 U	390 U	9	Unknown Hydrocarbons; Unknowns; Unknown Ketone	Note C
SS29	0-6	390 U	390 U	390 U	3	Unknown Ketone; Unknowns	Note E
SS30	0-6	400 U	400 U	400 U	5	Substituted Benzene; Unknowns; Unknown Ketone	Note E
SS31	0-6	400 U	400 U	400 U	5	Caryophyllene; Substituted Benzene; Unknowns	Note E
SS32	0-6	400 U	200 (c)	400 U	13	Unknowns	Note B
SS33	0-6	350 U	190 (c)	350 U	4	Unknown Hydrocarbons; Unknowns	Note A,B
SS34	0-6	370 U	370 U	370 U	19	Unknown Hydrocarbons; Unknowns; Aldehydes	Note B
SS35	0-6	390 U	390 U	390 U	5	Unknown Hydrocarbons; Unknowns	Note C
SS36	0-6	460 U	460 U	140 (c)	15	Hexadecanoic Acid; Organic Acids; Unknowns	Note B
SS37	0-6	390 U	390 U	390 U	10	Unknown Hydrocarbons; Unknowns	Note C
SS38	0-6	370 U	370 U	370 U	1	Unknown Ketone	Note C
SS39	0-6	370 U	370 U	370 U	7	Unknown Hydrocarbons; Unknowns	Note C
SP1	0-6	820 U	1,200	820 U	15	Benzenesulfonamide; Substituted Phenols; Unknowns	Note D

U indicates the compound was not detected above limit indicated.
(c) The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: Non-detect data for Di-n-octylphthalate, Benzo(b)flouranthene, Benzo(k)flouranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene should be rejected.
Note B: Non-detect data for 3,3'-Dichlorobenzidene should be rejected.
Note C: Non-detect data for Benzyl Alcohol and 4-Chloroaniline should be rejected.
Note D: Due to a substantial deviation of the first internal standard area, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropyl)ether, 2-Methylphenol, Hexachloroethane, 4-Methylphenol, and n-Nitroso-di-n-propylamine.
Note E: Sample extract was incorrectly diluted prior to analysis. This results in the method detection limit being increased by a factor of 1.1.

10/04/90

AR301112

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene
Background Federal ug/L	ND	0.033(f)	2.8(f)	ND	0.88(f)
ST1-SW1	10.0 U	23	34	5.0 U	39
ST2-SW1	(7)(c)	5	6	[5]	7
ST2-SW1A	(8)(c,e)	6	8	[5]	9
ST3-SW1	10.0 U	5.0 U	5.0 U	[5]	5.0 U
ST4-SW1	10.0 U	5.0 U	5.0 U	5.0 U	5.0 U
ST5-SW1	[7](c)	5.0 U	5.0 U	[4](c)	5.0 U
ST6-SW1	[7](c)	5.0 U	5.0 U	5.0 U	5.0 U
ST7-SW1	[9](c)	5.0 U	5.0 U	5.0 U	5.0 U

U indicates the compound was not detected above the limit indicated.
ND=Not Developed
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=45 FR 79,318-79,379; November 28, 1980.

10/09/90

AR301013

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Acetone	1,2-Dichloroethene	Trichloroethene	Methylene Chloride	Tetrachloroethene	Tentatively Identified Compounds
Background Federal ug/L	ND	0.033(g)	2.8(g)	ND	0.88(g)	
ST1-SW2	[8](c)	30	38	5.0 U	41	Unknown Hydrocarbon
ST1-SW2A	[10]	24	30	5.0 U	32(f)	
ST2-SW2	[8](c)	5	6	5.0 U	7(f)	
ST3-SW2	10.0 U	5.0 U	5.0 U	[2]	5.0 U	
ST4-SW2	10.0 U	5.0 U	5.0 U	[3]	5.0 U	
ST5-SW2	10.0 U	5.0 U	5.0 U	[2]	5.0 U	
ST6-SW2	10.0 U	5.0 U	5.0 U	[3]	5.0 U	
ST7-SW2	10.0 U	5.0 U	5.0 U	[2]	5.0 U	

U indicates the compound was not detected above the limit indicated.
ND=Not Developed
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(f)=Mass spectral criteria was not met for the identification of this compound; therefore, the compound is tentatively identified.
(g)=45 FR 79,318-79,379; November 28, 1980.

10/09/90

AR301114

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 1)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L	NA			Note A
ST1-SW1	18	1	1H-Benzotriazole	
ST2-SW1	10.0 U	0		
ST2-SW1A	10.0 U	0		
ST3-SW1	10.0 U	0		
ST4-SW1	10.0 U	0		
ST5-SW1	10.0 U	0		
ST6-SW1	10.0 U	0		
ST7-SW1	10.0 U	0		

U indicates the compound was not detected above the limit indicated.
Note A: No Federal Background Criteria Developed

10/09/90

AR301115

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SURFACE WATER (Round 2)
in units of ug/L

Sample ID	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentatively Identified Compounds	Comments
Background Federal ug/L	NA			Note A
ST1-SW2	10.0 U	4	Substituted Propanol; Substituted Benzene; Unknown	
ST1-SW2A	10.0 U	2	Substituted Propanol; Unknown	
ST2-SW2	10.0 U	4	Substituted Propanol; Unknown	
ST3-SW2	10.0 U	0		
ST4-SW2	(9)(c)	0		
ST5-SW2	(18)	0		
ST6-SW2	(18)	0		
ST7-SW2	(15)	0		

U indicates the compound was not detected above the limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
Note A: No Federal Background Criteria Developed
NA - Not Applicable.

10/09/90

AR301116

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE WATER SAMPLES
ROUND I

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
ST1-SW1	157(a)	17.6	2.0 U	5,240	9.0 U	3.4	788	1.0 U	0.2 U	18.0 U	2,510 U(a)	1.0 U	94,300	21.0(a,c)	NR
ST1-SW1	1,190	21.2	2.0 U	5,750	9.0 U	6.3	2,640	1.0 U	0.2 U	18.0 U	2,780(a)	1.0 U	99,100	20.6(a,c)	10 U(d)
ST2-SW1	696	91.8	2.0 U	22,800	9.0 U	3.2	5,570	1.0 U	0.2 U	18.0 U	11,000(a)	1.0 U	46,800	20.1(a,c)	10 U(d)
ST2-SW1 F	44.0(a)	132.0	2.0 U	34,000	9.0 U	1.7	4,520	1.0 U	0.2 U	18.0 U	14,500(a)	1.0 U	17,300	9.6(a,c)	NR
ST2-SW1A	643(a)	91.8	2.0 U	21,100	9.0 U	3.0	5,230	1.0 U	0.2 U	18.0 U	8,920(a)	1.0 U	42,200	9.6(a,c)	10 U(d)
ST2-SW1A	161(a)	63.6	2.0 U	16,300	9.0 U	2.9	2,060	1.0 U	0.2 U	18.0 U	7,260(a)	1.0 U	58,400	10.1(a,c)	NR
ST3-SW1	547(a)	67.1	2.0 U	10,900	9.0 U	2.7	2,350	1.1	0.2 U	18.0 U	6,460(a)	1.0 U	20,200	10.1(a,c)	16.2(e)
ST3-SW1 F	76.5(a)	56.5	2.0 U	10,800	9.0 U	2.8	728	1.0 U	0.2 U	18.0 U	6,120(a)	1.0 U	21,000	10.4(a,c)	NR
ST4-SW1	440(a)	56.5	6.9	3,550	9.0 U	1.5	1,360	1.1	0.2 U	18.0 U	2,680(a)	1.0 U	9,000	18.2(a,c)	10 U(d)
ST4-SW1 F	76.3(a)	49.4	4.0	3,440	9.0 U	3.1	305	1.0 U	0.2 U	18.0 U	2,570(a)	1.0 U	9,120	60.8(a,c)	NR
ST5-SW1	533(a)	49.4	8.0	5,120	9.0 U	4.1	1,780	1.0 U	0.2 U	18.0 U	3,660(a)	1.0 U	11,800	15.5(a,c)	10 U(d)
ST5-SW1 F	23.6(a)	44.1	8.0	5,300	9.0 U	4.2	418	1.0 U	0.2 U	18.0 U	3,670(a)	1.0 U	12,800	15.7(a,c)	NR
ST6-SW1	305(a)	25.2	7.9	3,910	9.0 U	3.4	1,410	1.0 U	0.2 U	18.0 U	3,970(a)	1.0 U	8,300	10.3(a,c)	10 U(d)
ST6-SW1 F	16.7(a)	23.8	4.0	3,600	9.0 U	7.4	365	2.4	0.2 U	18.0 U	2,510 U(a)	1.0 U	8,720	10.4(a,c)	NR
ST7-SW1	350(a)	28.2	2.0 U	3,140	9.0 U	1.3	1,750	1.0 U	0.2 U	18.0 U	3,900(a)	1.0 U	4,490	20.9(a,c)	10 U(d)
ST7-SW1 F	14.5(a)	24.7	4.0	2,840	9.0 U	3.3	302	1.0 U	0.2 U	18.0 U	2,510 U(b)	1.0 U	4,760	10.5(a,c)	NR

U - Not detected above limit indicated.
NR - Not Required
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate results deviated by greater than 20% indicating precision problems.
(d) - Detection limits should be estimated due to extended holding times.
(e) - Estimate value due to extended holding time.

10/05/90

AR301117

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SURFACE WATER SAMPLES
ROUND II

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
ST1-SW2	3,570	26.8(d)	5.0 U	6,100	5.0 U	16.8	5,190	3.5(a)	0.20 U	10.0 U	1,140(c)	1.0 U	113,000	14.8(a,c)	4.7 U(f)
ST1-SW2 F	126(a)	12.1(d)	5.0 U	6,270	5.0 U	5.3	495	3.5 U	0.20 U	10.0 U	2,230(c)	1.0 U	115,000	5.3(a,c)	NR
ST1-SW2A	3,630	26.5(d)	5.0 U	6,640	6.7	13.7	5,750	2.9(a)	0.20 U	10.0 U	2,320(c)	1.0 U	116,000	25.1(a,c)	5.0 U(f)
ST1-SW2A F	55.7(a)	15.4(d)	5.0 U	6,690	5.0 U	3.8	343	1.0 U	0.20 U	10.0 U	3,190(c)	1.0 U	117,000	5.2(a,c)	NR
ST2-SW2	2,400	81.6(d)	5.0 U	17,300	5.0 U	9.9	6,960	3.1	0.20 U	10.0 U	5,830(c)	1.0 U	67,900	19.6(a,c)	4.6 U(f)
ST2-SW2 F	159	35.3(d)	5.0 U	11,200	5.0 U	2.9	1,060	1.0 U	0.20 U	10.0 U	3,820(c)	1.0 U	95,700	10.3(a,c)	NR
ST3-SW2	1,370	75.8(d)	5.0 U	12,100	7.3	4.7	3,670	1.0 U	0.20 U	10.0 U	5,410	1.0 U	26,100	9.8(a,c)	10.5(g)
ST3-SW2 F	50.9(a)	64.0(d)	5.0 U	12,500	5.0 U	3.1	738	1.0 U	0.20 U	10.0 U	6,190	1.0 U	27,200	10.3(a,c)	NR
ST4-SW2	319	61.4(d)	5.0 U	3,720	5.2	1.0	1,340	2.1(a)	0.20 U	10.0 U	3,040	1.0 U	10,500	23.4(a,c)	2.5 U(f)
ST4-SW2 F	37.7(a)	53.0(d)	5.0 U	3,450	5.0 U	1.6	369	1.0 U	0.20 U	10.0 U	871	1.0 U	10,700	12.5(a,c)	NR
ST5-SW2	1,060	64.7(d)	5.0 U	6,940	5.0 U	5.9	3,490	1.6(a)	0.20 U	10.0 U	3,440	1.0 U	16,500	20.3(a,c)	2.5 U(f)
ST5-SW2 F	53.8(a)	50.8(d)	5.0 U	6,340	5.0 U	3.4	676	1.0 U	0.20 U	10.0 U	3,360	1.0 U	16,300	12.4(a,c)	NR
ST6-SW2	638	38.2(d)	5.0 U	5,060	5.0 U	3.4	6,070	1.0 U	0.20 U	10.0 U	1,000	1.0 U	11,100	9.4(a,c)	2.5 U(f)
ST6-SW2 F	24.4(a)	28.0(d)	5.0 U	5,230	5.0 U	3.7	1,620	1.0 U	0.20 U	10.0 U	2,050	1.0 U	12,200	9.8(a,c)	NR
ST7-SW2	211	32.4(d)	5.0 U	3,590	5.0 U	1.0	4,480	2.1(a)	0.20 U	10.0 U	2,190	1.0 U	4,320	9.7(a,c)	3.4 U(f)
ST7-SW2 F	26.6(a)	25.8(d)	5.0 U	3,560	5.0 U	1.8	1,620	1.0 U	0.20 U	10.0 U	1,700	1.0 U	4,730	7.3(a,c)	NR

LEGEND:

U - Not detected above limit indicated.
NR - Not Required
(a) - Sample result is less than five times the concentration of the associated blank and should not be considered real.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(f) - Reject value due to extended holding time.
(g) - Estimate value due to extended holding times.

10/08/90

AR301118

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR GROUND WATER (Round 1)
in units of ug/L

Sample ID	Acetone	2-Butanone	1,1-Dichloroethene	1,2-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Methylene Chloride	1,1-Dichloroethane	Comment
Federal Standards ug/L	NA	NA	7(f)	270(h)	200(f)	5(f)	5(g)	150(h)	NA	
MW1-GW1	190(e)	100(b)	25 U	25 U	25 U	25 U	25 U	25 U	25 U	Note A
MW2-GW1RE	10 U	10 U	5 U	5 U	5 U	120(a)	5 U	5 U	5 U	Note B
MW3-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	Note B
MW4-GW1	10 U	10 U	5 U	5 U	5 U	5 U	5 U	(5)	5 U	
MW5-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	Note B
MW6-GW1RE	10 U	10 U	5 U	5 U	5 U	5 U	17(a)	5 U	5 U	Note B
MW7-GW1	10 U	10 U	4(c)	4 U	4(c)	9	48	5 U	5 U	Note C
MW8-GW1	1,300(e)	1,000 U	710	500 U	620	1,100	8,200	500 U	500 U	Note A
MW9-GW1DL	20,000 U	20,000 U	9,900(d,a)	10,000 U	150,000(a)	10,000 U	26,000(a)	(14,000)	10,000 U	Note B
MW9-GW1ADL(Dup)	20,000 U	20,000 U	9,800(d,a)	10,000 U	140,000(a)	10,000 U	26,000(a)	(15,000)	10,000 U	Note B
MW10-GW1RE	1,000 U	1,000 U	1,300(a)	500 U	1,900(a)	4,200(a)	12,000(a)	(700)	500 U	Note B
MW11-GW1	50 U	50 U	280	33	320	480	8,000	(30)	42	Note D
MW12-GW1RE	1,000 U	1,000 U	390(d)	500 U	520(a)	980(a)	16,000(a)	(470)	500 U	Note B
MW13-GW1RE	1,000 U	1,000 U	500 U	560(a)	320(a,d)	1,300(a)	12,000(a)	(430)	500 U	Note B
AR1-GW1	10 U	10 U	5 U	5 U	5 U	3(c)	19(b)	5 U	5 U	
AR2-GW1	200 U	200 U	200(b)	100 U	260	990(b)	880(b)	100 U	100 U	
AR2-GW1A	200 U	200 U	280(b)	100 U	350	1,300(b)	1,200(b)	100 U	100 U	
AR3-GW1	500 U	500 U	250 U	4,400	900	4,200	4,300(e)	180(d)	250 U	

NA=Not Available
DL=Dilution
RE=Reextraction
U indicates compound was not detected above the limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
(a)=Due to laboratory data recording problems the original analysis is not usable.
The reanalysis exceeded the holding time; therefore, the value is considered estimated.
The compound is tentatively identified.
The compound is tentatively identified and quantitated at less than the method detection limit.
Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
Proposed
Suggested No Adverse Response Levels (SNARLS)
A: Non-detected data for Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
B: As a result of not meeting holding time, the method quantitation limits are considered estimated for all target compounds.
C: Non-detect data for Acetone, Carbon Disulfide, Vinyl Acetate, 4-Methyl-2-petanone, and 2-Hexanone should be rejected.
D: The value - Tetrachloroethene was determined from a dilution.

10/09/90

AR301119

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR GROUND WATER (Round 2)
in units of ug/L

Sample ID	1,1-Dichloroethene	1,1,1-Trichloroethane	Trichloroethene	Tetrachloroethene	Carbon Disulfide	Methylene Chloride	Chloroform	Acetone
Federal Standards	7(f)	200(f)	5 (f)	5 (g)	NA	150(i)	NA(h)	NA
MW1-GW2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
MW2-GW2	5	5	94	5 U	39	5 U	5 U	5 U
MW3-GW2	5 U	5 U	5 U	5 U	5 U	5	5 U	5 U
MW4-GW2	5 U	5 U	5 U	5 U	5 U	4(c)	5 U	18
MW5-GW2	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
MW6-GW2	5 U	5 U	5 U	22	5 U	5 U	5 U	5 U
MW7-GW2	10 U	10 U	6 (c)	110	10 U	10 U	17	10 U
MW8-GW2	510	530	800	5,400	500 U	500 U	500 U	500 U
MW9-GW2	2,600	36,000	2,500 U	6,800	2,500 U	2,500 U	2,500 U	2,500 U
MW10-GW2	1,900 (d)	5,200	4,700	14,000	2,500 U	2,500 U	2,500 U	2,500 U
MW11-GW2	260 (b)	310	560 (b)	6,800 (b)	250 U	200(d)	250 U	600
MW12-GW2	1,000 U	600 (d)	700 (d)	7,700	1,000 U	1,000 U	1,000 U	1,000 U
MW13-GW2	1,000 U	1,000 U	670 (d)	5,800	1,000 U	1,000 U	1,000 U	1,000 U

U indicates that compound was not detected above the limit indicated.
NA = Not Available
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
(h)=A Maximum Contaminant Level has been established for total trihalomethanes at 0.10 mg/l (which includes chloroform).
(i)=Suggested No Adverse Response Levels (SNARLS)

10/09/90

AR301120

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUND WATER (Round 1)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW1	ND	0		
MW2-GW1	ND	0		
MW3-GW1	ND	1	2-Cyclohexen-1-one	
MW4-GW1	ND	0		
MW5-GW1	ND	1	2-Cyclohexen-1-one	
MW6-GW1	ND	0		
MW7-GW1	ND	6	Tetrachloroethene, Cyclic Compounds, Phosphoric Acid Ester, and Unknowns	
MW8-GW1	ND	12	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	
MW9-GW1	ND	15	Tetrachloroethene, Sub. 2-Propanol, Unknown Hydrocarbons, and Unknowns	
MW9-GW1A	ND	14	Tetrachloroethene, Unknown Hydrocarbons, and Unknowns	
MW10-GW1	ND	10	Tetrachloroethene, Substituted 2-Propanols, Organosulfer Compounds, and Unknowns	Note A
MW11-GW1	ND	6	Substituted 2-Propanol, 1H-Benzotriazole, and Unknowns	Note B
MW12-GW1	ND	6	Tetrachloroethene, Substituted 2-Propanol, and Unknowns	
MW13-GW1	ND	10	Tetrachloroethene and Unknowns	
AR1-GW1	ND	0		
AR2-GW1	ND	0		
AR2-GW1A	ND	1	Unknown Substituted Benzene	
AR3-GW1	ND	0		

ND=No target compounds detected
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.
Note B: No surrogate compounds detected; all non-detect data should be rejected.

10/04/90

AR 201121

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR GROUND WATER (Round 2)
in units of ug/L

Sample ID	Target Compound List Detected	Number of Tentatively Identified Compounds	Tentative Identifications	Comments
MW1-GW2	ND	0		
MW2-GW2	ND	0		
MW3-GW2	ND	2	Dodecanamide and Unknown	
MW4-GW2	ND	0		
MW5-GW2	ND	0		
MW6-GW2	ND	0		
MW7-GW2	ND	2	Phosphoric Acid Ester and Unknown Substituted Benzene	
MW8-GW2	ND	2	Substituted 2-Propanols and Unknowns	Note A
MW9-GW2	ND	2	Unknowns	
MW10-GW2	ND	5	Substituted 2-Propanols and Unknowns	
MW11-GW2RE	ND	4	Tetrachloroethene, Substituted Propanol, Substituted Benzene, and Unknown	Note B
MW12-GW2	ND	4	Substituted 2-Propanols, Unknown, and Unknown Substituted Benzene	
MW13-GW2	ND	7	Unknown and Unknown Substituted Benzene	

ND=No target compounds detected
RE=Reextraction
Note A: Due to the recovery of an acid surrogate at less than 10% for this sample, non-detect data for the acid fraction should be rejected.
Note B: Due to exceeding holding time, method detection limits should be considered estimated.

10/08/90

AR301122

AR301123

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND-WATER SAMPLES
ROUND I

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW1 GW1	7,750(b)	74.0	5.0 U	27,800(d)	16.2	5.5	14,100(b,d)	5.4	0.2 U	11.0 U	3,700	1.0 U	24,500	30.6(c,d)	2.5 U(e)
MW1 GW1 F	34.9(a,b)	58.7	5.0 U	23,500(d)	5.0 U	6.0	65.8(a,b,d)	6.4	0.2 U	11.0 U	2,150	1.0 U	26,300	19.6(c,d)	NR
MW2 GW1	21,900(b)	105	6.2	7,930(d)	42.5	10.7	61,800(b,d)	13.2	0.2 U	13.1	5,050	1.0 U	7,830	41.0(c,d)	2.5 U(e)
MW2 GW1 F	35.3(a,b)	29.1	5.0 U	6,940(d)	5.0 U	5.2	38.2(a,b,d)	1.0 U	0.2 U	11.0 U	1,770	1.0 U	8,670	3.4(a,c,d)	NR
MW3 GW1	5,700(b)	53.7	5.0 U	4,290(d)	7.6	3.4	10,900(b,d)	4.5	0.2 U	11.0 U	2,900	1.0 U	10,100	15.7(a,c,d)	2.5 U(e)
MW3 GW1 F	26.3(a,b)	25.2	5.0 U	3,750(d)	5.0 U	1.0 U	16.9(a,b,d)	1.0 U	0.2 U	11.0 U	1,580	1.0 U	10,100	7.2(a,c,d)	NR
MW4 GW1	58,600	128	5.0 U	5,850	83.1	62.9(a)	137,000	40.7	0.2 U	19.3	6,980	1.1	11,100	70.1	10 U
MW4 GW1 F	391	2.0 U	5.0 U	1,830	5.0 U	5.1(a)	574	1.0 U	0.2 U	10.0 U	937 U	1.0 U	110,000	4.5	NR
MW5 GW1	45,900(b)	93.0	5.0 U	4,110(d)	72.0	19.5	96,100(b,d)	28.7	0.2 U	11.0 U	9,040	1.0 U	115,000	69.8(c,d)	2.5 U(e)
MW5 GW1 F	31.1(a,b)	2.2	5.0 U	943(d)	5.0 U	3.2	29.5(a,b,d)	1.0 U	0.2 U	11.0 U	937 U	1.0 U	112,000	3.1(a,c,d)	NR
MW6 GW1	16,100(b)	74.9	5.0 U	10,800(d)	22.8	8.8	35,400(b,d)	16.4	0.2 U	11.0 U	4,040	1.0 U	9,710	37.5(c,d)	2.5 U(e)
MW6 GW1 F	21.0 U(b)	16.0	5.0 U	9,140(d)	5.0 U	2.6	16.2(a,b,d)	1.0 U	0.2 U	11.0 U	1,710	1.0 U	10,700	3.6(a,c,d)	NR
MW7 GW1	36,700(b)	92.8	5.0 U	3,510(d)	48.3	66.3	56,900(b,d)	26.4	0.34	24.4	5,640	1.0 U	265,000	70.0(c,d)	78.4(f)
MW7 GW1 F	197(a,b)	6.6	5.0 U	2,180(d)	5.0 U	16.3	1,400(b,d)	1.0 U	0.2 U	11.0 U	937 U	1.0 U	266,000	4.6(a,c,d)	NR
MW8 GW1	12,900(b)	106	7.7	19,600(d)	15.5	8.3	27,600(b,d)	7.9	0.2 U	13.3	5,500	1.0 U	63,400	28.3(c,d)	2.5 U(e)
MW8 GW1 F	34.4(a,b)	57.6	5.0 U	20,200(d)	5.0 U	3.1	216(b,d)	1.0 U	0.2 U	11.8	3,880	1.0 U	72,100	10.9(a,c,d)	NR
MW9 GW1	11,300(b)	222	5.0 U	5,360(d)	12.5	10.6	23,300(b,d)	8.1	0.2 U	11.0 U	4,290	1.0 U	6,720	33.0(c,d)	2.5 U(e)
MW9 GW1 F	138(a,b)	161	5.0 U	5,050(d)	5.0 U	2.9	90.9(a,b,d)	1.0 U	0.2 U	11.0 U	2,610	1.0 U	6,160	15.2(a,c,d)	NR
MW9 GW1A(dup)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2.5 U(e)
MW10 GW1	49,600(b)	124.0	5.0 U	138,000(d)	40.5	17,400	62,300(b,d)	33.4	0.2 U	530	15,400	1.0 U	255,000	4,060(c,d)	19.9(f)

U - Not detected above limit indicated.
NR - Not Required
MW1 GW1 = total metals; MW1 GW1 F = filtered or dissolved metals
(a) - Value is less than five times the concentration of the contaminant in the associated blank and therefore may not be real.
(b) - Estimate value due to poor precision associated with matrix spike assessment.
(c) - Estimate value due to large variances between duplicate samples.
(d) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(e) - Reject value due to extended holding time.
(f) - Estimate value due to extended holding time.

10/08/90

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND-WATER SAMPLES
ROUND I (continued)

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW10 GW1 F	7,700(b)	25.2	5.0 U	160,000(d)	5.0 U	2,550	53.8(a,b,d)	1.0 U	0.2 U	597	11,500	1.0 U	277,000	4,550(c,d)	NR
MW11 GW1	2,950	40.5	5.0 U	34,000	5.5	2.4(a)	8,470	2.6	0.2 U	31.2	4,750(a)	1.0 U	116,000	167	10.0 U
MW11 GW1 F	24.3	29.7	5.0 U	34,100	5.0 U	2.9(a)	501	1.0 U	0.2 U	24.7	3,950(a)	1.0 U	119,000	158	NR
MW12 GW1	6,730(b)	44.8	5.0 U	6,610(d)	10.9	3.4	12,700(b,d)	12.8	0.2 U	11.0 U	1,930	1.0 U	139,000	18.3(c,d)	2.5 U(e)
MW12 GW1 F	22.6(a,b)	15.0	5.0 U	7,590(d)	5.0 U	2.0	352(b,d)	1.0 U	0.2 U	11.0 U	1,010	1.0 U	156,000	11.9(a,c,d)	NR
MW13 GW1	2,960(b)	28.0	5.0 U	26,900(d)	5.0 U	3.4	8,320(b,d)	2.6	0.2 U	12.1	3,580	1.0 U	229,000	47.5(c,d)	2.5 U(e)
MW13 GW1 F	384(b)	19.3	5.0 U	25,400(d)	5.0 U	2.1	1,800(b,d)	1.0 U	0.2 U	11.0 U	1,700	1.0 U	243,000	44.6(c,d)	NR
AR1 GW1	54,900(c)	151	3.0 U	5,610	78.8	19.8	98,500	39.9	0.2 U	7.5	12,400	1.0 U	39,100	117	10.0 U
AR1 GW1 F	11.0 U(c)	9.7	3.0 U	2,270	3.0 U	5.5	17.8	1.0 U	0.2 U	5.0 U	771	1.0 U	40,600	9.5	NR
AR2 GW1	25,600(c)	86.6	3.0 U	4,690	53.2	16.8	88,900	21.1	0.2 U	5.0 U	12,600	1.0 U	125,000	54.7	11.6
AR2 GW1 F	35.4(a,c,f)	16.5	3.0 U	3,110(f)	3.0 U	8.0(f)	198(f)	1.0 U	0.2 U	5.0 U	7,600	1.0 U	137,000	6.8	NR
AR2 GW1A	28,000(c)	88.6	5.6(a)	4,530	58.3	15.2	90,600	22.4	0.2 U	5.0 U	13,800	1.0 U	120,000	55.3	10.0 U
AR2 GW1AF	470(c,f)	18.9	3.0 U	3,860(f)	3.0 U	16.2(f)	1,220(f)	1.0 U	0.2 U	5.0 U	8,320	1.0 U	139,000	5.8	NR
AR3 GW1	19,700(c)	66.1	3.0 U	6,050	22.1	4.8	36,300	14.8	0.2 U	5.0 U	2,480	1.0 U	118,000	29.9	15.1
AR3 GW1 F	33.6(a,c)	6.8	3.0 U	2,420	5.9	2.9	51.6	1.0 U	0.2 U	5.0 U	535	5.0 U	120,000	3.7	NR

U - Not detected above limit indicated.
NR - Not Required
MW1 GW1 = Total metals; MW1 GW1 F = Filtered or dissolved metals.
(a) - Value is less than five times the concentration of the contaminant in the associated blank and therefore is considered non-detectable.
(b) - Estimate value due to poor precision associated with matrix spike assessment.
(c) - Estimate value due to large variances between duplicate samples.
(d) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(e) - Reject value due to extended holding time.
(f) - Estimate value due to extended holding time.

10/08/90

R301124

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND-WATER SAMPLES
ROUND II

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW1-GW2	3,550	79.1	4.0 U	18,900	11.1	3.4	6,070	3.9	0.20 U	15.2(a)	2,270(a)	1.0 U(d)	24,400	44.3	5.0 U
MW1-GW2 F	30.6	71.1	4.0 U	19,100	4.0 U	3.6	16.2	3.0 U	0.20 U	19.3(a)	1,120(a)	1.0 U(d)	24,600	35.3	NR
MW2-GW2	5,060	52.0	4.0 U	9,000	4.9	3.0	13,400	3.0 U	0.20 U	10.0 U(a)	1,180(a)	1.0 U(d)	6,600	42.9	5.0 U
MW2-GW2 F	11.0 U	35.2	4.0 U	9,620	4.0 U	4.0	7.6	3.0 U	0.20 U	10.0 U(a)	1,840(a)	1.0 U(d)	7,280	10.2	NR
MW3 GW2	1,520	26.1	5.0 U	4,120	5.0 U	4.7(a)	2,570	1.9	0.20 U	10.0 U	871 U(b)	1.0 U	3,690	6.3	10.0 U
MW3 GW2 F	26.2	14.5	5.0 U	4,470	5.0 U	6.0(a)	17.1(a)	4.6	0.20 U	10.0 U	979(a)	1.0 U	4,350	4.5	NR
MW4 GW2	36,200(c)	83.8	3.0 U	2,900	50.3 U	38.9	76,500	28.0	0.20 U	5.0 U	4,770	1.0 U	110,000	56.6	10.0 U
MW4 GW2 F	204(c)	1.0 U	3.0 U	758	3.0 U	6.2	224	2.0	0.20 U	5.0 U	1,170	1.0 U	108,000	5.3	NR
MW5-GW2	18,100	40.9	5.0 U	1,110	28.2	10.4	34,500	12.6	0.20 U	10.0 U	3,480	1.0 U	119,000	36.2(a)	10.0 U(b)
MW5-GW2 F	89.8	2.9	5.0 U	374	5.0 U	5.8	154	3.0 U	0.20 U	10.0 U	871 U	1.0 U	116,000	10.2(a)	NR
MW6-GW2	22,000	104	5.0 U	10,500	30.7	10.5	46,700	19.5	0.20 U	10.0 U	3,660	1.0 U	10,500	46.3(a)	10.0 U(b)
MW6-GW2 F	48.6	20.5	5.0 U	8,630	5.0 U	4.0	25.0	3.0 U	0.20 U	10.0 U	896	1.0 U	10,400	10.1(a)	NR
MW7-GW2	26,200	70.2	5.0 U	2,820	31.1	53.3	31,200	23.1	0.20 U	14.6	3,070	1.0 U	229,000	63.0(a)	77.0(c)
MW7-GW2 F	332	3.7	5.0 U	1,830	5.0 U	15.6	161	11.0	0.20 U	10.0 U	871 U	1.0 U	229,000	10.1(a)	NR
MW8-GW2	8,930	110	7.4	11,000	16.3	2.8	17,500	10.5	0.20 U	10.1	3,650	1.0 U	60,000	45.3(a)	16.0(c)
MW8-GW2 F	113	39.6	6.4	10,400	5.0 U	5.2	51.0	3.0 U	0.20 U	10.0 U	1,970	1.0 U	62,300	24.9(a)	NR
MW9-GW2	3,910	241	5.0 U	4,960	5.2	10.0 U	6,980	3.0 U	0.20 U	10.0 U	2,290	1.0 U	4,280	28.6(a)	10.0 U(b)
MW9-GW2 F	625	251	5.0 U	5,570	5.0 U	4.7	89.0	3.0 U	0.20 U	10.0 U	2,320	1.0 U	5,130	35.0(a)	NR
MW10-GW2	32,500	70.2	7.5	153,000	22.4	730.0	29,400	11.6	0.20 U	550	11,500	1.0 U	246,000	4,080(a)	10.0 U(b)
MW10-GW2 F	9,810	22.3	7.2	153,000	5.0 U	653.0	276	3.0 U	0.20 U	567	8,920	1.0 U	247,000	4,100(a)	NR

LEGEND:

U - Not detected above limit indicated.
NR - Not Requested
(a) - Estimate values due to precision problems associated with the laboratory duplicate.
(b) - Reject value due to extended holding times.
(c) - Estimate value due to extended holding times.

10/08/90

AR301125

ARROWHEAD PLATING SITE
INORGANIC DATA FOR GROUND-WATER SAMPLES
ROUND II (continued)

Sample ID	Aluminum ug/L	Barium ug/L	Cadmium ug/L	Calcium ug/L	Chromium ug/L	Copper ug/L	Iron ug/L	Lead ug/L	Mercury ug/L	Nickel ug/L	Potassium ug/L	Silver ug/L	Sodium ug/L	Zinc ug/L	Cyanide ug/L
MW11-GW2	1,350	35.3	3.0 U	38,500	4.1	3.4	5,920	2.6	0.20 U	18.4	4,220	1.0 U	100,000	171	10 U
MW11-GW2 F	82.7	33.4	4.8	40,200	3.0 U	3.0	1,670	1.0 U	0.20 U	11.9	3,630	1.0 U	107,000	175	NR
MW12-GW2	1,040	17.6	5.0 U	6,190	5.0 U	1.8	2,160	3.0 U	0.20 U	10.0 U	871 U	1.0 U	150,000	17.4(a)	10.0 U(b)
MW12-GW2 F	16.7	12.5	5.0 U	5,760	5.0 U	2.4	338	3.0 U	0.20 U	10.0 U	871 U	1.0 U	157,000	10.6(a)	NR
MW13-GW2	2,470	23.4	5.0 U	26,300	5.0	326.0	5,560	3.0 U	0.20 U	10.0 U	2,720	1.3	227,000	69.4(a)	10.0 U(b)
MW13-GW2 F	494	11.8	5.0 U	16,700	5.0 U	3.1	778	3.0 U	0.20 U	10.0 U	1,460	1.0 U	235,000	41.5(a)	NR

LEGEND:

U - Not detected above limit indicated.
NR - Not Requested
(a) - Estimate values due to precision problems associated with the laboratory duplicate.
(b) - Reject value due to extended holding times.

10/08/90

TABLE
BLANK SUMMARY FOR VOLATILE ORGANIC ANALYSIS OF GROUND WATER (Round 1, 4/17/90)
UG/KG

Associated Samples	MW7-GW1 MW8-GW1 Trip Blank 10 MW1-GW1	MW1-GW1	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW6-GW1MS MW6-GW1MSD	Epuipment Blank 2RE MW10-GW1RE MW12-GW1RE MW13-GW1RE MW9-GW1ADL MW9-GW1DL Trip Blank 11RE Trip Blank 12RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE Equipment Blank 2RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE Equipment Blank 2RE	MW2-GW1RE MW3-GW1RE MW5-GW1RE MW6-GW1RE MW7-GW1 MW8-GW1 MW9-GW1DL MW9-GW1ADL MW10-GW1RE MW12-GW1RE MW13-GW1RE
Blank Indenification	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equipment Blank 2RE

Compounds Detected (ug/L)	VBLK17	Trip Blank 10	VBLK09	VBLK21	Trip Blank 11RE	Trip Blank 12RE	Equip Blank 2RE
Methylene Chloride	1	0	0	5	5	6	4
Acetone	0	15	0	0	9	10	10

10/04/90

AR301127

ARROWHEAD PLATING SITE
VOLATILE ORGANICS ANALYSIS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	1,2-Dichloroethene ug/kg	Trichloroethene ug/kg	Tetrachloroethene ug/kg	Acetone ug/kg	2-Butanone ug/kg	Comments
ST1-SD1	6 (c)	7 (b)	18	15.0 U	15.0 U	
ST2-SD1	7.0 U	7.0 U	7.0 U	9 (c,e)	14.0 U	
ST2-SD1A	7.0 U	7.0 U	7.0 U	14.0 U	14.0 U	
ST3-SD1	7.0 U	7.0 U	7.0 U	13.0 U	13.0 U	
ST4-SD1	8.0 U	8.0 U	8.0 U	20 (e)	16.0 U	
ST5-SD1	7.0 U	7.0 U	7.0 U	56 (e,h)	14.0 U	Note A
ST6-SD1	9.0 U	9.0 U	9.0 U	120 (e)	21	
ST7-SD1	7.0 U	7.0 U	7.0 U	15.0 U	15.0 U	

U indicates the compound was not detected above the limit indicated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(e)=Due to the substantial deviation in the response for the daily calibration, this value is considered estimated.
(h)=Due to a substantial deviation in the internal standard area, this value is considered estimated.

Note A: Due to a substantial deviation for all internal standard areas, the method detection limit is considered estimated for all target compounds.

10/04/90

AR301128

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Acetone
ST1-SD2	13.0 U
ST1-SD2A	12.0 U
ST2-SD2	14.0 U
ST3-SD2	13.0 U
ST4-SD2	[18]
ST5-SD2	[7](c)
ST6-SD2	[32]
ST7-SD2	[13]

U indicates the compound was not detected above the limit indicated.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

10/04/90

AR301129

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 1)
in units of ug/kg

Sample ID	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Number of Tentatively Idenified Compounds	Tentative Identification	Comments
ST1-SD1	2,400 U	500 U	6	Unknown Ketones; Unknown Organic Acid; Unknowns	
ST2-SD1	2,300 U	470 U	12	Unknown Ketones, Hydrocarbons, and Alcohols; Unknowns	
ST2-SD1A	2,300 U	470 U	8	Unknown Ketones, Hydrocarbons, and Alcohols; Hexanedioic Acid	
ST3-SD1	2,100 U	440 U	3	Ketones and Unknowns	
ST4-SD1	2,500 U	520 U	13	Ketones and Unknown Hydrocarbons	
ST5-SD1	730(c)	640	23	Ketones; Tetrahydronapththalene; Substituted Napthalenes; Unknowns	
ST6-SD1	2,800 U	590 U	17	Hexadecanoic Acid; Unknown Hydrocarbon; Unknowns	Note A
ST7-SD1	500(c)	190(c)	23	Ketones; Organic Acids; Hydrocarbons; Unknowns	

U indicates the compound was not detected above the limit indicated.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.

Note A: Due to a sustantial deviation for the first and second internal standards areas, the method detection limit is considered estimated for the following compounds: 2-Chlorophenol, Phenol, Bis(2-chloroethyl)ether, 1,3-Dichlorobenzene, 1,4-Dichlorobenzene, 1,2-Dichlorobenzene, Benzyl Alcohol, Bis(2-chloroisopropylether), 2-Methylphenol, Hexachloroethane, 4-Methylphenol, n-Nitroso-di-n-propylamine, Nitrobenzene, Isophorone, 2-Nitrophenol, 2,4-Dimethylphenol, Bis(2-chloroethoxy)methane, 2,4-Dichlorophenol, 1,2,4-Trichlorobenzene, Naphthalene, Benzoic Acid, 4-Chloroaniline, Hexachlorobutadiene, 4-Chloro-3-methylphenol, and 2-Methylnaphthalene

10/04/90

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SEDIMENTS (Round 2)
in units of ug/kg

Sample ID	Target Compound List Detected	Number of Tentatively Idenified Compounds	Tentative Identification
ST1-SD2	ND	8	Unknown Ketones; Unknown Hydrocarbons
ST1-SD2A	ND	7	Unknown Ketones; Unknown Hydrocarbons
ST2-SD2	ND	4	Unknown Ketones; Unknowns
ST3-SD2	ND	6	Molecular Sulfur; Unknown Ketones; Unknowns
ST4-SD2	ND	3	Molecular Sulfur; Unknown Ketones; Unknowns
ST5-SD2	ND	10	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST6-SD2	ND	11	Molecular Sulfur; Unknown Hydrocarbons; Unknowns
ST7-SD2	ND	9	Molecular Sulfur; Tetrahydronaphthalene; Unknown Hydrocarbons; Unknowns

ND=No target compounds were detected.

10/04/90

AR301131

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SEDIMENT SAMPLES
ROUND I

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ST1-SD1	0.21	14.1	0.59	909	7.5	4.4(a)	0.94(a)	3.0 U	0.11 U	6.4	1,090(b)	0.79	193	23.1(c)	0.63 U(d)
ST2-SD1	0.16	23.0	0.63	583	5.2	2.5(a)	1.29(a)	3.2 U	0.13 U	2.5 U	716(b)	0.87	91.4	15.6(c)	0.63 U(d)
ST2-SD1A	0.16	17.8	0.51	690	7.0	2.5(a)	0.35(a)	2.9 U	0.12 U	2.3 U	948(b)	0.50	109	10.7(c)	0.56 U
ST3-SD1	0.05	4.5	0.53	98.0	3.4	1.8(a)	0.29(a)	2.9 U	0.10 U	2.3 U	320(b)	0.38 U	26.4	6.2(c)	0.52 U(d)
ST4-SD1	0.72	37.5	0.52	274	16.3	4.4(a)	0.13(a)	5.5	0.13 U	2.6 U	1,010(b)	0.71	68.4	18.6(c)	0.64 U(d)
ST5-SD1	0.44	32.0	0.26 U	267	7.4	2.5(a)	0.78(a)	3.0 U	0.12 U	2.3 U	366(b)	0.44	51.9	11.3(c)	0.64 U(d)
ST6-SD1	1.21	92.2	0.98	622	14.5	7.2(a)	3.98(a)	8.5	0.17 U	6.5	711(b)	1.5	69.9	31.3(c)	0.70 U(d)
ST7-SD1	0.55	48.4	0.25 U	360	8.9	2.4(a)	0.63(a)	3.3	0.12 U	3.6	412(b)	0.42	31.7	14.9(c)	0.43 U(d)

U - Not detected above the limit indicated.
(a) - Estimate value due to low bias associated with precision problems.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Field duplicate result deviated by greater than 20% indicating precision problems.
(d) - Detection limit should be estimated due to extended holding time.

10/08/90

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SEDIMENT SAMPLES
ROUND II

Sample ID	Aluminum mg/kg	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
ST1-SD2	0.26(b,c)	13.2(c)	0.65 U	693	9.1(c)	2.4	10,200(b)	3.7	0.11 U	5.2	854(c)	0.26 U	140	20.4(c,d)	0.30 U(e)
ST1-SD2A	0.34(b,c)	10.9(c)	0.60 U	222	5.7(c)	2.1	7,710(b)	3.2	0.12 U	1.8	303(c)	0.24 U	77.2	9.7(c,d)	0.30 U(e)
ST2-SD2	0.19(b,c)	38.0(c)	0.71 U	638	7.0(c)	1.9	4,920(b)	5.4	0.12 U	1.4 U	1,030(c)	0.28 U	129	6.8(c,d)	0.33 U(e)
ST3-SD2	0.10(b,c)	7.0(c)	0.62 U	103	4.1(c)	1.3	3,770(b)	2.0	0.12 U	1.2 U	213(c)	0.25 U	18.7	6.3(c,d)	0.30 U(e)
ST4-SD2	1.32(b,c)	78.6(c)	0.68 U	194	30.9(c)	6.2	22,800(b)	9.2	0.14 U	3.8	2,120(c)	0.27 U	61.9	21.4(c,d)	0.32 U(e)
ST5-SD2	0.57(b,c)	37.0(c)	0.59 U	225	8.2(c)	2.0	9,240(b)	4.1	0.12 U	4.0	432(c)	0.24 U	42.4	11.6(c,d)	0.32 U(e)
ST6-SD2	1.97(b,c)	118(c)	0.58 U	325	19.9(c)	6.9	19,200(b)	6.6	0.14 U	11.9	1,040(c)	0.23 U	71.2	37.7(c,d)	0.35 U(e)
ST7-SD2	0.53(b,c)	63.5(c)	0.57 U	346	14.0(c)	2.2	6,520(b)	4.6	0.12 U	3.2	731(c)	0.23 U	29.9	20.3(c,d)	0.29 U(e)

LEGEND:

U - Not detected above limit indicated.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to laboratory precision problems.
(d) - Estimate value due to potential chemical or physical interferences.
(e) - Estimate detection limits due to extended holding times.

10/08/90

AR301133

ARROWHEAD PLA[illegible]TE
VOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	Tetrachloroethene	Acetone	2-Butanone	Toluene	1,2-Dichloroethene (total)	Total Xylenes	Methylene Chloride
SB1-S4	15-17	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB2-S7	12-14	5 U	11 U	11 U	5 U	5 U	5 U	5 U
SB3-S4	15-17	7 U	14 U	14 U	7 U	7 U	7 U	7 U
SB4-SS3	10-12	6 U	13 U	13 U	6 U	6 U	6 U	12
SB4-SS3A	10-12	6 U	13 U	13 U	6 U	6 U	6 U	9
SB5-S1	0-2	6 U	13 U	13 U	6 U	6 U	6 U	6 U
SB5-S4	15-17	6 U	17 (e)	12 U	6 U	6 U	6 U	6 U
SB6-S1	0-2	22	120 (e)	12 U	6 U	6 U	6 U	6 U
SB6-S2	5-7	5 U	11 U	11 U	5 U	6 U	6 U	5 U
SB6-S4	15-17	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB7-S3	10-12	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB7-S4	15-17	6 U	13 U	13 U	6 U	6 U	6 U	6 U
SB8-S2	6-7	140,000	11,000 (d)	14,000 U	7,100 U	7,100 U	7,100 U	7,100 U
SB8-S3 RE	10-12	7	200	17	4 (c)	6 U	6 U	[5] (c)
SB8-S3A (Dup) RE	15-17	26	100	9 (c)	2 (c)	1 (c)	6 U	6 U
SB9-S1 RE	0-2	6 U	12 U	12 U	6 U	6 U	6 U	6 U
SB9-S3	10-12	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB9-S3A (Dup) RE	10-12	5 U	10 U	10 U	5 U	5 U	5 U	5 U
SB9-S4	15-17	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB10-S3	10-12	11 U	11 U	11 U	6 U	6 U	6 U	(5)
SB11-S2	5-7	6 U	13 U	13 U	6 U	6 U	6 U	6 U
SB12-S2	5-7	7 (c)	16 U	16 U	8 U	8 U	8 U	8 U
SB12-S2A (Dup)	5-7	9	16 U	16 U	8 U	8 U	8 U	8 U
SB13-S1	0-2	6 U	11 U	11 U	6 U	6 U	6 U	6 U
SB20-SS7	12-14	6 U	[16] (e)	11 U	6 U	6 U	4 (c)	6 U

U indicates compound was not detected above limit indicated.
RE=Reextraction
(c)=The compound is tentatively identified, and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the trip blank.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.

10/05/90

AR301135

ARROWHEAD PLATING SITE
SEMIVOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/kg

Sample ID	Depth	4-Chloro-Aniline	Bis(2-ethylhexyl)phthalate	Number of Tentatively Identified Compounds	Tentative Identification	Comments
SB1-S4	15-17	380 U	380 U	0		
SB2-S7	12-14	360 U	360 U	0		
SB3-S4	15-17	470 U	470 U	0		
SB4-SS3	10-12	420 U	420 U	4	Unknowns	
SB4-SS3A	10-12	420 U	420 U	5	Unknowns	
SB5-S1	0-2	840 U	840 U	3	Unknowns	
SB5-S4	15-17	780 U	780 U	0		
SB6-S1	0-2	820 U	820 U	3	2,4-Dimethyl-3-heptanone, Unknown Alcohol, and Unknown	
SB6-S2	5-7	720 U	720 U	0		
SB6-S4 RE	15-17	740 U	740 U	0		See Note A,B
SB7-S3	10-12	490 U	490 U	0		
SB7-S4	15-17	830 U	830 U	0		
SB8-S2	6-7	740 U	740 U	1	Unknown	
SB8-S3	10-12	740 U	740 U	5	Ketones and Unknowns	
SB8-S3A (Dup)	10-12	290(c)	770 U	2	Unknowns	
SB9-S1	0-2	750 U	750 U	4	2,4-Dimethyl-3-Heptanone and Unknowns	
SB10-S3	10-12	380 U	380 U	0		
SB11-S2	5-7	400 U	210(c)	0		
SB12-S2	5-7	510 U	510 U	8	Unknowns	
SB12-S2A (Dup)	5-7	520 U	520 U	9	Unknowns	
SB13-S1	0-2	370 U	370 U	10	Unknowns, Unknown Hydrocarbon, and Molecular Sulfur	

U indicates compound was not detected above limit indicated.
(c)=The compound is tentatively identified, and quantitated at less than the method detection limit.
Note A: Due to a recovery of an acid surrogate at less than 10% for this sample, method detection limits for acid compounds should be rejected.
Note B: Due to the low response of 3,3-Dichlorobenzidene the method detection limit should be rejected.

10/08/90

AR301136

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SB1-S4	0.23(b)	8.4(e)	0.54 U	15.3(b)	3.9	3.7	20,600	4.5 U	0.11 U	3.1	198(b)	0.33 U	16.5(c,d)	7.2(b,c)	0.40 U
SB2-S7	0.36(b)	12.2(e)	0.54 U	23.5(b)	5.5	2.7	12,400	4.5 U	0.11 U	2.3	274(b)	0.33 U	14.8(c,d)	5.2(b,c)	0.36 U
SB3-S4	0.45(b)	8.5(e)	0.54 U	25.2(b)	7.0	4.5	26,800	4.8	0.11 U	3.2	104 U	0.33 U	13.6(c,d)	9.7(b,c)	0.36 U
SB4-SS3	0.35	12.1	0.50 U	164(b)	33.3(b)	1.5	103,000	4.5 U	0.11 U	6.7(b)	232	0.33 U(d)	76.1(b,c)	21.2(b,c)	0.36 U
SB4-SS3A	0.51	11.7	0.45 U	256(b)	13.5(b)	1.2	43,000	1.7 U	0.12 U	3.8(b)	185	0.23 U(d)	164(b,c)	8.3(b,c)	0.29 U
SB5-S1	1.23(b)	51.0(e)	0.52 U	5.86(b)	14.4	6.0	12,400	9.1	0.10 U	6.6	490(b,c)	0.31 U	26.1(c,d)	17.1(b,c)	0.39 U
SB5-S4	0.42(b)	14.1(e)	0.59 U	30.7(b)	10.1	3.2	49,200	4.8 U	0.11 U	4.3	191(b)	0.35 U	220(c)	12.7(b,c)	0.45 U
SB6-S1	0.74(b)	31.2(e)	0.57 U	29,600(b)	11.4	30.4	7,160	13.4	0.11 U	6.1	927(b)	0.34 U	194(c)	24.6(b,c)	0.83
SB6-S2	1.04(b)	26.9(e)	0.53 U	225(b)	8.7	4.0	8,320	6.3	0.10 U	3.7	317(b)	0.32 U	45.1(c)	10.4(b,c)	0.48 U
SB6-S4	0.36(b)	10.2(e)	0.56 U	134(b)	4.8	1.8	14,200	4.6 U	0.11 U	3.0	137(b)	0.34 U	11.1(c,d)	6.0(b,c)	0.55 U
SB7-S3	0.45(b)	11.9(e)	0.53 U	18.4(b)	9.5	50.1	30,100	4.3 U	0.11 U	3.0	172(b)	0.32 U	42.8(c)	11.1(b,c)	0.52 U
SB7-S4	0.56(b)	12.1(e)	0.60 U	131(b)	10.5	7.3	12,100	6.2	0.11 U	3.5	990(b)	0.36 U	952(c)	22.6(b,c)	0.61 U
SB8-S2	0.83(a)	47.1(d)	0.56 U	553(d)	11.5(d)	4.3(b,c)	11,000(d)	6.3(b,d)	0.11 U	3.3	191	0.33 U	169(c,d)	9.8	0.55 U
SB8-S3A	0.56(a)	49.7(d)	0.57 U	263(d)	5.7(d)	2.5(b,c)	5,420(d)	4.7 U(d)	0.11 U	2.3	205	0.34 U	40.0(c,d)	8.9	0.56 U
SB8-S3	0.75(a)	32.3(d)	0.55 U	329(d)	9.2(d)	3.2(b,c)	11,400(d)	5.1(d)	0.095 U	3.3	236	0.33 U	40.3(c,d)	9.5	0.55 U

LEGEND:

U - Not detected above the limit indicated.
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with matrix spike assessment.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Value is less than five times the concentration in the associated blank.
(e) - Estimate value due to poor laboratory precision.

10/08/90

AR301137

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB9-S1	0.73(a)	22.0(d)	0.55 U	370(d)	10.0(d)	5.3(b,c)	10,900(d)	5.7(b)	0.11 U	2.1	202	0.33 U	21.8(c,d)	7.7	0.54 U
SB10-S3	0.40(a)	19.2(d)	0.56 U	129(d)	6.5(d)	5.8(b,c)	54,100(d)	4.6 U(d)	0.11 U	2.4	157	0.34 U	495(c,d)	13.6	0.52 U
SB11-S2	0.62(a)	9.5(d)	0.62 U	138(d)	18.4(d)	5.9(b,c)	18,100(d)	5.1 U(d)	0.12 U	1.4	499	0.37 U	575(c,d)	6.2	0.58 U
SB12-S2	0.50(a)	13.2(d)	0.77 U	35.3(b,d)	13.8(d)	6.4(b,c)	8,680(d)	6.4(d)	0.16 U	2.1	1,020	0.46 U	98.3(c,d)	13.6	0.69 U
SB12-S2A	0.72(a)	21.5(d)	0.78 U	58.0(d)	14.4(d)	8.5(b,c)	10,700(d)	13.0(d)	0.14 U	2.6	1,210	0.47 U	177(c,d)	19.5	0.76 U
SB13-S1	0.45(a)	18.7(d)	0.63 U	428(d)	6.2(d)	3.5(b,c)	13,500(d)	5.2 U(d)	0.13 U	2.3	156	0.38 U	97.5(c,d)	7.7	0.60 U
SB15-SS1	NR	NR	NR	NR	NR	3.7	NR	NR	NR	NR	NR	NR	NR	3.6	0.45 U(d)
SB15-SS2	NR	NR	NR	NR	NR	3.6	NR	NR	NR	NR	NR	NR	NR	7.7	0.56 U(d)
SB15-SS3	NR	NR	NR	NR	NR	2.3	NR	NR	NR	NR	NR	NR	NR	8.2	0.60 U(d)
SB15-SS4	NR	NR	NR	NR	NR	2.5	NR	NR	NR	NR	NR	NR	NR	7.0	0.65 U(d)
SB16-SS1	NR	NR	NR	NR	NR	6.9(b)	NR	NR	NR	NR	NR	NR	NR	15.2(c)	0.55 U(d)
SB16-SS10	NR	NR	NR	NR	NR	4.7(b)	NR	NR	NR	NR	NR	NR	NR	13.1(c)	0.56 U(d)
SB16-SS2	NR	NR	NR	NR	NR	6.5(b)	NR	NR	NR	NR	NR	NR	NR	17.1(c)	0.46 U(d)
SB16-SS3	NR	NR	NR	NR	NR	117(b)	NR	NR	NR	NR	NR	NR	NR	45.0(c)	0.71(a)
SB16-SS4	NR	NR	NR	NR	NR	9.9(b)	NR	NR	NR	NR	NR	NR	NR	15.6(c)	0.44 U(d)
SB16-SS5	NR	NR	NR	NR	NR	1.9(b)	NR	NR	NR	NR	NR	NR	NR	8.1(c)	0.47 U(d)
SB16-SS6	NR	NR	NR	NR	NR	4.1(b)	NR	NR	NR	NR	NR	NR	NR	6.2(c)	0.56 U(d)
SB16-SS7	NR	NR	NR	NR	NR	11.7(b)	NR	NR	NR	NR	NR	NR	NR	14.5(c)	0.52 U(d)

LEGEND:

U - Not detected above the limit indicated.
NR - Not Requested
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.

10/08/90

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
SB16-SS8	NR	NR	NR	NR	NR	4.5(b)	NR	NR	NR	NR	NR	NR	NR	7.2(c)	0.49 U(d)
SB16-SS9	NR	NR	NR	NR	NR	3.9(b)	NR	NR	NR	NR	NR	NR	NR	8.2(c)	0.54 U(d)
SB17-SS1	NR	NR	NR	NR	NR	9.6	NR	NR	NR	NR	NR	NR	NR	14.8	0.56 U(d)
SB17-SS2	NR	NR	NR	NR	NR	6.9	NR	NR	NR	NR	NR	NR	NR	9.4	0.56 U(d)
SB17-SS3	NR	NR	NR	NR	NR	5.3	NR	NR	NR	NR	NR	NR	NR	15.8	0.52 U(d)
SB17-SS4	NR	NR	NR	NR	NR	15.3	NR	NR	NR	NR	NR	NR	NR	15.3	0.48 U(d)
SB17-SS5	NR	NR	NR	NR	NR	1,060	NR	NR	NR	NR	NR	NR	NR	226	1.5(a)
SB17-SS6	NR	NR	NR	NR	NR	860	NR	NR	NR	NR	NR	NR	NR	267	2.6(a)
SB18-SS1	NR	NR	NR	NR	NR	54.2	NR	NR	NR	NR	NR	NR	NR	51.5	0.53 U(d)
SB18-SS2	NR	NR	NR	NR	NR	10.4	NR	NR	NR	NR	NR	NR	NR	12.6	0.52 U(d)
SB18-SS3	NR	NR	NR	NR	NR	51.9	NR	NR	NR	NR	NR	NR	NR	28.9	0.46(a)
SB18-SS4	NR	NR	NR	NR	NR	71.0	NR	NR	NR	NR	NR	NR	NR	30.7	0.51 U(d)
SB18-SS5	NR	NR	NR	NR	NR	5.5	NR	NR	NR	NR	NR	NR	NR	9.8	0.53 U(d)
SB18-SS6	NR	NR	NR	NR	NR	7.0	NR	NR	NR	NR	NR	NR	NR	9.1	0.55 U(d)

LEGEND:

U - Not detected above the limit indicated.
NR - Not Requested
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.

10/05/90

AR301138

AR301139

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued)

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium mg/kg	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium mg/kg	Zinc mg/kg	Cyanide mg/kg
SB19-SS1	NR	NR	NR	NR	NR	5.4(b)	NR	NR	NR	NR	NR	NR	NR	15.4(c)	0.27 U(d)
SB19-SS2	NR	NR	NR	NR	NR	1.9(b)	NR	NR	NR	NR	NR	NR	NR	12.8(c)	0.26 U(d)
SB19-SS3	NR	NR	NR	NR	NR	4.2(b)	NR	NR	NR	NR	NR	NR	NR	14.3(c)	0.28 U(d)
SB19-SS4	NR	NR	NR	NR	NR	5.2(b)	NR	NR	NR	NR	NR	NR	NR	16.5(c)	0.28 U(d)
SB19-SS5	NR	NR	NR	NR	NR	57.8	NR	NR	NR	NR	NR	NR	NR	25.3(c)	0.45(a)
SB19-SS6	NR	NR	NR	NR	NR	12.4	NR	NR	NR	NR	NR	NR	NR	18.3(c)	0.27 U(d)
SB19-SS7	NR	NR	NR	NR	NR	5.0(b)	NR	NR	NR	NR	NR	NR	NR	17.9(c)	0.29 U(d)
SB20-SS1	NR	NR	NR	NR	NR	5.6(b)	NR	NR	NR	NR	NR	NR	NR	12.3(c)	0.28 U(d)
SB20-SS2	NR	NR	NR	NR	NR	4.0(b)	NR	NR	NR	NR	NR	NR	NR	12.4(c)	0.27 U(d)
SB20-SS3	NR	NR	NR	NR	NR	9.9(b)	NR	NR	NR	NR	NR	NR	NR	15.6(c)	0.20 U(d)
SB20-SS4	NR	NR	NR	NR	NR	192.0	NR	NR	NR	NR	NR	NR	NR	53.7(c)	2.6(a)
SB20-SS5	NR	NR	NR	NR	NR	82.2	NR	NR	NR	NR	NR	NR	NR	36.1(c)	1.6(a)
SB20-SS5A	NR	NR	NR	NR	NR	81.1	NR	NR	NR	NR	NR	NR	NR	39.5(c)	2.0(a)
SB20-SS6	NR	NR	NR	NR	NR	8.6(b)	NR	NR	NR	NR	NR	NR	NR	11.6(c)	1.6(a)
SB20-SS7	NR	NR	NR	NR	NR	25.2	NR	NR	NR	NR	NR	NR	NR	39.0(c)	0.72(a)

LEGEND:

U - Not detected above limit indicated.
NR - Not Requested
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.

10/05/90

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

10/11/90

Sharon -

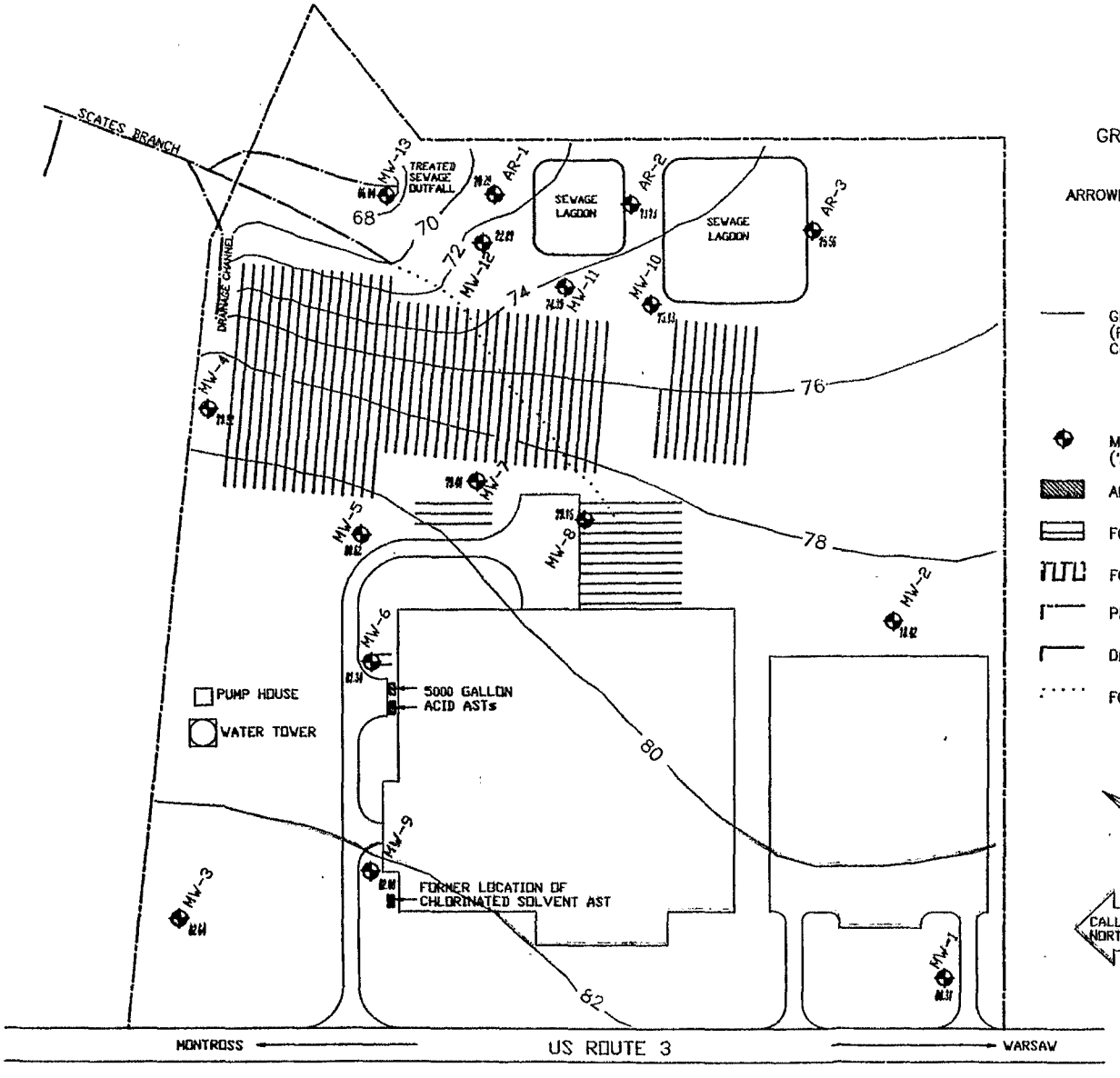
Here are the site plans for Montross that were missing from your copy of the monthly report.

Please call if you have any questions

- Claudia Brand

cc: Gary Dietrich
Drew Lawsch ✓

AR301140



GROUNDWATER CONTOUR PLAN
10 JULY, 1990

ARROWHEAD PLATING SITE, MONTROSS VIRGINIA

GROUNDWATER ELEVATION
(Feet above mean sea level)
Contour interval = 2 feet

MONITORING WELL
('AR' refers to A.R. Winerick wells)

ABOVE-GROUND STORAGE TANK (AST)

FORMER DRUM STORAGE AREA

FORMER POND AREAS

PROPERTY LINE

DRAINAGE

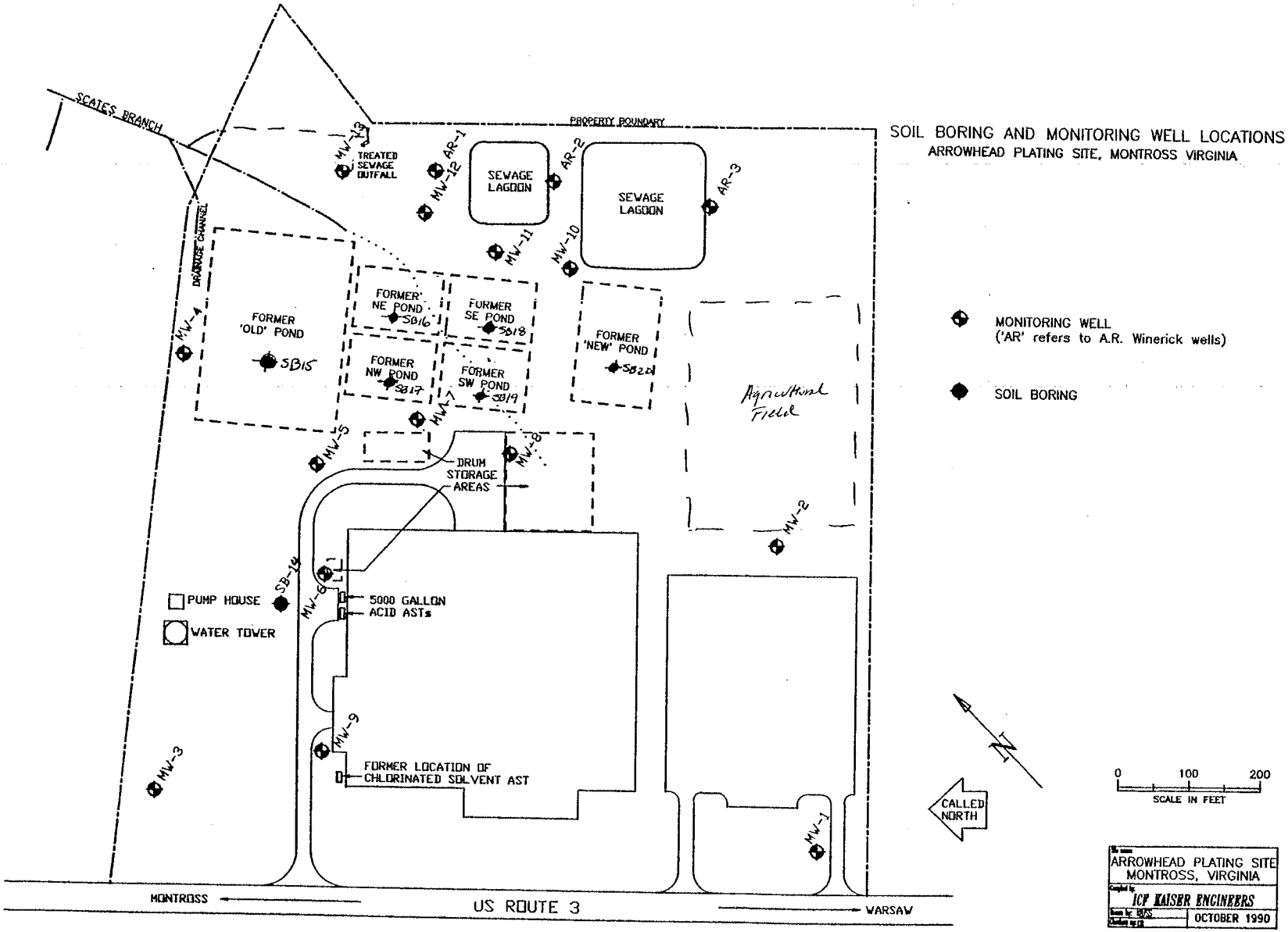
FORMER DRAINAGE (Approximate)

CALLED NORTH

0 100 200
SCALE IN FEET

ARROWHEAD PLATING SITE
MONTROSS, VIRGINIA
ICF KAISER ENGINEERS
SEPTEMBER 1990

AR301141


SOIL BORING AND MONITORING WELL LOCATIONS
ARROWHEAD PLATING SITE, MONTROSS VIRGINIA
SCATES BRANCH
PROPERTY BOUNDARY
DRAINAGE CHANNEL
TREATED SEWAGE OUTFALL
SEWAGE LAGOON
SEWAGE LAGOON
FORMER 'OLD' POND
FORMER NE POND
FORMER SE POND
FORMER NW POND
FORMER SW POND
FORMER 'NEW' POND
SB15
SB16
SB17
SB18
SB19
SB20
Agricultural Field
DRUM STORAGE AREAS
PUMP HOUSE
WATER TOWER
5000 GALLON ACID ASTs
FORMER LOCATION OF CHLORINATED SOLVENT AST
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
AR-1
AR-2
AR-3
SB-14
MONITORING WELL
('AR' refers to A.R. Winerick wells)
SOIL BORING
CALLED NORTH
N
0
100
200
SCALE IN FEET
MONTROSS
US ROUTE 3
WARSAW
ARROWHEAD PLATING SITE
MONTROSS, VIRGINIA
ICF KAISER ENGINEERS
OCTOBER 1990

AR301142

REC'D 11/9/90
-RDLII-

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

November 8, 1990

Ms. Sharon Wilcox
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Ms. Wilcox:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from October 1 through October 31, 1990. As we discussed in our telephone conversation today, it is our understanding that the State's formal request for the additional sampling (scheduled for the week of November 12) will be provided as soon as possible. Furthermore, a follow-up letter is anticipated from the State describing the need for additional monitoring wells and establishing a meeting time to discuss the issue.

Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand
Senior Environmental Scientist

cc: Charles Perry
Gary Dietrich
Kim Hummel/Drew Lausch

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: October 1, 1990 -- October 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: November 8, 1990

Specific Accomplishments in Reporting Period:

- Erosion control measures were implemented during the weeks of October 22 and 29 in accordance with the approved plan developed by Weston Environmental Services (WES).

- On October 25, Claudia Brand and Andrea Fogg of ICF KE met with Sharon Wilcox of the VADWM and Chuck Moore of WES at the Arrowhead Plating site. The purpose of the meeting was to review the erosion control plan, review previous RI/FS and cleanup activities, and discuss upcoming work.

- The risk assessment was completed, and work on the ecological assessment continued.

Projected Tasks to Be Completed in Upcoming Month:

- The following tasks are scheduled for November:

    - completion of the ecological assessment;
    - resampling of five surface water and sediment locations;
    - slug testing;
    - confirmatory soil sampling over former pond areas; and
    - sampling of the sewage lagoons as requested by the VADWM.

Problems Encountered and Solutions:

- None.

AR301144

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

December 7, 1990

Ms. Sharon Wilcox
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Ms. Wilcox:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from November 1 through November 30, 1990.

Please note that writing of the RI report and development of a revised schedule have been put on hold pending receipt of the letter from the State you informed me would be sent. Based on our discussions at the site on November 13, it was my understanding that this letter would formally request additional monitoring wells and field activities at the site. Furthermore, you indicated that you recommended completion of this additional work prior to RI report writing. Therefore, in order to keep the project moving forward, it is important that we receive the request letter and your approval of an extension of the RI schedule in writing as soon as possible.

Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand
Senior Environmental Scientist

cc: Charles Perry/Don Irwin
Gary Dietrich
Kim Hummel/Drew Lausch

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: November 1, 1990 -- November 30, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: December 7, 1990

Specific Accomplishments in Reporting Period:

- During the week of November 12, 1990, ICF KE conducted the following:

  - Slug testing in all of the monitoring wells (with the exception of MW8 due to access problems). The purpose of the testing was to determine the hydraulic conductivity (permeability) of the unconsolidated soils. The measured values are provided in the attached table.

  - Surficial soil sample collection from the former pond area as a confirmatory closure measure.

  - Collection of surface water and sediments from five stream locations along Scates Branch and reanalysis for cyanide, at the request of the VADWM.

  - Collection of surface water and sludges from the active sewage ponds and analysis for VOCs, metals and cyanide. (Results for these samples were received this week, but have not yet been sorted or reviewed.) Copies of the data will be provided with the December monthly report.

- State data for split samples were compared to ICF KE's data and were found to exhibit fairly close correlation.

- The ecological assessment was completed.

AR301146

Projected Tasks to Be Completed in Upcoming Month:

- No field tasks are scheduled for December. Writing of the RI/FS report has been put on hold in response to Sharon Wilcox's verbal request for installation of additional monitoring wells. ICF KE is awaiting a formal request letter from the State for this additional work, prior to developing a revised schedule for RI completion.

Problems Encountered and Solutions:

- None.

AR301147

PRELIMINARY RESULTS FROM SLUG TEST ANALYSIS PERFORMED
AT ARROWHEAD PLATING SITE MONITOR WELLS

WELL ID	FALLING HEAD K[1]	RISING HEAD K
MW1	0.001285	0.004569
MW2	0.00174	0.004544
MW3	0.002031	0.0009845
MW4	0.005771	NA
MW5	0.002384	0.001613
MW6	0.00692	0.004968
MW7	0.0036	0.00166
MW8[2]	NA	NA
MW9	0.002919	0.001787
MW10	0.001686	0.00118
MW11	0.001468	0.001573
MS12	0.001167	0.00133
MW13	0.001457	0.001178
AVERAGE	0.002703	0.002307
OVERALL AVERAGE = 0.002505		

[1] K in ft/min
[2] MW8 was not tested

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

January 7, 1991

Mr. Khoa Nguyen
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr Nguyen:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from December 1 through December 31, 1990.

Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand
Senior Environmental Scientist

cc: Don Irwin/ Brian Bertonneau
Gary Dietrich
Kim Hummel

MONTHLY PROGRESS REPORT FOR
ARROWHEAD PLATING SITE RI/FS
MONTROSS, VA

REPORTING PERIOD: December 1, 1990 -- December 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: January 7, 1991

Specific Accomplishments in Reporting Period:

- ICF KE received the data for the samples collected during November. Copies of the summary data pages are attached. These samples included:

  - Surface soils from the former pond area (SS1 - SS20) analyzed for VOCs, cyanide, and metals;

  - Surface water and sediment samples from Scates Branch stations (ST1 - ST5) analyzed for cyanide only; and,

  - Surface water and sediment samples from the sewage ponds (SEW1 - SEW3) analyzed for VOCs metals and cyanide. (No water sample was required from the SEW3 location.)

- All of the data was reviewed and validated, and validation reports are attached.

- Preliminary efforts are underway to develop the addendum to the work plan as requested by the VADWM.

Projected Tasks to Be Completed in Upcoming Month:

- No field tasks are scheduled for January.

- ICF KE will complete the draft work plan addendum by January 18, 1990. At that time, a revised schedule will be submitted for the completion of the RI/FS.

Problems Encountered and Solutions:

- None.

AR301150

VOLATILE ANALYSIS
ANALYTICAL DATA PACKAGE

CLIENT : ICF FAIRFAX
SITE : ARROWHEAD PLATING
PROJECT: 420.58 B#21
CONTROL: 3913
DATE : 12/04/90

AR301151

6850 Versar Center • P. O. Box 1549 • Springfield, Virginia 22151 • Telephone: (703) 750-3000 • 1-800-283-7727

EPA SAMPLE NO.

SS1

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36838

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4899

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 14 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301152

VOLATILE ORGANICS ANALYSIS DATA SHEET

SS2

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36839

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4900

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. <10 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301153

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS2

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36839

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4900

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301154

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS3

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36840

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4901

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301155

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS3

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36840

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4901

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301156

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS4

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36841

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4902

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301157

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS4

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36841

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4902

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301158

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS5

Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36842

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4903

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 12 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301159

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS5

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36842

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4903

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 12 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS6

Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36843

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4904

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301161

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS6

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36843

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4904

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS7

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36844

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4905

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301163

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS7

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36844

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4905

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS8

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36845

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4906

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301165

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS8

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36845

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4906

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS9

Name: VERSAR INC. Contract: _____

Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36846

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4907

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 8 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

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FORM I VOA 1/87 Rev.

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS9

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36846

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4907

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 8 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301168

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS10

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36847

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4908

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 8 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	4	J
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

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FORM I VOA 1/87 Rev.

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS10

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36847

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4908

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 8 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS11

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36848

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4910

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	7	
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS11

) Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36848

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4910

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS12

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36849

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4911

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	J
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

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1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS12

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36849

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4911

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS13

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36850

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4912

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	J
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS13

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36850

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4912

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/26/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301176

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS14

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36851

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4928

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS14

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36851

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4928

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS15

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36852

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4929

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/27/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301179

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS15

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36852

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4929

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/27/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301180

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS16

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36853

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4930

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/27/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	5	J
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

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1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS16

Lab Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36853

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4930

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 9 Date Analyzed: 11/27/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301182

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS17

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36854

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4931

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301183

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS17

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36854

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4931

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301184

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS18

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36855

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4932

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301185

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS18

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36855

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4932

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/27/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS19

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36856

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4946

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/28/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301187

FORM I VOA 1/87 Rev.

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS19

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36856

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4946

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 11 Date Analyzed: 11/28/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS20

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36857

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4947

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/28/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	11	U
74-83-9	Bromomethane	11	U
75-01-4	Vinyl chloride	11	U
75-00-3	Chloroethane	11	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	11	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	11	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	11	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	11	U
591-78-6	2-Hexanone	11	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301189

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SS20

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36857

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4947

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 10 Date Analyzed: 11/28/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301190

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SEW1-SW1

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36858

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6306

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. ____ Date Analyzed: 11/24/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	10	B
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301191

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SEW1-SW1

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36858

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6306

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. ____ Date Analyzed: 11/24/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS. NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

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VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SEW2-SW1

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36859

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6309

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. _____ Date Analyzed: 11/24/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	4	BJX
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

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EPA SAMPLE NO.

SEW2-SW1

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36859

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6309

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. ____ Date Analyzed: 11/24/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 66-25-1	HEXANAL	24.22	8.0	J

AR301194

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SEW1SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36860

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4948

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 23 Date Analyzed: 11/28/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	13	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	13	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

AR301195

1E

VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SEW1SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36860

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4948

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 23 Date Analyzed: 11/28/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301196

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SEW2SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36861

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4951

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 29 Date Analyzed: 11/28/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	14	U
74-83-9	Bromomethane	14	U
75-01-4	Vinyl chloride	14	U
75-00-3	Chloroethane	14	U
75-09-2	Methylene chloride	7	U
67-64-1	Acetone	14	U
75-15-0	Carbon disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
540-59-0	1,2-Dichloroethene (total)	7	U
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	14	U
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon tetrachloride	7	U
108-05-4	Vinyl acetate	14	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	Trans-1,3-dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-pentanone	14	U
591-78-6	2-Hexanone	14	U
127-18-4	Tetrachloroethene	7	U
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	7	U
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Total xylenes	4	U

AR304197

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SEW2SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36861

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4951

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 29 Date Analyzed: 11/28/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301198

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SEW3SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36862

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4952

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 24 Date Analyzed: 11/28/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	13	U
74-83-9	Bromomethane	13	U
75-01-4	Vinyl chloride	13	U
75-00-3	Chloroethane	13	U
75-09-2	Methylene chloride	7	U
67-64-1	Acetone	13	U
75-15-0	Carbon disulfide	7	U
75-35-4	1,1-Dichloroethene	7	U
75-34-3	1,1-Dichloroethane	7	U
540-59-0	1,2-Dichloroethene (total)	7	U
67-66-3	Chloroform	7	U
107-06-2	1,2-Dichloroethane	7	U
78-93-3	2-Butanone	13	U
71-55-6	1,1,1-Trichloroethane	7	U
56-23-5	Carbon tetrachloride	7	U
108-05-4	Vinyl acetate	13	U
75-27-4	Bromodichloromethane	7	U
78-87-5	1,2-Dichloropropane	7	U
10061-01-5	cis-1,3-Dichloropropene	7	U
79-01-6	Trichloroethene	7	U
124-48-1	Dibromochloromethane	7	U
79-00-5	1,1,2-Trichloroethane	7	U
71-43-2	Benzene	7	U
10061-02-6	Trans-1,3-dichloropropene	7	U
75-25-2	Bromoform	7	U
108-10-1	4-Methyl-2-pentanone	13	U
591-78-6	2-Hexanone	13	U
127-18-4	Tetrachloroethene	7	U
79-34-5	1,1,2,2-Tetrachloroethane	7	U
108-88-3	Toluene	15	
108-90-7	Chlorobenzene	7	U
100-41-4	Ethylbenzene	7	U
100-42-5	Styrene	7	U
1330-20-7	Total xylenes	7	U

AR301199

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

SEW3SD1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36862

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4952

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 24 Date Analyzed: 11/28/90

Column (pack/cap) CAP Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301200

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

TRIP_BLANK

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36863

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6310

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. _____ Date Analyzed: 11/24/90

Column: (pack/cap) PACK Dilution Factor: 1.0

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L

CAS NO.	COMPOUND		Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene chloride	5	B
67-64-1	Acetone	10	U
75-15-0	Carbon disulfide	5	U
75-35-4	1,1-Dichloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U
540-59-0	1,2-Dichloroethene (total)	5	U
67-66-3	Chloroform	5	U
107-06-2	1,2-Dichloroethane	5	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	5	U
56-23-5	Carbon tetrachloride	5	U
108-05-4	Vinyl acetate	10	U
75-27-4	Bromodichloromethane	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	cis-1,3-Dichloropropene	5	U
79-01-6	Trichloroethene	5	U
124-48-1	Dibromochloromethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
71-43-2	Benzene	5	U
10061-02-6	Trans-1,3-dichloropropene	5	U
75-25-2	Bromoform	5	U
108-10-1	4-Methyl-2-pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
108-88-3	Toluene	5	U
108-90-7	Chlorobenzene	5	U
100-41-4	Ethylbenzene	5	U
100-42-5	Styrene	5	U
1330-20-7	Total xylenes	5	U

AR301201

FORM I VOA 1/87 Rev.

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

TRIP_BLANK

I Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913 SAS No.: _____ SDG No.: 21

Matrix: (soil/water) WATER Lab Sample ID: 36863

Sample wt/vol: 5.0 (g/mL) ML Lab File ID: U6310

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. ____ Date Analyzed: 11/24/90

Column (pack/cap) PACK Dilution Factor: 1.0

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q

AR301202

Versar Laboratories INC

ANALYTICAL DATA PACKAGE
General Chemistry Section

CLIENT: ICF-FAIRFAX
SITE: ARROWHEAD PLATING
CODE-BATCH: ICFARROW - 21
CONTROL #: 3913
DATE: 04-DEC-90
ANALYSIS: TOTAL CYANIDE

ANALYTICAL NARRATIVE
General Chemistry Section

DATE: 04-Dec-90
CODE/CONTROL: ICFARROW / 3913
CLIENT/SITE: ICF-Fairfax / Arrowhead Plating
PROJECT/BATCH: 420.58 / 21

This task consisted of eight water and twenty-nine soil samples which were analyzed for total cyanide according to the CLP modified version of method 335.2 from Methods for the Chemical Analysis of Water and Wastes, 1983 (MCAWW). Results for the soil samples have been reported on an oven-dried basis.

Samples were received November 14, 1990, and were distilled and analyzed from November 20 through 26. No analytical problems were encountered, and holding times were met. All check standard recoveries and duplicate precision results were within acceptable limits, and blank results were below method detection limits. Recovery for the distilled spike for sample SEW1-SD1 was low. An analytical spike for this same sample yielded an acceptable recovery. All other distilled spikes were acceptable, and no other quality assurance problems were encountered.

Release of this data has been authorized by laboratory management.

Sincerely,

Melanie J. Dillman

Melanie J. Dillman
General Chemistry Section

M Dillman for C Thompson
Approved for Release
Chris Thompson, Section Chief

versar Laboratories .NC

General Chemistry Section
ANALYSIS REPORT

DATE: 04-Dec-90
CODE / CONTROL #: ICFARROW / 3913
CLIENT / SITE: ICF-Fairfax / Arrowhead Plating
PROJECT / BATCH: 420.58 / 21

LAB #	FIELD #	Total Cyanide (ug/L)	Total Cyanide (mg/kg)			
36888	ST1-SW3A	2.84				
36889	ST1-SW3	2.61				
36890	SEW1-SW1	11.6				
36891	SEW2-SW1	4.22				
36892	ST3-SW3	<2.50				
36893	ST4-SW3	<2.50				
36894	ST5-SW3	2.61				
36895	ST2-SW3	<2.50				
36865	SS-1		<0.29			
36866	SS-2		<0.27			
36867	SS-3		<0.27			
36868	SS-4		0.36			
36869	SS-5		<0.28			
36870	SS-6		<0.28			
36871	SS-7		<0.27			
36872	SS-8		<0.28			
36873	SS-9		<0.26			
36874	SS-10		<0.27			
36875	SS-11		<0.27			
36876	SS-12		<0.27			
36877	SS-13		<0.27			
36878	SS-14		<0.28			
36879	SS-15		<0.27			
36880	SS-16		<0.27			
36881	SS-17		<0.27			
36882	SS-18		<0.26			
36883	SS-19		<0.28			
36884	SS-20		0.40			
36885	SEW1-SD1		<0.32			
36886	SEW2-SD1		<0.35			
36887	SEW3-SD1		<0.32			
36896	ST1-SD3A		<0.33			
36897	ST4-SD3		<0.36			
36898	ST5-SD3		<0.29			
36899	ST2-SD3		<0.34			
36900	ST3-SD3		<0.31			
36901	ST1-SD3		<0.34			

M. Dillman for C. Thompson
LABORATORY MANAGER

AR301205

Versar Laboratories INC.

ANALYTICAL DATA PACKAGE
Metals Section

CLIENT: ICF-FAIRFAX
SITE: ARROWHEAD PLATING
CODE-BATCH: ICFARROW - 21
CONTROL #: 3913
DATE: 04-DEC-90

Versar Laboratories INC

TRACE METALS SECTION
ANALYSIS NARRATIVE

Versar Code: ICFARROW - 21
Client: ICF-Fairfax
Control Number: 3913

Date: December 4, 1990
Site: Arrowhead Plating

This report contains metals analytical results for twenty-three soils and two water samples which were received at Versar Laboratories, Inc. on November 14, 1990. The samples were analyzed for the following elements:

Aluminum	Barium	Cadmium	Calcium
Chromium	Copper	Iron	Lead
Mercury	Nickel	Potassium	Silver
Sodium	Zinc		

Analytical Methods

The samples were prepared and analyzed by the US EPA Test Methods for Evaluating Solid Waste, SW 846, third edition. The water samples were also analyzed by US EPA Methods for Analysis of Water and Wastes, Mar. 83 for copper, lead and silver. The following is a summary of the methods:

Water Preparation	Method: ICP - 3010 GFAA - 3020
Soil Preparation	Method: ICP - 3050, 7.5
ICP Analysis	Method: 6010
GFAA Analysis	Method:
Copper	220.2
Lead	239.2
Silver	272.2
Mercury - Water/Soil Preparation/Analysis	Method: 7470/7471
Percent Solids Determination	Method: Exhibit D, Sec. IV, Part F, D-84

Analytical Results

The report is divided into the following sections. A description of each part and any comments concerning them is provided below:

Cover Page - Cross reference list of the laboratory sample number and the field sample number.

Form I - Summary of results for each sample.

Form IIA - Initial and continuing calibration verification results. All ICP recoveries were within the 10 % control limits. All graphite furnace atomic absorption (GFAA) and cold vapor atomic absorption (CVAA) recoveries were within the 20 % control limits.

Form III - Initial and continuing calibration blanks and preparation blank results. All blanks were less than the instrumental detection limit (IDL) except for:

Initial or Continuing Calibration Blank - Ba, Fe

Water Preparation Blank - Al, Ca, Fe, Na, Zn

Soil Preparation Blank - Al, Ba, Fe, Na, Zn

Form IV - ICP interference check sample. All recoveries were within the 20 % control limits.

Form VA - Spike sample recovery results. All spike recoveries were within the 25% control limits except for:

SEW1-SW1 - Ag

SS-19 - Al

Form VI - Duplicate results. Al relative percent differences (RPD's) between the sample and the duplicate were between the 20% control limits except for:

SEW1-SD1 - Ca, K

SEW1-SW1 - Al, Pb

SS-19 - Ca, Cu

Analytical Results (continued)

Form IX - ICP serial dilution results. All serial dilutions agreed with the original sample results within the 10 % control limits for all applicable elements except for:

SEW1-SD1 - K, Na, Zn

SEW1-SW1 - Zn

SS-19 - Cr, Cu, K, Zn

General Discussion

The levels of the elements detected above the instrumental detection limit, may be considered typical of the method of analysis. All analyses were performed within the required holding times for metals.

The poor silver spike recovery was most likely the result of the precipitation of silver chloride during the hydrochloric acid digestion. The out of control spike recovery for aluminum may be attributed to the nonhomogeneous nature of the soil samples.

As in the case of the aluminum spike recovery, the high duplicate RPD's for aluminum, calcium, copper, and potassium may be due to the nonhomogeneous nature of the soil samples. The out of control RPD for lead may be attributed to the greater variability when the sample concentration is at or near the instrumental detection limit.

If there are any questions concerning this report, please contact Janet Jaufmann at (703) 750-3000.

Prepared by: [signature]

Reviewed by: [signature]

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING___

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

SOW No. : SW_846,_3RD_ED.

Field Sample No.	Lab Sample ID.
SEW1-SD1	36885
SEW1-SD1D	36885D
SEW1-SD1S	36885S
SEW1-SW1	36902
SEW1-SW1D	36902D
SEW1-SW1S	36902S
SEW2-SD1	36886
SEW2-SW1	36903
SEW3-SD1	36887
SS-1	36865
SS-10	36874
SS-11	36875
SS-12	36876
SS-13	36877
SS-14	36878
SS-15	36879
SS-16	36880
SS-17	36881
SS-18	36882
SS-19	36883
SS-19 D	36883D
SS-19 S	36883S
SS-2	36866

Were ICP interelement corrections applied ? Yes/No YES

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

Comments:

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: Laurie C. Kimbell

Date: 12-4-90 AR301210

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING___

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

SOW No. : SW_846,_3RD_ED.

Field Sample No.	Lab Sample ID.
SS-20	36884
SS-3	36867
SS-4	36868
SS-5	36869
SS-6	36870
SS-7	36871
SS-8	36872
SS-9	36873

Were ICP interelement corrections applied ? Yes/No YES

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

Comments:

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Lab Manager: [signature]

Date: 12-4-90

COVER PAGE - IN

AR301211

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SEW1-SD1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36885____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __77.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7150			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	22.7			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.63	U		P
7440-70-2	Calcium	240			P
7440-47-3	Chromium	7.6			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	35.8			P
7439-89-6	Iron	10400			P
7439-92-1	Lead	9.9			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	368			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	172			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	22.3			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: FINE__

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SEW1-SW1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : WATER_____ Lab Sample ID: 36902____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	137			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	21.1			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	5.0	U		P
7440-70-2	Calcium	4700			P
7440-47-3	Chromium	6.0	U		P
7440-48-4	Cobalt				NR
7440-50-8	Copper	6.9			F
7439-89-6	Iron	896			P
7439-92-1	Lead	2.0			F
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.20	U		CV
7440-02-0	Nickel	12.0	U		P
7440-09-7	Potassium	15800			P
7782-49-2	Selenium				NR
7440-22-4	Silver	1.0	U		F
7440-23-5	Sodium	116000			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	14.8			P
	Cyanide				NR

Color Before: GREY_____ Clarity Before: CLOUDY Texture: _____

Color After : COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301213

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SEW2-SD1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21__

Matrix : SOIL_____ Lab Sample ID: 36886____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __71.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4400			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	14.0			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.67	U		P
7440-70-2	Calcium	233			P
7440-47-3	Chromium	3.8			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	7.8			P
7439-89-6	Iron	8350			P
7439-92-1	Lead	4.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.14	U		CV
7440-02-0	Nickel	1.6	U		P
7440-09-7	Potassium	197			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.67	U		P
7440-23-5	Sodium	129			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	11.8			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: FINE__

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301214

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SEW2-SW1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : WATER_____ Lab Sample ID: 36903____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: ___0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5_	Aluminum__	5850	_	_____	P_
7440-36-0_	Antimony__	_____	_	_____	NR
7440-38-2_	Arsenic___	_____	_	_____	NR
7440-39-3_	Barium____	41.3	_	_____	P_
7440-41-7_	Beryllium_	_____	_	_____	NR
7440-43-9_	Cadmium___	5.0	U	_____	P_
7440-70-2_	Calcium___	4200	_	_____	P_
7440-47-3_	Chromium__	7.6	_	_____	P_
7440-48-4_	Cobalt____	_____	_	_____	NR
7440-50-8_	Copper____	7.6	_	_____	F_
7439-89-6_	Iron_____	1750	_	_____	P_
7439-92-1_	Lead_____	3.9	_	_____	F_
7439-95-4_	Magnesium_	_____	_	_____	NR
7439-96-5_	Manganese_	_____	_	_____	NR
7439-97-6_	Mercury___	0.20	U	_____	CV
7440-02-0_	Nickel____	12.0	U	_____	P_
7440-09-7_	Potassium_	13400	_	_____	P_
7782-49-2_	Selenium__	_____	_	_____	NR
7440-22-4_	Silver____	1.0	U	_____	F_
7440-23-5_	Sodium____	98700	_	_____	P_
7440-28-0_	Thallium__	_____	_	_____	NR
7440-62-2_	Vanadium__	_____	_	_____	NR
7440-66-6_	Zinc_____	17.0	_	_____	P_
_____	Cyanide___	_____	_	_____	NR

Color Before: GREY_____ Clarity Before: CLOUDY Texture: _____

Color After : COLORLESS Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

AR301215

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SEW3-SD1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21____

Matrix : SOIL_____ Lab Sample ID: 36887____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __75.5

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13200			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	40.2			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.66	U		P
7440-70-2	Calcium	501			P
7440-47-3	Chromium	16.8			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	60.1			P
7439-89-6	Iron	12100			P
7439-92-1	Lead	33.3			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	3.3			P
7440-09-7	Potassium	679			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.66	U		P
7440-23-5	Sodium	314			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	47.9			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: FINE__

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301216

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-1

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36865____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __85.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7680			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	39.6			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.58	U		P
7440-70-2	Calcium	751			P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	14.7			P
7439-89-6	Iron	9270			P
7439-92-1	Lead	6.0			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	3.8			P
7440-09-7	Potassium	298			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.58	U		P
7440-23-5	Sodium	64.8			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	16.4			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301217

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-9

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_

Matrix : SOIL_____ Lab Sample ID: 36873____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __92.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6930			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	31.8			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	6140			P
7440-47-3	Chromium	6.6			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	13.3			P
7439-89-6	Iron	8300			P
7439-92-1	Lead	6.8			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.3			P
7440-09-7	Potassium	500			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	131			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	14.7			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-10

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36874____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __91.9

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8020			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	25.0			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	350			P
7440-47-3	Chromium	7.5			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	3.4			P
7439-89-6	Iron	9560			P
7439-92-1	Lead	7.1			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.5			P
7440-09-7	Potassium	292			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	354			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	9.8			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-11

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36875____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10200			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	41.6			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	573			P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	3.4			P
7439-89-6	Iron	11900			P
7439-92-1	Lead	7.1			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.8			P
7440-09-7	Potassium	369			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	138			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	15.4			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301220

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-12

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36876____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7230			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	29.8			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	2220			P
7440-47-3	Chromium	6.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	4.5			P
7439-89-6	Iron	9620			P
7439-92-1	Lead	7.0			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.5			P
7440-09-7	Potassium	453			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	194			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	10.6			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301221

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INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-13

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36877____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7740			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	32.8			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	1510			P
7440-47-3	Chromium	7.6			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	5.5			P
7439-89-6	Iron	10800			P
7439-92-1	Lead	7.5			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.6			P
7440-09-7	Potassium	354			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	163			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	13.0			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301222

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-14

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36878____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9330			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	36.1			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	911			P
7440-47-3	Chromium	9.3			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	8.5			P
7439-89-6	Iron	11700			P
7439-92-1	Lead	6.8			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.8			P
7440-09-7	Potassium	375			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.52	U		P
7440-23-5	Sodium	136			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	15.3			P
	Cyanide				NR

Color Before: BROWN____ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-15

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36879____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.8

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6850			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	27.3			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	1320			P
7440-47-3	Chromium	6.4			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	10.2			P
7439-89-6	Iron	8510			P
7439-92-1	Lead	7.8			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.4			P
7440-09-7	Potassium	303			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	83.3			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	11.3			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-16

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36880____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __91.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6210			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	20.9			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.52	U		P
7440-70-2	Calcium	765			P
7440-47-3	Chromium	5.2			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	5.4			P
7439-89-6	Iron	13400			P
7439-92-1	Lead	5.0			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.2			P
7440-09-7	Potassium	251			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.52	U		P
7440-23-5	Sodium	459			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	10.8			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301225

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INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-17

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36881____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7160			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	25.6			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	1090			P
7440-47-3	Chromium	6.5			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	11.2			P
7439-89-6	Iron	11000			P
7439-92-1	Lead	6.6			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	1.6			P
7440-09-7	Potassium	328			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.54	U		P
7440-23-5	Sodium	100			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	11.1			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301226

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INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-18

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36882____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7500			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	30.4			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	584			P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	3.2			P
7439-89-6	Iron	9720			P
7439-92-1	Lead	8.4			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.5			P
7440-09-7	Potassium	257			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.54	U		P
7440-23-5	Sodium	111			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	11.2			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-19

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36883____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __89.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9990			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	28.5			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.56	U		P
7440-70-2	Calcium	1250			P
7440-47-3	Chromium	8.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	5.8			P
7439-89-6	Iron	11400			P
7439-92-1	Lead	7.2			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	4.2			P
7440-09-7	Potassium	353			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.56	U		P
7440-23-5	Sodium	150			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	12.5			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301228

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FIELD SAMPLE NO.

SS-2

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36866____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __90.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3910			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	13.5			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	364			P
7440-47-3	Chromium	3.6			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	33.7			P
7439-89-6	Iron	4910			P
7439-92-1	Lead	3.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.7			P
7440-09-7	Potassium	187			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	187			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	10.7			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

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FIELD SAMPLE NO.

SS-20

Client : ICF_FAIRFAX Site: ARROWHEAD_PLATING

Lab Name: VERSAR_INC. Control No.: 3913 Code: ICFARROW Batch: 21

Matrix : SOIL Lab Sample ID: 36884

Level (low/med): Date Received: 11/14/90

% Solids: 90.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8390			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	33.3			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.53	U		P
7440-70-2	Calcium	2690			P
7440-47-3	Chromium	7.7			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	34.4			P
7439-89-6	Iron	9820			P
7439-92-1	Lead	11.6			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.3			P
7440-09-7	Potassium	389			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.53	U		P
7440-23-5	Sodium	158			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	15.8			P
	Cyanide				NR

Color Before: ORANGE Clarity Before: Texture: MEDIUM

Color After : YELLOW Clarity After: CLEAR Artifacts:

Comments:

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FIELD SAMPLE NO.

SS-3

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36867____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __91.3

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4410			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	13.8			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	153			P
7440-47-3	Chromium	5.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	7.5			P
7439-89-6	Iron	5410			P
7439-92-1	Lead	3.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	1.4			P
7440-09-7	Potassium	214			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.54	U		P
7440-23-5	Sodium	400			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	5.6			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-4

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36868____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __89.0

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5720			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	14.7			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	112			P
7440-47-3	Chromium	4.4			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	18.9			P
7439-89-6	Iron	5420			P
7439-92-1	Lead	3.6	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	1.8			P
7440-09-7	Potassium	288			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.55	U		P
7440-23-5	Sodium	293			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	6.2			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

1

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-5

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36869____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __88.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6160			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	23.0			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	1910			P
7440-47-3	Chromium	6.1			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	12.3			P
7439-89-6	Iron	7910			P
7439-92-1	Lead	3.6	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.2			P
7440-09-7	Potassium	391			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.54	U		P
7440-23-5	Sodium	108			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	13.5			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301233

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-6

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36870____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __89.2

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5620			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	20.2			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	1150			P
7440-47-3	Chromium	6.0			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	16.4			P
7439-89-6	Iron	6480			P
7439-92-1	Lead	4.0			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	2.6			P
7440-09-7	Potassium	223			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.55	U		P
7440-23-5	Sodium	127			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	12.7			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-7

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36871____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __91.4

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4710			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	15.1			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.54	U		P
7440-70-2	Calcium	419			P
7440-47-3	Chromium	4.3			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	9.7			P
7439-89-6	Iron	6590			P
7439-92-1	Lead	3.5	U		P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.6			P
7440-09-7	Potassium	165			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.54	U		P
7440-23-5	Sodium	116			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	8.5			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

FORM I - IN

INORGANIC ANALYSES DATA SHEET

FIELD SAMPLE NO.

SS-8

Client : ICF_FAIRFAX_____ Site: ARROWHEAD_PLATING_

Lab Name: VERSAR_INC. Control No.: 3913____ Code: ICFARROW Batch: 21_____

Matrix : SOIL_____ Lab Sample ID: 36872____

Level (low/med): _____ Date Received: 11/14/90_

% Solids: __89.7

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8800			P
7440-36-0	Antimony				NR
7440-38-2	Arsenic				NR
7440-39-3	Barium	36.2			P
7440-41-7	Beryllium				NR
7440-43-9	Cadmium	0.55	U		P
7440-70-2	Calcium	454			P
7440-47-3	Chromium	7.9			P
7440-48-4	Cobalt				NR
7440-50-8	Copper	9.3			P
7439-89-6	Iron	9200			P
7439-92-1	Lead	3.7			P
7439-95-4	Magnesium				NR
7439-96-5	Manganese				NR
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	3.0			P
7440-09-7	Potassium	303			P
7782-49-2	Selenium				NR
7440-22-4	Silver	0.55	U		P
7440-23-5	Sodium	67.1			P
7440-28-0	Thallium				NR
7440-62-2	Vanadium				NR
7440-66-6	Zinc	14.8			P
	Cyanide				NR

Color Before: ORANGE___ Clarity Before: _____ Texture: MEDIUM

Color After : YELLOW___ Clarity After: CLEAR_ Artifacts: _____

Comments:

AR301236

FORM I - IN

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

TO: Claudia Brand

FROM: Davida Parker Trumbo dpt

DATE: January 3, 1991

SUBJECT: Arrowhead Plating Site, Data Validation, twenty-three (23) Soil Samples and four (4) Water Samples for Volatile Organic Analysis, Versar Laboratories Inc., Control Number 3913.

A data validation was performed on the volatile organic data acquired for (23) soil and (4) water samples collected at the Arrowhead Plating Site as part of the remedial investigation/feasibility study. The samples were analyzed in accordance with the EPA Office of Solid Waste, *Test Methods for Evaluating Solid Waste*, Method 8240 for volatile organic compounds.

The data was validated in accordance with appropriate modifications to the *Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses*, February 1988, and quality control criteria established in the noted analytical method. A copy of the checklist used to record the specific observances has been provided for your information as an attachment to this report.

The following samples were included in this data package:

SS-1	SS-8	SS-15	SEW2-SD1
SS-2	SS-9	SS-16	SEW3-SD1
SS-3	SS-10	SS-17	SEW1-SW1
SS-4	SS-11	SS-18	SEW2-SW1
SS-5	SS-12	SS-19	TRIPBLANK
SS-6	SS-13	SS-20	TRIPBLANK2
SS-7	SS-14	SEW-SD1	

Overall Data Assessment: The overall laboratory performance met quality control criteria with the following exceptions:

1. The holding time of 14 days was exceeded for the following samples: SS-14, SS-15, SS-16, SS-17, SS-18, SS-19, SS-20, SEW1-SD1, SEW2-SD1, and SEW3-SD1. It should be noted that the samples in question are soil samples. Currently, the Agency has not adopted holding time criteria for soil samples but has left it up to the discretion of the data reviewer to apply water holding time criteria to soil samples. Since the samples in question exceeded the holding time by at most two days it is felt that the impact of the situation may not be highly critical to the data quality. The data will however be deemed estimated for these samples, and it will be left to the discretion of the project manager to have the samples reanalyzed.

2. The detection limits should be estimated for the noted analytes in the associated samples due to the variability of the response factors associated with the continuing calibration

ANALYTE	SAMPLE(S)
Chloromethane Bromomethane 1,1,1-Trichloroethane Carbon Tetrachloride Dibromochloromethane	SS-1 SS-6 SS-11 SS-2 SS-7 SS-12 SS-3 SS-8 SS-13 SS-4 SS-9 SS-5 SS-10
1,1,2,2-Tetrachloroethane	SS-19 SEW-SD2 SS-20 SEW-SD3 SEW-SD1
Bromomethane Chloroethane 4-Methyl-2-Pentanone 2-Hexanone	SEW1-SW1 SEW2-SW1 TRIPBLANK TRIPBLANK2

3. The concentration of methylene chloride reported in samples SS-11, SS-12, SS-13, SS-16, and SEW2-SW1 will be qualified as artifacts because the reported concentrations are below the acceptance criteria.

The following criteria were reviewed during the data validation:

1. **Holding Times:** All criteria were met with the exception of the following samples: SS-14, SS-15, SS-16, SS-17, SS-18, SS-19, SS-20, SEW1-SD1, SEW2-SD1, and SEW3-SD1. Information pertaining to the characterization of these samples is not available to the data reviewer, therefore the results will be considered estimated.

2. **GC/MS Tuning:** The tuning and performance criteria were evaluated to ensure mass resolution identification and the sensitivity of the instrumentation. The raw data was verified against the mass calibration and found to be compliant. GC/MS tuning information was available for all samples analyzed in this batch. All ion abundance criteria were met.

3. **Initial and Continuing Calibration Verification:** All criteria were met for initial calibration. Several continuing calibration results were non-compliant with respect to the percent difference between initial and continuing calibration. The criterion for conformance is a variance no greater than 25% from the initial calibration result. Analytes and affected samples include:

ANALYTE	SAMPLE(S)	ACTION
Chloromethane Bromomethane 1,1,1-Trichloroethane Carbon Tetrachloride Dibromochloromethane	SS-1 SS-6 SS-11 SS-2 SS-7 SS-12 SS-3 SS-8 SS-13 SS-4 SS-9 SS-5 SS-10	The detection limits for the noted analytes should be estimated in the associated samples due to the variability in the response factors associated with the continuing calibration.
1,1,2,2-Tetrachloroethane	SS-19 SEW-SD2 SS-20 SEW-SD3 SEW-SD1	
Bromomethane Chloroethane 4-Methyl-2-pentanone 2-Hexanone	SEW1-SW1 SEW2-SW1 TRIPBLANK TRIPBLANK2	

3. **Blank Assessment:** The function of this criterion was to determine the existence and magnitude of contamination problems. The results associated with each blank (i.e., method and trip) were reviewed and evaluated. One method blank was processed for each matrix type. Methylene chloride and acetone were both detected at a concentration of 5 ppb in the associated blank sample. Acetone was not detected in any of the samples associated with this case, and therefore does not contribute contamination. Methylene chloride was detected in several samples below the quantitation limit but above the instrument detection limit (i.e., SS-12, SS-13, SS-16, and SEW2-SW1) and in sample SS-11 just above the detection limit. The data will be qualified to indicate that the concentration of methylene chloride in the noted samples are to be considered artifacts.

4. **Surrogate Recovery:** Laboratory performance criteria was established by means of spiking activities. All samples requiring volatile organic analysis were spiked with three surrogate compounds prior to analysis. All surrogate recoveries were compliant with the requisite control criteria.

5. **Matrix Spike/Matrix Spike Duplicate:** The raw data was checked and all calculations agreed within 10% of the reported values. It was noted that the matrix spike Form I did not contain the actual concentration of spiked analyte. The laboratory was consulted for clarification.

6. **Field Precision Evaluation:** Field duplicates were not included in this sample set.

7. **Internal Standard Performance:** The internal standard performance criteria was evaluated to discern the GC/MS sensitivity and the stabilization of the response during the sample run. The raw data was evaluated and the retention times and internal standard areas were verified. All criteria were determined to be compliant with quality control protocols.

8. **TCL Compound Identification:** The objective of this assessment was to minimize the number of erroneous identifications of compounds. The criteria is applied more easily in the detection of false positive results due to the fact that false negatives would imply missing data, and therefore would be more difficult to assess. It is my opinion that the information provided by Versar Laboratories Inc. concerning positive identifications is correct.

9. **Compound Quantitation and Reported Detection Limits:** This criteria was assessed to determine whether reported results and quantitation limits were accurate. Detection limit information was not provided in this data package. All calculated results were compliant.

10. **Tentatively Identified Compounds:** The objective of this assessment was to ensure that the laboratory performed library searched for non-TCL constituents that had area/height greater than 10% of the size of the nearest internal standard. The raw data was checked and it was determined that the laboratory performed library searched for all required peaks in the sample and blank chromatograms as applicable.

NUS Corporation
Data Review Worksheets

Project Name Arrowhead Plating
TDD No. _____
Reference No. _____

REGIONAL REVIEW OF ORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Versar Inc data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data reviewed included:

Case No. 3913
No. of Sample 23 Soil
4 H_2O

SAS No. _____
Matrix _____

Sampling Date: 11/12/90
Shipping Date: 11/14/
Date Received by Lab: 11/14/90

Traffic Report Nos: SS1 - SS20 ; SEW1-SD1 ; SEW2-SD1 ; SEW3-SD1 ; SEW1-SW1 ; SEW2-SW2
Blank No.: Tripblank ; Tripblank 2
Duplicate Nos _____

Contract No. _____ requires that specific analytical work be done and that associated reports be provided by the contractor to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Holding times
- DFTPP and BFB performance results
- Surrogate spike results
- Matrix spike results
- Field/Lab Precision Evaluation
- Blank analysis results
- Detection limit results
- Initial and Continuing Calibration

Overall comments: _____

Definitions of Qualifiers:

A - Acceptable data.
J - Approximate data due to quality control criteria.
* - Reject data due to other quality control criteria.
** - Reject data due to blank contamination.
ND - Not detected.
+ - Positive compound identification.
NJ - Tentatively identified compound.

Reviewer: W. B. Jumbo Date: 12/27/90

AR301242

NUS Corporation
Data Review Worksheets

I. HOLDING TIMES

See Note (1) ___ VOA fractions were analyzed within ~~X~~ 10 days of receipt (10 days-soil)
Rec'd 11/14/90

___ Samples were extracted within 5 days of receipt (10 days-soil)

___ Sample extracts were analyzed within 40 days of extraction

Refer to Result Summary Table for actual dates of receipt and analysis.

Action: Results of compounds detected in samples not analyzed within the contract required holding times (CRHT) should be approximated (J'd). The reviewer may reject non-detected compounds in samples which were excessively beyond the CRHT (i.e., 30 days past CRHT).

Remarks: Note (1): Samples exceeding 14 day holding time included: SS-14 – SS20; SEW1-SD1; SEW2-SD1; SEW3-SD1.

II. DFTPP AND BFB PEFORMANCE RESULTS (Form V)

___ The DFTPP performance results were reviewed on Form V and found to be within the specified criteria.

✓ The BFB performance results were reviewed on Form V and found to be within the specified criteria.

The (DFTPP/BFB) performance result(s) was/were reviewed and the following abundanc were found to fall outside the specified criteria:

Compound	m/z	Required Abundance	Actual Abundance

Remarks:

AR301243

NUS Corporation
Data Review Worksheets

III. SURROGATE SPIKE RECOVERIES (Form II)

All criteria were met for Soil & H_2O samples

For any given fraction, determine the number of surrogate compounds with unacceptable recoveries per the total number of surrogates in that fraction. Identify the unacceptable surrogate recovery in parantheses.

Traffic Report No.	VOA	B/N	A	Pest
SS-1 — SS-20	0/3			
SEW1 — SEW3-SD1	0/3			
SEW1 - SEW2 - SW6SW2	0/3			

Surrogate Actions:

	Percent Recovery		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
non-detected compounds	R	A[1]	A

CRR - Contract Required Recovery range

Surrogate Action should be applied when one VOA or two B/N or two A surrogate recoveries do not meet contractual requirements. When the surrogate spike result is not detected due to sample dilution, no action is warranted.

If surrogate spike recoveries are out of specification on initial analysis, but meet criteria on re-analysis, report results based on results of re-analysis.

Note:

AR301244

1 - For samples with surrogate percent recoveries between 10% and the Contract Required Recovery range, an evaluation of detection limits is beyond the scope of work for a Level I data validation. However, detection limits should be estimated when evaluated under a Level II data validation.

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Data Review Worksheets

IV. MATRIX SPIKE RECOVERIES (Form III)

all criteria were met for soil and water samples

For any given fraction, determine the number of unacceptable recoveries per the total number of matrix spike recoveries in that fraction and identify the unacceptable matrix spike recoveries in paranthesis.

Traffic Report No.	VOA	B/N	A	Pest
SEW1-SW1				
SEW1-SD1				
SS-13				

Matrix Spike Actions:

	Percent Recovery		
	<10%	10%-CRR	>CRR
Positive sample results	J	J	J
non-detected compounds	R	A	A

CRR - Contract Required Recovery range

In general, the results of the entire fraction may be qualified, when fifty percent of the matrix spike recoveries do not meet established advisory limits. When the percent recovery does not meet advisory contractual limits for a matrix spike compound in both sets of duplicate spike sample results, the results of the compound in the unspiked sample should be qualified (i.e., "J" that compound in that sample, if there has been a positive hit).

Matrix spike recoveries not within the advisory contractual limits should be applied only to the sample on which the spike was performed.

Calculation: $\%R = \frac{SSR-SR}{SA} \times 100$

Note:

SSR = Spiked Sample Result
SR = Sample Result
SA = Spiked Added from spiking mix
%R = Matrix Spike Percent Recovery

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NUS Corporation
Data Review Worksheets

All Criteria met

V. MATRIX SPIKE DUPLICATE ANALYSIS RESULTS (Form III)

Soil: _____ Aqueous: _____

The relative percent difference (RPD) for each parameter was evaluated. The established advisory RPD criteria for each matrix spike compound are listed on Form III. When the RPD is greater than the contractual advisory limit for a matrix spike compound, the result for the compound in the unspiked sample should be approximated. In general, the results of the entire fraction for the unspiked sample may be approximated (J'd), when fifty percent of the RPDs are greater than the established Quality Control limits.

Laboratory Duplicate Actions should be applied to duplicate samples only.

Fraction	Compound	Sample #	Duplicate Sample #	RPD

Remarks: _____

Calculation: $RPD = \frac{(A - B)}{(A + B)/2} \times 100$

AR301246

Note:

RPD - Relative Percent Difference
A - Sample Result
B - Duplicate Sample Result

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Data Review Worksheets

Not Provided with Package

VI. FIELD PRECISION RESULTS

Soil: _____ Aqueous: _____

The relative percent difference (RPD) for each parameter was evaluated. The duplicate analysis RPD advisory acceptance criteria should be:

Fraction	Aqueous	Soil
VOA	J>15%	J>25%
Base/Neutral	J>25%	J>32%
Acid	J>45%	J>43%
Pesticide	J>25%	J>45%

Field Duplicate Actions should be applied to all other samples of the same matrix.

Field precision advisory acceptance criteria were generated by calculating the mean RPD for each fraction from the matrix spike duplicate QC limits on Form III.

Fraction	Compound	Sample #	Duplicate Sample #	RPD

Remarks: _____

Calculation: $RPD = \frac{A - B}{(A+B)/2} \times 100$

AR301247

Note:

RPD - Relative percent difference.
A - Sample Result.
B - Duplicate Sample Result.

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Data Review Worksheets

VII. BLANK ANALYSIS RESULTS

The blank analysis was reviewed. The contamination in the blanks are listed below:

A. Laboratory Blanks (Form IV)

DATE	LAB ID #	FRACTION	COMPOUND	CONCENTRATION, ppb	CRDL
11/24/90	VBLK 3	VOA	MeCl2	3	
			Acetone	5	

B. Field Blanks

DATE	TR RPT #	FRACTION	COMPOUND	CONCENTRATION, ppb	CRDL
11/24/90	TB	VOA	MeCl2	5	

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

TO: Claudia Brand

FROM: Davida Parker Trumbo

DATE: January 3, 1991

SUBJECT: Arrowhead Plating Site, Data Validation, Twenty-three (23) Soil and Two (2) Water Samples for Metals Analysis, Versar Laboratories Inc., Control Number 3913.

A data validation was performed on the inorganic analytical data from 2 water and 23 soil samples collected at the Arrowhead Plating Site as part of the remedial investigation/feasibility study. The samples were analyzed in accordance with EPA Office of Solid Waste, Test Methods for Evaluating Solid Waste. The following metals were analyzed:

Aluminum	Chromium	Mercury	Sodium
Barium	Copper	Potassium	Zinc
Calcium	Iron	Nickel	
Cadmium	Lead	Silver	

The data was validated in accordance with quality control criteria established in the noted analytical methods. A copy of the checklist used to record the specific observances has been provided for your information as an attachment to this report.

The following samples were included in this data package:

SS-1	SS-8	SS-15	SEW2-SD1
SS-2	SS-9	SS-16	SEW3-SD1
SS-3	SS-10	SS-17	SEW1-SW1
SS-4	SS-11	SS-18	SEW2-SW1
SS-5	SS-12	SS-19	
SS-6	SS-13	SS-20	
SS-7	SS-14	SEW1-SD1	

Overall Assessment of Data: The overall laboratory performance met quality control criteria with the following exceptions:

1. Sample results for aluminum in SEW1-SW1 and zinc in SEW2-SW1 should be considered artifacts and qualified accordingly.

2. Silver results in samples SEW1-SW1 and SEW2-SW1 may have the tendency to be biased low due to percent recoveries associated with the matrix spike.

3. Calcium results should be considered estimated in samples SEW1-SD1, SEW2-SD1, and SEW3-SD1 due to poor laboratory precision associated with this analyte. Aluminum results should be estimated in samples SEW1-SW1 and SEW2-SW1 due to poor laboratory precision.

4. The potential for physical or chemical interferences exists for sodium and zinc in sediment samples and zinc in surface soil sample.

The following criteria were reviewed during the data validation:

1. **Holding Times:** All criteria were met.

2. **Initial and Continuing Calibration Verification:** All criteria were met.

3. **Blank Analysis:** The following blank contamination and potentially affected samples are summarized below:

Blank	Contaminant	Concentration	Impact
[1]PBW	Aluminum	57.9 ug/L	SEW1-SW1
	Calcium	28.4	SEW2-SW1
	Iron	34.2	
	Sodium	117	
	Zinc	5.6	
[2]PBS1	Aluminum	7.51 mg/kg	Soils and
	Barium	0.20	Sediments
	Iron	1.18	
	Sodium	7.21	
PBS3	Aluminum	8.02	Soils and
	Iron	0.55	Sediments
	Sodium	8.18	

[1] Preparation Blank Water
[2] Preparation Blank Soil

Action: The concentration reported for aluminum (137 ug/L) in sample SEW1-SW1 and the zinc concentration (17.0 ug/L) for SEW2-SW1 should be qualified since the concentrations are less than five times the concentration determined in the associated blank. A review of the soil data indicated that the level of constituents reported in the samples are above the five times criterion reported in the associated blank and therefore do not require qualification.

4. **ICP Interference Check Sample:** All criteria were met.

5. **Matrix Spike Sample Analysis:** The spike recovery for silver in SEW1-SW1 was 71.1%. The low recovery indicates that the accuracy for the noted constituents were not in control and results for these analytes may have the tendency to be biased low. The water samples should be qualified accordingly.

6. **Laboratory Precision Evaluation:** Duplicate analysis was performed on samples SEW1-SD1, SEW1-SW1, and SS-19. The relative percent difference was greater than 20% for aluminum in SEW1-SW1 and greater than 35% for calcium in SEW1-SD1. These results indicate that the laboratory precision for the noted analytes was not within control. Aluminum results should be considered estimated in water sample and calcium results should be considered estimated for sediment samples.

CR301250

7. **Field Precision Evaluation:** Not applicable. Duplicate samples were not collected during this sampling event.

8. **Laboratory Control Sample:** Metals were analyzed by SW-846 methods which do not specify the evaluation of laboratory control samples.

9. **Standard Additions/Furnace Atomic Absorption Analysis (GFAA):** Water samples were analyzed using GFAA and all criteria were in control.

10. **Serial Dilution Results:** All criteria were met with the exception of sodium and zinc in sample SEW1-SD1 and zinc in SS-19. The associated sample results should be approximated for these analytes.

NUS Corporation
Data Review Worksheets

Project Name Arrowhead Plating
TDD No.
Reference No.

REGIONAL REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Versar Laboratories Inc. data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data reviewed included:

Case. No. 3913 SAS No. _____ Sampling Date: 11/12/90
Shipping Date:
No. of samples 23 Soil, 2 Water Matrix _____ Date Received By Lab: 11/14/90

Traffic Report Nos: SS-1 — SS-20; SEW-SD1; SEW2-SD1; SEW3-SD1; SEW1-SW1; SEW2-SW1
Blank No.:
Duplicate Nos.:

Contract No. _____ requires that specific analytical work be done and that associated reports be provided by the contractor to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Holding times
- Calibration Verification
- Field and Lab Blank Analysis
- Interference QC Results
- Matrix Spike Percent Recovery Results
- Laboratory Precision Evaluation
- Field Precision Evaluation
- Lab Control Sample Results
- Detection Limit Results
- Standard Addition Results
- Serial Dilution Results

Overall Comments:

Definition of Qualifiers:

A - Acceptable data.
JB - Approximate data due to blank contamination.
J - Approximate data due to other quality control criteria.
* - Reject data due to quality control review.
ND - Non-detected element.
+ - Positive element identification.

AR301252

Reviewer: D. B. Gruber Date: 12/28/90

NUS Corporation
Data Review Worksheets

I. Holding Times

Date samples received: 11/14/90
Date analyzed (Hg): 11/30/90
Date analyzed (all others) by: _____

Action:

If samples are analyzed for mercury (28 days), cyanide (14 days) or any other element (6 months) in excess of the holding times, approximate results for that element. If mercury or cyanide are held for over one month in excess of the contract required holding time, reject results.

Remarks: All criteria were met

II. Initial and Continuing Calibration Verification (Form II)

✓ Calibrations were performed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during the analysis, and met contractual criteria.

___ Calibrations were not performed as specified in Functional Guidelines for Evaluating Inorganic Analyses and/or did not meet contract-specified windows: (specify) _____

Action Windows:

	Accept	Approximate	Reject
mercury	50-79% for ND[1] 80-120% for +/ND >121% for ND	50-79% for + 121-150% for +	<50% or >150% for +/ND
all others	50-89% for ND[1] 90-110% for +/ND >111% for ND	50-89% for + 111-150% for +	<50% or >150% for +/ND

NOTE:

+ - positive values.
ND - non-detected elements.
1 - When calibration results fall between 50-79% recovery for mercury and 50-89% for all other elements, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be estimated when evaluated under a Level II Data Validation.

Remarks: _____

NUS Corporation
Data Review Worksheets

III. Blank Analysis Results (Form III)

Contaminants	Initital Calibration Blank Value	Cont. Calib. Blank 1	Cont. Calib. Blank 2	Preparation Blank 1 ug/L	Preparation Blank 2 mg/kg	Prep Blank ~~Trip Blank~~ #: 3	Action HLO	Action Soil
Aluminum				57.9	7.51	8.02	290	~~38~~ 40
Antimony								
Arsenic								
Barium					0.203			1.02
Beryllium								
Cadmium								
Calcium				28.4			142	
Chromium								
Cobalt								
Copper								
Iron				34.2	1.18	0.547	171	5.9
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium				117	7.21	8.18	585	~~36~~ 41
Thallium								
Vanadium								
Zinc				5.6			28	
Other:								

Note: Contamination detected above IDLs should be evaluated and qualified.

Action levels are determined by multiplying the highest concentration of contamination determined in any trip or laboratory blank by five. The action level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor.

All results less than 5x action level should be considered highly suspect and reported as "JB". No action should be taken on the blank value itself.

IV. ICP Interference Check Sample Analysis (Form IV)

The ICP interference check sample analysis is performed to verify the contract laboratories interelement and background correction factors.

✓ Interference QC samples were run at the beginning and end of each sample analysis run (or a minimum of twice per 8 hour working shift, whichever is more frequent) and were within the control limits specified in the Inorganic DV SOW.

____ Interference QC samples were run, but did not meet the control limits.

In general, the sample data can be accepted without qualification if the concentrations of Al, Ca, Fe and Mg are less than 50% of the ICS concentrations.

Further evaluation of data not meeting the interference check sample control limits is beyond the scope of work for a level I data validation. Refer to Inorganics DV SOW for level II DV guidelines.

Note: The 20% contract limit is based on the true value for EPA standards, and on the mean value (run at least five times) for non-EPA standards.

Remarks: _____

Sample #: SEW1-SW1 Sample #: _____

Compound	SSR	SR	S	%R	Action	SSR	SR	R	%R	Action
Aluminum										
Antimony										
Arsenic										
Barium										
Beryllium										
Cadmium										
Calcium										
Chromium										
Cobalt										
Copper										
Iron										
Lead										
Magnesium										
Manganese										
Mercury										
Nickel										
Potassium										
Selenium										
Silver	2.06	1.00U	100	71.1	3					
Sodium										
Thallium										
Vanadium										
Zinc										
Other:										

If the sample concentration exceeds the spike concentration by a factor of 4 of more, no action is taken.

Calculation: $\%R = \frac{SSR-SR}{S} \times 100$

When the sample result (SR) is less than the contract required detection limit, 'SR' is equal to zero.

Accept	Approximate	Reject
SSR (75-125%)	SR(ND) + %R <30% for SSR[1]	SR(ND) + %R <30% for SSR[2]
SR(ND) + %R (30-74%) for SSR[5]	SR(+) + %R (30-74%) for SSR[3]	
	SR(+) + %R >125% for SSR[4]	

NOTE:

S - amount of spike
SSR - spiked sample result
SR - unspiked sample results
%R - percent recovery
ND - non-detected elements
\+ - positive results
1 - Discuss in review that sample results could be biased significantly low and that the reported concentration is the minimum concentration at which the analyte is present.
2 - Indicate in review memo of the possibility of false negatives, detection limits are elevated over what is reported, and that severe analytical deficiencies exist.
3 - Determine percent bias of results. Report that the detection limit may be biased low.
4 - Determine percent bias of sample results; false positive results may potentially exist.
5 - When the spiked sample results fall between 30-74% recovery, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be approximated and the percent bias determined when evaluated under a Level II Data Validation.

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NUS Corporation
Data Review Worksheets

VI. Laboratory Precision Evaluation

Element	CRDL	Sample #: SEW1-SD1D	Duplicate Sample #: * SEW1-SW1D	RPD	Action
* Aluminum	200	138	339	84.3	
Antimony	60				
Arsenic	10				
Barium	200				
Beryllium	5				
Cadmium	5				
Calcium	5000	240	350	37.5	
Chromium	10				
Cobalt	50				
Copper	25				
Iron	100				
Lead	5				
Magnesium	5000				
Manganese	15				
Mercury	0.2				
Nickel	40				
Potassium	5000				
Selenium	5				
Silver	10				
Sodium	5000				
Thallium	10				
Vanadium	50				
Zinc	20				
Other:					

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

Actions:

For aqueous samples, 'J' results for elements which have an RPD > 20%. For soil samples, 'J' results for elements which have an RPD > 35%. If sample results are less than 5x the CRDL, 'J' results for elements whose absolute difference is >CRDL. For sample results less than the CRDL, the RPD is not calculated (NC).

Calculation: $RPD = \frac{A - B}{(A + B)/2} \times 100$

NOTE:
CRDL - Contract Required Detection Limit.
RPD - Relative Percent Difference.
A - Sample Result.
B - Duplicate Sample Result.

AR301257

NUS Corporation
Data Review Worksheets

VII. Field Precision Evaluation None collected

Element	CRDL	Sample #:	Duplicate Sample #:	RPD	Action
Aluminum	200				
Antimony	60				
Arsenic	10				
Barium	200				
Beryllium	5				
Cadmium	5				
Calcium	5000				
Chromium	10				
Cobalt	50				
Copper	25				
Iron	100				
Lead	5				
Magnesium	5000				
Manganese	15				
Mercury	0.2				
Nickel	40				
Potassium	5000				
Selenium	5				
Silver	10				
Sodium	5000				
Thallium	10				
Vanadium	50				
Zinc	20				
Other:					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

Actions:

For aqueous samples, 'J' results for elements which have an RPD > 20%. For soil samples, 'J' results for elements which have an RPD > 35%. If sample results are less than 5x the CRDL, 'J' results for elements whose absolute difference is >CRDL. For sample results less than the CRDL, the RPD is not calculated (NC).

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Calculation: $RPD = \frac{A - B}{(A + B)/2} \times 100$

NOTE:

CRDL - Contract Required Detection Limit.
RPD - Relative Percent Difference.
A - Sample Result
B - Duplicate Sample Result

VIII. Laboratory Control Sample (Form VII)

_____ Laboratory Control Sample (LCS) analysis was performed for every twenty samples received and met contractual criteria.

_____ Laboratory Control Sample (LCS) analysis was performed, but did not meet the criteria for the following elements: _____

Calculation: %R = (Observed/True) x 100

Actions:

	Accept	Approximate	Reject
% Recovery	30-79 for ND[1] 80-120 for ND/+ > 120 for ND	30-79 for + > 120% for + < 30% for +	< 30 for ND

NOTE:

+ - positive results
ND - not detected elements
1 - When the percent recovery falls between 30-79 for the LCS, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be estimated when evaluated under a Level II Data Validation.

An aqueous LCS mercury sample is not required of the laboratory.

IX. Detection Limit Results (Form VII)

_____ Instrument detection limit results were present and found to be less than the Contract Required Detection Limits.

_____ Detection limit results were not included in the data package.

_____ Detection limits were present, but the criteria was not met for the following elements:

_____
_____
_____
_____

Action:

Adjust sample detection limits for elements not meeting contractual criteria listed above. Elements detected below the adjusted detection limit should be rejected (R'd).

Calculating detection limits for soil samples:
Sample detection limit (mg/kg) =

AR301259

$$100 \times \frac{\text{IDL (ug/l)}}{\text{\% solids}} \times \frac{\text{Volume diluted to (ml)}}{\text{wet weight digested (gms)}} \times \frac{1\text{L}}{1{,}000\text{ ml}} \times \frac{1{,}000\text{ gm}}{1\text{ kg}} \times \frac{1\text{ mg}}{1{,}000\text{ ug}}$$

NUS Corporation
Data Review Worksheets

X. Standard Additions/Furnace Atomic Absorption Analysis

✓ Duplicate injections and one-point analytical spikes were performed for all samples; duplicate injections agreed within ± 20%.

___ Duplicate injections and/or spikes were not performed for the following samples/elements: _____

___ Duplicate injections did not agree within ± 20% for samples:

_____ (J sample results)

___ Spike recoveries met the 85-115% recovery criteria for all samples.

___ Spike recoveries did not meet the 85-115% recovery criteria. Actions should be taken as follows:

	Spike Recov. 85-115%	Spike Recov. <85 or >115%	Spike Recov. <10%
Sample conc. >50% of spike value	Accept	use MSA	Reject

If the spike recovery is less than 40% and the laboratory has not re-analyzed the sample, approximate (J) the data for that sample.

✓ Method of Standard Addition (MSA) was not performed as required for sample #:

SEW2-SW1 (J Data)

___ MSA was used to quantitate analytical results when contractually required.

✓ Correlation coefficients > 0.995 (accept results)
___ Correlation coefficients < 0.995 for samples numbers:

_____ (J Data)

Comments: _____

AR301260

XI. Serial Dilution Results/Inductively Coupled Plasma (ICP) Analysis

Serial dilution analysis enables the reviewer to evaluate whether significant physical or chemical interferences exist due to sample matrix for samples analyzed by ICP. Sample results for elements analyzed and quantitated by Furnace Atomic Absorption should not be evaluated. Sample results should be evaluated for interferences by serial dilution analysis when the serial diluted sample result multiplied by the dilution factor is less than the instrument detection limit multiplied by a factor of ten. See below for examples.

____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

____ Serial Dilutions were not performed for the following:

____ Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 10x the IDL after dilution.

Element	IDL	IDL x 10	Sample #: SEW1-SD1	Serial Diluted Sample	Actions
Aluminum					
Barium					
Beryllium					
Cadmium					
Calcium					
Cobalt					
Copper					
Iron					
Magnesium					
Manganese					
Nickel					
Potassium	744	7,440	2924	3844	NR
Sodium	29	290	1371	1521	J
Vanadium					
Zinc	2	20	178	207	J
Other: SEW1-SW1 Zn	2	20	14.8	20.6	NR

Actions: All data for samples of the same matrix for that element should be approximated (J) when the serial dilution results do not meet contractual requirements.

For examples

1. Magnesium (Mg) was detected in Sample A at a concentration of 65 ppb. The IDL for Mg is 10 ppb. The sample was then diluted by a factor of ten. The serially diluted sample result (SR) was 80 ppb. The sample should not be evaluated for matrix interferences, since: 80 ppb (SR) ÷ 10 (dilution factor) = 8. Eight is less than 100 (10 ppb (IDL) x 10). No action is warranted.

2. Aluminum (Al) was detected in Sample B at a concentration of 2,000 ppb. The IDL for Al is 70 ppb. The sample was diluted by a factor of four. The serially diluted sample result (SR) was 3,200 ppb. The sample should be evaluated for matrix interferences, since: 3,200 ppb (SR) ÷ 4 (dilution factor) = 800. Eight hundred is greater than 700 (70 ppb (IDL) x 10). The serially diluted sample result of 3,200 ppb is not within 10% of the undiluted sample results of 2,000 ppb. Therefore, aluminum results in samples should be approximated (J'd).

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page 2 of 2

XI. Serial Dilution Results/Inductively Coupled Plasma (ICP) Analysis

Serial dilution analysis enables the reviewer to evaluate whether significant physical or chemical interferences exist due to sample matrix for samples analyzed by ICP. Sample results for elements analyzed and quantitated by Furnace Atomic Absorption should not be evaluated. Sample results should be evaluated for interferences by serial dilution analysis when the serial diluted sample result multiplied by the dilution factor is less than the instrument detection limit multiplied by a factor of ten. See below for examples.

____ Serial Dilutions were performed for each matrix and results of the diluted sample analysis agreed within ten percent of the original undiluted analysis.

____ Serial Dilutions were not performed for the following:

✓ Serial Dilutions were performed, but analytical results did not agree within 10% for analyte concentrations greater than 10x the IDL after dilution.

Element	IDL	IDL x 10	Sample #: SS-19	Serial Diluted Sample	Actions
Aluminum					
Barium					
Beryllium					
Cadmium					
Calcium					
Cobalt					
Copper	5	50	51.6	39.5	NR
Iron					
Magnesium					
Manganese					
Nickel					
Potassium	744	7,440	3141	4267	NR
Sodium					
Vanadium					
Zinc	2	20	111	127	J
Other:					

Actions: All data for samples of the same matrix for that element should be approximated (J) when the serial dilution results do not meet contractual requirements.

For examples:

1. Magnesium (Mg) was detected in Sample A at a concentration of 63 ppb. The IDL for Mg is 10 ppb. The sample was then diluted by a factor of ten. The serially diluted sample result (SR) was 80 ppb. The sample should not be evaluated for matrix interferences, since: 80 ppb (SR) ÷ 10 (dilution factor) = 8. Eight is less than 100 (10 ppb (IDL) x 10). No action is warranted.

2. Aluminum (Al) was detected in Sample B at a concentration of 2,000 ppb. The IDL for Al is 70 ppb. The sample was diluted by a factor of four. The serially diluted sample result (SR) was 3,200 ppb. The sample should be evaluated for matrix interferences, since: 3,200 ppb (SR) ÷ 4 (dilution factor) = 800. Eight hundred is greater than 700 (70 ppb (IDL) x 10). The serially diluted sample result of 3,200 ppb is not within 10% of the undiluted sample results of 2,000 ppb. Therefore, aluminum results in samples should be approximated (J'd).

AR301262

XII. Calculations

For soil samples, the following equation may be necessary to convert raw data values (usually reported in ug/l) to actual sample concentrations (mg/kg):

If the lab uses 1 gm sample (wet weight) to 500 milliliters:

sample results (mg/kg) =
wet weight

$$\text{Digest result} \quad \frac{ug}{L} \times \frac{500\ ml}{1\ gm} \times \frac{1L}{1{,}000\ ml} \times \frac{1{,}000\ gm}{1kg} \times \frac{1\ mg}{1{,}000\ ug}$$

In addition, the results are converted to dry weight using the percent solids calculation:

$$\frac{\%\ solids \times wet\ weight}{100} = \text{final concentration, dry weight}$$

December 4, 1990

Narrative
ICF Fairfax - Arrowhead Plating
Volatile Organic Analysis
EPA OSW Method 8240
Versar Project 420.58 - Batch 21
Control 3913

This report contains the analytical data for the volatile organic analysis of four (4) water samples and twenty-three (23) soil samples. The samples listed below were received by Versar Laboratories on November 14, 1990 and were analyzed following EPA Office Of Solid Waste (OSW) Method 8240 for volatile organic compounds.

SAMPLE LIST

SS-1	SS-8	SS-15	SEW2-SD1
SS-2	SS-9	SS-16	SEW3-SD1
SS-3	SS-10	SS-17	SEW1-SW1
SS-4	SS-11	SS-18	SEW2-SW1
SS-5	SS-12	SS-19	TRIPBLANK
SS-6	SS-13	SS-20	TRIPBLANK2
SS-7	SS-14	SEW1-SD1	

GC/MS instrument calibrations using BFB met requirements for volatile organic analysis. All calibration criteria were met for the volatile initial calibration curves and the continuing calibration standards. All volatile organic analyses occurred during the twelve hour period that followed daily instrument calibration.

Volatile surrogate standard recovery values met specified criteria for all volatile analyses. Three sets of volatile matrix spike/matrix spike duplicate analyses were performed for this batch shipment of samples. All recovery and relative percent difference (RPD) values were within specified QC limits. Volatile organic analysis for samples SS-14, SS-15, SS-16, SS-17, SS-18, SS-19, SS-20, SEW1-SD1, SEW2-SD1, SEW3-SD1, and the soil QC samples were completed after expiration of the fourteen day of sample holding time. Other sample analyses were completed prior to expiration of sample holding times. All samples were analyzed without dilution. Volatile non-target compounds have been tentatively identified using the EPA/NBS Mass Spectral Database Library.

AR301264

Detection limits and concentrations of volatile organic compounds present in the soil samples are reported on a "dry weight" basis, which accounts for the moisture content of each sample.

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

SS1

Name: VERSAR INC. Contract: _____

Lab Code: VERSAR Case No.: 3913A SAS No.: _____ SDG No.: 21

Matrix: (soil/water) SOIL Lab Sample ID: 36838

Sample wt/vol: 5.0 (g/mL) G Lab File ID: Y4899

Level: (low/med) LOW Date Received: 11/14/90

% Moisture: not dec. 14 Date Analyzed: 11/26/90

Column: (pack/cap) CAP Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
74-87-3	Chloromethane	12	U
74-83-9	Bromomethane	12	U
75-01-4	Vinyl chloride	12	U
75-00-3	Chloroethane	12	U
75-09-2	Methylene chloride	6	U
67-64-1	Acetone	12	U
75-15-0	Carbon disulfide	6	U
75-35-4	1,1-Dichloroethene	6	U
75-34-3	1,1-Dichloroethane	6	U
540-59-0	1,2-Dichloroethene (total)	6	U
67-66-3	Chloroform	6	U
107-06-2	1,2-Dichloroethane	6	U
78-93-3	2-Butanone	12	U
71-55-6	1,1,1-Trichloroethane	6	U
56-23-5	Carbon tetrachloride	6	U
108-05-4	Vinyl acetate	12	U
75-27-4	Bromodichloromethane	6	U
78-87-5	1,2-Dichloropropane	6	U
10061-01-5	cis-1,3-Dichloropropene	6	U
79-01-6	Trichloroethene	6	U
124-48-1	Dibromochloromethane	6	U
79-00-5	1,1,2-Trichloroethane	6	U
71-43-2	Benzene	6	U
10061-02-6	Trans-1,3-dichloropropene	6	U
75-25-2	Bromoform	6	U
108-10-1	4-Methyl-2-pentanone	12	U
591-78-6	2-Hexanone	12	U
127-18-4	Tetrachloroethene	6	U
79-34-5	1,1,2,2-Tetrachloroethane	6	U
108-88-3	Toluene	6	U
108-90-7	Chlorobenzene	6	U
100-41-4	Ethylbenzene	6	U
100-42-5	Styrene	6	U
1330-20-7	Total xylenes	6	U

FORM I VOA 1/87 Rev.

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

TO: Claudia Brand

FROM: Davida Parker Trumbo dpt

DATE: January 3, 1991

SUBJECT: Arrowhead Plating Site, Data Validation, Twenty-nine (29) Soil and Eight (8) Water Samples for Cyanide Analysis, Versar Laboratories Inc., Control Number 3913.

A data validation was performed on the analytical data acquired for cyanide from (8) water and (29) soil samples collected at the Arrowhead Plating Site as part of the remedial investigation/feasibility study. The samples were analyzed for total cyanide in accordance with the modified CLP version of method 335.2 from *Methods for the Chemical Analysis of Water and Waste*, 1983.

The data was validated in accordance with quality control criteria established in the noted analytical method. A copy of the checklist used to record the specific observances has been provided for your information as an attachment to this report.

The following samples were included in this data package:

SS-1	SS-8	SS-15	SEW2-SD1	ST5-SD3	SEW1-SW1
SS-2	SS-9	SS-16	SEW3-SD1	ST1-SW3	SEW2-SW1
SS-3	SS-10	SS-17	ST1-SD3	ST1-SW3A	
SS-4	SS-11	SS-18	ST1-SD3A	ST2-SW1	
SS-5	SS-12	SS-19	ST2-SD3	ST3-SW1	
SS-6	SS-13	SS-20	ST3-SD3	ST4-SW1	
SS-7	SS-14	SEW1-SD1	ST4-SD3	ST5-SW1	

Overall Assessment of Data: The overall laboratory performance met quality control criteria and were compliant with the requisite specifications with the exception of the distilled matrix spike for sample SEW1-SD1. The detection limits for sediment samples should be qualified as being low biased.

The following criteria were reviewed during the data validation:

1. **Holding Times:** All criteria were met.

2. **Initial and Continuing Calibration Verification:** All criteria were met.

3. **Blank Analysis:** All criteria were met.

4. **Matrix Spike Sample Analysis:** All criteria were met with the exception of SEW1-SD1, which had a recovery of 65%. The detection limit has the potential for being biased low in the sediment samples.

5. **Laboratory Precision Evaluation:** Duplicate analysis was performed on samples ST4-SW3, SEW1-SD1, and SS-19. All sample results were reported below the detection limit.

6. **Field Precision Evaluation:** Duplicate samples were collected for samples ST1-SD3 and ST1-SW3. The sample results were reported below the detection limit.

7. **Laboratory Control Sample:** All criteria were met.

NUS Corporation
Data Review Worksheets

Project Name Arrowhead Plating
TDD No.
Reference No.

REGIONAL REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Versar data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data reviewed included:

Case No. 3913 SAS No. ____ Sampling Date: 11/12/90
Shipping Date:
No. of samples 29 soil, 8 H2O Matrix ____ Date Received By Lab: 11/14/90

Traffic Report Nos: SS1 – SS-20; SEW1-3 (SD1); ST1-5 (SD3); ST1-5 (SW1); SEW1-2 (SW1)
Blank No.:
Duplicate Nos.:

Contract No. ____ requires that specific analytical work be done and that associated reports be provided by the contractor to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- Holding times
- Calibration Verification
- Field and Lab Blank Analysis
- Interference QC Results
- Matrix Spike Percent Recovery Results
- Laboratory Precision Evaluation
- Field Precision Evaluation
- Lab Control Sample Results
- Detection Limit Results
- Standard Addition Results
- Serial Dilution Results

Overall Comments:

Definition of Qualifiers:

A - Acceptable data.
JB - Approximate data due to blank contamination.
J - Approximate data due to other quality control criteria.
* - Reject data due to quality control review.
ND - Non-detected element.
+ - Positive element identification.

Reviewer: D. B. Gumbo Date: 1/3/90

AR301268

NUS Corporation
Data Review Worksheets

I. Holding Times

Date samples received: 11/14/19
Date analyzed (Hg):
Date analyzed (all others) by: CN 12/26/90

Action:

If samples are analyzed for mercury (28 days), cyanide (14 days) or any other element (6 months) in excess of the holding times, approximate results for that element. If mercury or cyanide are held for over one month in excess of the contract required holding time, reject results.

Remarks: _____

II. Initial and Continuing Calibration Verification (Form II)

✓ Calibrations were performed at the beginning of sample analysis and at a minimum frequency of ten percent or every two hours during the analysis, and met contractual criteria.

___ Calibrations were not performed as specified in Functional Guidelines for Evaluating Inorganic Analyses and/or did not meet contract-specified windows: (specify) _____

Action Windows:

	Accept	Approximate	Reject
mercury	50-79% for ND[1] 80-120% for +/ND >121% for ND	50-79% for + 121-150% for +	<50% or >150% for +/ND
all others	50-89% for ND[1] 90-110% for +/ND >111% for ND	50-89% for + 111-150% for +	<50% or >150% for +/ND

NOTE:

+ - positive values.
ND - non-detected elements.
1 - When calibration results fall between 50-79% recovery for mercury and 50-89% for all other elements, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be estimated when evaluated under a Level II Data Validation.

Remarks: _____

Sample #: SEW1-SD1 Sample #: _____

Compound	SSR	SR	S	%R	Action	SSR	SR	R	%R	Action
Aluminum										
Antimony										
Arsenic										
Barium										
Beryllium										
Cadmium										
Calcium										
Chromium										
Cobalt										
Copper										
Iron										
Lead										
Magnesium										
Manganese										
Mercury										
Nickel										
Potassium										
Selenium										
Silver										
Sodium										
Thallium										
Vanadium										
Zinc										
Other: CN	46.5	ND	16.4	65.3	J					

If the sample concentration exceeds the spike concentration by a factor of 4 of more, no action is taken.

Calculation: $\%R = \frac{SSR-SR}{S} \times 100$

When the sample result (SR) is less than the contract required detection limit, 'SR' is equal to zero.

Accept	Approximate	Reject
SSR (75-125%)	SR(ND) + %R <30% for SSR[1]	SR(ND) + %R <30% for SSR[2]
SR(ND) + %R (30-74%) for SSR[5]	SR(+) + %R (30-74%) for SSR[3]	
	SR(+) + %R >125% for SSR[4]	

NOTE:

S - amount of spike
SSR - spiked sample result
SR - unspiked sample results
%R - percent recovery
ND - non-detected elements
+ - positive results
1 - Discuss in review that sample results could be biased significantly low and that the reported concentration is the minimum concentration at which the analyte is present.
2 - Indicate in review memo of the possibility of false negatives, detection limits are elevated over what is reported, and that severe analytical deficiencies exist.
3 - Determine percent bias of results. Report that the detection limit may be biased low.
4 - Determine percent bias of sample results; false positive results may potentially exist.
5 - When the spiked sample results fall between 30-74% recovery, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be approximated and the percent bias determined when evaluated under a Level II Data Validation.

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All criteria met

VI. Laboratory Precision Evaluation

Element	CRDL	Sample #:	Duplicate Sample #:	RPD	Action
Aluminum	200				
Antimony	60				
Arsenic	10				
Barium	200				
Beryllium	5				
Cadmium	5				
Calcium	5000				
Chromium	10				
Cobalt	50				
Copper	25				
Iron	100				
Lead	5				
Magnesium	5000				
Manganese	15				
Mercury	0.2				
Nickel	40				
Potassium	5000				
Selenium	5				
Silver	10				
Sodium	5000				
Thallium	10				
Vanadium	50				
Zinc	20				
Other: CN	10				

Laboratory Duplicate Actions should be applied to all other samples of the same matrix type.

Actions:

For aqueous samples, 'J' results for elements which have an RPD > 20%. For soil samples, 'J' results for elements which have an RPD > 35%. If sample results are less than 5x the CRDL, 'J' results for elements whose absolute difference is >CRDL. For sample results less than the CRDL, the RPD is not calculated (NC).

Calculation: $RPD = \frac{A - B}{(A + B)/2} \times 100$

NOTE:
CRDL - Contract Required Detection Limit.
RPD - Relative Percent Difference.
A - Sample Result.
B - Duplicate Sample Result.

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NUS Corporation
Data Review Worksheets

All criteria Met

VII. Field Precision Evaluation

Element	CRDL	Sample #:	Duplicate Sample #:	RPD	Action
Aluminum	200				
Antimony	60				
Arsenic	10				
Barium	200				
Beryllium	5				
Cadmium	5				
Calcium	5000				
Chromium	10				
Cobalt	50				
Copper	25				
Iron	100				
Lead	5				
Magnesium	5000				
Manganese	15				
Mercury	0.2				
Nickel	40				
Potassium	5000				
Selenium	5				
Silver	10				
Sodium	5000				
Thallium	10				
Vanadium	50				
Zinc	20				
Other:					

Field Duplicate Actions should be applied to all other samples of the same matrix type.

Actions:

For aqueous samples, 'J' results for elements which have an RPD > 20%. For soil samples, 'J' results for elements which have an RPD > 35%. If sample results are less than 5x the CRDL, 'J' results for elements whose absolute difference is >CRDL. For sample results less than the CRDL, the RPD is not calculated (NC).

Calculation: $RPD = \frac{A - B}{(A + B)/2} \times 100$

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NOTE:

CRDL - Contract Required Detection Limit.
RPD - Relative Percent Difference.
A - Sample Result
B - Duplicate Sample Result

VIII. Laboratory Control Sample (Form VII)

✓ Laboratory Control Sample (LCS) analysis was performed for every twenty samples received and met contractual criteria.

____ Laboratory Control Sample (LCS) analysis was performed, but did not meet the criteria for the following elements: _____

Calculation: %R = (Observed/True) x 100

Actions:

	Accept	Approximate	Reject
% Recovery	30-79 for ND[1] 80-120 for ND/+ > 120 for ND	30-79 for + > 120% for + < 30% for +	< 30 for ND

NOTE:

+ - positive results
ND - not detected elements
1 - When the percent recovery falls between 30-79 for the LCS, an evaluation of detection limits is beyond the scope of work for a NUS/FIT Level I Data Validation. However, detection limits should be estimated when evaluated under a Level II Data Validation.

An aqueous LCS mercury sample is not required of the laboratory.

IX. Detection Limit Results (Form VII)

____ Instrument detection limit results were present and found to be less than the Contract Required Detection Limits.

____ Detection limit results were not included in the data package.

____ Detection limits were present, but the criteria was not met for the following elements:

_____
_____
_____
_____

Action:

Adjust sample detection limits for elements not meeting contractual criteria listed above. Elements detected below the adjusted detection limit should be rejected (R'd).

Calculating detection limits for soil samples:
Sample detection limit (mg/kg) =

AR301273

$$100 \times \frac{\text{IDL (ug/l)}}{\text{\% solids}} \times \frac{\text{Volume diluted to (ml)}}{\text{wet weight digested (gms)}} \times \frac{1\text{L}}{1{,}000\text{ ml}} \times \frac{1{,}000\text{ gm}}{1\text{ kg}} \times \frac{1\text{ mg}}{1{,}000\text{ ug}}$$

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

February 8, 1991

Mr. Khoa Nguyen
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Mr Nguyen:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from January 1 through January 31, 1990.

Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Environmental Scientist

cc: Don Irwin/ Brian Bertonneau
Gary Dietrich
Kim Hummel

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: January 1, 1990 -- January 31, 1990

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: February 8, 1991

Specific Accomplishments in Reporting Period:

- ICF KE prepared the addendum to the work plan, and responded to VADWM and EPA comments.
- We began preparing sections of the draft RI report.

Projected Tasks to Be Completed in Upcoming Month:

- Field work will include: the installation and sampling of 6 new monitoring wells (including four off-site locations); resampling of existing wells; resampling of 5 surface water locations for CN; and sampling of 3 additional surface water stations located in tributaries of Scates Branch.
- ICF KE will continue to draft the RI report.

Problems Encountered and Solutions:

- None.

ICF KAISER ENGINEERS

ICF KAISER ENGINEERS, INC.
9300 LEE HIGHWAY
FAIRFAX, VIRGINIA 22031-1207
703/934-3300

April 9, 1991

Mr. Khoa Nguyen
Environmental Engineer Consultant
Virginia Department of Waste Management
101 N. 14th Street, 18th Floor
Richmond, VA 23219

Dear Khoa:

Enclosed for your review is the monthly progress report for the RI/FS at the Arrowhead Plating site in Montross, Virginia. The report covers the period from March 1 through March 31, 1991. As requested, I am also enclosing summary tables of the validated data for the samples collected in February.

As you know, we are beginning work on the FS, and I am looking forward to talking with you soon about specific aspects of the project such as the ARARs and the tentatively agreed upon schedule. Should you have any comments or questions, feel free to call me at (703) 934-3937.

Sincerely,

Claudia A. Brand

Claudia A. Brand
Senior Environmental Scientist

cc: Don Irwin/ Brian Bertonneau
Charles Perry
Gary Dietrich
Kim Hummel

MONTHLY PROGRESS REPORT FOR ARROWHEAD PLATING SITE RI/FS MONTROSS, VA

REPORTING PERIOD: March 1, 1991 -- March 31, 1991

PREPARED BY: Claudia A. Brand, Project Coordinator

DATE PREPARED: April 8, 1991

Specific Accomplishments in Reporting Period:

- Received data from General Physics for additional groundwater and surface water samples and conducted data validation.
- Completed draft RI report and submitted for client review.

Projected Tasks to Be Completed in Upcoming Month:

- Finalization of RI report and submittal to VADWM and EPA.
- Initial FS research and preliminary drafting of report sections.

Problems Encountered and Solutions:

- None.

A[illegible]WHEAD PLATING SITE
SUMMARY OF METALS IN GROUND WATER
ROUND III
[ug/L]

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanide
MW1 GW3	3,100	79.4	5.0 U	14,700	9.0 U	8.2(a,b)	2,030(d)	2.0 U(b)	0.35(a,b)	27.0 U	4,010 (a)	1.0 U(b)	24,200	97.7	5.0 U
MW1 GW3 F	1,250	64.5	5.0 U	11,300	9.0 U	8.2(a,b)	27 U(d)	2.0 U(b)	0.20(a,b)	27.0 U	4,640 (a)	1.0 U(b)	23,300	78.3	NR
MW2 GW3	6,530	75.8	5.0 U	6,280	13.8	9.9(a,b)	14,700(d)	5.3 (b)	0.22(a,b)	27.0 U	5,700 (a)	1.0 U(b)	4,430	35.4	5.0 U
MW2 GW3 F	118 U	44.0 U	5.0 U	2,580	9.0 U	5.6(a,b)	27 U(d)	2.0 U(b)	0.20(a,b)	27.0 U	5,210 (a)	1.0 U(b)	4,200	16.1	NR
MW3 GW3	6,890	52.1	5.0 U	2,380	13.5	3.3(a,b)	16,100(d)	2.0 U(b)	0.20(a,b)	27.0 U	4,720 (a)	1.0 U(b)	5,220	27.5	5.0 U
MW3 GW3 F	118 U	44.0 U	5.0 U	2,430	9.0 U	4.8(a,b)	27 U(d)	2.0 U(b)	0.20(a,b)	27.0 U	3,870 (a)	-- (b)	5,540	19.9	NR
MW4 GW3	46,800	80.4	5.0 U	2,010	58.2	54.0(b)	108,000(d)	2.0 U(b)	0.20(a,b)	27.0 U	8,050 (a)	1.0 U(b)	50,400	68.8	5.0 U
MW4 GW3 F	596	44.0 U	5.0 U	336(a)	9.0 U	8.5(a,b)	923(d)	2.0 U(b)	0.22(a,b)	27.0 U	4,830 (a)	2.6 (b)	79,700	13.1	NR
MW5 GW3	2,040	44.0 U	5.0 U	374(a)	9.0 U	4.0(a,b)	4,520(d)	2.0 U(b)	0.20(a,b)	27.0 U	4,840 (a)	1.0 U(b)	84,500	14.7	5.0 U
MW5 GW3 F	118 U	44.0 U	5.0 U	271(a)	9.0 U	9.0(a,b,e)	27 U(d)	2.0 U(b)	0.20(a,b)	27.0 U	4,310 (a)	1.0 U(b)	81,800	8.0 U	NR
MW6 GW3	1,320	44.0 U	5.0 U	2,900	9.0 U	2.5(a,b)	4,480(d)	-- (b)	0.22(a,b)	27.0 U	5,390 (a)	1.0 U(b)	10,700	10.8	5.0 U
MW6 GW3 F	118 U	44.0 U	5.0 U	2,940	9.0 U	3.4(a,b)	27 U(d)	2.0 U(b)	0.20(a,b)	27.0 U	4,980 (a)	1.0 U(b)	10,700	10.8	NR
MW7 GW3	4,030 (d,f)	9.0 U	5.0 U	812 U	9.0 U	21.1(b)	5,090(d)	2.4 (b)	0.30	16.0 U	1,090	13.1 (b)	182,000	8.0 U(d)	18.1
MW7 GW3 F	153 (d,f)	9.0 U	5.0 U	812 U	9.0 U	9.3(a,b)	160(d)	2.0 U(b)	0.22	16.0 U	700	1.0 U(b)	190,000	10.3(a,d)	NR
MW8 GW3	1,290 (d,f)	44.2(a)	5.0 U	6,600	9.0 U	6.0(a,b)	3,660(d)	2.0 U(b)	1.40	16.0 U	3,220	1.0 U(b)	42,200	19.4(a,d)	5.0 U
MW8 GW3 F	411 (d,f)	39.7(a)	5.3	6,230	9.0 U	3.6(a,b)	43.8(d)	2.0 U(b)	0.95	16.0 U	3,460	1.0 U(b)	40,600	24.5(a,d)	NR
MW9 GW3	4,290 (d,f)	167.0	5.0 U	2,540	9.9	3.8(a,b)	10,600(d)	2.0 U(b)	0.20	21.4 (a)	1,830	1.0 U(b)	2,960	9.0(a,d)	5.0 U
MW9 GW3 F	536 (d,f)	132.0	5.0 U	2,500	9.0 U	3.6(a,b)	55.8(d)	2.0 U(b)	0.30	16.0 U	1,340	1.0 U(b)	2,900	19.0(a,d)	NR
MW10 GW3	50,600(d,f)	21.4(a)	6.7	155,000	9.0 U	3,200(b)	21,600(d)	2.0 U(b)	0.20	667.0	15,200	1.0 U(b)	267,000	5,600 (d)	128.0
MW10 GW3 F	41,400(d,f)	12.4(a)	9.2	199,000	9.0 U	3,100(b)	1,890(d)	2.0 U(b)	0.20	696.0	14,800	1.0 U(b)	252,000	5,220 (d)	NR
MW11 GW3	837	44.0 U	5.0 U	31,900	9.0 U	1.6(a,b)	6,010(d)	2.0 U(b)	0.20(b)	27.0 U	8,200 (a)	1.0 U(b)	68,200	200.0	5.0
MW11 GW3 F	118 U	44.0 U	5.0 U	31,300	9.0 U	5.1(a,b)	494(d)	2.0 U(b)	0.20(b)	27.0 U	7,710	1.0 U(b)	73,300	192.0	NR
MW12 GW3	900	44.0 U	5.0 U	11,500	9.0 U	3.2(a,b)	5,210(d)	2.0 U(b)	0.20(b)	27.0 U	5,010 (a)	1.0 U(b)	177,000	13.5	5.0
MW12 GW3 F	283 (a)	44.0 U	5.0 U	11,100	9.0 U	2.8(a,b)	3,880(d)	2.0 U(b)	0.20(b)	27.0 U	5,180 (a)	1.0 U(b)	167,000	13.9	NR
MW13 GW3	2,010	44.0 U	5.0 U	7,010	9.0 U	3.9(a,b)	3,810(d)	2.0 U(b)	0.20(b)	27.0 U	5,800 (a)	1.0 U(b)	203,000	24.0	5.0
MW13 GW3 F	801	44.0 U	5.0 U	9,060	9.0 U	5.9(a,b)	154(d)	2.0 U(b)	0.20(b)	27.0 U	5,730 (a)	1.0 U(b)	206,000	28.2	NR

AR301278

ARROWHEAD PLATING SITE
SUMMARY OF METALS IN GROUND WATER
ROUND III (CONTINUED)
[ug/L]

Sample ID	Aluminum	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Mercury	Nickel	Potassium	Silver	Sodium	Zinc	Cyanid
MW21 GW3	142,000	66.3	10.8	144,000	24.8 (a,d)	11,000	97,700 (d)	5.4 (b)	0.20 U(b,d)	553.0	19,800	1.2 (b)	147,900 (d)	3,660.0	5.0 U
MW21 GW3 F	99,600(d)	44.0 U	11.9	156,000	9.0 U(a)	12,200	41,600	2.0 U(b)	0.20 U	621.0	17,900	1.0 U(b)	148,000	4,170.0	NR
MW22 GW3	11,800	95.7	5.0 U	2,440	20.8 (a,d)	8,690	38,500 (d)	11.2 (b)	0.20 U(b,d)	27.0 U	3,060 (a)	1.0 U(b)	11,660 (d)	85.5	5.0 U
MW22 GW3 F	150(a,d)	44.0 U	5.0 U	1,920	9.0 U(a)	7.8(a)	80.8	2.0 U(b)	0.20 U	27.0 U	1,670 (a)	1.0 U(b)	11,250	21.5	NR
MW23 GW3	21,500	117.0	5.0 U	44,500	45.9 (a,d)	21.2	56,300 (d)	21.7 (b)	0.20 U(b,d)	48.3	12,600	1.0 U(b)	318,000 (d)	174.0	18.3
MW23 GW3 F	347(a,d)	51.0	5.0 U	38,300	9.0 U(a)	4.7(a)	3,880	2.0 U(b)	0.20 U	29.0	8,660	1.0 U(b)	320,000	76.6	NR
MW24 GW3	4,000	44.0 U	5.0 U	52,100	16.5 (a,d)	7.2	10,300 (d)	2.0 U(b)	0.58 (b,d)	32.6	5,660	1.0 U(b)	294,000 (d)	52.8	22.9
MW24 GW3 F	1,200(d)	44.0 U	5.0 U	51,300	9.0 U(a)	5.6(a)	1,680	2.0 U(b)	0.20 U	27.2	4,860	1.0 U(b)	292,000	48.4	NR
MW25 GW3	2,540	78.1	5.0 U	1,910	11.8 (a,d)	6.8(a)	7,320 (d)	2.6 (b)	0.20 U(b,d)	27.0 U	1,440 (a)	1.0 U(b,d)	16,440	14.5	5.0 U
MW25 GW3 F	307(a,d)	44.0 U	5.0 U	1,810	9.0 U(a)	6.0(a)	232	2.0 U(b)	0.20 U	27.0 U	1,490 (a)	1.0 U(b)	17,520	11.1	NR
MW26 GW3	23,700	94.6	5.0 U	5,430	46.4 (d)	12.8	61,800 (d)	6.6 (b)	0.20 U(b,d)	27.0 U	7,260	1.0 U(b)	54,600 (d)	59.6	5.0 U
MW26 GW3 F	122,000(d)	44.0 U	5.0 U	3,250	9.0 U(a)	5.0(a)	310	2.0 U(b)	0.20 U	27.0 U	2,240 (a)	1.0 U(b)	52,400	11.5	NR
AR1 GW3	4,310(d,f)	19.6(a)	5.0 U	897	16.0	10.3(b)	11,100 (d)	3.5 (b)	0.20 U	41.6	1,880	1.0 U	199,000	39.9(a,d)	5.0 U
AR1 GW3 F	118 U(d,f)	9.0 U	5.0 U	812 U	9.0 U	4.2(a,b)	49.3 (d)	2.0 U(b)	0.20 U	16.0 U	835	1.0 U(b)	34,200	13.0(a,d)	NR
AR2 GW3	9,920(d,f)	52.9(a)	5.0 U	13,200	25.2	9.5(a,b,e)	30,400 (d)	3.2 (b)	0.30	16.0 U	6,980	1.0 U(b)	103,000	23.5(a,d)	11.9
AR2 GW3 F	124(d,f)	21.7(a)	5.0 U	11,300	9.0 U	11.8(b)	38.2 (d)	2.0 U(b)	0.20 U	16.0 U	5,850	1.0 U(b)	123,000	11.9(a,d)	NR
AR3 GW3	21,800(d,f)	71.0	5.0 U	8,160	15.3	8.4(a,b)	56,400 (d)	6.9 (b)	0.20 U	16.0 U	1,960	1.0 U(b)	111,000	35.2(a,d)	34.1
AR3 GW3 F	118 U(d,f)	9.0 U	5.0 U	812 U	9.0 U	13.4(b)	68.0 (d)	2.0 U(b)	0.20 U	16.0 U	310	1.0 U(b)	106,000	78.9(d)	NR
AR3 GW3A	8,620(d,f)	34.7(a)	5.0 U	5,800	17.3	10.4(b)	23,500 (d)	5.2 (b)	0.22	19.2 (a)	815	1.0 U(b)	108,000	8.0 U(d)	29.6
AR3 GW3A F	796(d,f)	943.0	5.0 U	5,160	9.0 U	27.5(b)	1,108 (d)	4.9 (b)	0.20 U	16.0 U	1,420	1.0 U(b)	121,000	552.0(d)	NR

Key: U - Not detected above the value indicated.
NR - Not requested.

(a) - Value is less than five times the concentration in the associated blank and should be considered a non-detect.
(b) - Estimate value due to bias associated in the matrix spike assessment.
(c) - Reject value due to poor recovery associated with matrix spike.
(d) - Estimate value due to poor laboratory precision.
(e) - Estimate value due to low correlation for the method of standard additions.
(f) - Estimate value due to potential chemical or spectral interference.

AMMARAD TRAINING 5111
VOLATILE ORGANICS DATA FOR GROUNDWATER (Round 3)
In units of ug/L

Sample ID	Acetone	1,1 Dichloroethene	1,2 Dichloroethane	1,1,1 Trichloroethane	Trichloroethene	Tetrachloroethene	Methylene chloride	1,1 Dichloroethane	Vinyl chloride	Chloroform	1,2 Dichloroethane	Toluene	1,1,2,2 Tetrachloroethane	Chloroethane	1,1,2 Trichloroethane	Benzene	Ethylbenzene	Xylene	4 Methyl 2 pentanone	Carbon Disulfide	Comment
Federal Standards ug/L	NA	NA	NA	200	5(f)	5(g)	150(h)														
RW1-GW3	(12)	5U	5U	5U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW2-GW3	10U	5U	5U	5U	9	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW3-GW3	10U	5U	5U	5U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW4-GW3	10U	5U	5U	5U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW5-GW3	10U	5U	5U	5U	5U	[2]	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW6-GW3	10U	5U	5U	5U	5U	[12]	5U	5U	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW7-GW3,DL	10U	4(c)	9	10	[9]	150	5U	1(c,e)	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	Note A
RW8-GW3,DL	10U	1,100	800	1,100	1,500	7,500	(2)	440(e)	10U	3(c)	9	5U	5U	2(c)	25	7	2(c)	5U	10U	5U	Note A
RW9-GW3,DL	10U	4,000	77(h)	61,000	2,600	13,000	(9)	120(h)	5(c,h)	20(h)	6(h)	6(h)	5U	10U	[9]	1(c,h)	1(c,h)	1(c,h,e)	2(c,h)	5U	Note A,B
RW10-GW3,DL	(9)	3,400	5U	3,500	18,000	14,000	5U	50(h,e)	10U	7(h)	13(h)	1	5U	10U	[8]	5U	5U	5U	10U	5U	Note A,B
RW11-GW3,DL	10U	260(a,h)	72(h)	320(a,h)	300	4,200	1(c,h)	71(h,e)	2(c,h)	6(h)	2(c,h)	5U	5U	10U	1(c,h)	4(c,h)	5U	5U	10U	(2)	Note B
RW12-GW3,DL	10U	240(a)	240(a)	220(a)	490	5,000	1(c)	74(e)	10U	2(c)	2(c)	5U	5U	10U	6	2(c)	5U	5U	10U	5U	
RW13-GW3,DL	10U	170	300(a)	130	300	3,200	1(c)	52(e)	10U	1(c)	1(c)	5U	5U	10U	1(c)	1(c)	5U	5U	10U	5U	
AR1-GW3	10U	11	5U	14	22	120	(7)	1(c)	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	
AR2-GW3,DL	10U	500	7	540	1,200	2,500	(8)	21	10U	4(c)	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	
AR3-GW3,DL	10U	100	600	190	2,000(j)	1,000(j)	5U	23	4(c)	5U	5U	5U	5U	7(c)	5U	5U	5U	5U	10U	5U	
AR3A-GW3,DL	10U	85	720	190	2,400(j)	2,900(j)	5U	23	3(c)	5U	5U	1(c)	5U	8(c)	5U	5U	5U	5U	10U	5U	
AR21-GW3,DL,DL	(10)	4,000(h)	87	4,100(h,e)	15,000(j)	7,100(h)	5U	240(d)	10	10	22	[15]	5U	10U	5U	5U	5U	5U	10U	5U	
AR22-GW3	10U	10	2(c)	46	21	50	3(c)	1(c)	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	
AR23-GW3,DL	(9)	71	3(c)	57	3,300	105	5U	5(c)	10U	27	5U	[2]	4(c)	10U	5U	5U	5U	5U	10U	5U	
AR24-GW3,DL	10U	180	6	110	4,800	180	5	9	10U	27	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	
AR25-GW3,DL	10U	20	30	46	750	110	5U	4(c)	10U	5U	5U	5U	5U	10U	5U	5U	5U	5U	10U	5U	
AR26-GW3,DL	10U	1,000(a)	5U	420(a)	21,000	810(a)	5U	12	10U	5(c)	9	[4]	5U	10U	5U	5U	5U	5U	10U	5U	

NA-Not Available
DL-Dilution
RE-Reextraction
U-Indicates the compound was not detected above the limit indicated.
( )-This detected concentration is considered non detected because it is within ten times the concentration detected in the reagent blank.
[ )-This detected concentration is considered non detected because it is within five times the concentration detected in the associated field blank.
(a)-The quantitated value exceeds the range of calibration; therefore, this value should be considered estimated.
(b)-The compound is tentatively identified.
(c)-The compound is tentatively identified and quantitated at less than the method detection limit.
(d)-Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)-Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)-40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)-Proposed
(h)-Suggested No Adverse Response Levels (SNARLS)
(j)-Analysis of sample outside holding time; this value should be considered estimated.
(k)-Due to a noncompliant surrogate, this value should be considered estimated.

Note A: Due to a substantial deviation of the Xylene response, the method detection limit should be considered estimated.
Note B: Due to a noncompliant surrogate recovery, the method detection limits for all target compounds should be considered estimated.

AR301280

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SURFACE WATER (Round 3)
in units of ug/L

Sample ID	Acetone	1,1-Dichloro-ethene	1,2-Dichloro-ethene	1,1,1-Trichloro-ethane	Trichloro-ethene	Tetrachloro-ethene	Methylene Chloride	1,1-Dichloro-ethane	Chloroform	1,2-Dichloro-ethane	1,1,2 Tri-chloroethane	Carbon Disulfide
Federal Standards ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MF-SW1,DL	10U	44	980(a)	170	1,600	300	1(c)	30(e)	6	5U	3(c)	5U
MF2-SW1	10	3(c)	4(c)	(3)	140	(6)	5U	5U	5U	5U	5U	5U
SF-SW1,DL	10U	44	8	28	1,800	30	5U	1(c,e)	2(c)	2(c)	4(c)	(2)

NA=Not Available
DL=Dilution
RE=Reextraction
U=Indicates the compound was not detected above the limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the field blank.
(a)=The quantitated value exceeds the range of calibration; therefore, this value should be considered estimated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
(h)=Suggested No Adverse Response Levels (SNARLS)
(j)=Analysis of sample outside holding time; this value should be considered estimated.
(k)=Due to a noncompliant surrogate, this value should be considered estimated.

AR301281

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SEDIMENTS (Round 3)
in units of ug/Kg

Sample ID	Acetone	1,1-Dichloro-ethene	1,2-Dichloro-ethene	1,1,1-Trichloro-ethane	Trichloro-ethene	Tetrachloro-ethene	Methylene Chloride	Benzene	Styrene	Comment
Federal Standards ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	
MF-SD1	(7)	2(c)	37	20	160	120	(23)	(3)	3(c)	Note A
SF-SD1	(6)	13	7U	14	1,400	48	(40)	(4)	7U	Note A,B

NA=Not Available
DL=Dilution
RE=Reextraction
U=Indicates the compound was not detected above the limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the field blank.
(a)=The quantitated value exceeds the range of calibration; therefore, this value should be considered estimated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
(h)=Suggested No Adverse Response Levels (SNARLS)
(j)=Analysis of sample outside holding time; this value should be considered estimated.
(k)=Due to a noncompliant surrogate, this value should be considered estimated.

Note A: Quantitated values are from both low-level and mid-level analysis.
Note B: The method detection limit for 2-Butanone should be considered estimated.

AR301282

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR SOIL BORINGS
in units of ug/Kg

Sample ID	Acetone	2-Butanone	1,1-Dichloro-ethene	1,2-Dichloro-ethene	1,1,1-Trichloro-ethane	Trichloro-ethene	Tetrachloro-ethene	Methylene Chloride	1,1-Dichloro-ethane	Benzene	Comment
Federal Standards ug/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
SB21-S3	30	12U	7	5(c)	15	150	86	(7)	2(c)	(2)	
SB21-S5	49(c)	63U	470	26(c)	460	1,300(a)	1,300(a)	(19)	24(c)	8(c)	
SB21-S6	130	62U	56	31U	100	160	190	(17)	31U	8(c)	
SB22-S3	20	11U	5U	5U	5U	5U	5U	(5)	5U	(2)	

NA=Not Available
DL=Dilution
RE=Reextraction
U=Indicates the compound was not detected above the limit indicated.
( )=This detected concentration is considered non-detected because it is within ten times the concentration detected in the reagent blank.
[ ]=This detected concentration is considered non-detected because it is within ten times the concentration detected in the field blank.
(a)=The quantitated value exceeds the range of calibration; therefore, this value should be considered estimated.
(b)=The compound is tentatively identified.
(c)=The compound is tentatively identified and quantitated at less than the method detection limit.
(d)=Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)=Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)=40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)=Proposed
(h)=Suggested No Adverse Response Levels (SNARLS)
(j)=Analysis of sample outside holding time; this value should be considered estimated.
(k)=Due to a noncompliant surrogate, this value should be considered estimated.

ARROWHEAD PLATING SITE
INORGANIC DATA FOR SOIL BORING SAMPLES
(continued) [The first part of this table was sent to you previously]

Sample ID	Aluminum %	Barium mg/kg	Cadmium mg/kg	Calcium %	Chromium mg/kg	Copper mg/kg	Iron mg/kg	Lead mg/kg	Mercury mg/kg	Nickel mg/kg	Potassium mg/kg	Silver mg/kg	Sodium %	Zinc mg/kg	Cyanide mg/kg
SB19-SS1	NR	NR	NR	NR	NR	5.4(b)	NR	NR	NR	NR	NR	NR	NR	15.4(c)	<.27(d)
SB19-SS2	NR	NR	NR	NR	NR	1.9(b)	NR	NR	NR	NR	NR	NR	NR	12.8(c)	<.26(d)
SB19-SS3	NR	NR	NR	NR	NR	4.2(b)	NR	NR	NR	NR	NR	NR	NR	14.5(c)	<.28(d)
SB19-SS4	NR	NR	NR	NR	NR	5.2(b)	NR	NR	NR	NR	NR	NR	NR	16.5(c)	<.28(d)
SB19-SS5	NR	NR	NR	NR	NR	57.8	NR	NR	NR	NR	NR	NR	NR	25.3(c)	0.45(a)
SB19-SS6	NR	NR	NR	NR	NR	12.4	NR	NR	NR	NR	NR	NR	NR	18.3(c)	<.27(d)
SB19-SS7	NR	NR	NR	NR	NR	5.0(b)	NR	NR	NR	NR	NR	NR	NR	17.9(c)	<.29(d)
SB20-SS1	NR	NR	NR	NR	NR	5.6(b)	NR	NR	NR	NR	NR	NR	NR	12.3(c)	.28(d)
SB20-SS2	NR	NR	NR	NR	NR	4.0(b)	NR	NR	NR	NR	NR	NR	NR	12.4(c)	<.27(d)
SB20-SS3	NR	NR	NR	NR	NR	9.9(b)	NR	NR	NR	NR	NR	NR	NR	15.6(c)	<.20(d)
SB20-SS4	NR	NR	NR	NR	NR	192.0	NR	NR	NR	NR	NR	NR	NR	53.7(c)	2.6(a)
SB20-SS5	NR	NR	NR	NR	NR	82.2	NR	NR	NR	NR	NR	NR	NR	36.1(c)	1.6(a)
SB20-SS5A	NR	NR	NR	NR	NR	81.1	NR	NR	NR	NR	NR	NR	NR	39.5(c)	2.0(a)
SB20-SS6	NR	NR	NR	NR	NR	8.6(b)	NR	NR	NR	NR	NR	NR	NR	11.6(c)	1.6(a)
SB20-SS7	NR	NR	NR	NR	NR	25.2	NR	NR	NR	NR	NR	NR	NR	39.0(c)	0.72(a)
SB21-S3	.57	12.9 (b)	1.2 U(e)	1,380	8.8 (b,f)	84.8 (b,f)	13,100	3.4 (b)	0.13	6.6 U(e)	75.9 (a)	0.59 (b)	1,318.63 (a)	33.5 (b)	11.4
SB21-S5	.287	11.3 (b)	1.3 U(e)	209 U	2.3 U(b,f)	14.8 (b,f)	9,900	1.0 (b)	0.13	7.0 U(e)	189.0	0.26 U(b)	144.33 (a)	3.4 (b)	1.29 U
SB21-S6	.414	11.0 U(b)	1.3 U(e)	204 U	3.6 (b,f)	42.3 (b,f)	21,200	2.3 (b)	0.19	6.8 U(e)	582.0	0.25 U	155.58 (a,b)	8.7 (b)	1.25 U
SB22-S3	.416	9.6 U(b)	1.1 U(e)	178 U	6.5 (b,f)	3.7 (a,b,f)	11,000	3.1 (b)	0.11	5.9 U(e)	253.0 (a)	0.22 U(b)	83.24 (a)	4.0 (b)	1.10 U
SB23-S1	.886	23.98 (b)	1.19 U	5,090	10.22	4.0 (b)	10,900	7.2 (b)	0.04	6.02 U	69.27	0.22 U(e)	51.50 (a)	9.55	1.12

New data

LEGEND:

< - Not detected above limit indicated.
NR - Not Requested
(a) - Estimate value due to low bias associated with extended holding time.
(b) - Estimate value due to low bias associated with the matrix spike and matrix spike duplicate.
(c) - Estimate value due to potential chemical or physical interferences associated with ICP analysis.
(d) - Estimate detection limit due to elevated level associated with extended holding time.
(e) - Reject value due to poor recovery due to poor recovery associated with matrix spike.
(f) - Estimate value due to poor laboratory precision.

AR301284

ARROWHEAD PLATING SITE
VOLATILE ORGANICS DATA FOR FIELD BLANKS
in units of ug/l

Sample ID	1,1,1-Trichloro ethane	Trichloro ethene	Tetrachloro ethene	Methylene chloride	Toluene	1,1,2,2 Tetra chloroethane	1,1,2 Tri chloroethane	Bromodichloro methane	cis 1,3 Dichloro propene	Dibromochloro methane	trans 1,3 Dichloro propene	Carbon Disulfide	Comment
Federal Standards ug/l	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Tripblank-1	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	10U	5U	
Tripblank-2	5U	4(c)	2(c)	(5)	5U	2(c)	2(c)	1(c)	1(c)	1(c)	2(c)	5U	
Tripblank-3	5U	5U	5U	5U	5U	5U	5U	5U	5U	5U	10U	5U	
Tripblank-4	(1)	5U	(1)	5U	5U	5U	5U	5U	5U	5U	10U	(1)	
Equipmntblk2	5U	5U	(6)	5U	5U	5U	5U	5U	5U	5U	10U	5U	
Tripblk	5U	5U	5U	5U	11(j)	5U	5U	5U	5U	5U	10U	5U	Note A

NA-Not Available
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RE-Reextraction
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[ ]-This detected concentration is considered non-detected because it is within ten times the concentration detected in the field blank.
(a)-The quantitated value exceeds the range of calibration; therefore, this value should be considered estimated.
(b)-The compound is tentatively identified.
(c)-The compound is tentatively identified and quantitated at less than the method detection limit.
(d)-Mass spectral data suggests the presence of this compound, but due to the dilution the compound cannot be confirmed.
(e)-Due to a substantial deviation in the response for the daily calibration, this value is considered estimated.
(f)-40 CFR, Part 141-National Primary Drinking Water Regulation. pp526-533, 585-587
(g)-Proposed
(h)-Suggested No Adverse Response Levels (SNARLS)
(j)-Analysis of sample outside holding time; this value should be considered estimated.
(k)-Due to a noncompliant surrogate, this value should be considered estimated.

Note A: Due to a noncompliant surrogate recovery, the method detection limits for all target compounds should be considered estimated.

AR301285