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NAS WHITING FIELD
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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY PHASE IIA TECHNICAL MEMORANDUM NUMBER 1 FOR WATER AND SEDIMENT ASSESSMENT NAS WHITING FIELD FL

7/1/1993

ABB ENVIRONMENTAL SERVICES, INC

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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

PHASE IIA

NAVAL AIR STATION, WHITING FIELD
MILTON, FLORIDA

Technical Memorandum No. 1
Surface Water and Sediment Assessment

Contract Task Order No. 050

Contract No. N62467-89-D-0317

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July 1993

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AVGAS	aviation gasoline
ARARs	Applicable or Relevant and Appropriate Requirements
AWQC	Ambient Water Quality Criteria
BEHP	bis(2-ethylhexyl)phthalate
CCJM	C.C. Johnston & Malhorta Environmental Engineers and Scientists
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_2M Hill	CH_2M Hill Laboratories
CLP	Contract Laboratory Program
CRDL	Contract Required Detection Limit
DCE	dichloroethene
DO	dissolved oxygen
DQOs	data quality objectives
°C	degrees Celsius
ER-L	Effects Range Low
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FGFWFC	Florida Game and Fresh Water Fish Commission
FS	Feasibility Study
FSWQS	Florida Surface Water Quality Standards
HRS	Hazard Ranking System
IAS	Initial Assessment Study
IDL	instrument detection limit
IR	Installation Restoration
LCS	laboratory control samples
MCL	maximum contaminant level
MCLG	maximum contaminant level goal
MS/MSD	matrix spike/matrix spike duplicate
μg/kg	micrograms per kilograms
μg/ℓ	micrograms per liter
μmhos/cm	micromhos per centimeter
mg/kg	milligrams per kilograms

GLOSSARY (Continued)

NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OLF	Outlying Landing Field
PA	Preliminary Assessment
PAHs	polynuclear aromatic hydrocarbons
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCBs	polychlorinated biphenyls
QC	quality control
RI	Remedial Investigation
RPD	Relative Percent Difference
SARA	Superfund Amendments and Reauthorization Act
SDG	sample delivery group
SI	Site Inspection
SOPs	Standard Operating Procedures
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SQC	sediment quality criteria
SVOCs	semivolatile organic compounds
TAL	target analyte list
TCE	trichloroethene
TCL	target compound list
TOC	total organic carbon
TRAWING FIVE	Training Air Wing Five
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tanks
VOCs	volatile organic compounds
WWTP	Wastewater Treatment Plant

1.0 INTRODUCTION

ABB Environmental Services, Inc. (ABB-ES), has prepared Technical Memorandum No. 1 for the Phase IIA Remedial Investigation (RI) and Feasibility Study (FS) for Naval Air Station (NAS) Whiting Field located in Milton, Florida, for the Department of the Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). The RI/FS is being conducted under contract number N62467-89-D-0317.

Technical Memorandum No. 1, Surface Water and Sediment Assessment, is the first in a series of technical memoranda that will summarize the results and transmit data gathered during the Phase IIA RI.

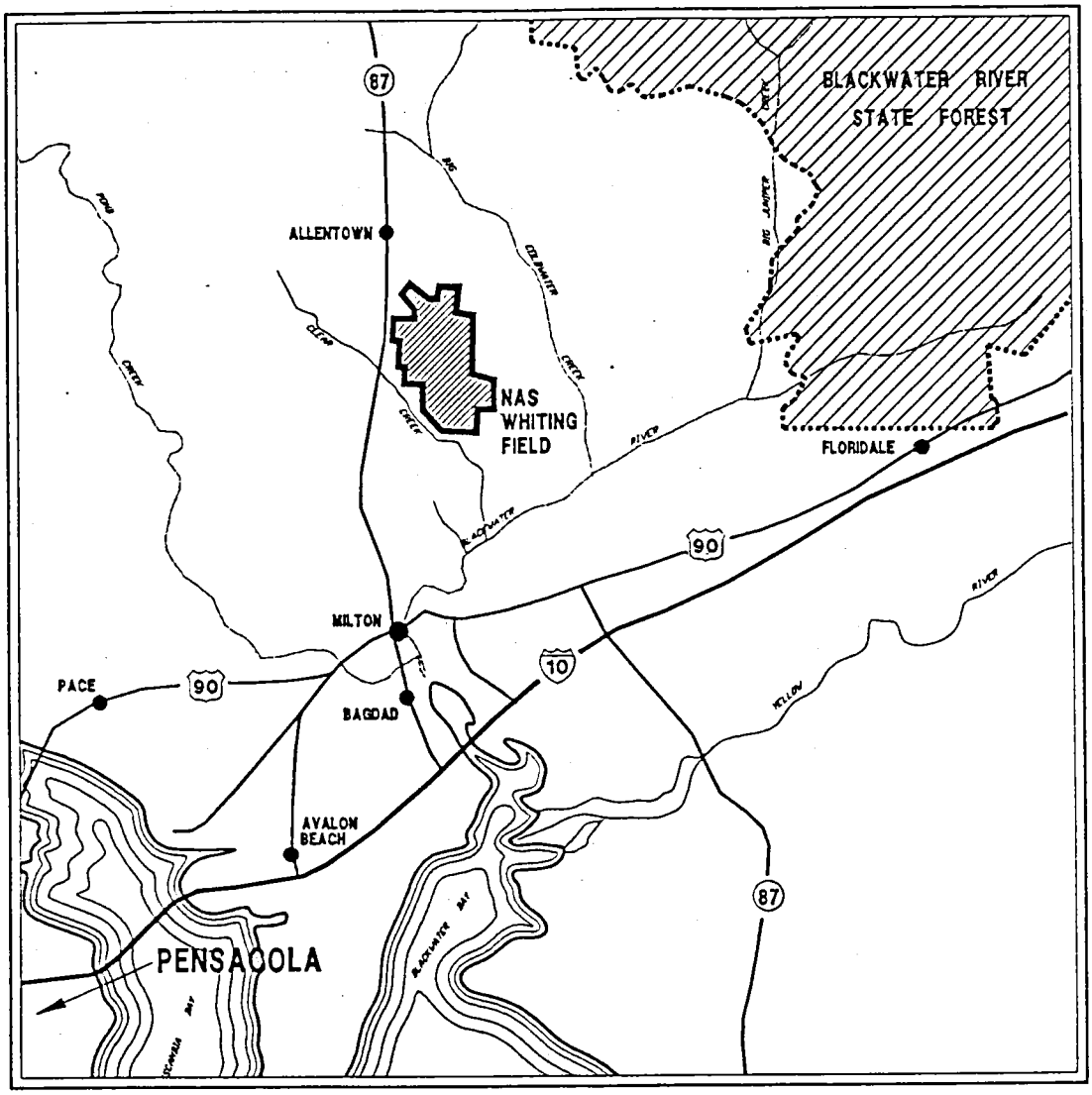
Installation Location and Description. NAS Whiting Field is located in northwest Florida approximately 7 miles north of Milton (Figure 1-1) and 20 miles northeast of Pensacola. NAS Whiting Field currently consists of two air fields separated by an industrial area and covers approximately 2,560 acres in Santa Rosa County. Figure 1-2 presents the installation layout.

NAS Whiting Field, home of Training Air Wing Five (TRAWING FIVE), was constructed in the early 1940's. It was commissioned as the Naval Auxiliary Air Station Whiting Field in July 1943 and has served as a naval aviation training facility since then. The field's mission has been to train student naval aviators in the use of basic instruments, formation and tactic phases of fixed-wing and propeller-driven aircraft, and in the basic and advanced portions of helicopter training.

NAS Whiting Field lies within the Western Highlands physiographic division of Santa Rosa County in the Coastal Plain Province. The Western Highlands are characterized by a well drained, southward sloping plateau with numerous streams. Land surrounding NAS Whiting Field primarily consists of agricultural land to the northwest, residential and forested areas to the south and southwest, and forested land around the remaining boundaries. This land use distribution is shown in Figure 1-3.

Located on an upland area, elevations at NAS Whiting Field range from 150 to 190 feet above sea level. The facility is bounded by low-lying receiving waters; Clear Creek to the west and south and Big Coldwater Creek to the east. These two streams are tributaries of the Blackwater River, which discharges to the estuarine waters of the East Bay of the Escambia Bay coastal system.

1.1 PURPOSE OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) AND BACKGROUND. The purpose of the RI/FS at NAS Whiting Field is to identify a range of remedial alternatives to address any identified risks to public health and the environment posed by toxic or hazardous chemicals present as a result of past waste disposal practices or spills. To achieve this objective, the RI must collect data sufficient to assess the nature and distribution of chemicals associated with each site. The data collected in the RI will be used in the FS to screen, evaluate, and select remedial alternatives to provide permanent, feasible solutions to environmental contamination problems at NAS Whiting Field.



SITE MAP

N

MAP LOCATION

0 2.5 5 MILES

SCALE: 1" = 5 MILES

Source: ABB Environmental Services Inc. 1992

FIGURE 1-1
FACILITY LOCATION MAP

RI/FS PROGRAM

NAS WHITING FIELD
MILTON, FLORIDA

Figure 1-2 Installation Layout

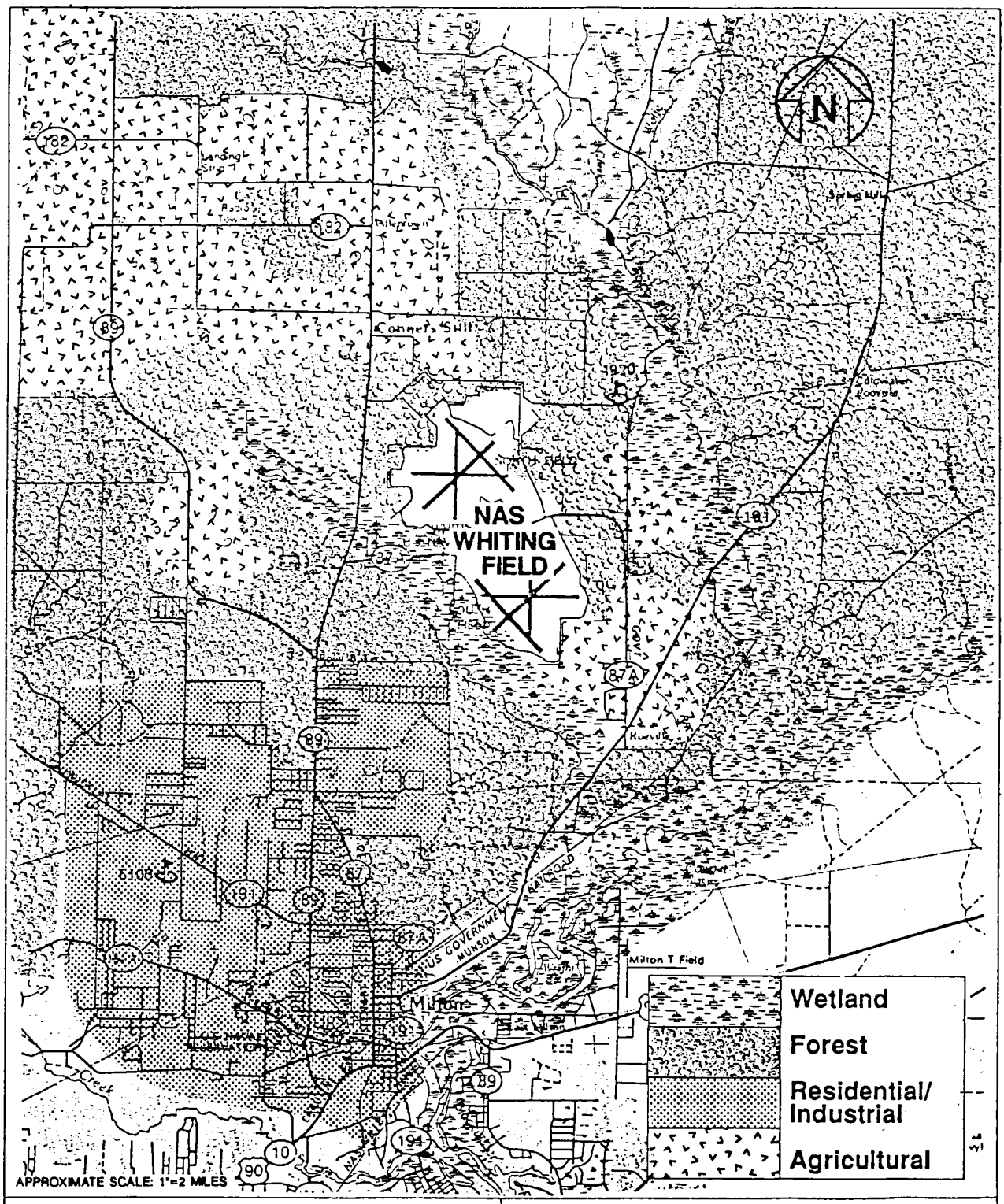


FIGURE 1-3

Land Use Distribution in the Vicinity of NAS Whiting Field

FLORIDA ATLAS & GAZETTEER, DeLORME MAPING COMPANY, 1987

RI/FS PROGRAM

NAS WHITING FIELD
MILTON, FLORIDA

The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations. The IR program is the Navy response authority under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that Federal facilities comply with the act, both procedurally and substantively. SOUTHNAV-FACENGCOM is the agency responsible for the Navy IR program in the Southeastern United States. Therefore, SOUTHNAVFACENGCOM has the responsibility to process NAS Whiting Field through Preliminary Assessment (PA), Site Inspection (SI), priority listing, RI/FS, and remedial response selection in compliance with the guidelines of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Section 105(a)(8)(A) of SARA required the U.S. Environmental Protection Agency (USEPA) to develop criteria in order to set priorities for remedial action based on relative risk to public health and the environment. To meet this requirement, USEPA has established the Hazard Ranking System (HRS) as Appendix A to the NCP. The HRS is a scoring system designed to assess relative threat to public health and the environment posed by documented or potential releases of hazardous substances at a site. First promulgated in 1982, the HRS was amended in December 1990, effective March 14, 1991 (55 Federal Register No. 241:51532-51667), to comply with requirements of Section 105(c)(1) of SARA to increase the accuracy of the assessment of relative risk. The newly promulgated HRS II (March 1991) has been substantially revised and is designed to prioritize sites after the SI phase of the CERCLA process. The SI or expanded SI is used to present the required data to expeditiously perform an HRS II ranking. At NAS Whiting Field, the SI was conducted as a Confirmation Study, Verification Phase.

The preliminary HRS II score (ABB-ES, 1992a) for NAS Whiting Field indicates that it may qualify for the National Priorities List (NPL). As such, the RI/FS for NAS Whiting Field follows the requirements of the NCP, as amended by SARA, and guidance for conducting RI/FS under CERCLA (USEPA, 1988c).

Previous Investigations. Prior to the implementation of the Phase IIA RI/FS program, a PA, two sampling and analysis programs, and Phase I of the RI/FS program had been conducted at NAS Whiting Field. The PA, conducted as an Initial Assessment Study (IAS), was conducted by Envirodyne Engineers in 1984 (Envirodyne Engineers, 1985).

Historical records reviewed during the IAS indicated that throughout the years of operation, NAS Whiting Field has generated a variety of wastes related to pilot training, the operation and maintenance of aircraft and ground support equipment, and the station's facility maintenance activities. Prior to the establishment of hazardous waste management programs and programs to recycle waste oil, most of the hazardous wastes were reportedly disposed onsite. Waste materials were disposed either in dumpsters that were emptied into onsite disposal areas or they went into waste oil bowsers, which probably were used for firefighting training. Envirodyne Engineers (1985) estimated that thousands of gallons of wastes including waste paints, paint thinners, solvents, waste oils, waste gasoline, hydraulic fluids, aviation gasoline (AVGAS), tank bottom sludges, polychlorinated biphenyls (PCBs) containing transformer fluids, and paint stripping wastewater were potentially dumped into onsite disposal areas. These disposal areas consisted of natural or man-made depressions located within the

confines of the air station. In addition to the waste materials routinely disposed onsite in the disposal areas, additional materials were reportedly released onsite as the result of accidents or equipment failure.

Based on historical data, aerial photographs, field inspections, and personnel interviews, 16 disposal or spill sites of potential contamination and/or contaminant migration were initially identified at NAS Whiting Field by the IAS team.

The IAS report concluded that 15 of the 16 sites warranted further investigation, under the Navy's IR program, to assess potential long-term impacts. Only Site 2, the Northwest Open Disposal Area, was judged not to warrant further consideration.

To evaluate the 15 sites that warranted further investigation, a Confirmation Study, including sampling and monitoring of the sites, was recommended in the IAS to confirm or deny the existence of the suspected contamination and to quantify the extent of any problems that might exist. The results of the Confirmation Study would then be used to evaluate the necessity of conducting mitigating actions or cleanup operations.

The Confirmation Study consisted of two parts: verification and characterization. In November 1985, Geraghty & Miller, Inc., prepared for the Navy a plan of action for the Verification Study entitled *Naval Assessment and Control of Installation Pollutants, Verification Study, NAS Whiting Field* (Geraghty and Miller, 1985b), which was subsequently submitted to the Florida Department of Environmental Regulation (FDER). (In July 1993, FDER became the Florida Department of Environmental Protection [FDEP].) This plan contained details of the proposed scope of work for the Verification Study. During discussions with FDER in December 1985, two additional sites (17 and 18) were added to the Verification Study. Both were active sites at that time where waste oils and fuels were burned in firefighting training exercises.

In addition, during 1985 one of the sites (Site 5, Battery Acid Seepage Pit) was investigated under a Consent Order with the FDER. Data from this investigation has been compiled in a report entitled *Detection and Monitoring Program, Battery Shop Site, Final Report, NAS Whiting Field, Florida* (Geraghty & Miller, 1985a).

The results of the Verification Study reported to SOUTHNAVFACENGCOM by Geraghty & Miller (*Verification Study, Assessment of Potential Ground-Water Pollution at Naval Air Station Whiting Field, Florida*) (Geraghty & Miller, 1986) provided an assessment of the physical and chemical conditions currently existing at NAS Whiting Field. Groundwater contamination was detected at some sites and not at others. The study concluded that a Characterization Study was needed to determine the nature and extent of contamination at sites requiring additional study at NAS Whiting Field.

The three-phase (IAS, Confirmation Study, and Remedial Measures) IR program was modified in 1987-88 to be congruent with CERCLA and SARA. The updated nomenclature includes:

- PA and SI,
- RI,
- FS, and

- Planning and Implementation of Remedial Design.

The IAS and the first part of the Confirmation Study are the former counterparts of the PA and the SI.

In December 1990, the Phase I RI was initiated by ABB-ES. The Phase I RI program addressed 14 of the 18 previously identified sites at NAS Whiting Field. Limited investigations were conducted at Sites 2 and 12 during the Phase I RI. No contamination attributable to Sites 2 and 12 was detected and no further action was proposed for both sites. Site 2, the Northwest Open Disposal Area, only received construction and demolition debris and was initially judged to warrant no further consideration early in the IR program. However, at a Project Managers meeting in Atlanta on November 13, 1992, USEPA and FDER requested that additional investigations be conducted at Sites 2 and 12 before no further action could be proposed. Subsequently, Sites 2 and 12 again become part of the RI. Site 5 was not included in the Phase I RI. Site 5, the Battery Acid Seepage Pit, was extensively studied in 1985 (Geraghty & Miller, 1985a) under an FDER Consent Order (84-0253). Results indicated no significant contamination had resulted from past activities at the Battery Acid Shop and the Consent Order was recommended to be rescinded on April 15, 1987. However, the presence of benzene in samples from the existing monitoring wells surrounding the seepage pit warrants further consideration. As such, the investigation of benzene contamination around Site 5 is coupled with the field and laboratory investigation proposed for production well W-S2. Sites 4, 7, and 8 are currently being investigated under the Navy's underground storage tank (UST) program and, therefore, are not incorporated in the Navy's IR program. However, an agreement between the Navy, USEPA, and FDER was made during a Project Mangers' meeting at Whiting Field on July 7, 1992, to sample monitoring wells at those sites for full scan target compound list (TCL) and target analyte list (TAL) analytes and decide, based on the results of the analyses, whether Sites 4, 7, and 8 should remain in the Navy's UST program or be transferred into the Navy's IR program. The wells are currently scheduled to the sampled in August 1993.

Five additional sites were identified and subsequently added to the Phase IIA RI program for assessment of contamination. The site numbers and names are as follows:

Site 29, Auto Hobby Shop,
Site 30, South Field Maintenance Hangar,
Site 31, Sludge Drying Beds and Disposal Areas,
Site 32, North Field Maintenance Hangar, and
Site 33, Midfield Maintenance Hangar.

Site numbers 19 through 28 will not be used at Whiting Field because they identify sites located at one of Whiting Field's Outlying Landing Fields (OLF Barin) in Foley, Alabama.

The locations of all 23 NAS Whiting Field sites are shown in Figure 1-4. Each of Sites 1 through 18 and Sites 29 through 33 are being evaluated with regard to contaminant characteristics, migration pathways, and pollutant receptors. Table 1-1 summarizes the information collected on these sites.

Figure 1-4 Location of Sites at NAS Whiting Field

Table 1-1
Summary of Potential Disposal Sites

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Site No.	Site Name and Type	Location	Period of Operation	Types of Material Disposed	Comments
1	Northwest Disposal Area (landfill).	North Field, west side	1943-1965	Refuse, waste paints, thinners, solvents, waste oils, and hydraulic fluids.	Secondary disposal area during this period; site covers 5 acres.
2	Northwest Open Disposal Area (landfill).	North Field, west side	1976-1984	Construction and demolition debris, tires, and furniture.	Former borrow pit location, commonly referred to as the "Wood Dump."
3	Underground Waste Solvent Storage Area (tank).	North Field, south of Building 2941.	1980-1984	Waste solvents, paint stripping residue, and 120-gallon spill.	Wastes generated by paint stripping operations.
4	North AVGAS Tank Sludge Disposal Area.	North Field, north of Tow Lane.	1943-1968	Tank bottom sludge containing tetraethyl lead.	Sludge disposal in shallow holes near tanks.
5	Battery Acid Seepage Pit (contaminated soil).	South Field, southwest of Building 1454.	1964-1984	Waste electrolyte solution containing heavy metals and waste battery acid.	Pits located 110 feet from potable supply well (W-S2).
6	South Transformer Oil Disposal Area (contaminated soil).	South Field, southeast of Building 1454.	1940's-1960's	PCB-contaminated dielectric fluid.	Disposal in "0-2" drainage ditch.
7	South AVGAS Tank Sludge Disposal Area (landfill and tanks).	South Field, west of Building 1406.	1943-1968	Tank bottom sludge containing tetraethyl lead.	Sludge disposed in shallow holes near tanks.
8	AVGAS Fuel Spill Area (contaminated soil).	South Field, south of Building 1406.	Summer 1972	AVGAS containing tetraethyl lead.	Fuel spill of about 25,000 gallons on an area of about 2 acres.
9	Waste Fuel Disposal Pit (landfill).	South Field, east side	1950's-1960's	Waste AVGAS containing tetraethyl lead.	Fuel disposed in former borrow pit.
10	Southeast Open Disposal Area (A) (landfill).	South Field, southeast area	1965-1973	Construction and demolition debris, waste solvents, paint, oils, hydraulic fluid, PCBs, pesticides, and herbicides.	Secondary disposal area during this period; site covers about 4 acres.
11	Southeast Open Disposal Area (B) (landfill).	South Field, southeast area	1943-1970	Construction and demolition debris, waste solvents, paint, oils, hydraulic fluid, and PCBs.	Secondary disposal area during this period; site covers about 3 acres.

See notes at end of table.

Table 1-1
Summary of Potential Disposal Sites

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Site No.	Site Name and Type	Location	Period of Operation	Types of Material Disposed	Comments
12	Tetraethyl Lead Disposal Area (waste pile).	South Field, southeast area	May 1, 1968	Tank bottom sludge and fuel filters contaminated with tetra-ethyl lead.	Disposal area posted with warning; site consists of two earth covered mounds; 25 foot by 25 foot area.
13	Sanitary Landfill (landfill)	South Field, southeast area	1979-1984	Refuse, waste solvents, paint, hydraulic fluids, and asbestos.	Primary sanitary landfill, potentially received hazardous wastes the first year of operation.
14	Short-Term Sanitary Landfill (landfill).	South Field, southeast area	1978-1979	Refuse, waste solvents, oils, paint, and hydraulic fluids.	Primary sanitary landfill for brief period; relocated due to drainage problems.
15	Southwest Landfill (landfill)	South Field, southwest area	1965-1979	Refuse, waste paints, oils, sol-vents, thinners, asbestos, and hydraulic fluid.	Primary landfill for this time period; covers about 15 acres.
16	Open Disposal and Burning Area (landfill).	South Field, southwest area	1943-1965	Refuse, waste paints, oils, sol-vents, thinners, PCBs, and hy-draulic fluid.	Primary disposal area for this time period; covers about 10 acres.
17	Crash Crew Training Area (contaminated soil).	North Field, west side	1951-Present	JP-4.	Waste fuels and some solvents ignited, then extinguished.
18	Crash Crew Training Area (contaminated soil).	North Field, west side	1951-1990	JP-4.	Waste fuels and some solvents ignited, then extinguished.
29	Auto Hobby Shop	Area around Building 1404	1940's-1990	Paint, oils, and solvents	Abandoned underground waste oil tanks.
30	South Field Maintenance Hangar.	Area around Building 1406	1940's - present	Fuels, solvents, and oils	Abandoned underground waste oil tanks.
31	Sludge Drying Beds and Disposal Areas.	Wastewater Treatment Plant and along perimeter roads.	1940's - present	Wastewater Treatment Plant sludge.	Sludge from beds spread on ground along perimeter road.
32	North Field Maintenance Hangar.	Area around Building 1424	1940's - present	Fuels, solvents, and oils	Abandoned underground waste oil tanks.
33	Midfield Maintenance Hangar	Area around Building 1454	1940's - present	Fuels, solvents, and oils	Abandoned underground waste oil tanks.

Notes: AVGAS = aviation gasoline.
PCB = polychlorinated biphenyls.

1.2 PHASE I SURFACE WATER AND SEDIMENT INVESTIGATION RESULTS. The Phase I surface water and sediment sampling program at NAS Whiting Field consisted of three components: (1) collection of surface water and sediment samples, (2) measurement of general water quality parameters (i.e., pH and specific conductance) and physical description of each sampling location, and (3) measurements of instantaneous streamflow and channel cross sectionals at three locations in Clear Creek and two locations in Big Coldwater Creek. The results of this investigation are thoroughly documented in the RI Phase I Technical Memorandum No. 4 (ABB-ES, 1992c); however, a brief summary of the results and conclusions follows.

Surface water quality data from the 12 surface water samples (analyzed for TCL volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs], pesticides and PCBs, and TAL metals plus cyanide) indicated no significant environmental contamination in Clear Creek or Big Coldwater Creek surface waters.

However, one of the sediment samples collected from the Clear Creek floodplain contained halogenated VOCs and metals concentrations exceeding background concentrations. The halogenated VOCs observed, cis-1,2-dichloroethene (DCE), trans-1,2-DCE, and 1,1 dichloroethane, are frequently observed as transformation products or solvents in military or industrial use.

1.3 OBJECTIVES OF THE PHASE IIA SURFACE WATER AND SEDIMENT INVESTIGATION. Stormwater drainage from the industrial, support, and runway areas of NAS Whiting Field is routed to Clear Creek and Big Coldwater Creek via a series of concrete drainage ditches. In addition, based on the hydrogeologic setting, groundwater from parts of the installation appears to discharge to Clear Creek. The secondary-treated sewage effluent from the NAS Whiting Field Sanitary Wastewater Treatment Plant (WWTP) is discharged onto the floodplain of Clear Creek. The preliminary public health evaluation and preliminary environmental assessment, therefore, identified Clear Creek and Big Coldwater Creek as potential receiving waters from toxic and hazardous materials migrating via overland flow or groundwater discharge. Human exposure could occur as a result of either recreational body-contact water use or ingestion of aquatic organisms taken from the receiving waters. Aquatic and adjoining wetland biological communities may also be affected by contaminants.

During the Phase I RI, no significant environmental contamination was detected migrating in Clear Creek or Big Coldwater surface water and no environmental contamination was detected in the sediments of either stream. However, VOCs and metals were detected in the Clear Creek floodplain sediment in excess of background concentrations.

Therefore, the objective of the Phase IIA RI surface water and sediment program was to more closely evaluate the presence, nature, and extent of contamination in Clear Creek and its floodplain. Because no environmental contamination was detected in Big Coldwater Creek during the Phase I investigation, no surface water or sediment samples were collected from Big Coldwater Creek during the Phase IIA RI investigation. Data derived from this program will be used in the Public Health Evaluation and Environmental Risk Assessment to be performed during the Phase II RI.

1.4 ECOLOGICAL SETTING OF CLEAR CREEK. Wetland habitats in the vicinity of the Clear Creek floodplain include titi swamps, bay swamps, and bottomland forest hardwoods (habitat types of Wolfe and others, 1988). In general, titi and bay swamps occur in the upper regions on the Clear Creek floodplain, and bottomland hardwood swamp occurs in the lower Clear Creek floodplain.

Titi swamps in the vicinity of Clear Creek are dominated by black titi (*Cliftonia monophylla*) and swamp titi (*Cyrilla raceniflora*). Swamp titi tends to dominate much of the shrub community in the upper regions of the Clear Creek floodplain and black titi occurs sparsely at the site. Other species observed in the site's titi and bay swamps include red maple (*Acer rubrum*), slash pine (*Pinus elliotii*), longleaf pine (*Pinus palustris*), sweetbay magnolia (*Magnolia virginiana*), fetterbush (*Lyonia lucida*), several holly species (*Ilex* spp.), royal fern (*Osmunda regalis*), and chain fern (*Woodwardia areolata*). In the vicinity of several of the sampling stations, Atlantic white cedar (*Chamaecyparis thyoides*) is a conspicuous and dominant member of the hydrophytic forest community.

Between Clear Creek and the upper swamp communities, a bottomland hardwood forest occurs. This habitat is dominated by black gum (*Nyssa sylvatica*), also known as swamp tupelo. Other species observed in the site's bottomland swamp include red maple, fetterbush, several holly species, royal fern, chain fern, rush (*Juncus* sp.), and sphagnum moss (*Sphagnum* spp.).

Numerous specimens of the white-topped pitcher plant (*Saracenia leucophylla*) were observed in the vicinity of three of the Clear Creek surface water and sediment sampling stations (Sampling Stations 2, 4, and 11). This carnivorous plant is a State-listed endangered species in Florida, and is a candidate for listing under the Federal Endangered Species Act (Florida Game and Fresh Water Fish Commission [FGFWFC], 1991). The white-topped pitcher plant has been previously observed elsewhere at NAS Whiting Field within the Clear Creek floodplain (Environmental Protection Systems, Inc., 1991).

2.0 FIELD PROGRAM SUMMARY

The Phase IIA surface water and sediment sampling program at NAS Whiting Field consisted of the collection of surface water and sediment samples, measurement of general water quality parameters (pH, specific conductance, and dissolved oxygen), and a physical description of each sampling location. Details of the sampling program are presented in the following sections.

2.1 SAMPLING AND ANALYSIS. A total of 11 surface water and sediment samples, 2 surface water duplicate samples, 2 duplicate sediment samples, 4 equipment rinsate blanks, and 4 trip blank samples was collected during the Phase IIA RI surface water and sediment sampling event. The surface water and sediment sampling locations are presented in Figure 2-1. For reference, the Phase I RI surface water and sediment sampling locations have been included in Figure 2-1. Table 2-1 provides a description of each sampling station and associated rationale. All samples were collected in accordance with the procedures discussed in the USEPA Region IV Standard Operating Procedures (SOPs) (USEPA, 1991).

The sampling program was conducted in two separate events between July 13 through 16 and on August 19, 1992. The separate events were necessitated by a delayed sample shipment delivery to the laboratory during the first event. The samples arrived at the laboratory at a temperature in excess of 20 degrees Celsius (°C), which exceeds the temperature preservation criteria of 4 °C. To prevent compromising the sample data quality the samples were not analyzed. These samples were again collected during the second sampling event (August 19, 1992) with appropriate quality control (QC) samples.

Clear Creek surface water samples for VOC analysis and metals were collected by submerging a clean glass beaker into the creek and transferring the collected water directly into the pre-preserved sample bottles. Sample aliquots for all other analytical groups were collected directly into the sample bottles by submerging the individual bottles into the creek.

Floodplain surface water samples were also collected by submerging a clean beaker and sample bottles in areas where ponded water was present. At two of the three sampling locations, untreated wood boxes (2 feet by 2 feet with open ends) were placed into the sediment to allow seeping groundwater and surface water to collect for sampling. This technique effectively increased the volume of water that could be sampled from these floodplain locations.

All creek sediment samples were collected from the upper foot of sediment using a stainless-steel hand auger. Floodplain sediment samples were collected with a stainless-steel spoon. Upon retrieval, the sediment samples were placed in a glass bowl and homogenized using a stainless-steel spoon. The sample was then transferred to the appropriate sample bottles with the spoon.

Each sediment fraction collected for VOC analysis was transferred directly from the auger bucket or the spoon to the sample bottles without homogenizing so as to limit volatilization of the sample. All sediment samples were collected in accordance with procedures discussed in the USEPA Region IV SOPs (1991). All data generated during both the surface water and sediment sampling operations were recorded in bound field log books.

Figure 2-1 Phase I and Phase IIA Surface Water and Sediment Sampling Locations

Table 2-1
Surface Water and Sediment Sampling Locations and Rationale

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Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Sample Station	Location	Rationale
1	Upstream of the north field drainage ditch "C".	Characterize upstream background surface water and sediment quality in Clear Creek.
2	Approximately 100 feet upstream of State Road 87A bridge.	Characterize the nature of contamination downstream of the concrete drainage ditch discharge from the northwest part of the installation.
3	Approximately 25 feet upstream of the new "A" ditch discharge into Clear Creek.	Characterize the nature of surface water and sediment contamination downgradient of the industrial area.
4	The floodplain east of Clear Creek north of the new "A" ditch discharge next to a rusted 55-gallon drum.	Evaluate degree of floodplain surface water and sediment contamination downgradient of the industrial area and confirm the Phase I detection of volatile organic compounds (VOCs) and metals.
5	The convergence of the new "A" ditch and Clear Creek.	Evaluate degree of surface water and sediment contamination at the new "A" drainage ditch discharge.
6	The convergence of the old "A" ditch and Clear Creek.	Characterize the nature of surface water and sediment contamination downgradient of Site 16 (from overland surface water flow or groundwater discharge) and at the discharge of the old "A" drainage ditch.
7	The floodplain east of Clear Creek south of the old "A" ditch.	Characterize the nature of floodplain surface water and sediment contamination downgradient of Site 16.
8	Approximately 600 feet south of the convergence of old "A" ditch and Clear Creek.	Characterize the nature of surface water and sediment contamination downgradient of Site 15 (from overland surface water flow or groundwater discharge).
9	The floodplain east of Clear Creek and west of Site 15.	Characterize the nature of floodplain surface water and sediment contamination downgradient of Site 15.
10	Approximately 100 feet upstream of the new "M" drainage ditch.	Characterize the nature and extent of contamination downstream of the above sampling locations.
11	100 feet downstream of the convergence of the new "S" ditch and Clear Creek.	Characterize the nature and extent of the cumulative downstream contamination below NAS Whiting Field.

2.2 DATA QUALITY ASSESSMENT. Based on the review of the data, all of the QC criteria and the data quality objectives (DQOs) presented in the workplan were met. Details of the data quality assessment are presented in Sections 2.3 through 2.8.

The QC program uses QC samples to document the quality of the associated environmental sample results and to evaluate the performance of the laboratory. The quality of the environmental data is controlled by two components: sampling and analysis. Various factors affecting each of these components are as follows:

1. Sampling
   - sampling design
   - sample collection techniques
   - sample handling and delivery

2. Analysis
   - analytical methods
   - laboratory instrumentation

Both the sampling and analytical components contain potential sources of uncertainty, error, and biases that may affect the overall quality of the measurement.

The QC samples used to identify the source of uncertainty and magnitude of error include: field QC samples and laboratory QC samples.

1. Field QC samples
   - field duplicates
   - field blanks
   - equipment rinsate blanks
   - trip blanks
   - field spikes

2. Laboratory QC samples
   - method blanks
   - surrogate spikes
   - matrix spike/matrix spike duplicate (MS/MSD) samples
   - laboratory control samples (LCS) and LCS duplicates

The remaining portion of this chapter discusses the quality control aspects of the surface water and sediment sampling episodes as follows: Section 2.3, Sample Handling, Delivery, and Chain of Custody; Section 2.4, Field Quality Control Assessment; Section 2.5, Laboratory Quality Control Assessment; Section 2.6, Data Quality Objectives Assessment (as stated in the RI/FS Planning Document [E.C. Jordan, 1990]) and evaluates the quality of the surface water and sediment sample results by means of a set of DQO parameters.

2.3 SAMPLE HANDLING, DELIVERY, AND CHAIN OF CUSTODY. Collection of surface water and sediment samples was performed in accordance with the USEPA Region IV SOPs.

All samples were properly preserved, were placed in coolers packed with bagged ice immediately after their collection, and remained in the custody of the field personnel until shipment to the laboratory. All samples were shipped under

chain-of-custody requirements to CH_2M Hill Laboratories (CH_2M Hill) in Montgomery, Alabama, for analysis. Upon arrival at the laboratory, the chain-of-custody form and temperature were checked for each cooler. The chain-of-custody form was then signed by laboratory personnel and the samples were accepted for analysis.

2.4 FIELD QUALITY CONTROL ASSESSMENT. Table 2-2 presents a list of field quality control samples collected for analysis. These included field duplicates, equipment rinsate blanks, field blanks, and VOC trip blanks for each surface water and sediment sample shipment.

Table 2-2
Field Quality Control (QC) Sampling Schedule

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Event/Date	Surface Water and Sediment Sampling Stations	Number of Surface Water Samples Collected	Number of Sediment Samples Collected	Number of Field QC Samples				
				Trip Blanks	Rinsate Blanks	Field Blanks	Field Dup.	MS/ MSD Pairs
Event 1 (July 13-16 1992)								
July 13	11 and 10	2	2	1	-	-	1	1
July 14	9, 8, and 7	3	3	1	1	1	-	-
July 15	6 and 4	2	2	1	2	-	1	-
July 16	5, 3, 2, and 1 (rejected)	-	-	-	-	-	-	-
Event 2 August 19, 1992	5, 3, 2, and 1 (resampled)	4	4	1	1	1	1	1
Total	11 sampling stations	11	11	4	4	2	3	2

Notes: Dup. = duplicate samples.
MS/MSD = matrix spike and matrix spike duplicate.

All field QC samples were collected in conformance with the requirements of the June 1988 Naval Energy and Environmental Suport Activity (NEESA) *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program* (NEESA Document 20.2-047B, 1988) and USEPA Region IV SOP (USEPA, 1991).

2.5 LABORATORY QUALITY CONTROL ASSESSMENT. Analytical results (see Appendix A) were validated by C.C. Johnston & Malhorta Environmental Engineers and Scientists (CCJM), Lakewood, Colorado, who followed USEPA functional guidelines for inorganics and organics analysis (USEPA, 1988b; 1988c) and requirements found in Section 7.3 of the NEESA *Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program* (NEESA 20.2-047B, 1988).

Appendix B includes a list of sample delivery groups (SDG) and the associated laboratory sample identification numbers for the surface water and sediment samples and corresponding data validation case narratives from CCJM for each SDG.

2.6 DATA QUALITY OBJECTIVES ASSESSMENT. The QC sample results are evaluated in terms of DQOs. DQOs refer to a set of qualitative and quantitative statements that assess the quality of data generated during the sampling and analysis phases of the project as defined in *Data Quality Objectives for Remedial Response Activities* (USEPA, 1987). The DQOs are defined by the parameters including: precision, accuracy, representativeness, completeness, and comparability (PARCC). These parameters present an indication of data quality and the confidence that a particular compound or inorganic analyte is present or absent in an associated environmental sample. Surface water and sediment sampling program DQOs as stated in Section 4.0 of Volume I of the RI/FS Planning Document (Jordan, 1990) are Level C with 10 percent being Level D.

The following paragraphs define each of the PARCC criteria.

Precision. Precision is a measure of the reproducibility of the analytical results under a given set of conditions. It is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is measured as the Relative Percent Difference (RPD):

$$100 \times \frac{D_1 - D_2}{0.5(D_1 + D_2)} \qquad (1)$$

where D_1 and D_2 are the reported concentrations for sample duplicate analyses. The results of duplicate samples are taken from the same source and analyzed under identical conditions to evaluate the precision.

Field duplicate samples provide a quantitative measure for the cumulative precision of the sampling and analytical components. On the other hand, the MS/MSD pair provides a quantitative measure for the precision in the laboratory component.

Accuracy. Accuracy is a quantitative parameter determining the nearness of a result to its true value. Accuracy measures the bias in a measurement system.

Percent recovery of the known spike concentration added to the sample is used to evaluate accuracy. Percent recovery is calculated using the equation:

$$100 \times \frac{A - B}{C} \qquad (2)$$

where

A = measured concentration in the spiked sample,
B = measured concentration of the spike compound in the unspiked sample, and
C = concentration of the spike.

Field surrogate sample results provide a quantitative measure for the cumulative accuracy of the sampling and analytical components.

Blank spike/LCS, MS/MSD, and surrogate spike samples provide a quantitative measure for the accuracy in the analytical component.

Field surrogate samples were not collected during this program. In the absence of a field surrogate, the sampling accuracy can be qualitatively assessed by reviewing the associated blank results (field blank, rinsate blank, and trip blank), because the sources of bias in the sampling process include field contamination, preservation, and handling.

Representativeness. Representativeness is a qualitative parameter that expresses the degree to which the sample data are characteristic of a sample population, parameter variations at a sampling point, or an environmental condition. Representativeness of a given data set is controlled by the sampling techniques adopted, rationale used for sampling locations, sample handling, and delivery. The integrity of the sample during collection, preservation, delivery, and analysis is monitored by using blank samples.

Completeness. Completeness is defined as the percentage of measurements made that are judged to be valid measurements. It is evaluated to determine if an acceptable level of data were obtained so that a valid scientific data assessment can be completed.

An 85 percent completeness goal (USEPA, 1987) was targeted during the sampling and analysis program for the surface water and sediment sampling episodes.

Comparability. Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurement data of similar samples and sample conditions. This goal is achieved through use of standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units. Comparability is limited by other PARCC parameters.

2.7 SITE-SPECIFIC DATA QUALITY ASSESSMENT. Surface water and sediment samples were collected from 11 locations along the Clear Creek at NAS Whiting Field during the Phase IIA RI field explorations. Sampling was completed through two sampling events as follows:

Event 1 (July 13 to July 16, 1992), samples from all the 11 stations; and

Event 2 (August 19, 1992), resampling from Stations 1, 2, 3, and 5 because of violation of preservation criteria for the samples collected from these stations during Event 1.

All samples including the quality control samples were analyzed for TCL VOCs, TCL SVOCs, pesticides and PCBs, and TAL metals and total cyanides in accordance with the USEPA Contract Laboratory Program (CLP) methodology.

Results from the field and laboratory QC samples, as presented in Table 2-3, are used to measure the PARCC parameters. The following paragraphs present the PARCC measurements specific to each analysis and media and overall assessment of DQOs.

Table 2-3
Field QC Sample Analysis Results

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NAS Whiting Field, Milton, Florida

Analyte	Field Duplicates						Trip Blanks				Rinsate Blanks				Field Blanks	
	WHF-2A-STA5-( )-01/01A		WHF-2A-STA6-( )-01/01A		WHF-2A-STA10-( )-01/01A		WHF-2A-SW/SD-( )				WHF-2A-SW/SD-( )				WHF-2A-SW/SD-( )	
							TB-01	TB-02	TB-03	TB-09	RB-01	RB-02	RB-03	RB-09	FB-01	FB-02
Analysis/Matrix	SW	SD	SW	SD	SW	SD	W	W	W	W	W	W	W	W	W	W
TCL VOCs																
Methylene chloride	–	15/18	–	–	–	–	–	–	–	–	–	–	–	–	–	7
Acetone	–	2/4	–	–/130	–	–	–	–	–	–	–	–	–	–	–	10
Carbon disulfide	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2 J	–
Benzene	–	–	1 J/1 J	–	1 J/1 J	–	–	–	–	–	–	–	–	–	–	–
Trichloroethene	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Xylene	–	–	–	–	–	4 J/4 J	–	–	–	–	–	–	–	–	–	–
Toluene	–	–	–	–	–	–	4 J	4 J	4 J	–	–	–	–	–	–	–
TCL SVOCs																
Di-n-butyl phthalate	–	–	–	–	–	–	NA	NA	NA	NA	14	12	13	–	10 J	12
bis(2-Ethylhexyl)phthalate	–	–	–	–	–	–	NA	NA	NA	NA	–	–	3	–	–	–
Pesticides and PCBs																
TAL Metals and Cyanides																
Aluminum	–	–	116 J/120 J	–	–	–	NA	NA	NA	NA	57.8 J	33.4 J	52.1 J	33.4	28.7 J	33.14
Barium	12.6 J/12.4 J	145/5	17.8 J/17.6 J	–	–	–	NA	NA	NA	NA	1.1 J	0.8 J	2.1 J	1.1	0.6 J	1.1
Calcium	3,480 J/3,520 J	–	989 J/1,010 J	93/364	–	–	NA	NA	NA	NA	272 J	246 J	300 J	325	237 J	325
Chromium	–	4/7	–	–	–	–	NA	NA	NA	NA	2 J	2.2 J	4.8 J	–	–	–
Cobalt	–	–	–	–	–	–	NA	NA	NA	NA	2.6 J	–	–	–	–	–
Copper	–	–	13.8 J/13.8 J	–	–	8/2	NA	NA	NA	NA	4.8 J	18.6 J	16.3 J	–	–	–
Iron	–	1,510/1,000	973 J/981	–	–	–	NA	NA	NA	NA	26.6 J	26.8 J	48.4 J	20	40.8 J	18.3
Lead	767/770	8/9	1.7 J/1.3 J	–	–	–	NA	NA	NA	NA	2.2 J	1.2 J	–	–	1 J	–
Manganese	–	–	18.5 J/18.8	–	–	–	NA	NA	NA	NA	1.7 J	–	2.1 J	–	–	–
Magnesium	16.5/16.8	–	647 J/662 J	–	–	–	NA	NA	NA	NA	–	–	–	–	–	–
Nickel	773 J/789 J	–	–	–	–	–	NA	NA	NA	NA	–	–	–	–	22.4 J	–
Potassium	1,500 J/794 J	–	–	–	–	–	NA	NA	NA	NA	–	–	–	–	–	–
Sodium	–	–	3,140 J/3,090 J	–	–	–	NA	NA	NA	NA	855 J	867 J	901 J	759	897 J	759
Zinc	12,800 J/12,800 J	22/97	27.1 J/20.2 J	–	–	–	NA	NA	NA	NA	14.4 J	23.4	30.7	8	8.1 J	8

Notes: SW = surface water (expressed as micrograms per liter [$\mu g/\ell$]).
SD = sediment (expressed as milligrams per kilogram for all inorganic analytical parameters and micrograms per kilogram for the organic analytical parameters).
W = source water for the equipment decontamination (expressed as micrograms per liter).
15/18 = results of environmental sample and its duplicate.
– = result is within the quality control (QC) criteria.
= estimated value.
NA = not applicable.

TCL = target compound list.
VOCs = volatile organic compounds.
SVOCs = semivolatile organic compounds.
PCBs = polychlorinated biphenyls.
TAL = target analyte list.
J

2.7.1 Precision The cumulative precision of sampling and analytical components was measured by using the field duplicates for surface water and sediment media obtained from sampling Stations 5, 6 (Station 12 is a blind duplicate for Station 6), and 10 (see Table 2-3). The laboratory component of precision is measured by using MS and MSD samples for both the media obtained from sampling station 10 (see Appendix B, Data Validation Case Narratives from CCJM).

TCL VOCs. The cumulative precision is within the QC acceptance criteria for all but two VOCs for both surface water and sediment samples. Methylene chloride and acetone are the two VOCs with precisions outside the QC limits and the detection of these two compounds is likely the result of laboratory contamination (see CCJM case narratives, Appendix B). Overall, the RPD values outside the acceptance criteria do not reflect a problem affecting data quality (see CCJM Case Narratives in Appendix B). The laboratory component of precision is within the QC limits for all analytes in both the media.

TCL SVOCs. The cumulative precision of SVOCs is within the QC acceptance criteria for all analytes for both the surface water and sediment samples. The laboratory component of precision is within the QC limits for all but six SVOCs for surface water samples and all SVOCs for the sediment samples. The six SVOCs (none were detected in the associated field samples) for which the laboratory component of precision was outside the QC criteria for surface water samples were: phenol, 2-chlorophenol, 1-4-dichlorobenzene, n-nitroso-di-n-propylamine, 1,2,4-trichlorobenzene, and acenaphthene. No qualifiers have been applied to the sample data on the basis of RPD values outside control limits (see CCJM case narratives, Appendix B).

Pesticides and PCBs. The cumulative precision of sampling and analytical components for pesticides and PCBs in both the surface water and sediment samples was within the QC limits for all compounds.

TAL metals and Total Cyanides. The cumulative precision of the sampling and analytical components for TAL metals and total cyanide is within the QC limits for all analytes in surface water and all but six analytes in the sediment samples. The six analytes that were outside the QC criteria include: barium, chromium, copper, iron, lead, and zinc. The reason for these analytes not meeting the QC RPD criteria may be attributed to the heterogeneity of the sediment sample. Overall, the RPD values outside the acceptance criteria do not reflect a problem affecting data quality (see CCJM Case Narratives in Appendix B). The analytical component of precision was within the QC limits for all analytes in both the media.

2.7.2 Accuracy The laboratory component of accuracy was measured by using MS and MSD samples for surface water and sediment samples obtained from sampling station 10. No qualifiers were added to the sample data on the basis of MS/MSD recoveries outside control limits (see Appendix B, Data Validation Case Narratives from CCJM).

TCL VOCs. The analytical component of accuracy is within the QC limits for all the 34 VOCs for sediment samples and all but two VOCs for surface water samples. Benzene and toluene were the compounds that did not meet the accuracy criteria for surface water samples.

TCL SVOCs. The analytical component of accuracy is within the QC limits for all SVOCs in surface waters and all but three SVOCs in sediment samples. The SVOCs that did not meet the QC criteria included: 1,4 dichlorobenzene, 1,2,4-trichlorobenzene, and acenaphthene.

Pesticides and PCBs. The analytical component of accuracy is within the QC limits for all pesticides and PCBs in surface waters and sediment samples.

TAL Metals and Total Cyanides. The analytical component of accuracy is within the QC limits for all analytes in surface water and all but one analyte in the sediment samples. The analyte that is outside the criteria in sediment samples was lead.

2.7.3 Representativeness A total of four trip blanks, two field blanks, and four rinsate blanks were used during the surface water and sediment sampling events (Table 2-1) to assess the representativeness of the sampling and analysis results. Appropriate qualifications were added to the affected analytes based on the QC criteria (see Appendix B).

TCL VOCs. No VOCs were detected in trip or rinsate blanks. Methylene chloride (7 micrograms per liter [$\mu g/\ell$]) and acetone (10 $\mu g/\ell$) were only detected in one field blank. These VOCs were also detected in the laboratory method blanks at levels ranging from 4 to 12 $\mu g/\ell$.

TCL SVOCs. Bis(2-ethylhexyl)phthalate (3 $\mu g/\ell$) and di-n-butyl phthalate (10 J to 14 $\mu g/\ell$) were detected in field blanks and sediment sampling equipment rinsate blanks.

Pesticides and PCBs. No analytes were detected in any of the field QC samples.

TAL Metals and Total Cyanides. Aluminum, barium, calcium, iron, lead, nickel, sodium, and zinc were detected at levels as shown in Table 2-3 for the field blanks and the rinsate blanks.

2.7.4 Completeness Greater than 99 percent of the surface water and sediment sample results for TCL VOCs, TCL SVOCs, pesticides and PCBs, and TAL metals and total cyanides were qualified as valid results (see CCJM case narratives in Appendix B). The VOC data for 4-methyl-2-pentanone in 11 samples were rejected if it was reported as undetected because the calibration was outside data validation specifications.

2.7.5 Comparability Surface water and sediment sample results are comparable because of the following reasons.

- Standard procedures as mentioned in sections 2.2 and 2.3 were followed for sampling and analytical phases throughout the surface water and sediment sampling program.

- Consistent units of measure were used throughout the project for all the surface water and sediment sampling results.

2.8 SUMMARY. Table 2-4 presents the summary of QC sample evaluation results with respect to the PARCC criteria as discussed in this chapter. Based on the results of the QC sample analyses, the overall precision and accuracy goals of the project were achieved. Results from the method blanks, trip blanks, and field blanks analyses indicate that the data are representative of the environmental conditions at Clear Creek. Overall, greater than 99 percent completeness was attained, based on QC sample results and data validation criteria, thus satisfying the 85 percent completeness goal. Standard methods of analysis and units of measure were used throughout the project; therefore, all the QC criteria and the DQOs mentioned in the workplan were met.

Table 2-4
Summary of Data Quality Objective (DQO) Assessment (Precision, Accuracy, Representativeness, Completeness and Comparability [PARCC] Parameters)

Technical Memorandum No. 1
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	Precision[1]	Accuracy[2]	Representativeness	Completeness (percent)	Comparability
Surface Water Samples	Acceptable	Acceptable	Representative		
TCL VOCs	Acceptable	Acceptable	Representative	>99	High
TCL SVOCs	Acceptable	Acceptable	Representative	>99	High
Pesticides and PCBs	Acceptable	Acceptable	Representative	>99	High
TAL metals and total cyanide	Acceptable	Acceptable	Representative	>99	High
Sediment Samples	Acceptable	Acceptable	Representative		
TCL VOCs	Acceptable	Acceptable	Representative	>99	High
TCL SVOCs	Acceptable	Acceptable	Representative	>99	High
Pesticides and PCBs	Acceptable	Acceptable	Representative	>99	High
TAL metals and total cyanide	Acceptable	Acceptable	Representative	>99	High

[1] Cumulative of sampling and analytical components.
[2] Analytical component.

Notes: TCL VOCs = target compound list volatile organic compounds.
TCL SVOCs = target compound list semivolatile organic compounds.
PCBs = polychlorinated biphenyls.
TAL = target analyte list.

3.0 RESULTS AND INTERPRETATION

The purpose of this section is to present the results of the Phase IIA RI surface water and sediment sampling program. Information regarding surface hydrology including surface water classification, surface drainage, flood prone areas, and streamflow data are thoroughly detailed in the Phase I RI Technical Memorandum No. 4 (ABB-ES, 1992c). Because this background information has not changed since the Phase I program, it has not been repeated in this technical memorandum.

Section 3.1 details the results of the Phase IIA RI surface water sampling and analysis. Section 3.2 presents the results of the sediment sampling and analysis. The last section, Section 3.3, presents the overall surface water and sediment assessment.

3.1 SURFACE WATER QUALITY. This section presents the results of the surface water sampling and analysis of 11 sampling locations. Eight of these locations (Stations 1, 2, 3, 5, 6, 8, 10, and 11) are located in Clear Creek and three locations (Stations 4, 7, and 9) are in the floodplain of Clear Creek. Descriptions of sampling locations and specific sampling rationale are presented in Table 2-1 (Section 2.1).

The surface water data from Clear Creek and its floodplain were subject to the following Applicable or Relevant and Appropriate Requirements (ARARs) and exceedances of these ARARs were identified:

- Federal Primary Drinking Water Standards maximum contaminant levels (MCLs) and Florida Drinking Water Standards,
- Federal Ambient Water Quality Criteria (AWQC), and
- Florida Surface Water Quality Standards (FSWQS).

Exceedances of the above ARARs and their impact to human health and the environment will be evaluated in the Baseline Risk Assessment that will be developed at the completion of the RI.

Table 3-1 presents current water quality criteria and standards including newly promulgated Federal drinking water MCLs and maximum contaminant level goals (MCLGs). Florida drinking water standards are not specifically applicable as numerical standards in Class III surface waters, but will be used as a comparison because the potential to use Clear Creek as a source of drinking water exists.

3.1.1 Surface Water Physical Parameters Prior to sample collection, physical parameters including pH, temperature, specific conductance, and dissolved oxygen were measured at each sampling station.

The pH ranged from 4.79 at Station 5 to 5.98 at Station 4, indicating that the surface water is moderately acidic. The temperature varied only a few degrees (ranging from 23 to 25 °C) between the 11 stations. The specific conductance measured in Clear Creek (10 to 120 micromhos per centimeter [μmhos/cm]) showed low concentrations of cations and anions. The dissolved oxygen (DO) measurement ranged between 1.2 and 8.2 $\mu g/\ell$. Only one DO reading (Station 9, 1.2 $\mu g/\ell$) was below Chapter 17-302.510, Florida Administrative Code (FAC), guidelines (for dissolved oxygen in Class III freshwater) of $\geq$ 5 $\mu g/\ell$. A summary of the surface water physical parameters is presented in Table 3-2.

Table 3-1
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
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Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[j] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Volatile Organics											
Acetone	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Benzene	5	0	0.66	40	[6]5,300/--	[6]5,100/700	1	[22]71.28	[22]71.28/71.28	--	--
Bromodichloromethane (dichlorobromomethane)	[7]100	--	--	--	--/--	-/-	[7]100	[22]22	[22]22/22	--	--
Bromoform	[7]100	--	--	--	--/--	--/--	[7]100	[22]360	[22]360/360	--	--
Bromomethane (methyl bromide)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
2-Butanone (methyl ethyl ketone)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Carbon disulfide	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Carbon tetrachloride	5	0	0.4	6.49	[8]35,200/--	[8]50,000/--	3	[22]4.42	[22]4.42/4.42	--	--
Chlorobenzene (monochlorobenzene)	100	100	488	--	[1,8]250/50	[1,8]160/129	100	--	--/--	--	--
Chloroethane (ethyl chloride)	--	--	--	--	--/--	--/--	--	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[i] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
2-Chloroethylvinyl ether	--	--	--	--	--/--	--	--	--	--/--	--	--
Chloroform	[7]100	--	0.19	15.7	[6]28,900/1,240	--/--	[7]100	[22]470.8	[22]470.8/470.8	--	--
Chloromethane (methyl chloride)	--	--	--	--	--/--	--/--	--	[22]470.8	[22]470.8/470.8	--	--
Dibromochloromethane (chlorodibromomethane)	[7]100	--	--	--	--/--	--/--	[7]100	[22]34	[22]34/34	--	--
1,1-Dichloroethane	--	--	--	--	--/--	--/--	--	--	--/--		
1,2-Dichloroethane	5	0	0.94	2.43	[6]118,000/20,000	[6]118,000/--	3	--	--/--	--	--
1,1-Dichloroethene (1,1-Dichloroethylene)	7	7	0.033	1.85	--/--	--/--	7	[22]3.2	[22]3.2/3.2	--	--
cis-1,2-Dichloroethene (cis-1,2-Dichloroethylene)	70	70	--	--	--/--	--/--	70	--	--/--	--	--
trans-1,2-Dichloroethene (trans-1,2-Dichloroethylene)	100	100	--	--	--/--	--/--	100	--	--/--	--	--
1,2-Dichloropropane	5	0	--	--	--/--	--/--	5	--	--/--	--	--
cis-1,3-Dichloropropene	--	--	--	--	--/--	--/--	--	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

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trans-1,3-Dichloropropene	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Ethyl benzene	700	700	1,400	3,280	[e]32,000 /--	[e]430/--	700	--	---/---	--	--
2-Hexanone	-	-	-	-	--/--	--/--	-	-	--/--	--	--
4-Methyl-2-pentanone (methyl isobutyl ketone)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Methylene chloride (dichloromethane)	5(g)	0(g)	--	--	--/--	--/--	5	[22]1,580	[22]1,500/1,500	--	--
Styrene	100	100	--	--	--/--	--/--	100	--	--/--	--	--
1,1,2,2-Tetrachloroethane	--	--	0.17	10.7	[e]--/2,400	[e]9,020/--	--	[22]10.8	[22]10.8/10.8	--	--
Tetrachloroethylene (1,1,2,2-tetrachloroethene)	5	0	0.8	8.85	[e]5,280/840	[e]10,200/5,-000	3	[22]8.85	[22]8.85/8.85	--	--
Toluene	1,000	1,000	14,300	424,000	[e]17,500/--	[e]6,300/5,000	1,000	--	--/--	--	--
1,1,1-Trichloroethane	200	200	18,400	1,030,000	--/--	[e]31,200/--	200	173,000	173,000	--	--
1,1,2-Trichloroethane	5(g)	3(g)	0.6	41.8	[e]--/9,400	--/--	5	--	--/--	--	--
Trichloroethene (trichloroethylene)	5	0	2.7	80.7	[e]45,000/21,900	[e]2,000/--	3	[22]80.7	[22]80.7/80.7	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[i] (µg/kg)
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	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Vinyl acetate	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Vinyl chloride	2	0	2	525	--/--	--/--	1	--	--/--	--	--
Xylenes (total)	10[4]	10[4]	--	--	--/--	--/--	10[4]	--	--/--	--	--
Semivolatile Organics											
Acenaphthene	--	--	--	--	[8]1,700 /520	[8]970/710	--	2,700	2,700/2,700	--	--
Acenaphthylene	--	--	--	--	--/--	--/--	--	([19])	([19])	--	--
Anthracene	--	--	--	--	--/--	--/--	--	[19]110,000	[19]110,000	85	--
Benzo(a)anthracene	[12]0.1	[12]0	--	--	--/--	--/--	--	([19])	([19])	230	13,200
Benzo(a)pyrene	0.2(g)	0(g)	--	--	--/--	--/--	0.2	([19])	([19])	400	10,600
Benzo(b)fluoranthene	[12]0.2	[12]0	--	--	--/--	--/--	--	([19])	([19])	--	--
Benzo(k)fluoranthene	0.2([12])	[12]0	--	--	--/--	--/--	--	([19])	([19])	--	--
Benzo(g,h,i)perylene	--	--	--	--	--/--	--/--	--	([19])	([19])	--	--
Benzoic acid	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Benzyl alcohol	--	--	--	--	--/--	--/--	--	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[i] (µg/kg)
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			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
4-Bromophenyl-phenylether	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Butylbenzylphthalate	[12]100	[12]0	--	--	--/--	--/--	--	--	--/--		--
4-Chloro-3-methylphenol (4-chloro-m-creosol)	--	--	--	--	[6]30/--	--/--	--	([33])	([33])	--	--
4-chloroaniline	--	--	--	--	--/--	--/--	--	--	--/--	--	--
bis(2-Chloroethoxy) methane	--	--	--	--	--/--	--/--	--	--	--/--	--	--
bis(2-Chloroethyl) ether	--	--	0.03	1.36	--/--	--/--	--	--	--/--	--	--
bis(2-Chloroisopropyl) ether	--	--	--	--	--/--	--/--	--	--	--/--	--	--
2-Chloronaphthalene	--	--	--	--	[6,34]1,600/--	[6,34]7.5/--	--	--	--/--	--	--
2-Chlorophenol	--	--	--	--	[6]4,380/--	--/--	--	400	400/400	--	--
4-Chlorophenyl-phenylether	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Chrysene	[12]0.2	[12]0	--	--	--/--	--/--	--	([19])	([19])	400	--
di-n-Butylphthalate	--	--	--	--	--/--	--/--	--	--	[18]3/--	--	--
di-n-Octylphthalate (p-phthalic acid)	--	--	--	--	--/--	--/--	--	--	[18]3/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[i] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Dibenzo(a,h)anthracene	[12]0.3	[12]0	--	--	--/--	--/--	--	([19])	([19])	60	--
Dibenzofuran	--	--	--	--	--/--	--/--	--	--	--/--	--	--
1,2-Dichlorobenzene (o-dichlorobenzene)	600	600	--	--	[1,6]250/50	[1,6]160/129	600	--	--/--	--	--
1,3-Dichlorobenzene (m-dichlorobenzene)	600	600	--	--	[1,6]250/50	[1,6]160/129	--	--	--/--	--	--
1,4-Dichlorobenzene (p-dichlorobenzene)	75	75	--	--	[1,6]250/50	[1,6]160/129	75	--	--/--	--	--
3,3'-Dichlorobenzidine	--	--	0.0103	0.0204	--/--	--/--	--	--	--/--	--	--
2,4-Dichlorophenol	--	--	3,090	--	[6]2,020/350	--/--	--	790	790/790	--	--
Diethylphthalate	--	--	350,000	1,800,000	--/--	--/--	--	--	--/--	--	--
Dimethylphalate	--	--	313,000	2,900,000	--/--	--/--	--	--	--/--	--	--
2,4-Dimethylphenol	--	--	--	--	[6]2,120/--	--/--	--	--	--/--	--	--
4,6-Dinitro-2-methylphenol	--	--	--	--	--/--	--/--	--	--	--/--	--	--
2,4-Dinitrophenol	--	--	70	14,300	--/--	--/--	--	14,260	14,260	--	--
2,4-Dinitrotoluene	--	--	0.11	9.1	[6]330/230	[6]590/370	--	[22]9.1	[22]9.1/9.1	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[j] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[e,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
2,6-Dinitrotoluene	--	--	--	--	--/--	[8]590/370	--	--	--/--	--	--
bis(2-Ethylhexyl) phthalate (di-2-ethylhexylphthalate)	6(g)	0(g)	15,000	50,000	[12]400/360	[12]400/360	4	--	[18]3/--	--	--
Fluoranthene	--	--	42	54	[8]3,980/--	[8]40/16	--	370	370/370	600	18,800
Fluorene	--	--	--	--	--/--	--/--	--	[19]14,000	[19]14,000	35	--
Hexachlorobenzene	1(g)	0(g)	0.00072	0.00074	[12]6/3.68	[1,8]160/129	1	--	--/--	--	--
Hexachlorobutadiene	--	--	0.45	50	[8]90/9.3	[8]32/--	--	[22]49.7	[22]49.7/49.7	--	--
Hexachlorocyclopentadiene	[5]50(g)	50(g)	206	--	[8]7/5.2	[8]7/--	50	--	--/--	--	--
Hexachloroethane	--	--	1.9	8.74	[8]980/540	[8]940/--	--	--	--/--	--	--
Indeno(1,2,3-cd) pyrene	[12]0.4	[12]0	--	--	--/--	--/--	0.4	([19])	([19])	--	--
Isophorone	--	--	5,200	520,000	[8]117,000 /--	[8]12,900/--	--	--	--/--	--	--
2-Methylnaphthalene	--	--	--	--	--/--	--/--	[21]100(h)	--	--/--	65	--
2-Methylphenol (o-creosol)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
4-Methylphenol (p-creosol)	--	--	--	--	--/--	--/--	--	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
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	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Naphthalene	--	--	--	--	[6]2,300/620	[6]2,350/--	[21]100(h)	--	--/--	340	--
Nitrobenzene	--	--	19,800	--	[6]27,000 /--	[6]6,680/--	--	--	--/--	--	--
2-Nitroaniline (o-nitroaniline)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
3-Nitroaniline (m-nitroaniline)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
4-Nitroaniline (p-nitroaniline)	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Nitrophenols	--	--	--	--	[6]230/150	[6]4,850/--	--	--	--/--	--	--
N-nitroso-di-n-propylamine	--	--	--	--	--/--	--/--	--	--	--/--	--	--
N-nitrosodiphenylamine	--	--	4.9	16.1	--/--	--/--	--	--	--/--	--	--
Pentachlorophenol	1	0	1,010	--	[23]20/13	13/7.9	1	7.9	[32]7.9	--	--
Phenanthrene	--	--	--	--	[12]30/6.3	[12]7.7/4.6	--	([19])	([19])	225	1.29
Phenol	--	--	3,500	--	[6]10,200/2,560	[6]5,800/--	--	4,600,000	4,600,000	--	--
Pyrene	--	--	--	--	--/--	--/--	--	[19]11,000	[19]11,000	350	13,100
2,4,5-Trichlorophenol	--	--	2,600	--	[12]100/63	[12]240/11	--	([33])	([33])	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

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Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

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2,4,6-Trichlorophenol	--	--	1.2	3.6	[6]--/970	--/--	--	[22,33]6.5	[22,33]6.5/6.5	--	--
Pesticides/PCBs											
Alachlor	2	0	--	--	--/--	--/--	2	--	--/--	--	--
Aldrin	--	--	0.000074	0.000079	3/--	1.3/--	--	[18,22]0.00014	[16,22]0.00014		
Atrazine	3	3	--	--	--/--	--/--	3	--	--/--	--	--
Alpha-BHC	--	--	--	--	[6]100/--	[6]0.34/--	--	--	--	--	--
Beta-BHC	--	--	--	--	[6]100/--	[6]0.34/--	--	[22]0.046	[22]0.046/0.046	--	--
Delta-BHC	--	--	--	--	[6]100/--	[6]0.34/--	--	--	--	--	--
Carbonfuran	40	40	--	--	--/--	--/--	40	--	--/--	--	--
Chlordane	2	0	0.00046	0.00048	2.4/ 0.0043	0.09/ 0.004	2	[22,28]0.00059	[22,28]0.00059		
2,4-D	70	70	100	--	--/--	--/--	70	--	--/--	--	--
4,4-DDD	--	--	--	--	--/--	--/--	--	--	--/--	2	--
4,4-DDE	--	--	--	--	[6]1,050/--	[6]14/--	--	--	--/--	2	--
4,4-DDT	--	--	0.000024	0.000024	1.1/0.001	0.13/0.001	--	[22,27]0.00059	[22,27]0.00059	1	8.28

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
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Dibromochloropropane	0.2	0	--	--	--/--	--/--	0.2	--	--/--	--	--
Dieldrin	--	--	0.000071	0.00076	2.5/0.0019	0.71/0.0019	--	[22,28]0.00014	[22,28]0.00014	0.02	1.3
Endosulfan (I and II)	--	--	--	--	0.22/0.056	0.034/0.0087	--	0.0087	0.056/0.0087	--	--
Endosulfan sulfate	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Endrin	2(g)	2(g)	1	--	0.18/0.0023	0.037/0.0036	2	0.00023	0.00023	0.02	0.533
Endrin aldehyde	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Endrin ketone	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Ethylene dibromide	0.05	0	--	--	--/--	--/--	0.02	--	--/--	--	--
Heptachlor	0.4	0	0.00028	0.00029	0.52/0.0038	0.053/0.0036	0.4	[22,29]0.00021	[22,29]0.00021	--	1.1
Heptachlor epoxide	0.2	0	--	--	0.52/0.0038	0.053/0.0036	0.2	--	--/--	--	--
Lindane	0.2	0	0.0186	0.0625	2/0.08	0.16/--	0.2	[22,30]0.063		--	1.57
Methoxychlor	40	40	100	--	--/--	--/0.03	40	0.03	0.03/0.03	--	--
PCBs	0.5	0	0.000079	0.000079	2/0.014	10/0.03	0.5	[22,31]0.000045	[22,31]0.000045	50	195
Silvex (2,4,5-TP)	50	50	10	--	--/--	--/--	10	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[j] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Toxaphene	3	0	0.00071	0.00073	0.73/0.0002	0.21/0.0002	3	0.0002	0.0002	--	--
Metals/Inorganics											
Aluminum	[10]500/200	--	([3])	([3])	([3])	([3])	[10]200	1,500	--/1,500	--	--
Antimony	6(g)	6(g)	146	45,000	[12]88/30	[12]1,500/500	6	4,300	4,300/4,300	2	--
Arsenic	[4]50	--	0.0022	0.0175	--/--	--/--	50	50	50/50	33	--
Arsenic (III)	--	--	--	--	360/190	69/36	--	36	--/36	--	--
Arsenic (V)	--	--	--	--	[6]850/--	[6]2,319/--	--	--	--/--	--	--
Asbestos	7MFL	[24]7MFL	30k fibers/L	--	--/--	--/--	[24]7MFL	--/--	--	--	--
Barium	2,000	2,000	1,000	--	--/--	--/--	2,000	--	--/--	--	--
Beryllium	4(g)	4(g)	0.0037	0.0641	[6]130/5.3	--/--	4	[22]0.13	[22]0.13/0.13	--	--
Cadmium	5	5	10	--	[11]3.9/1.1	43/9.3	5	9.3	[17]9.3	5	--
Calcium	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Chromium	100	100	--	--	--/--	--/--	100	--	--/--	80	--
Chromium (III)	--	--	170,000	3,433,000	[11]1,700/ 210	[6]10,300/-	--	673,000	[17]673000	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[j] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Chromium (VI)	--	--	50	--	16/11	1,100/50	--	50	11/50	--	--
Cobalt	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Copper	[10]100	1,300	--	--	[11]18/12	2.9/--	[10]1,000	2.9	[17]2.9	70	--
Cyanide	[12]200(g)	[12]200(g)	200	--	22/5.2	1/--	200	1	5.2/1	--	--
Fluoride	[10]200	200	--	--	--/--	--/--	[25]4,000	--	--/--	--	--
Iron	[10]300	--	300	--	--/1,000	--/--	[10]300	300	1,000/300	--	--
Lead	TT[9]	0	50	--	[11]83/3.2	220/8.5	15	5.6	[17]5.6	35	--
Magnesium	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Manganese	[10]50	[12]0.2	50	100	--/--	--/--	[10]50	100	--/--	--	--
Mercury	2	2	0.144	0.146	2.4/0.012	2.1/0.0025	2	0.025	0.012/0.2	0.15	--
Nickel	100(g)	100(g)	13.4	100	[11]1,400/160	75/8.3	100	8.3	[17]8.3	30	--
Nitrate (as N)	10,000	10,000	10,000	--	--/--	--/--	10,000	--	--/--	--	--
Nitrite (as N)	1,000	1,000	--	--	--/--	--/--	--	--	--/--	--	--
Nitrate + nitrite (both as N)	10,000	10,000	--	--	--/--	--/--	--	--	--/--	--	--

See notes at end of table.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Chemical Name	Federal Standards and Guidance						Florida Standards and Guidance			NOAA Sediment ER-L Guidelines[i] (µg/kg)	USEPA Sediment Quality Criteria[j] (µg/kg)
	Safe Drinking Water Act (SDWA)[a]		CWA Ambient Water Quality Criteria[b]				Drinking Water Standards[c,h]	Surface Water Quality Standards[d]			
			For Protection of Human Health		For Protection of Aquatic Life						
	MCL[f] (µg/ℓ)	MCLG[f] (µg/ℓ)	Water and Fish Consumption (µg/ℓ)	Fish Consumption only (µg/ℓ)	Fresh Water Acute/Chronic (µg/ℓ)	Marine Acute/Chronic (µg/ℓ)	MCL (µg/ℓ)	Class II (µg/ℓ)	Class III Fresh/Marine (µg/ℓ)		
Potassium	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Selenium	50	50	10	--	20/5	300/71	50	71	5/71	--	--
Silver	[10]100	--	--	--	[11,15]4.1/0.12	[15]2.3/--	[15]100	0.05	0.07/0.05	1	--
Sodium	([13])	--	--	--	--/--	--/--	160,000	--	--/--	--	--
Thallium	2(g)	0.5(g)	--	--	--/--	--/--	2	48	48/48	--	--
Vanadium	--	--	--	--	--/--	--/--	--	--	--/--	--	--
Zinc	[10]5,000	--	--	--	[11]120/110	95/86	[10]5,000	86	[17]86	120	--

See notes on following page.

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Sources:

(a) U.S. Environmental Protection Agency (USEPA), SDWA National Primary Drinking Water Regulations per 40 CFR 141: MCLs and MCLGs.
(b) USEPA, "Water Quality Criteria Summary", Office of Science and Technology, Health and Ecological Criteria Division, Washington, D.C. May 1, 1991.
(c) Florida Administrative Code, 17-550, "Safe Drinking Water Act", January, 1991.
(d) Florida Administrative Code, 17-302, "Surface Water Quality Standards", amended between March and August, 1992.
(e) Florida Administrative Code, 17-775, "Soil Thermal Treatment Facilities", December, 1990.
(f) USEPA, "Drinking Water Standards and Health Advisories", Office of Water, Washington, DC, November, 1991.
(g) USEPA, "National Primary and Secondary Drinking Water Regulations; Synthetic Organic Chemicals and Inorganic Chemicals; Final Rule", 57FR31777, July 17, 1992.
(h) Florida Administrative Code, 17-550, "Safe Drinking Water Phase V Standards", January 1, 1993.
(i) NOAA, Technical Memorandum No. 5 OMA 52. "The Potential for Biological Effects of Sediment-Sorbed Contaminants tested in the National Status and Trends Program," March, 1990. Edward R. Long and Lee G. Morgan, Seattle, WA.
(j) USEPA, "Interim Sediment Criteria Values for Nonpolar Hydrophobic Organic Contaminants"; Office of Water Regulations and Standards; SCD No. 17; Washington, DC, 1988. Values have been normalized based on an approximated total organic carbon concentration of 1 percent.

[1] Standard indicated is for chlorinated benzenes as a group.
[2] Standard for aldicarb sulfone is 4 $\mu g/\ell$ and aldicarb sulfoxide is 2 $\mu g/\ell$.
[3] Criteria are pH dependent. Refer to 53FR33178.
[4] MCL for arsenic currently under review.
[5] Secondary MCL of 8 $\mu g/\ell$ proposed for hexachlorocyclopentadiene.
[6] Insufficient data to develop criteria. Value presented is the Lowest Observed Effect Level (LOEL).
[7] Standard indicated is the standard for total trihalomethanes (i.e., the sum of concentrations of chloroform, bromodichloromethane, dibromochloromethane, and bromoform). Refer to 56FR3579 and Florida Administrative Code, 17-550.
[8] Proposed standard for aldicarb sulfone is 2 $\mu g/\ell$ and aldicarb sulfoxide is 4 $\mu g/\ell$.
[9] Treatment Technique (TT) requirement.
[10] Secondary MCL.
[11] Hardness dependent criteria (100 mg/ℓ $CaCO_3$ used).
[12] Proposed standard or criteria.
[13] No MCL has been set for sodium. However, a reporting level of 20 mg/ℓ has been established. Monitoring is required and data is reported to health officials to protect individuals on a highly restricted sodium diet.
[14] Standard indicated is for total Volatile Organic Aromatics (VOAs) (i.e., the sum of concentrations of benzene, toluene, ethylbenzene, and total xylene).
[15] Different levels are proposed (marine acute - 7.2 $\mu g/\ell$; marine chronic - 0.92 $\mu g/\ell$; freshwater acute - 0.92 $\mu g/\ell$).
[16] Not to exceed 1.3 $\mu g/\ell$ (Class II or Class II marine) or 3.0 $\mu g/\ell$ (Class III fresh water).

Table 3-1 (Continued)
Chemical-Specific Standards and Guidance

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

[17] Hardness-dependent (Values are in $\mu g/\ell$, with (ln H) = natural logarithm of the total hardness expressed as mg/ℓ calcium carbonate ($CaCO_3$)).

cadmium	$= e^{(0.7852(\ln H)-3.49)}$	lead	$= e^{(1.273(\ln H)-4.705)}$
chromium (III)	$= e^{(0.819(\ln H)+1.561)}$	nickel	$= e^{(0.846(\ln H)-1.1645)}$
copper	$= e^{(0.8545(\ln H)-1.465)}$	zinc	$= e^{(0.8473(\ln H)+0.7614)}$

[18] Standard indicated is for phthalate esters.
[19] Polycyclic aromatic hydrocarbons (PAHs) (i.e., the sum of concentrations of acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) shall not exceed 0.031 $\mu g/\ell$ at annual average flow conditions.
[20] Not used.
[21] Standard indicated is the cleanup criteria for the sum of naphthalene and methylnaphthalene.
[22] At average annual flow conditions.
[23] This standard is pH dependent; 7.8 pH used. Refer to 51FR43666.
[24] Units for asbestos MCLs are millions of fibers per liter for fibers longer than 10 micrometers.
[25] Fluoride also has a secondary MCL of 2,000 $\mu g/\ell$.
[26] Not to exceed 0.004 $\mu g/\ell$ (Class II or Class III marine) or 0.0043 $\mu g/\ell$ (Class III fresh water).
[27] Not to exceed 0.001 $\mu g/\ell$.
[28] Not to exceed 0.0019 $\mu g/\ell$.
[29] Not to exceed 0.0036 $\mu g/\ell$ (Class II or Class III marine) or 0.0038 $\mu g/\ell$ (Class III fresh water).
[30] Not to exceed 0.16 $\mu g/\ell$ (Class II or Class III marine) or 0.08 $\mu g/\ell$ (Class III fresh water).
[31] Not to exceed 0.03 $\mu g/\ell$ (Class II or Class III marine) or 0.014 $\mu g/\ell$ (Class III fresh water).
[32] This standard is pH dependent. Concentration limit ($\mu g/\ell$) $= e^{(1.006(pH)-5.29)}$, not to exceed 30 $\mu g/\ell$ at any time. [Not to exceed 8.2 $\mu g/\ell$ at average annual flow conditions. Rule reference (d).]
[33] "Phenolic compounds as listed - Total chlorinated phenols, including trichlorophenols, and chlorinated creosols shall not exceed 1.0 $\mu g/\ell$ except as set forth in sub-sub-paragraph 1-6 below or unless higher values are shown not to be chronically toxic."
[34] Standard indicated is for chlorinated naphthalenes as a group.

Notes: SDWA = Safe Water Drinking Act.
CWA = Clean Water Act.
MCL = Maximum Contaminant Level.
$\mu g/\ell$ = micrograms per liter.
MCLG = Maximum Contaminant Level Goal.
Class II = Shellfish Propagation or Harvesting.
Class III = Recreation, Fish & Wildlife Propagation.
TCLP = Toxicity Characteristic Leachate Procedure.
$\mu g/kg$ = micrograms per kilogram.
TT = treatment technique (requirements are in effect).

Table 3-2
Surface Water Physical Parameters

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Sample Location Number	Date Measured	pH	Temperature (°C)	Conductivity (μmhos/cm)	Dissolved Oxygen (mg/ℓ)
Station 01	7/16/92	5.86	25	45	7.8
Station 02	7/16/92	5.92	25	50	7.5
Station 03	7/16/92	5.87	24	55	7.4
Station 04	7/15/92	4.79	24	N/A	N/A
Station 05	7/16/92	5.98	24	180	5.7
Station 06	7/15/92	5.6	24	25	7.4/7.8
Station 07	7/14/92	5.8	23	10	N/A
Station 08	7/14/92	5.09	24	20	8.2
Station 09	7/14/92	N/A	23	70	1.2
Station 10	7/13/92	5.48/5.37	25	20	8.2
Station 11	7/13/92	5.25	24	20	6.7

Notes: °C = degrees Celsius.
μmhos/cm = micromhos per centimeter.
mg/ℓ = milligrams per liter.
N/A = not available.

3.1.2 Clear Creek Surface Water Quality The following paragraphs discuss the results of the surface water analysis. Validated chemical analytical results with Contract Required Detection Limits (CRDLs) are presented in Appendix A. A summary of detected organic and inorganic compounds is presented in Tables 3-3 and 3-4. The significance of these data will be discussed in the ARAR evaluation in Section 3.1.4.

No VOCs were detected at concentrations above the CRDL in surface water samples collected from Clear Creek. Results of the VOC analysis (showing detections below the CRDL) are presented in Table 3-3. No SVOCs, pesticides, or PCBs were detected in any of the Clear Creek surface water samples.

Results of the inorganic chemical analyses are tabulated in Table 3-4. A total of five inorganic analytes were detected above the CRDL in the surface water samples from Clear Creek. All analytes in Table 3-4 that are flagged "J" were detected below the CRDL, or detected in the laboratory preparation blank, and/or in the associated QC blanks (rinsate and field) collected in the field (see CCJM validation case narratives in Appendix B). A comparison of the inorganic analytes with the minimum, maximum, and frequency of detection, background concentration, CRDLs, and ARARs is presented in Table 3-5.

The five analytes reported above the CRDL were iron, lead, manganese, nickel, and sodium. Of these five analytes, lead, nickel, and sodium were flagged "J" due to their presence in the field or rinsate blanks.

Comparison to Station 1, Upstream Background Surface Water Sample. No VOCs, SVOCs, pesticides, or PCBs were detected in the upstream background surface water sample collected from Station 1. The only two inorganic analytes detected (at Station 1) above the CRDL included iron (852 $\mu g/\ell$) and manganese (16.3 $\mu g/\ell$).

Iron was detected downstream of Station 1 at concentrations ranging from 767 to 998 $\mu g/\ell$. These concentrations were below or less than two times the background concentration of 852 $\mu g/\ell$.

Manganese was detected downstream of Station 1 at all sampling locations, with concentrations ranging from 16.4 to 18.9 $\mu g/\ell$. These concentrations are slightly greater than one time the Station 1 background concentration of 16.3 $\mu g/\ell$.

Lead was detected above the CRDL (5 $\mu g/\ell$) at only one location (Station 2, 9.3 J $\mu g/\ell$) downstream of Station 1. The Station 1 lead concentration was estimated at 4.6 J $\mu g/\ell$.

Nickel was detected above the CRDL (40 $\mu g/\ell$) at only one location (Station 8, 43.2 J $\mu g/\ell$) downstream of Station 1. Nickel was not detected at Station 1.

A complete comparison of the range and frequency of all TAL analytes to the background inorganic analyte concentrations is presented in Table 3-5.

In summary, the concentrations of inorganic analytes detected above the CRDL in the downstream surface water samples were below or less than two times the concentrations detected in the background surface water sample collected from Station 1. The variation in inorganic concentrations appears to be related to the heterogeneity of inorganic constituents in the sediments of Clear Creek. No presence of contamination in Clear Creek surface water can be interpreted based

Table 3-3
Surface Water Analytical Results, Volatile Organic Compounds

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	1SW01	2SW01	3SW01	99-04-SW[1]	5SW01	5SW01A	99-06-SW	99-12-SW[2]
Laboratory Sample No.	33711003	33711005	33711001	22243007	33710001	33710002	22243001	22243004
Units	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ
Date Collected	19-Aug-92	19-Aug-92	19-Aug-92	15-July-92	19-Aug-92	19-Aug-92	15-July-92	15-July-92
Methylene chloride	--	--	--	--	--	--	--	--
Acetone	--	--	--	--	--	--	--	--
Carbon disulfide	--	--	--	1 J	--	--	--	--
1,2-Dichloroethene (total)	--	--	--	5	--	--	--	--
Trichloroethene	--	--	--	3 J	--	--	--	--
Benzene	--	--	--	--	--	--	1 J	1 J

See notes at end of table.

Table 3-3 (Continued)
Surface Water Analytical Results, Volatile Organic Compounds

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-07-SW[1]	99-08-SW	99-09-SW[1]	99-10-SW	99-10-SWA
Laborabory Sample No.	22225009	22225003	22225001	22211001	22212003
Units	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ
Date Collected	16-July-92	16-July-92	16-July-92	13-July-92	13-July-92
Methylene chloride	--	--	--	--	--
Acetone	--	--	--	--	--
Trichloroethene	--	--	--	1 J	1 J
Benzene	--	1 J	--	--	--
Xylenes (total)	--	--	--	--	--

[1] Samples collected from the floodplain of Clear Creek.
[2] Duplicate sample for Station 6.

Notes: µg/ℓ = micrograms per liter.
Aug = August
-- = not detected.
J = estimated value.

Table 3-4
Surface Water Analytical Results, Inorganics Analytes

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	1-SW-01	2-SW-01	3-SW-01	99-04-SW[1]	5-SW-01	5-SW-01A	99-06-SW	99-12-SW[2]
Laboratory Sample No.	22562003	22562005	22562001	22243007	22563001	22563002	22243001	22243004
Units	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ
Date Collected	19-Aug-92	19-Aug-92	19-Aug-92	14-July-92	19-Aug-92	19-Aug-92	14-July-92	14-July-92
Aluminum	141 J	142 J	140 J	144 J	--	--	116 J	120 J
Arsenic	17.1 J	--	--	1 J	--	1.2 J	--	--
Barium	--	16.6 J	17 J	14.7 J	12.6 J	12.4 J	17.8 J	17.6 J
Cadmium	1,050 J	--	--	--	--	--	3.3 J	--
Calcium	--	1,280 J	926 J	900 J	3,480 J	3,520 J	989 J	1,010 J
Chromium	--	--	--	11.7 J	--	--	--	3.2 J
Cobalt	1.9 J	--	--	2.4 J	--	--	--	2.3 J
Copper	852	--	2.7 J	19.4 J	--	--	13.8 J	13.8 J
Iron	4.6 J	863	915	2,490	767	770	973	981
Lead	680 J	9.3 J	3 J	2.4 J	--	--	1.7 J	1.3 J
Magnesium	16.3	665 J	680 J	483 J	773 J	789 J	647 J	662 J
Manganese	--	16.8	16.4	19.1	16.5	16.8	18.5	18.8
Nickel	--	--	--	20.5 J	--	--	--	--
Potassium	--	--	--	--	1,500 J	794 J	--	--
Silver	2.9 J	--	--	1.8 J	--	--	--	--
Sodium	2,700 J	2,700 J	2,720 J	3,110 J	12,800 J	12,800 J	3,140 J	3,090 J
Vanadium	2.2 J	1.3 J	--	1.4 J	--	--	--	--
Zinc	13.1 J	10.1 J	--	21.6 J	--	--	27.1 J	20.2 J

See notes at end of table.

Table 3-4 (Continued)
Surface Water Analytical Results, Inorganic Analytes

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-07-SW[1]	99-08-SW	99-09-SW[1]	99-10-SW	99-10-SWA	99-11-SW
Laboratory Sample No.	22225009	22225003	22225001	22211001	22212003	22212001
Units	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ	µg/ℓ
Date Collected	17-July-92	17-July-92	17-July-92	13-July-92	13-July-92	13-July-92
Aluminum	338	159 J	408	--	112 J	80 J
Barium	21.8 J	17.9 J	29.7 J	18.3 J	16.9 J	16.7 J
Cadmium	--	4 J	--	--	--	--
Calcium	10,400	954 J	5,820	--	920 J	942 J
Chromium	--	--	2 J	--	4.2 J	4.7 J
Cobalt	--	--	4.2 J	--	3.8 J	2.4 J
Copper	3.6 J	12.1 J	6.8 J	--	5.3 J	5.3 J
Iron	855	949	2,650	1,050 J	998	814
Lead	3.3 J	2.4 J	2.2 J	--	3.4 J	3.8 J
Magnesium	2,590 J	645 J	1,460 J	633 J	629 J	626 J
Manganese	166	18.9	1,420	17.9	18	16.8
Mercury	--	--	--	--	.17 J	.17 J
Nickel	--	43.2 J	19 J	--	--	--
Potassium	3,740 J	--	756 J	--	--	730 J
Silver	--	--	--	--	1.5 J	1.9 J
Sodium	6,830	3,280 J	4,070 J	--	3,010 J	3,030 J
Vanadium	--	--	--	--	1.6 J	1.6 J
Zinc	9.2 J	25.6 J	20.7 J	--	10.2 J	10.9 J

[1] Samples collected from the floodplain of Clear Creek.
[2] Duplicate sample for Station 6.

Notes: µg/ℓ = micrograms per liter.
Aug = August.
-- = not detected.
J = estimated value.

Table 3-5
Surface Water Inorganic Analyte Comparison

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

Compound	Surface Water Samples (µg/ℓ)				CRDLs (µg/ℓ)	ARARs (µg/ℓ)	
	Minimum Concentra-tion	Maximum Concentra-tion	Frequency[1]	Background Concentration Phase IIA Station 1		AWQC Freshwater Chronic	FSWQS Class III, Freshwater
Aluminum	80	408	10/11	141 J	200	([2])	--
Antimony	--	--	0/11	--	60	30	4,300
Arsenic	1 J	1.2 J	2/11	--	10	190	50
Barium	12.4 J	29.7 J	11/11	17.1 J	200	--	--
Beryllium	--	--	0/11	--	5	5.3	0.13
Cadmium	3.3 J	4 J	2/11	--	5	1.1	9.3
Calcium	920 J	10,400	10/11	1,050 J	5,000	--	--
Chromium	2 J	11.7 J	5/11	--	10	50	11
Cobalt	2.3 J	4.2 J	5/11	--	50	--	--
Copper	1.9 J	19.4 J	8/11	1.9 J	25	12	[3]2.9
Cyanide	--	--	0/11	--	10	5.2	5.2
Iron	767	2,650	11/11	852	100	1,000	1,000
Lead	1.3 J	9.3 J	10/11	4.6 J	5	3.2	[3]5.6
Magnesium	483 J	2,590 J	11/11	680 J	5,000	--	--
Manganese	16.3	1,420	11/11	16.3	15	--	--
Mercury	0.17 J	0.17 J	2/11	--	0.2	0.012	0.012
Nickel	19 J	43.2 J	3/11	--	40	160	[3]8.3
Potassium	730 J	3,740 J	4/11	--	5,000	--	--
Selenium	--	--	0/11	--	5	5	5
Silver	1.5 J	2.9 J	4/11	2.9 J	10	0.12	0.07
Sodium	2,700 J	12,800 J	11/11	2,700 J	5,000	--	--
Thallium	--	--	0/11	--	10	--	48
Vanadium	1.3 J	2.2 J	5/11	--	50	--	--
Zinc	9.2 J	27.1 J	8/11	--	20	110	[2]86

[1] First value denotes number of detections; second value denotes number of samples collected.
[2] pH dependent.
[3] hardness dependent.

Notes: µg/ℓ = micrograms per liter.
CRDL = Contract Required Detection Limit.
ARARs = Applicable or Relevant and Appropriate Requirements.
AWQC = Ambient Water Quality Criteria.
FSWQS = Florida Surface Water Quality Standards.

on the comparison to background concentrations and two isolated detections of lead and nickel above the CRDL.

3.1.3 Floodplain Surface Water Quality In general, no contamination in the floodplain surface water samples (Stations 4, 7, and 9) was detected other than the VOC 1,2-DCE. A summary of the detected organic and inorganic compounds is presented in Tables 3-3, 3-4, and 3-6. Validated chemical analytical results with CRDLs are presented in Appendix A.

Table 3-6
Surface Water Analytical Results,
Semivolatile Compounds

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-07-SW[1]
Laboratory Sample No.	22225009
Units	µg/ℓ
Date Cyollected	14-July-92
Di-n-butylphthalate	16
bis(2-Ethylhexyl) phthalate	--

[1] Sample collected from the floodplain of Clear Creek.

Notes: µg/ℓ = micrograms per liter.
-- = not detected.

1,2-DCE was detected at one (Station 4) of the three floodplain surface water sampling locations. 1,2-DCE was detected at a concentration of 5 µg/ℓ, which is equivalent to the CRDL at the Phase IIA Station 4, located adjacent to the Phase I sediment sampling location where 1,2-DCE was detected. Results of the VOCs detected in floodplain surface water samples are presented in Table 3-3.

Only one SVOC, di-n-butylphthalate (a common laboratory contaminant), was detected above the CRDL (Station 7, 16 µg/ℓ) in the floodplain surface water samples. Results of the SVOCs detected in surface water samples are presented in Table 3-6. No pesticides or PCBs were detected in the floodplain surface water samples.

All analytes in Table 3-4 that are flagged "J" were also detected in the laboratory method blanks, the rinsate blanks and/or field blanks, or the concentration was below the CRDL (see CCJM Case Narratives in Appendix B).

Seven inorganic analytes including aluminum, chromium, calcium, iron, manganese, sodium, and zinc were detected above the CRDL in the surface water samples collected from the floodplain of Clear Creek. The greater number of analytes detected above the CRDL in Clear Creek floodplain surface water may be the result of the organic rich floodplain sediments.

3.1.4 Surface Water Applicable or Relevant and Appropriate Requirements (ARARs) Evaluation This section evaluates the surface water data based on the ARARs presented in Section 3.1 and Table 3-1. Exceedances of surface water ARARs will be interpreted in the Baseline Risk Assessment.

VOCs, SVOCs, Pesticides, and PCBs. No concentrations of VOCs, SVOCs, pesticides, and PCBs in any surface water samples exceeded any of the established ARARs.

Inorganic Target Analytes. Concentrations of inorganic analytes in surface water samples did not exceed the Federal or State drinking water standards. However, several inorganic analyte concentrations exceeded Federal chronic AWQC for aquatic organisms and FSWQS for Class III, freshwater. In addition, the CRDL for six inorganic analytes (cadmium, copper, cyanide, lead, mercury, and silver) exceeded Federal chronic AWQC for aquatic organisms and the CRDL for six inorganic analytes (beryllium, copper, cyanide, mercury, nickel, and silver) exceeded FSWQS for Class III, freshwater. A comparison between AWQC and FSWQS ARARs with CRDLs is shown in Table 3-5.

Aluminum exceeded the chronic AWQC of 87 $\mu g/\ell$ at surface water Station 1 (141 J $\mu g/\ell$), Station 2 (142 J $\mu g/\ell$), Station 3 (140 J $\mu g/\ell$), Station 4 (144 J $\mu g/\ell$), Station 6 (116 J $\mu g/\ell$), Station 7 (338 $\mu g/\ell$), Station 8 (159 $\mu g/\ell$), Station 9 (408 $\mu g/\ell$), and Station 10 (112 J $\mu g/\ell$). Although the AWQC standard for aluminum is based on surface water with a pH between 6.5 and 9.0 (Clear Creek pH is <6.0), it will be used for comparison purposes. It should also be noted that the upstream background concentration at Station 1 (141 J $\mu g/\ell$) exceeds the AWQC standard by 54 $\mu g/\ell$.

The CRDL (5 $\mu g/\ell$) for beryllium exceeded the FSWQS of 0.13 $\mu g/\ell$. Beryllium was not detected in any surface water sample above the instrument detection limit (IDL) of 0.24 $\mu g/\ell$.

The CRDL (5 $\mu g/\ell$) for cadmium exceeded the AWQC standard of 1.1 $\mu g/\ell$ for aquatic organisms. At Stations 6 and 8, cadmium was below the CRDL at an estimated concentration of 3.3 J mg/ℓ and 4.0 J $\mu g/\ell$, respectively, which exceeds the AWQC standard.

Chromium VI slightly exceeded the chronic AWQC standard (11 $\mu g/\ell$) at only one sampling station, Station 4 (11.7 J $\mu g/\ell$), which is located in the floodplain.

Copper was detected below the CRDL of 25 $\mu g/\ell$ at stations 4 (19.4 J $\mu g/\ell$), 6 (13.8 J $\mu g/\ell$), and 8 (12.1 J $\mu g/\ell$); however, these concentrations exceeded the chronic AWQC aquatic organism standard of 12 $\mu g/\ell$. The FSWQS (Class III, freshwater) for copper is hardness dependent. The hardness of Clear Creek surface water has not been determined so the sample concentrations could not be adjusted. Using unadjusted copper concentrations, the FSWQS for Class III, marine water, was exceeded at Station 4 (19.4 J $\mu g/\ell$), Station 5 (5.3 UJ $\mu g/\ell$), Station 6 (13.8 J $\mu g/\ell$), Station 7 (3.6 J $\mu g/\ell$), Station 8 (12.1 J $\mu g/\ell$), Station 9 (6.8 J $\mu g/\ell$), Station 10 (5.3 J $\mu g/\ell$), and Station 11 (5.3 J $\mu g/\ell$).

The iron FSWQS of 1,000 $\mu g/\ell$ was exceeded at Station 4 (2,490 $\mu g/\ell$), Station 9 (2,650 $\mu g/\ell$), and Station 10 (1,050 J $\mu g/\ell$).

The chronic AWQC for lead, which is below the CRDL (5.0 μg/ℓ) and the Station 1 background concentration (4.6 J μg/ℓ), is 3.2 μg/ℓ. This protective lead concentration was exceeded at floodplain Station 7 (3.3 J μg/ℓ) and Clear Creek surface water Stations 10 (3.4 J μg/ℓ) and 11 (3.8 J μg/ℓ).

The CRDL for mercury also exceeded the AWQC and FSWQS concentration of 0.012 μg/ℓ. Mercury was detected at Stations 10 and 11 at 0.17 J μg/ℓ, but qualified as estimated due to the presence of mercury in the laboratory blank at 0.172 μg/ℓ.

The FSWQS for nickel in Class III, freshwater, is hardness dependent and, as mentioned before, the hardness for Clear Creek surface water has not been determined. However, when using the FSWQS for nickel (8.3 μg/ℓ) in Class III, marine water, three surface water sampling stations (Station 4 at 20.5 J μg/ℓ, Station 8 at 43.2 J μg/ℓ, and Station 9 at 19 J μg/ℓ) exceeded the standard.

Silver is another inorganic analyte whose CRDL exceeded the chronic AWQC standard (0.12 μg/ℓ) for aquatic organisms, the FSWQS of 0.07 μg/ℓ for Class III, freshwater, and the Station 1 background concentration (2.9 J μg/ℓ). Silver was detected below the CRDL in the floodplain surface water sample from Station 4 (1.8 J μg/ℓ) and Clear Creek surface water samples from Station 1 (2.9 J μg/ℓ) and Station 11 (1.9 J μg/ℓ).

3.2 SEDIMENT QUALITY. This section presents the results of the sediment samples collected at the associated surface water sampling locations and the sediment ARAR evaluation. Eight samples were collected from the sediments within Clear Creek and three samples were collected from the Clear Creek floodplain sediments. Descriptions of the sampling locations and specific sampling rationale are presented in Table 2-1 (Section 2.1).

The sediment data from Clear Creek and its floodplain were compared to the following ARARs and exceedances of these requirements were identified.

- National Oceanic and Atmospheric Administration (NOAA) Effects Range Low (ER-L) for sediments
- USEPA sediment quality criteria

USEPA sediment quality criteria are dependent on total organic carbon (TOC) and, because no sediment TOC data are available, the guidelines have been normalized to an approximated TOC concentration of 1 percent.

Exceedances of the above guidances and their impact to human health and the environment will be evaluated in the Baseline Risk Assessment at the completion of the RI.

3.2.1 Clear Creek Sediment Analytical Results The sediments of Clear Creek consist of fine- to medium-grained sands that do not have a strong affinity for adsorbing or trapping organic or inorganic chemicals. As expected, few organic compounds and low concentrations of inorganic compounds were detected in these sediments. Analytical results for the eight sediment samples are presented in Tables 3-7 through 3-10 and discussed in the following paragraphs. Validated chemical analytical results with CRDLs are presented in Appendix A.

Table 3-7
Sediment Analytical Results,
Volatile Organic Compounds

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-04-SD[1]	99-12-SD[2]	99-07-SD[1]	99-08-SD
Laboratory Sample No.	22243008	22243005	22225008	22225005
Units	µg/kg	µg/kg	µg/kg	µg/kg
Date Collected	15-July-92	15-July-92	16-July-92	16-July-92
Methylene chloride	--	--	58 J	--
Acetone	210 J	130 J	--	120 J
1,2-Dichloroethene (total)	13 J	--	--	--
Xylenes (total)	--	--	11	--

[1] Samples collected from the floodplain of Clear Creek.
[2] Duplicate sample for Station 6.

Notes: µg/kg = micrograms per kilogram.
-- = not detected.
J = estimated value.

Table 3-8
Sediment Analytical Results, Semivolatile Compounds

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-04-SD[1]	5-SD-01	5-SD-01A	99-12-SD[2]	99-07-SD[1]
Laboratory Sample No.	22243008	22563003	22563004	22243005	22225008
Units	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
Date Collected	15-July-92	19-Aug-92	19-Aug-92	15-July-92	14-July-92
Phenanthrene	--	--	--	--	330 J
Fluoranthene	--	--	--	--	350 J
Pyrene	--	--	--	--	400 J
Butylbenzylphthalate	--	48 J	--	--	--
Benzo(a)anthracene	--	--	--	--	150 J
Chrysene	--	--	--	--	210 J
bis(2-Ethylhexyl)phthalate	9,300 J	110 J	120 J	57 J	860
Benzo(b)fluoranthene	--	--	--	--	220 J
Benzo(k)fluoranthene	--	--	--	--	270 J
Benzo(a)pyrene	--	--	--	--	160 J
Indeno(1,2,3-cd)pyrene	--	--	--	--	85 J

[1] Samples collected from the floodplain of Clear Creek.
[2] Duplicate sample for Station 6.

Notes: µg/kg = micrograms per kilogram.
Aug = August.
-- = not detected.
J = estimated value.

Table 3-9
Sediment Analytical Results,
Pesticides and Polychlorinated Biphenyls (PCBs)

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-04-SD[1]	99-07-SD[1]	99-09-SD[1]
Laboratory Sample No.	22243008	22225008	22225002
Units	µg/kg	µg/kg	µg/kg
Date Collected	15-July-92	17-July-92	17-July-92
Dieldrin	87 J	8.6 J	1.7 J
4,4'-DDE	150 J	62 J	--
4,4'-DDD	66 J	35 J	--
alpha-Chlordane	54 J	10 J	--
gamma-Chlordane	53 J	12 J	--
Aroclor-1260	450 J	88 J	--

[1] Samples collected from the floodplain of Clear Creek.

Notes: µg/kg = micrograms per kilogram.
-- = not detected.
J = estimated value.

Table 3-10
Sediment Analytical Results, Inorganic Analytes

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	1-SD-01	2-SD-01	3-SD-01	99-04-SD[1]	5-SD-01	5-SD-01A	99-06-SD
Laboratory Sample No.	22562004	22562006	22562002	22243008	22563003	22563004	22243002
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Collected	19-Aug-92	19-Aug-92	19-Aug-92	14-July-92	19-Aug-92	19-Aug-92	14-July-92
Aluminum	1,150	1,400	476	38,800	1,840	1,260	451
Arsenic	--	1.2 J	--	8.9 J	.46 J	.56 J	.32 J
Barium	1.2 J	1.6 J	.53 J	77.1 J	145 J	4.9 J	.9 J
Beryllium	--	--	--	.7 J	.09 J	--	--
Cadmium	--	--	--	14.6	--	--	.97 J
Calcium	78.8 J	81.7 J	55.3 J	1,710 J	--	--	93.2 J
Chromium	2 J	2.1 J	1.3 J	121	3.6 J	7.1 J	1.1 J
Cobalt	--	--	--	3.8 J	--	--	.42
Copper	1.8 J	3.4 J	1.9 J	96.8	8.7	7.1	1.8 J
Iron	569	2,760	848	9,610	1,510 J	1,000 J	735
Lead	1.9 J	3.3	2.3 J	981	7.8 J	8.9 J	2.4 J
Magnesium	16 J	17.8 J	--	480 J	42.9 J	31 J	--
Manganese	1.7 J	3.3 J	1.6 J	27.8	4.7	2.9 J	3.9
Mercury	.25 J	.2	.2	--	--	.08 J	--
Nickel	--	--	3.9 J	--	--	--	--
Selenium	--	--	--	4.3 J	--	--	--
Silver	--	--	--	5.7 J	--	--	--
Sodium	188 J	209 J	183 J	1,190 J	--	--	208 J
Vanadium	2.3 J	4 J	1.2 J	98.2	4 J	2.5 J	1.1 J
Zinc	3.7 J	4.6 J	45.7	313	22 J	97.3 J	5 J

See notes at end of table.

Table 3-10 (Continued)
Sediment Analytical Results, Inorganic Analytes

Technical Memorandum No. 1
Phase IIA, Remedial Investigation and Feasibility Study
Surface Water and Sediment Assessment
NAS Whiting Field, Milton, Florida

ABB-ES Sample No.	99-12-SD[2]	99-07-SD[1]	99-08-SD	99-09-SD[1]	99-10-SD	99-10-SDA	99-11-SD	CCF-SD-13
Laboratory Sample No.	22243005	22225008	22225005	22225002	22211003	22212005	22212002	35476008
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Collected	14-July-92	17-July-92	17-July-92	17-July-92	13-July-92	13-July-92	13-July-92	25-March-93
Aluminum	456	3,670	426	6,360	--	453	680	3,970
Arsenic	--	1.1 J	.4 J	.85 J	--	.36 J	.34 J	3 J
Barium	.57 J	28.9 J	2.1 J	9.9 J	.86 J	1.1 J	.8 J	8.9 J
Beryllium	--	.25 J	--	--	--	--	--	--
Cadmium	.81 J	6.1	1.1 J	1.7	--	.91 J	1.1 J	--
Calcium	364 J	2,770 J	110 J	315 J	--	83 J	102 J	213 J
Chromium	1 J	13.8	1 J	5	--	.79 J	1 J	8.4
Cobalt	--	1.5 J	.46 J	1.6 J	--	--	--	--
Copper	10.7 J	124	4.5 J	6 J	--	7.5	6.4	5.4 J
Iron	803	1,750	847	2,530	982	1,000	1,170	7,310
Lead	3 J	76.5	2.3	12.7	--	8.8	3.8	12.9
Magnesium	--	403 J	--	135 J	--	--	--	66 J
Manganese	1.5 J	39	2 J	33.6	--	1.5 J	2.2 J	4.6 J
Mercury	--	.22 J	--	--	--	--	--	--
Nickel	--	--	--	12 J	--	--	3.8 J	4.2 J
Potasium	--	--	--	--	--	--	--	87.5 J
Selenium	--	--	--	--	--	--	--	.44 J
Silver	--	9.2	--	--	--	--	--	--
Sodium	198 J	513 J	213 J	258 J	--	251 J	192 J	475 J
Vanadium	.98 J	4.5 J	1.2 J	9.3 J	--	.92 J	1 J	16.2 J
Zinc	13.1 J	122	10.1 J	12.9 J	--	5.6 J	10.1 J	11.9

[1] Samples collected from the floodplain of Clear Creek.
[2] Duplicate sample for Station 6.

Notes: mg/kg = milligrams per kilogram.
Aug = August.
-- = not detected.
J = estimated value.

Acetone was the only VOC detected in the sediment samples collected from within Clear Creek. Acetone was detected in sediment samples collected from Stations 6 and 8 at concentrations of 130 J and 120 J, respectively, micrograms per kilograms (μg/kg). Due to the presence of acetone in the QC samples, the detection of acetone appears to be the result of a laboratory artifact.

Two SVOCs, butylbenzylphthalate and bis(2-ethylhexyl)phthalate (BEHP), were detected in sediment samples. Phthalates are the most frequently occurring artifacts of sampling and analysis.

No pesticides or PCBs were detected in the sediments in Clear Creek.

Comparison to Station 1 Upstream Background Clear Creek Sediment Sample. No VOCs, SVOCs, pesticides, or PCBs were detected in the upstream background sediment sample collected from Station 1. Inorganic analytes detected above the CRDL included aluminum (1,150 milligrams per kilogram [mg/kg]), iron (569 mg/kg), and mercury (0.25 J mg/kg).

Lead was detected above the CRDL (5 mg/kg) in the downstream sediment samples from Station 6 (7.8 mg/kg) and Station 10 (8.8 mg/kg) and below the CRDL (1.9 mg/kg) at Station 1. The highest concentration of mercury (0.25 mg/kg) was detected in the background sample, whereas slightly lower concentrations (0.08 J to 0.22 J mg/kg) were detected in four downstream samples.

As mentioned in the surface water assessment, the heterogeneity of the sediments in Clear Creek can create variations in the concentrations of the inorganic analytes. No presence of contamination in Clear Creek sediments can be interpreted based on the comparison to background concentrations at Station 1.

3.2.2 Floodplain Sediment Analytical Results The sediments of the floodplain are highly organic in gross constituency and would be expected to trap metals as well as organic chemicals to a much greater degree than sand. As expected, concentrations of organic and inorganic compounds detected were substantially greater than from sediment samples collected from the sandy substrate of Clear Creek. Analytical results for the floodplain sediment samples are summarized in Tables 3-7 through 3-10 and discussed in the following paragraphs. Validated chemical analytical results with CRDLs are presented in Appendix A.

Three VOCs, methylene chloride (Station 7, 58 J μg/kg), acetone (Station 4, 210 J μg/kg), and xylene (Station 7, 11 μg/kg) were detected above the CRDL in floodplain sediment samples. 1,2-Dichloroethene (DCE) was detected at Station 4 (13 J μg/kg) below the CRDL of 29 μg/kg.

One SVOC, BEHP (9,300 J μg/kg), a common laboratory artifact, was detected in the sample from Station 4. However, at Station 7, 10 SVOCs were detected including: phenanthrene (330 J μg/kg), fluoranthene (350 J μg/kg), pyrene (400 J μg/kg), benzo(a)anthracene (150 J μg/kg), chrysene (210 J μg/kg), BEHP (860 μg/kg), benzo(b)fluoranthene (220 J μg/kg), benzo(k)fluoranthene (270 J μg/kg), benzo(a)pyrene (160 J μg/kg), and indeno(1,2,3-cd)pyrene (85 J μg/kg). As indicated by the "J" qualifier, most of these SVOCs were detected below the CRDL and are reported as estimated. Station 7 is located directly downgradient of Site 16 where for 22 years diesel fuel was routinely poured on landfill refuse and burned. It may be possible that SVOCs from the diesel fuel used at Site 16

are being transported by groundwater, being discharged into the floodplain, and being adsorbed by the organic rich sediments. Further investigation in the area of Station 7 may be warranted to determine the source of this contamination.

Six pesticides and one PCB were detected in the sediment samples collected from the floodplain Stations 4, 7, and 9. Dieldrin, 4,4-DDE, 4,4-DDD, alpha-chlordane, gamma-chlordane, and Aroclor-1260 were detected below the CRDL at Stations 4 and 7. The only compound reported at Station 9 was dieldrin (1.7 J μg/kg), which was also detected below the CRDL.

All TAL metals were detected in at least one of the three sediment samples (Stations 4, 7, and 9) collected from the floodplain. Inorganic analytical results are summarized in Table 3-10 and are compared to background concentrations in the following paragraphs.

Comparison to Upstream Background Floodplain Sediment Sample. Due to the high percentage of organic matter in the floodplain sediments, a comparison to the background sediment sample from the sandy substrate of Clear Creek could not be made. No background sediment samples were collected from the floodplain sediments during the Phase IIA sampling program. However, a concurrent and separate investigation of the Clear Creek floodplain sediments is underway and a background sediment sample (WHF-CCF-SD-13) has been collected from the organic rich floodplain sediments. The analytical results from this background sample will be used for chemical comparison to sediment samples collected from Stations 4, 7, and 9. No VOCs, SVOCs, pesticides, or PCBs were detected in the background sample. Inorganic analytes detected above the CRDL in the background sample include aluminum (3,970 mg/kg), arsenic (3 J mg/kg), chromium (8.4 mg/kg), copper (5.4 J mg/kg), iron (7,310 mg/kg), lead (12.9 mg/kg), manganese (4.6 J mg/kg), vanadium (16.2 J mg/kg), and zinc (11.9 mg/kg).

The inorganic analytes of primary concern to human health and the environment and that have NOAA sediment guidelines include arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.

Arsenic was detected at Station 4 (8.9 J mg/kg), Station 7 (1.1 J mg/kg), and Station 9 (0.85 J mg/kg). Only the arsenic concentration at Station 4 exceeded the background concentration of 3 J mg/kg.

Cadmium was also detected at all three sediment sampling locations (Station 4, 14.6 mg/kg; Station 7, 6.1 mg/kg; and Station 9, 1.7 mg/kg), but was not detected in the background sample.

The background sample had a chromium concentration of 8.4 mg/kg. This concentration was exceeded by more than 14 times at Station 4 (121 mg/kg) and less than 2 times at Station 7 (13.8 mg/kg). Chromium was detected below the background concentration at Station 9 (5 mg/kg).

Copper was detected above the background concentration (5.4 J mg/kg) at all three sample locations: Station 4, 96.8 mg/kg; Station 7, 124 mg/kg; and Station 9, 6 J mg/kg.

Lead was detected at Station 4 (981 mg/kg), Station 7 (76.5 mg/kg), and Station 9 (12.7 mg/kg). Station 4 exceeded the background lead concentration of 12.9 mg/kg by 76 times and Station 7 exceeded the background concentration by 6 times.

Mercury was not detected in the background sample and was only detected at Station 7 at 0.22 J mg/kg.

Nickel was also not detected in the background sample and was only detected at Station 9 at 12 J mg/kg.

Silver was detected at Station 4 (5.7 J mg/kg) and at Station 7 (9.2 mg/kg), but was not detected in the background sample.

Finally, zinc was detected in the background sample at 11.9 mg/kg and at all three sample stations. Station 4 had a zinc concentration (313 mg/kg) more than 26 times the background concentration. Station 7 (122 mg/kg) exceeded the background zinc concentration by 10 times and Station 9 only slightly exceeded the background concentration at 12.9 J mg/kg.

Based on the inorganic data above, Station 4 has substantially greater concentrations than the background soil sample or the two other samples (Stations 7 and 9) collected from the Clear Creek floodplain. The Station 4 sediment sample was collected from the same location as the Phase I Station 2 sediment sample. Elevated metals concentrations were also observed in the analytical results from Station 2. The Phase IIA Station 4 sediment sample was collected to provide a confirmation of the Phase I Station 2 results. The Phase I Station 2 and Phase IIA Station 4 results with the site-specific background concentration are presented as follows.

Metal	Sediment Concentration at Phase I RI Station 2 (mg/kg)	Sediment Concentration at Phase IIA RI Station 4 (mg/kg)	Site-specific Background Sediment Concentration (mg/kg)
Arsenic	--	8.9 J	3 J
Cadmium	--	14.6	--
Chromium	36.9	121	8.4
Copper	37.5	3.8 J	5.4 J
Lead	327	981	12.9
Mercury	0.15	--	--
Nickel	45.7	--	--
Silver	11.4	5.7 J	--
Zinc	58.0	313	11.9

Notes: mg/kg = milligrams per kilogram.
-- = not detected.
J = estimated value.

3.2.3 **Sediment ARAR Evaluation** This section evaluates the surface water data based on the ARARs presented in Section 3.1 and Table 3-1. Exceedances of the sediment ARAR values will be interpreted in the Baseline Risk Assessment.

NOAA and USEPA guidance values are not available for VOCs in sediments.

SVOCs that exceeded the NOAA ER-L and/or USEPA sediment quality criteria (SQC) guidelines included phenanthrene (Station 7, 330 J μg/kg; NOAA, 225 μg/kg; and USEPA, 1.29 μg/kg) and pyrene (Station 7, 400 J μg/kg and NOAA 350 μg/kg).

A total of six pesticides and PCBs were detected in sediment samples collected from Stations 4, 7, and 9 (all floodplain locations). All reported concentrations exceeded the NOAA and USEPA guidelines. Dieldrin (Station 4, 57J μg/kg; Station 7, 8.6 J μg/kg; and Station 9, 1.7 J μg/kg) exceeded the NOAA guideline of 0.02 μg/kg and the USEPA guideline of 1.3 μg/kg. 4,4-DDE (Station 4, 150 J μg/kg and Station 7, 62 J μg/kg) and 4,4-DDD (Station 4, 66 J μg/kg and Station 7, 35 J μg/kg) exceeded the NOAA guidelines of 2 μg/kg for both compounds. Chlordane (Station 4, 107 J μg/kg and Station 7, 22 μg/kg) exceeded the NOAA guideline of 0.5 μg/kg. The NOAA guideline for total PCBs (50 μg/kg) was also exceeded at both Station 4 (450 J μg/kg) and Station 7 (88 J μg/kg).

NOAA guidelines for inorganic analytes in sediments are presented in Table 3-1. There are no USEPA inorganic guidelines for sediments. Cadmium (NOAA, 5 mg/kg) was exceeded at Station 4 (14.6 mg/kg) and Station 7 (6.1 mg/kg). Chromium (NOAA, 80 mg/kg) was only exceeded at Station 4 (121 mg/kg). Copper (NOAA, 70 mg/kg) was exceeded at Station 4 (96.8 mg/kg) and Station 7 (124 mg/kg). Lead (NOAA, 35 mg/kg) was also exceeded at Station 4 (981 mg/kg) and Station 7 (76.5 mg/kg). Stations 1 (0.25 J mg/kg), 2 (0.2 mg/kg), 3 (0.2 mg/kg), and 7 (0.22 J mg/kg) exceeded the NOAA guideline for mercury of 0.15 mg/kg. Silver (NOAA, 1 mg/kg) was exceeded at Station 4 (5.7 mg/kg) and Station 7 (9.2 mg/kg). Finally, zinc (NOAA, 120 mg/kg) was exceeded at Station 4 (313 mg/kg) and slightly exceeded at Station 7 (122 mg/kg).

3.3 SURFACE WATER AND SEDIMENT SUMMARY AND CONCLUSIONS. Clear Creek surface water, as found during the Phase I RI, can be characterized as slightly acidic with low concentrations of cations and anions that are typical of the water chemistry of streams in a sandy undeveloped watershed. Based on the absence of organic compounds above CRDLs and on comparison of inorganic analytes to background sample concentrations, no significant environmental contamination attributable to NAS Whiting Field appears to be present in Clear Creek surface waters or sediments. Based on these findings, no further explorations are recommended for the surface water and sediments of Clear Creek.

However, the sediments of the Clear Creek floodplain sample from Station 4 contain VOCs and metals in excess of background concentrations. Similar compounds were detected at the same location (in excess of background concentrations) during the Phase I RI (Station 2). The VOCs detected at Station 4 included actone and 1,2-DCE. Inorganic compounds at Station 4 exceeding site-specific soil background concentrations by more than two times (see Section 3.2) included arsenic, cadmium, chromium, lead, silver, and zinc. The Station 7 floodplain sediment sample contained the VOC xylene, 11 SVOCs, and several inorganic compounds that exceeded background concentrations. Further exploration to assess the nature and extent of the floodplain sediment contamination is currently being investigated separate from the RI/FS program in order to expedite the contamination assessment and potential remediation program. A report titled *Clear Creek Investigation Report*, presenting the results and conclusions of the initial Clear Creek floodplain investigation, was submitted for regulatory review in July 1993. Data gathered from the Clear Creek floodplain will be evaluated in the Baseline Risk Assessment. In addition, several exceedances of FSWQS Class III, freshwater, and chronic AWQC standards for surface water, NOAA, and USEPA guidelines for sediments were identified. The exceedances are detailed in Sections 3.1.4 and 3.2.3 and will be addressed in the Baseline Risk Assessment at the completion of the RI.

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APPENDIX A

SUMMARIZED AND QUALIFIED CHEMICAL ANALYSIS RESULTS

APPENDIX B

SAMPLE DELIVERY GROUPS, LABORATORY SAMPLE IDENTIFICATION NUMBERS, AND C.C. JOHNSTON & MALHORTA ENVIRONMENTAL ENGINEERS AND SCIENTISTS (CCJM) VALIDATION CASE NARRATIVES

APPENDIX A

SUMMARIZED AND QUALIFIED CHEMICAL ANALYSIS RESULTS

SUMMARIZED AND QUALIFIED CHEMICAL ANALYSIS RESULTS

A-1	METALS AND CYANIDE
A-2	VOLATILE ORGANIC COMPOUNDS
A-3	SEMIVOLATILE ORGANIC COMPOUNDS
A-4	PESTICIDES AND PCBs

A-1

METALS AND CYANIDE

TAL-METALS

Lab Sample ID	ABB-ES Sample ID
22562003	WHF-2A-STA01-SW01
22562005	WHF-2A-STA02-SW01
22562001	WHF-2A-STA03-SW01
22243007	WHF-2A-STA04-SW01
22563001	WHF-2A-STA05-SW01
22563002	WHF-2A-STA05-SW01A
22563001	WHF-2A-STA06-SW01
22225009	WHF-2A-STA07-SW01
22225003	WHF-2A-STA08-SW01
22225001	WHF-2A-STA09-SW01
22211001	WHF-2A-STA10-SW01
22212003	WHF-2A-STA10-SW01A
22212001	WHF-2A-STA11-SW01
22243004	WHF-2A-STA12-SW01

TAL-METALS

Lab Sample ID	ABB-ES Sample ID
22562004	WHF-2A-STA01-SD01
22562006	WHF-2A-STA02-SD01
22562002	WHF-2A-STA03-SD01
22243008	WHF-2A-STA04-SD01
22563003	WHF-2A-STA05-SD01
22563004	WHF-2A-STA05-SD01A
22243002	WHF-2A-STA06-SD01
22225008	WHF-2A-STA07-SD01
22225005	WHF-2A-STA08-SD01
22225002	WHF-2A-STA09-SD01
22211003	WHF-2A-STA10-SD01
22212005	WHF-2A-STA10-SD01A
22212002	WHF-2A-STA11-SD01
22243005	WHF-2A-STA12-SD01

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22562003				22562005				22562001				22243007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SW-01				2-SW-01				3-SW-01				99-04-SW			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	141	J	ug/l	200	142	J	ug/l	200	140	J	ug/l	200	144	J	ug/l	200
Antimony	12.4	U	ug/l	60	12.4	U	ug/l	60	12.1	U	ug/l	60	12.4	U	ug/l	60
Arsenic	1	U	ug/l	10	1	U	ug/l	10	1	U	ug/l	10	1	J	ug/l	10
Barium	17.1	J	ug/l	200	16.6	J	ug/l	200	17	J	ug/l	200	14.7	J	ug/l	200
Beryllium	.24	U	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5
Cadmium	2.7	U	ug/l	5	2.7	U	ug/l	5	2.7	U	ug/l	5	2.7	U	ug/l	5
Calcium	1050	J	ug/l	5000	1280	J	ug/l	5000	926	J	ug/l	5000	900	J	ug/l	5000
Chromium	1.9	U	ug/l	10	1.9	U	ug/l	10	1.9	U	ug/l	10	11.7	J	ug/l	10
Cobalt	1.6	U	ug/l	50	1.6	U	ug/l	50	1.6	U	ug/l	50	2.4	J	ug/l	50
Copper	1.9	J	ug/l	25	1.8	U	ug/l	25	2.7	J	ug/l	25	19.4	J	ug/l	25
Iron	852		ug/l	100	863		ug/l	100	915		ug/l	100	2490		ug/l	100
Lead	4.6		ug/l	5	9.3	J	ug/l	5	3	J	ug/l	5	2.4	J	ug/l	5
Magnesium	680	J	ug/l	5000	665	J	ug/l	5000	680	J	ug/l	5000	483	J	ug/l	5000
Manganese	16.3		ug/l	15	16.8		ug/l	15	16.4		ug/l	15	19.1		ug/l	15
Mercury	.03	UJ	ug/l	.2	.03	UJ	ug/l	.2	.03	UJ	ug/l	.2	.16	U	ug/l	.2
Nickel	10.7	U	ug/l	40	10.7	U	ug/l	40	10.7	U	ug/l	40	20.5	J	ug/l	40
Potassium	602	U	ug/l	5000	602	U	ug/l	5000	602	U	ug/l	5000	602	U	ug/l	5000
Selenium	2.1	U	ug/l	5	2.1	U	ug/l	5	2.1	U	ug/l	5	1.9	U	ug/l	5
Silver	2.9	J	ug/l	10	1.5	U	ug/l	10	1.5	U	ug/l	10	1.8	J	ug/l	10
Sodium	2700	J	ug/l	5000	2700	J	ug/l	5000	2720	J	ug/l	5000	3110	J	ug/l	5000
Thallium	1.6	U	ug/l	10	1.6	U	ug/l	10	1.6	U	ug/l	10	2.1	U	ug/l	10
Vanadium	2.2	J	ug/l	50	1.3	J	ug/l	50	1.3	U	ug/l	50	1.4	J	ug/l	50
Zinc	13.1	J	ug/l	20	10.1	J	ug/l	20	7.6	U	ug/l	20	21.6	J	ug/l	20
Cyanide	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R = RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22563001				22563002				22243001				22243004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5-SW-01				5-SW-01A				99-06-SW				99-12-SW			
Collect Date:	19-AUG-92				19-AUG-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	195	UJ	ug/l	200	146	UJ	ug/l	200	116	J	ug/l	200	120	J	ug/l	200
Antimony	12.4	U	ug/l	60	10.7	U	ug/l	60	12.4	U	ug/l	60	12.4	U	ug/l	60
Arsenic	1	U	ug/l	10	1.2	J	ug/l	10	1	U	ug/l	10	1	U	ug/l	10
Barium	12.6	J	ug/l	200	12.4	J	ug/l	200	17.8	J	ug/l	200	17.6	J	ug/l	200
Beryllium	.24	U	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5
Cadmium	2.7	U	ug/l	5	3	U	ug/l	5	3.3	J	ug/l	5	2.7	U	ug/l	5
Calcium	3480	J	ug/l	5000	3520	J	ug/l	5000	989	J	ug/l	5000	1010	J	ug/l	5000
Chromium	1.9	U	ug/l	10	2.9	U	ug/l	10	1.9	U	ug/l	10	3.2	J	ug/l	10
Cobalt	1.6	U	ug/l	50	3.3	U	ug/l	50	1.6	U	ug/l	50	2.3	J	ug/l	50
Copper	5.3	UJ	ug/l	25	5.6	UJ	ug/l	25	13.8	J	ug/l	25	13.8	J	ug/l	25
Iron	767		ug/l	100	770		ug/l	100	973		ug/l	100	981		ug/l	100
Lead	2.7	UJ	ug/l	5	2.1	UJ	ug/l	5	1.7	J	ug/l	5	1.3	J	ug/l	5
Magnesium	773	J	ug/l	5000	789	J	ug/l	5000	647	J	ug/l	5000	662	J	ug/l	5000
Manganese	16.5		ug/l	15	16.8		ug/l	15	18.5		ug/l	15	18.8		ug/l	15
Mercury	.59	UJ	ug/l	.2	.43	UJ	ug/l	.2	.16	U	ug/l	.2	.16	U	ug/l	.2
Nickel	10.7	U	ug/l	40	5.3	U	ug/l	40	10.7	U	ug/l	40	10.7	U	ug/l	10
Potassium	1500	J	ug/l	5000	794	J	ug/l	5000	602	U	ug/l	5000	602	U	ug/l	5000
Selenium	2.1	U	ug/l	5	2.1	U	ug/l	5	1.9	U	ug/l	5	1.9	U	ug/l	5
Silver	1.5	U	ug/l	10	2	U	ug/l	10	1.5	U	ug/l	10	1.5	U	ug/l	10
Sodium	12800	J	ug/l	5000	12800	J	ug/l	5000	3140	J	ug/l	5000	3090	J	ug/l	5000
Thallium	1.6	U	ug/l	10	1.6	UJ	ug/l	10	2.1	U	ug/l	10	2.1	U	ug/l	10
Vanadium	1.3	UJ	ug/l	50	2.6	UJ	ug/l	50	1.3	U	ug/l	50	1.3	U	ug/l	50
Zinc	20.2	UJ	ug/l	20	17.8	UJ	ug/l	20	27.1	J	ug/l	20	20.2	J	ug/l	20
Cyanide	2.2	U	ug/l	10	.84	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22225009				22225003				22225001				22211001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-07-SW				99-08-SW				99-09-SW				99-10-SW			
Collect Date:	17-JUL-92				17-JUL-92				17-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	338		ug/l	200	159	J	ug/l	200	408		ug/l	200	114	UJ	ug/l	200
Antimony	12.4	U	ug/l	60	12.4	U	ug/l	60	12.4	U	ug/l	60	12.4	U	ug/l	60
Arsenic	1	UJ	ug/l	10	1	UJ	ug/l	10	1	UJ	ug/l	10	1	UJ	ug/l	20
Barium	21.8	J	ug/l	200	17.9	J	ug/l	200	29.7	J	ug/l	200	18.3	J	ug/l	200
Beryllium	.24	UJ	ug/l	5	.24	UJ	ug/l	5	.24	UJ	ug/l	5	.24	UJ	ug/l	5
Cadmium	2.7	U	ug/l	5	4	J	ug/l	5	2.7	U	ug/l	5	2.7	U	ug/l	5
Calcium	10400		ug/l	5000	954	J	ug/l	5000	5820		ug/l	5000	961	UJ	ug/l	5000
Chromium	1.9	UJ	ug/l	10	1.9	UJ	ug/l	10	2	J	ug/l	10	2.1	UJ	ug/l	10
Cobalt	1.6	UJ	ug/l	50	1.6	UJ	ug/l	50	4.2	J	ug/l	50	1.6	UJ	ug/l	50
Copper	3.6	J	ug/l	25	12.1	J	ug/l	25	6.8	J	ug/l	25	2	UJ	ug/l	25
Iron	855		ug/l	100	949		ug/l	100	2650		ug/l	100	1050	J	ug/l	100
Lead	3.3	J	ug/l	5	2.4	J	ug/l	5	2.2	J	ug/l	5	6	UJ	ug/l	5
Magnesium	2590	J	ug/l	5000	645	J	ug/l	5000	1460	J	ug/l	5000	633	J	ug/l	5000
Manganese	166		ug/l	15	18.9		ug/l	15	1420		ug/l	15	17.9		ug/l	15
Mercury	.16	U	ug/l	.2	.16	U	ug/l	.2	.16	U	ug/l	.2	.17	UJ	ug/l	.2
Nickel	10.7	U	ug/l	40	43.2	J	ug/l	40	19	J	ug/l	40	10.7	U	ug/l	40
Potassium	3740	J	ug/l	5000	602	UJ	ug/l	5000	756	J	ug/l	5000	602	U	ug/l	5000
Selenium	1.9	U	ug/l	5	1.9	U	ug/l	5	1.9	U	ug/l	5	1.9	U	ug/l	5
Silver	1.5	UJ	ug/l	10	1.5	UJ	ug/l	10	1.5	UJ	ug/l	10	1.5	U	ug/l	10
Sodium	6830		ug/l	5000	3280	J	ug/l	5000	4070	J	ug/l	5000	3030	UJ	ug/l	5000
Thallium	2.1	U	ug/l	10	2.1	U	ug/l	10	2.1	U	ug/l	10	2.1	U	ug/l	10
Vanadium	1.3	UJ	ug/l	50	1.3	UJ	ug/l	50	1.3	UJ	ug/l	50	1.3	U	ug/l	50
Zinc	9.2	J	ug/l	20	25.6	J	ug/l	20	20.7	J	ug/l	20	7.6	U	ug/l	20
Cyanide	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R = RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22212003				22212001			
Site	WHITING				WHITING			
Locator	99-10-SWA				99-11-SW			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE								
Aluminum	112	J	ug/l	200	80	J	ug/l	200
Antimony	12.4	U	ug/l	60	12.4	U	ug/l	60
Arsenic	1	U	ug/l	10	1	U	ug/l	10
Barium	16.9	J	ug/l	200	16.7	J	ug/l	200
Beryllium	.24	UJ	ug/l	5	.24	UJ	ug/l	5
Cadmium	2.7	U	ug/l	5	2.7	U	ug/l	5
Calcium	920	J	ug/l	5000	942	J	ug/l	5000
Chromium	4.2	J	ug/l	10	4.7	J	ug/l	10
Cobalt	3.8	J	ug/l	50	2.4	J	ug/l	50
Copper	5.3	J	ug/l	25	5.3	J	ug/l	25
Iron	998	J	ug/l	100	814	J	ug/l	100
Lead	3.4	J	ug/l	5	3.8	J	ug/l	5
Magnesium	629	J	ug/l	5000	626	J	ug/l	5000
Manganese	18	J	ug/l	15	16.8	J	ug/l	15
Mercury	.17	J	ug/l	.2	.17	J	ug/l	.2
Nickel	10.7	U	ug/l	40	10.7	U	ug/l	40
Potassium	602	U	ug/l	5000	730	J	ug/l	5000
Selenium	1.9	U	ug/l	5	1.9	U	ug/l	5
Silver	1.5	J	ug/l	10	1.9	J	ug/l	10
Sodium	3010	J	ug/l	5000	3030	J	ug/l	5000
Thallium	2.1	U	ug/l	10	2.1	U	ug/l	10
Vanadium	1.6	J	ug/l	50	1.6	J	ug/l	50
Zinc	10.2	J	ug/l	20	10.9	J	ug/l	20
Cyanide	2.2	U	ug/l	10	2.2	U	ug/l	10

U = NOT DETECTED J= ESTIMATED VALUE
U.!- REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
' ESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS ...SULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22562004				22562006				22562002				22243008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SD-01				2-SD-01				3-SD-01				99-04-SD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	1150		mg/kg	40	1400		mg/kg	40	476		mg/kg	40	38800		mg/kg	40
Antimony	3.3	U	mg/kg	12	3.6	U	mg/kg	12	3	U	mg/kg	12	18.5	U	mg/kg	12
Arsenic	.26	U	mg/kg	2	1.2	J	mg/kg	2	.25	U	mg/kg	2	8.9	J	mg/kg	2
Barium	1.2	J	mg/kg	40	1.6	J	mg/kg	40	.53	J	mg/kg	40	77.1	J	mg/kg	40
Beryllium	.06	U	mg/kg	1	.07	U	mg/kg	1	.06	U	mg/kg	1	.7	J	mg/kg	1
Cadmium	.72	U	mg/kg	1	.79	U	mg/kg	1	.67	U	mg/kg	1	14.6		mg/kg	1
Calcium	78.8	J	mg/kg	1000	81.7	J	mg/kg	1000	55.3	J	mg/kg	1000	1710	J	mg/kg	1000
Chromium	2	J	mg/kg	2	2.1	J	mg/kg	2	1.3	J	mg/kg	2	121		mg/kg	2
Cobalt	.41	U	mg/kg	10	.45	U	mg/kg	10	.38	U	mg/kg	10	3.8	J	mg/kg	10
Copper	1.8	J	mg/kg	5	3.4	J	mg/kg	5	1.9	J	mg/kg	5	96.8		mg/kg	5
Iron	569		mg/kg	20	2760		mg/kg	20	848		mg/kg	20	9610		mg/kg	20
Lead	1.9	J	mg/kg	1	3.3		mg/kg	1	2.3	J	mg/kg	1	981		mg/kg	1
Magnesium	16	J	mg/kg	1000	17.8	J	mg/kg	1000	11.9	U	mg/kg	1000	480	J	mg/kg	1000
Manganese	1.7	J	mg/kg	3	3.3	J	mg/kg	3	1.6	J	mg/kg	3	27.8		mg/kg	3
Mercury	.25	J	mg/kg	.1	.2		mg/kg	.1	.2		mg/kg	.1	.54	U	mg/kg	.1
Nickel	2.8	U	mg/kg	8	3.1	U	mg/kg	8	3.9	J	mg/kg	8	16	U	mg/kg	8
Potassium	158	U	mg/kg	1000	173	U	mg/kg	1000	148	U	mg/kg	1000	898	U	mg/kg	1000
Selenium	.55	U	mg/kg	1	.6	U	mg/kg	1	.51	U	mg/kg	1	4.3	J	mg/kg	1
Silver	.39	U	mg/kg	2	.43	U	mg/kg	2	.37	U	mg/kg	2	5.7	J	mg/kg	2
Sodium	188	J	mg/kg	1000	209	J	mg/kg	1000	183	J	mg/kg	1000	1190	J	mg/kg	1000
Thallium	.42	U	mg/kg	2	.46	U	mg/kg	2	.39	U	mg/kg	2	3.1	U	mg/kg	2
Vanadium	2.3	J	mg/kg	10	4	J	mg/kg	10	1.2	J	mg/kg	10	98.2		mg/kg	10
Zinc	3.7	J	mg/kg	4	4.6	J	mg/kg	4	45.7		mg/kg	4	313		mg/kg	4
Cyanide	.29	U	mg/kg	1	.31	U	mg/kg	1	.27	U	mg/kg	1	1.7	U	mg/kg	1

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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22563003				22563004				22243002				22243005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5-SD-01				5-SD-01A				99-06-SD				99-12-SD			
Collect Date:	19-AUG-92				19-AUG-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	1840		mg/kg	40	1260		mg/kg	40	451		mg/kg	40	456		mg/kg	40
Antimony	2.7	U	mg/kg	12	3.2	U	mg/kg	12	3.2	U	mg/kg	12	3.1	U	mg/kg	12
Arsenic	.46	J	mg/kg	2	.56	J	mg/kg	2	.32	J	mg/kg	2	.25	U	mg/kg	2
Barium	145	J	mg/kg	40	4.9	J	mg/kg	40	.9	J	mg/kg	40	.57	J	mg/kg	40
Beryllium	.09	J	mg/kg	1	.06	U	mg/kg	1	.06	U	mg/kg	1	.06	U	mg/kg	1
Cadmium	.77	U	mg/kg	1	.71	U	mg/kg	1	.97	J	mg/kg	1	.81	J	mg/kg	1
Calcium	109	UJ	mg/kg	1000	121	UJ	mg/kg	1000	93.2	J	mg/kg	1000	364	J	mg/kg	1000
Chromium	3.6	J	mg/kg	2	7.1	J	mg/kg	2	1.1	J	mg/kg	2	1	J	mg/kg	2
Cobalt	.84	U	mg/kg	10	.41	U	mg/kg	10	.42		mg/kg	10	.39	U	mg/kg	10
Copper	8.7		mg/kg	5	7.1		mg/kg	5	1.8	J	mg/kg	5	10.7	J	mg/kg	5
Iron	1510	J	mg/kg	20	1000	J	mg/kg	20	735		mg/kg	20	803		mg/kg	20
Lead	7.8	J	mg/kg	1	8.9	J	mg/kg	1	2.4	J	mg/kg	1	3	J	mg/kg	1
Magnesium	42.9	J	mg/kg	1000	31	J	mg/kg	1000	12.5	U	mg/kg	1000	12	U	mg/kg	1000
Manganese	4.7		mg/kg	3	2.9	J	mg/kg	3	3.9		mg/kg	3	1.5	J	mg/kg	3
Mercury	.02	UJ	mg/kg	.1	.08	J	mg/kg	.1	.08	U	mg/kg	.1	.07	U	mg/kg	.1
Nickel	1.4	U	mg/kg	8	2.8	U	mg/kg	8	2.7	U	mg/kg	8	2.6	U	mg/kg	8
Potassium	173	U	mg/kg	1000	157	U	mg/kg	1000	154	U	mg/kg	1000	149	U	mg/kg	1000
Selenium	.53	U	mg/kg	1	.54	U	mg/kg	1	.48	U	mg/kg	1	.46	U	mg/kg	1
Silver	.51	UJ	mg/kg	2	.39	U	mg/kg	2	.38	U	mg/kg	2	.37	U	mg/kg	2
Sodium	260	UJ	mg/kg	1000	211	UJ	mg/kg	1000	208	J	mg/kg	1000	198	J	mg/kg	1000
Thallium	.4	U	mg/kg	2	.41	UJ	mg/kg	2	.53	U	mg/kg	2	.51	U	mg/kg	2
Vanadium	4	J	mg/kg	10	2.5	J	mg/kg	10	1.1	J	mg/kg	10	.98	J	mg/kg	10
Zinc	22	J	mg/kg	4	97.3	J	mg/kg	4	5	J	mg/kg	4	13.1	J	mg/kg	4
Cyanide	.24	U	mg/kg	1	.29	U	mg/kg	1	.28	U	mg/kg	1	.27	U	mg/kg	1

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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22225008				22225005				22225002				22211003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-07-SD				99-08-SD				99-09-SD				99-10-SD			
Collect Date:	17-JUL-92				17-JUL-92				17-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	3670		mg/kg	40	426		mg/kg	40	6360		mg/kg	40	560	UJ	mg/kg	40
Antimony	7	U	mg/kg	12	3.2	U	mg/kg	12	4	U	mg/kg	12	3	U	mg/kg	12
Arsenic	1.1	J	mg/kg	2	.4	J	mg/kg	2	.85	J	mg/kg	2	.34	UJ	mg/kg	2
Barium	28.9	J	mg/kg	40	2.1	J	mg/kg	40	9.9	J	mg/kg	40	.86	J	mg/kg	40
Beryllium	.25	J	mg/kg	1	.06	U	mg/kg	1	.08	U	mg/kg	1	.06	UJ	mg/kg	1
Cadmium	6.1		mg/kg	1	1.1	J	mg/kg	1	1.7		mg/kg	1	1	UJ	mg/kg	1
Calcium	2770	J	mg/kg	1000	110	J	mg/kg	1000	315	J	mg/kg	1000	83.5	UJ	mg/kg	1000
Chromium	13.8		mg/kg	2	1	J	mg/kg	2	5		mg/kg	2	.62	UJ	mg/kg	2
Cobalt	1.5	J	mg/kg	10	.46	J	mg/kg	10	1.6	J	mg/kg	10	.38	U	mg/kg	10
Copper	124		mg/kg	5	4.5	J	mg/kg	5	6	J	mg/kg	5	1.9	UJ	mg/kg	5
Iron	1750		mg/kg	20	847		mg/kg	20	2530		mg/kg	20	982		mg/kg	20
Lead	76.5		mg/kg	1	2.3		mg/kg	1	12.7		mg/kg	1	2.5	UJ	mg/kg	1
Magnesium	403	J	mg/kg	1000	12.5	U	mg/kg	1000	135	J	mg/kg	1000	11.9	U	mg/kg	1000
Manganese	39		mg/kg	3	2	J	mg/kg	3	33.6		mg/kg	3	1.5	UJ	mg/kg	3
Mercury	.22	J	mg/kg	.1	.07	U	mg/kg	.1	.12	U	mg/kg	.1	.09	U	mg/kg	.1
Nickel	6	U	mg/kg	8	2.8	U	mg/kg	8	12	J	mg/kg	8	2.6	U	mg/kg	8
Potassium	340	U	mg/kg	1000	155	U	mg/kg	1000	193	U	mg/kg	1000	147	U	mg/kg	1000
Selenium	1.1	U	mg/kg	1	.48	U	mg/kg	1	.6	U	mg/kg	1	.46	U	mg/kg	1
Silver	9.2		mg/kg	2	.38	U	mg/kg	2	.48	U	mg/kg	2	.37	U	mg/kg	2
Sodium	513	J	mg/kg	1000	213	J	mg/kg	1000	258	J	mg/kg	1000	193	UJ	mg/kg	1000
Thallium	1.2	U	mg/kg	2	.53	U	mg/kg	2	.66	U	mg/kg	2	.5	U	mg/kg	2
Vanadium	4.5	J	mg/kg	10	1.2	J	mg/kg	10	9.3	J	mg/kg	10	.91	UJ	mg/kg	10
Zinc	122		mg/kg	4	10.1	J	mg/kg	4	12.9	J	mg/kg	4	3.9	UJ	mg/kg	4
Cyanide	.63	U	mg/kg	1	.28	U	mg/kg	1	.35	U	mg/kg	1	.27	U	mg/kg	1

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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22212005				22212002			
Site	WHITING				WHITING			
Locator	99-10-SDA				99-11-SD			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE								
Aluminum	453	J	mg/kg	40	680	J	mg/kg	40
Antimony	3.1	U	mg/kg	12	3.1	U	mg/kg	12
Arsenic	.36	J	mg/kg	2	.34	J	mg/kg	2
Barium	1.1	J	mg/kg	40	.8	J	mg/kg	40
Beryllium	.06	U	mg/kg	1	.06	U	mg/kg	1
Cadmium	.91	J	mg/kg	1	1.1	J	mg/kg	1
Calcium	83	J	mg/kg	1000	102	J	mg/kg	1000
Chromium	.79	J	mg/kg	2	1	J	mg/kg	2
Cobalt	.39	U	mg/kg	10	.39	U	mg/kg	10
Copper	7.5	J	mg/kg	5	6.4	J	mg/kg	5
Iron	1000	J	mg/kg	20	1170	J	mg/kg	20
Lead	8.8	J	mg/kg	1	3.8	J	mg/kg	1
Magnesium	12	U	mg/kg	1000	12.3	U	mg/kg	1000
Manganese	1.5	J	mg/kg	3	2.2	J	mg/kg	3
Mercury	.08	U	mg/kg	.1	.08	U	mg/kg	.1
Nickel	2.6	U	mg/kg	8	3.8	J	mg/kg	8
Potassium	149	U	mg/kg	1000	152	U	mg/kg	1000
Selenium	.46	U	mg/kg	1	.47	U	mg/kg	1
Silver	.37	U	mg/kg	2	.38	U	mg/kg	2
Sodium	251	J	mg/kg	1000	192	J	mg/kg	1000
Thallium	.51	U	mg/kg	2	.52	U	mg/kg	2
Vanadium	.92	J	mg/kg	10	1	J	mg/kg	10
Zinc	5.6	J	mg/kg	4	10.1	J	mg/kg	4
Cyanide	.27	U	mg/kg	1	.28	U	mg/kg	1

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CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22225004				22243003				22243006				22562007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-SW/SD-RB				99-SWSD-RB02				99-SWSD-RB03				SUR/SL-RB09			
Collect Date:	17-JUL-92				14-JUL-92				14-JUL-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE																
Aluminum	57.8	J	ug/l	200	33.4	J	ug/l	200	52.1	J	ug/l	200	84.6	J	ug/l	200
Antimony	12.4	U	ug/l	60	12.4	U	ug/l	60	12.4	U	ug/l	60	12.4	U	ug/l	60
Arsenic	1	UJ	ug/l	10	1	U	ug/l	10	1	U	ug/l	10	1	U	ug/l	10
Barium	1.1	J	ug/l	200	.78	J	ug/l	200	2.1	J	ug/l	200	1.1	J	ug/l	200
Beryllium	.24	UJ	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5	.24	U	ug/l	5
Cadmium	2.7	U	ug/l	5	2.7	U	ug/l	5	2.7	U	ug/l	5	2.7	U	ug/l	5
Calcium	272	J	ug/l	5000	246	J	ug/l	5000	300	J	ug/l	5000	489	J	ug/l	5000
Chromium	2	J	ug/l	10	2.2	J	ug/l	10	4.8	J	ug/l	10	1.9	U	ug/l	10
Cobalt	2.6	J	ug/l	50	1.6	U	ug/l	50	1.6	U	ug/l	50	1.6	U	ug/l	50
Copper	4.8	J	ug/l	25	18.6	J	ug/l	25	16.3	J	ug/l	25	1.8	U	ug/l	25
Iron	26.6	J	ug/l	100	26.8	J	ug/l	100	48.4	J	ug/l	100	20	J	ug/l	100
Lead	2.2	J	ug/l	5	1.2	J	ug/l	5	3.1	J	ug/l	5	1.9	J	ug/l	5
Magnesium	48.5	U	ug/l	5000	48.5	U	ug/l	5000	48.5	U	ug/l	5000	48.5	U	ug/l	5000
Manganese	1.7	J	ug/l	15	1.6	U	ug/l	15	2.1	J	ug/l	15	1.8	J	ug/l	15
Mercury	.16	U	ug/l	.2	.16	U	ug/l	.2	.16	U	ug/l	.2	.03	UJ	ug/l	.2
Nickel	10.7	U	ug/l	40	10.7	U	ug/l	40	10.7	U	ug/l	40	10.7	U	ug/l	40
Potassium	602	UJ	ug/l	5000	602	U	ug/l	5000	602	U	ug/l	5000	602	U	ug/l	5000
Selenium	1.9	U	ug/l	5	1.9	U	ug/l	5	1.9	U	ug/l	5	2.1	U	ug/l	5
Silver	1.5	UJ	ug/l	10	1.5	U	ug/l	10	1.5	U	ug/l	10	1.7	J	ug/l	10
Sodium	855	J	ug/l	5000	867	J	ug/l	5000	901	J	ug/l	5000	1040	J	ug/l	5000
Thallium	2.1	U	ug/l	10	2.1	U	ug/l	10	2.1	U	ug/l	10	1.6	U	ug/l	10
Vanadium	1.3	UJ	ug/l	50	1.3	U	ug/l	50	1.3	U	ug/l	50	1.3	U	ug/l	50
Zinc	14.4	J	ug/l	20	23.4		ug/l	20	30.7		ug/l	20	11	J	ug/l	20
Cyanide	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10	2.2	U	ug/l	10

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CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - METALS/INORGANICS

Lab Sample Number:	22225007				22562008			
Site	WHITING				WHITING			
Locator	99-SW/SD-FB				SUR/SL-FB-02			
Collect Date:	17-JUL-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP METALS AND CYANIDE								
Aluminum	28.7	J	ug/l	200	33.4	J	ug/l	200
Antimony	12.4	U	ug/l	60	15	J	ug/l	60
Arsenic	1	UJ	ug/l	10	1	U	ug/l	10
Barium	.58	J	ug/l	200	1.1	J	ug/l	200
Beryllium	.24	UJ	ug/l	5	.24	U	ug/l	5
Cadmium	2.7	U	ug/l	5	2.7	U	ug/l	5
Calcium	237	J	ug/l	5000	325	J	ug/l	5000
Chromium	1.9	UJ	ug/l	10	1.9	U	ug/l	10
Cobalt	1.6	UJ	ug/l	50	1.6	U	ug/l	50
Copper	1.8	U	ug/l	25	1.8	U	ug/l	25
Iron	40.8	J	ug/l	100	18.3	J	ug/l	100
Lead	1	J	ug/l	5	1.4	U	ug/l	5
Magnesium	48.5	U	ug/l	5000	48.5	U	ug/l	5000
Manganese	1.6	U	ug/l	15	1.6	U	ug/l	15
Mercury	.16	U	ug/l	.2	.26	J	ug/l	.2
Nickel	22.4	J	ug/l	40	10.7	U	ug/l	40
Potassium	602	UJ	ug/l	5000	602	U	ug/l	5000
Selenium	1.9	U	ug/l	5	2.1	U	ug/l	5
Silver	1.5	UJ	ug/l	10	1.5	J	ug/l	10
Sodium	897	J	ug/l	5000	759	J	ug/l	5000
Thallium	2.1	U	ug/l	10	1.6	U	ug/l	10
Vanadium	1.3	UJ	ug/l	50	1.3	U	ug/l	50
Zinc	8.1	J	ug/l	20	8	J	ug/l	20
Cyanide	2.2	U	ug/l	10	2.2	U	ug/l	10

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"'= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

A-2

VOLATILE ORGANIC COMPOUNDS

TCL-VOCs

Lab Sample ID	ABB-ES Sample ID
33711003	WHF-2A-STA01-SW01
33711005	WHF-2A-STA02-SW01
33711001	WHF-2A-STA03-SW01
22243007	WHF-2A-STA04-SW01
33710001	WHF-2A-STA05-SW01
33710002	WHF-2A-STA05-SW01A
22243001	WHF-2A-STA06-SW01
22225009	WHF-2A-STA07-SW01
22225003	WHF-2A-STA08-SW01
22225001	WHF-2A-STA09-SW01
22211001	WHF-2A-STA10-SW01
22212003	WHF-2A-STA10-SW01A
22212001	WHF-2A-STA11-SW01
22243004	WHF-2A-STA12-SW01

TCL-VOCs

Lab Sample ID	ABB-ES Sample ID
33711004	WHF-2A-STA01-SD01
33711006	WHF-2A-STA02-SD01
33711002	WHF-2A-STA03-SD01
22430008	WHF-2A-STA04-SD01
33710003	WHF-2A-STA05-SD01
33710004	WHF-2A-STA05-SD01A
22243002	WHF-2A-STA06-SD01
22225008	WHF-2A-STA07-SD01
22225005	WHF-2A-STA08-SD01
22225002	WHF-2A-STA09-SD01
22211003	WHF-2A-STA10-SD01
22212005	WHF-2A-STA10-SD01A
22212002	WHF-2A-STA11-SD01
22243005	WHF-2A-STA12-SD01

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - VOLATILE ORGANIC COMPOUNDS

Lab Sample Number:	33711003				33711005				33711001				22243007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1SW01				2SW01				3SW01				99-04-SW			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	6	UJ	ug/l	5	6	UJ	ug/l	5	6	UJ	ug/l	5	5	UJ	ug/l	5
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	20	UJ	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	1	J	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5		ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
2-Butanone	10	R	ug/l	10	10	R	ug/l	10	10	R	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	3	J	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	R	ug/l	10
Tetrachloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
1,1,2,2-Tetrachloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - VOLATILE ORGANIC COMPOUNDS

Lab Sample Number:	33710001				33710002				33710M01				33710D01			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5SW01				5SW01A				5SW01_MS				5SW01_MSD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	5	UJ	ug/l	5	5	UJ	ug/l	5	6		ug/l	5	6		ug/l	5
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	8	J	ug/l	10	8	J	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
2-Butanone	10	R	ug/l	10	10	R	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1,2,2-Tetrachloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - VOLATILE ORGANIC COMPOUNDS

Lab Sample Number:	22243001				22243004				22225009				22225003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SW				99-12-SW				99-07-SW				99-08-SW			
Collect Date:	15-JUL-92				15-JUL-92				16-JUL-92				16-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	19	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Acetone	21	UJ	ug/l	10	13	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	1	J	ug/l	5	1	J	ug/l	5	5	U	ug/l	5	1	J	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	R	ug/l	10	10	R	ug/l	10	10	R	ug/l	10	10	U	ug/l	10
Tetrachloroethene	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1,2,2-Tetrachloroethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - VOLATILE ORGANIC COMPOUNDS

Lab Sample Number:	22225001				22211001				22212003				22211M01			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SW				99-10-SW				99-10-SWA				99-10-SWMS			
Collect Date:	16-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	19	UJ	ug/l	5	29	UJ	ug/l	5	5	UJ	ug/l	5	28		ug/l	5
Acetone	24	UJ	ug/l	10	30	UJ	ug/l	10	10	U	ug/l	10	27		ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	1	J	ug/l	5	1	J	ug/l	5	5	U	ug/l	5
Dibromochloromethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1,2,2-Tetrachloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - VOLATILE ORGANIC COMPOUNDS

Lab Sample Number:	22211D01				22212001			
Site	WHITING				WHITING			
Locator	99-10-SWMSD				99-11-SW			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW								
Chloromethane	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	28		ug/l	5	5	U	ug/l	5
Acetone	28		ug/l	10	10	UJ	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5
2-Butanone	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	UJ	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	2	J	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	UJ	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	U	ug/l	5	5	UJ	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	U	ug/l	10
Tetrachloroethene	5	U	ug/l	5	5	U	ug/l	5
1,1,2,2-Tetrachloroethane	5	U	ug/l	5	5	U	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	33711004				33711006				33711002				22243008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1SD01				2SD01				3SD01				99-04-SD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	U	ug/kg	59
Bromomethane	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	UJ	ug/kg	59
Vinyl chloride	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	U	ug/kg	59
Chloroethane	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	U	ug/kg	59
Methylene chloride	18	UJ	ug/kg	6	17	UJ	ug/kg	7	13	UJ	ug/kg	6	38	UJ	ug/kg	29
Acetone	12	UJ	ug/kg	12	14	UJ	ug/kg	13	12	U	ug/kg	12	210	J	ug/kg	59
Carbon disulfide	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
1,1-Dichloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
1,1-Dichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
1,2-Dichloroethene (total)	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	13	J	ug/kg	29
Chloroform	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
1,2-Dichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
2-Butanone	12	UJ	ug/kg	12	13	UJ	ug/kg	13	12	UJ	ug/kg	12	59	U	ug/kg	59
1,1,1-Trichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
Carbon tetrachloride	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
Vinyl acetate	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	U	ug/kg	59
Bromodichloromethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
1,2-Dichloropropane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
cis-1,3-Dichloropropene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Trichloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Dibromochloromethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
1,1,2-Trichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
Benzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
trans-1,3-Dichloropropene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Bromoform	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
2-Hexanone	12	UJ	ug/kg	12	13	UJ	ug/kg	13	12	UJ	ug/kg	12	59	U	ug/kg	59
4-Methyl-2-pentanone	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12	59	U	ug/kg	59
Tetrachloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	UJ	ug/kg	29
Toluene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Chlorobenzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Ethylbenzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Styrene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29
Xylenes (total)	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	29	U	ug/kg	29

U = NOT DETECTED J= ESTIMATED VALUE
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R RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	33710003				33710004				33710M03				33710D03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5SD01				5SD01A				5SD01_MS				5SD01_MSD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Bromomethane	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Vinyl chloride	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Chloroethane	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Methylene chloride	15	UJ	ug/kg	6	18	UJ	ug/kg	7	12		ug/kg	6	11		ug/kg	6
Acetone	10	UJ	ug/kg	13	10	UJ	ug/kg	14	4	J	ug/kg	13	3	J	ug/kg	13
Carbon disulfide	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Chloroform	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
2-Butanone	13	UJ	ug/kg	13	14	UJ	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
1,1,1-Trichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Carbon tetrachloride	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Vinyl acetate	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Bromodichloromethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Dibromochloromethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2-Trichloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Bromoform	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
2-Hexanone	13	UJ	ug/kg	13	14	UJ	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
4-Methyl-2-pentanone	13	U	ug/kg	13	14	U	ug/kg	14	13	U	ug/kg	13	13	U	ug/kg	13
Tetrachloroethene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6
Xylenes (total)	6	U	ug/kg	6	7	U	ug/kg	7	6	U	ug/kg	6	6	U	ug/kg	6

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R = RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	22243002				22243005				22225008				22225005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SD				99-12-SD				99-07-SD				99-08-SD			
Collect Date:	15-JUL-92				15-JUL-92				16-JUL-92				16-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	U	ug/kg	13
Bromomethane	13	UJ	ug/kg	13	12	UJ	ug/kg	12	19	UJ	ug/kg	19	13	UJ	ug/kg	13
Vinyl chloride	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	U	ug/kg	13
Chloroethane	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	UJ	ug/kg	13
Methylene chloride	14	UJ	ug/kg	6	21	UJ	ug/kg	6	58	J	ug/kg	9	9	UJ	ug/kg	6
Acetone	65	UJ	ug/kg	13	130	J	ug/kg	12	65	UJ	ug/kg	19	120	J	ug/kg	13
Carbon disulfide	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
1,1-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	UJ	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	UJ	ug/kg	6
Chloroform	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
2-Butanone	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	U	ug/kg	13
1,1,1-Trichloroethane	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
Carbon tetrachloride	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
Vinyl acetate	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	UJ	ug/kg	13
Bromodichloromethane	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Dibromochloromethane	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
1,1,2-Trichloroethane	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Bromoform	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
2-Hexanone	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	U	ug/kg	13
4-Methyl-2-pentanone	13	U	ug/kg	13	12	U	ug/kg	12	19	U	ug/kg	19	13	U	ug/kg	13
Tetrachloroethene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	UJ	ug/kg	6	6	UJ	ug/kg	6	9	UJ	ug/kg	9	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	6	U	ug/kg	6	9	U	ug/kg	9	6	U	ug/kg	6
Xylenes (total)	6	U	ug/kg	6	6	U	ug/kg	6	11		ug/kg	9	6	U	ug/kg	6

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	22225002				22211003				22212005				22211M03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SD				99-10-SD				99-10-SDA				99-10-SDMS			
Collect Date:	16-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	16	U	ug/kg	16	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12
Bromomethane	16	UJ	ug/kg	16	12	UJ	ug/kg	12	13	UJ	ug/kg	13	12	U	ug/kg	12
Vinyl chloride	16	U	ug/kg	16	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12
Chloroethane	16	U	ug/kg	16	12	UJ	ug/kg	12	13	UJ	ug/kg	13	12	U	ug/kg	12
Methylene chloride	33	UJ	ug/kg	8	33	UJ	ug/kg	6	37	UJ	ug/kg	6	27		ug/kg	6
Acetone	11	UJ	ug/kg	16	99	UJ	ug/kg	12	120	UJ	ug/kg	13	86		ug/kg	12
Carbon disulfide	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethane	8	U	ug/kg	8	6	UJ	ug/kg	6	6	UJ	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethene (total)	8	U	ug/kg	8	6	UJ	ug/kg	6	6	UJ	ug/kg	6	6	U	ug/kg	6
Chloroform	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethane	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
2-Butanone	16	U	ug/kg	16	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12
1,1,1-Trichloroethane	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Carbon tetrachloride	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Vinyl acetate	16	U	ug/kg	16	12	UJ	ug/kg	12	13	UJ	ug/kg	13	12	U	ug/kg	12
Bromodichloromethane	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloropropane	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
cis-1,3-Dichloropropene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Trichloroethene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Dibromochloromethane	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2-Trichloroethane	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Benzene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
trans-1,3-Dichloropropene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Bromoform	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
2-Hexanone	16	U	ug/kg	16	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12
4-Methyl-2-pentanone	16	U	ug/kg	16	12	U	ug/kg	12	13	U	ug/kg	13	12	U	ug/kg	12
Tetrachloroethene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	8	UJ	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Toluene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Chlorobenzene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Ethylbenzene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Styrene	8	U	ug/kg	8	6	U	ug/kg	6	6	U	ug/kg	6	6	U	ug/kg	6
Xylenes (total)	4	J	ug/kg	8	6	U	ug/kg	6	4	J	ug/kg	6	6	U	ug/kg	6

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R = RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	22211D03				22212002			
Site	WHITING				WHITING			
Locator	99-10-SDMSD				99-11-SD			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW								
Chloromethane	12	U	ug/kg	12	13	U	ug/kg	13
Bromomethane	12	U	ug/kg	12	13	UJ	ug/kg	13
Vinyl chloride	12	U	ug/kg	12	13	U	ug/kg	13
Chloroethane	12	U	ug/kg	12	13	UJ	ug/kg	13
Methylene chloride	12		ug/kg	6	16	UJ	ug/kg	6
Acetone	54		ug/kg	12	82	UJ	ug/kg	13
Carbon disulfide	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	6	U	ug/kg	6
1,1-Dichloroethane	6	U	ug/kg	6	6	UJ	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	6	UJ	ug/kg	6
Chloroform	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6
2-Butanone	12	U	ug/kg	12	13	U	ug/kg	13
1,1,1-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6
Carbon tetrachloride	6	U	ug/kg	6	6	U	ug/kg	6
Vinyl acetate	12	U	ug/kg	12	13	UJ	ug/kg	13
Bromodichloromethane	6	U	ug/kg	6	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	6	U	ug/kg	6
Dibromochloromethane	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6
Bromoform	6	U	ug/kg	6	6	U	ug/kg	6
2-Hexanone	12	U	ug/kg	12	13	U	ug/kg	13
4-Methyl-2-pentanone	12	U	ug/kg	12	13	U	ug/kg	13
Tetrachloroethene	6	U	ug/kg	6	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	6	U	ug/kg	6
Xylenes (total)	6	U	ug/kg	6	6	U	ug/kg	6

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	22243003				22243006				33711K08				22225004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-SWSD-RB02				99-SWSD-RB03				SL_RB-09				99-SW_SD-RB			
Collect Date:	15-JUL-92				15-JUL-92				19-AUG-92				16-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	5	UJ	ug/l	5	5	UJ	ug/l	5	12	UJ	ug/l	5	23	UJ	ug/l	5
Acetone	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	27	UJ	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
2-Butanone	10	U	ug/l	10	10	U	ug/l	10	10	R	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Dibromochloromethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	R	ug/l	10	10	R	ug/l	10	10	U	ug/l	10	10	R	ug/l	10
Tetrachloroethene	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
1,1,2,2-Tetrachloroethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	UJ	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U = NOT DETECTED J= ESTIMATED VALUE
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R = RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	22211002				22212004				22225006				22243009			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	TRIP				TRIPBLANK1				99-SWSD-TB02				99-SWSD-TB03			
Collect Date:	13-JUL-92				13-JUL-92				16-JUL-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW																
Chloromethane	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	1	J	ug/l	5	4	UJ	ug/l	5	3	UJ	ug/l	5	5	UJ	ug/l	5
Acetone	10	UJ	ug/l	10	11	J	ug/l	10	9	UJ	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
2-Butanone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
2-Hexanone	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	R	ug/l	10	10	R	ug/l	10	10	R	ug/l	10	10	R	ug/l	10
Tetrachloroethene	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
1,1,2,2-Tetrachloroethane	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5	5	UJ	ug/l	5
Toluene	5	U	ug/l	5	2	J	ug/l	5	4	J	ug/l	5	4	J	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - VOLATILE ORGANICS

Lab Sample Number:	33711K07				22225007				33711K09			
Site	WHITING				WHITING				WHITING			
Locator	SL_TB-09				99-SW_SD-FB				SL_FB-02			
Collect Date:	19-AUG-92				16-JUL-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 87-SOW												
Chloromethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromomethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Vinyl chloride	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chloroethane	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Methylene chloride	12	UJ	ug/l	5	5	UJ	ug/l	5	7	UJ	ug/l	5
Acetone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Carbon disulfide	5	U	ug/l	5	2	J	ug/l	5	5	U	ug/l	5
1,1-Dichloroethene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,1-Dichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethene (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chloroform	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
2-Butanone	10	R	ug/l	10	10	U	ug/l	10	10	R	ug/l	10
1,1,1-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Carbon tetrachloride	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Vinyl acetate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Bromodichloromethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
1,2-Dichloropropane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
cis-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Trichloroethene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Dibromochloromethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
1,1,2-Trichloroethane	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Benzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
trans-1,3-Dichloropropene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Bromoform	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
2-Hexanone	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
4-Methyl-2-pentanone	10	U	ug/l	10	10	R	ug/l	10	10	U	ug/l	10
Tetrachloroethene	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
1,1,2,2-Tetrachloroethane	5	U	ug/l	5	5	UJ	ug/l	5	5	U	ug/l	5
Toluene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Chlorobenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Ethylbenzene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Styrene	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5
Xylenes (total)	5	U	ug/l	5	5	U	ug/l	5	5	U	ug/l	5

U = NOT DETECTED J= ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R = RESULT IS REJECTED AND UNUSABLE

A-3

SEMIVOLATILE ORGANIC COMPOUNDS

TCL-SVOCs

Lab Sample ID	ABB-ES Sample ID
22562003	WHF-2A-STA01-SW01
22562005	WHF-2A-STA02-SW01
22562001	WHF-2A-STA03-SW01
22243007	WHF-2A-STA04-SW01
22563001	WHF-2A-STA05-SW01
22563002	WHF-2A-STA05-SW01A
22243001	WHF-2A-STA06-SW01
22225009	WHF-2A-STA07-SW01
22225003	WHF-2A-STA08-SW01
22225001	WHF-2A-STA09-SW01
22211001	WHF-2A-STA10-SW01
22212003	WHF-2A-STA10-SW01A
22212001	WHF-2A-STA11-SW01
22243002	WHF-2A-STA12-SW01

TCL-SVOCs

Lab Sample ID	ABB-ES Sample ID
22562004	WHF-2A-STA01-SD01
22562006	WHF-2A-STA02-SD01
22562002	WHF-2A-STA03-SD01
22243008	WHF-2A-STA04-SD01
22563003	WHF-2A-STA05-SD01
22563004	WHF-2A-STA05-SD01A
22243002	WHF-2A-STA06-SD01
22225008	WHF-2A-STA07-SD01
22225005	WHF-2A-STA08-SD01
22225002	WHF-2A-STA09-SD01
22211003	WHF-2A-STA10-SD01
22212005	WHF-2A-STA10-SD01A
22212002	WHF-2A-STA11-SD01
22243005	WHF-2A-STA12-SD01

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22562003				22562003RE				22562005				22562005RE			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SW-01				1-SW-01_RE				2-SW-01				2-SW-01_RE			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
bis(2-Chloroethyl) ether	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,3-Dichlorobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
1,4-Dichlorobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzyl alcohol	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
1,2-Dichlorobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Bis(2-Chloroisopropyl) ether	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
N-Nitroso-di-n-propylamine	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Hexachloroethane	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Nitrobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Isophorone	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzoic acid	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
bis(2-Chloroethoxy) methane	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
1,2,4-Trichlorobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Naphthalene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Chloroaniline	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Hexachlorobutadiene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
2-Methylnaphthalene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Hexachlorocyclopentadiene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
2,4,5-Trichlorophenol	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50
2-Chloronaphthalene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2-Nitroaniline	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
Dimethylphthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Acenaphthylene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2,6-Dinitrotoluene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
3-Nitroaniline	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
Acenaphthene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2,4-Dinitrophenol	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50
4-Nitrophenol	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50
Dibenzofuran	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
2,4-Dinitrotoluene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Diethylphthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Chlorophenyl-phenylether	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Fluorene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Nitroaniline	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50
N-Nitrosodiphenylamine (1)	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
4-Bromophenyl-phenylether	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Hexachlorobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Pentachlorophenol	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50
Phenanthrene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Anthracene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Di-n-butylphthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Fluoranthene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Pyrene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22562003				22562003RE				22562005				22562005RE			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SW-01				1-SW-01_RE				2-SW-01				2-SW-01_RE			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Butylbenzylphthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
3,3'-Dichlorobenzidine	20	UJ	ug/l	20	20	UJ	ug/l	20	20	UJ	ug/l	20	20	UJ	ug/l	20
Benzo (a) anthracene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Chrysene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
bis(2-Ethylhexyl) phthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Di-n-octylphthalate	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (b) fluoranthene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (k) fluoranthene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (a) pyrene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Indeno (1,2,3-cd) pyrene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Dibenz (a,h) anthracene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (g,h,i) perylene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
'''= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
ESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22562001			22243007			22563001			22563002		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	3-SW-01			99-04-SW			5SW-01			5-SW01A		
Collect Date:	19-AUG-92			15-JUL-92			19-AUG-92			19-AUG-92		
	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW												
Phenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Chloroethyl) ether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Chlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,3-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,4-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzyl alcohol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Bis(2-Chloroisopropyl) ether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
N-Nitroso-di-n-propylamine	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachloroethane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Nitrobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Isophorone	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitrophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dimethylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzoic acid	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
bis(2-Chloroethoxy) methane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2,4-Trichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Naphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloroaniline	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobutadiene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloro-3-methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylnaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorocyclopentadiene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4,6-Trichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4,5-Trichlorophenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
2-Chloronaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitroaniline	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Dimethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Acenaphthylene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
3-Nitroaniline	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Acenaphthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
4-Nitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Dibenzofuran	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Diethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chlorophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluorene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Nitroaniline	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
4,6-Dinitro-2-methylphenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
N-Nitrosodiphenylamine (1)	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Bromophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Pentachlorophenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Phenanthrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Anthracene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Di-n-butylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluoranthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22562001				22243007				22563001				22563002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	3-SW-01				99-04-SW				5SW-01				5-SW01A			
Collect Date:	19-AUG-92				15-JUL-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	U	ug/l	20	20	U	ug/l	20	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R [illegible]SULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22563M01			22563D01			22243001			22243004		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	5-SW-01MS			5-SW-01MSD			99-06-SW			99-12-SW		
Collect Date:	19-AUG-92			19-AUG-92			15-JUL-92			15-JUL-92		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
CLP SEMIVOLATILES 87-SOW												
Phenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Chloroethyl) ether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Chlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,3-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,4-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzyl alcohol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2-Dichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Bis(2-Chloroisopropyl) ether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
N-Nitroso-di-n-propylamine	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachloroethane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Nitrobenzene	10 U	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10	10 UJ	ug/l	10
Isophorone	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitrophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dimethylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzoic acid	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
bis(2-Chloroethoxy) methane	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2,4-Trichlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Naphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloroaniline	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobutadiene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloro-3-methylphenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylnaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorocyclopentadiene	10 U	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10	10 UJ	ug/l	10
2,4,6-Trichlorophenol	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4,5-Trichlorophenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
2-Chloronaphthalene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitroaniline	50 U	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
Dimethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Acenaphthylene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
3-Nitroaniline	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Acenaphthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrophenol	50 U	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
4-Nitrophenol	50 U	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
Dibenzofuran	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrotoluene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Diethylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chlorophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluorene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Nitroaniline	50 U	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
N-Nitrosodiphenylamine (1)	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Bromophenyl-phenylether	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobenzene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Pentachlorophenol	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Phenanthrene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Anthracene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Di-n-butylphthalate	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluoranthene	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10	10 U	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22563M01				22563D01				22243001				22243004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5-SW-01MS				5-SW-01MSD				99-06-SW				99-12-SW			
Collect Date:	19-AUG-92				19-AUG-92				15-JUL-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	U	ug/l	20	20	U	ug/l	20	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22225009			22225009RE			22225003			22225003RE		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	99-07-SW			99-07-SW_RE			99-08-SW			99-08-SW_RE		
Collect Date:	14-JUL-92			14-JUL-92			14-JUL-92			14-JUL-92		
	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW												
Phenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
bis(2-Chloroethyl) ether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2-Chlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
1,3-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
1,4-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Benzyl alcohol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
1,2-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2-Methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Bis(2-Chloroisopropyl) ether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
N-Nitroso-di-n-propylamine	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Hexachloroethane	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Nitrobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Isophorone	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2-Nitrophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4-Dimethylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Benzoic acid	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
bis(2-Chloroethoxy) methane	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4-Dichlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
1,2,4-Trichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Naphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Chloroaniline	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Hexachlorobutadiene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Chloro-3-methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2-Methylnaphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Hexachlorocyclopentadiene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4,6-Trichlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4,5-Trichlorophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
2-Chloronaphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2-Nitroaniline	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
Dimethylphthalate	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Acenaphthylene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
3-Nitroaniline	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
Acenaphthene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4-Dinitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
4-Nitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
Dibenzofuran	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
2,4-Dinitrotoluene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Diethylphthalate	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Chlorophenyl-phenylether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Fluorene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Nitroaniline	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
N-Nitrosodiphenylamine (1)	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
4-Bromophenyl-phenylether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Hexachlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Pentachlorophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 UJ	ug/l	50
Phenanthrene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Anthracene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Di-n-butylphthalate	16	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10
Fluoranthene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 UJ	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22225009				22225009RE				22225003				22225003RE			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-07-SW				99-07-SW_RE				99-08-SW				99-08-SW_RE			
Collect Date:	14-JUL-92				14-JUL-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	UJ	ug/l	20	20	U	ug/l	20	20	UJ	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Chrysene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22225001			22225001RE			22211001			22212003		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	99-09-SW			99-09-SW_RE			99-10-SW			99-10-SWA		
Collect Date:	14-JUL-92			14-JUL-92			13-JUL-92			13-JUL-92		
	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL	VALUE QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW												
Phenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
bis(2-Chloroethyl) ether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Chlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,3-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,4-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzyl alcohol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2-Dichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Bis(2-Chloroisopropyl) ether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
N-Nitroso-di-n-propylamine	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachloroethane	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Nitrobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Isophorone	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitrophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dimethylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Benzoic acid	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
bis(2-Chloroethoxy) methane	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dichlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
1,2,4-Trichlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Naphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloroaniline	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobutadiene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chloro-3-methylphenol	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Methylnaphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorocyclopentadiene	10 U	ug/l	10	10 UJ	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10
2,4,6-Trichlorophenol	10 U	ug/l	10	10 UJ	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10
2,4,5-Trichlorophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50
2-Chloronaphthalene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2-Nitroaniline	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Dimethylphthalate	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Acenaphthylene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,6-Dinitrotoluene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
3-Nitroaniline	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50
Acenaphthene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50
4-Nitrophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50
Dibenzofuran	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
2,4-Dinitrotoluene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Diethylphthalate	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Chlorophenyl-phenylether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluorene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Nitroaniline	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50	50 UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50 UJ	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
N-Nitrosodiphenylamine (1)	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
4-Bromophenyl-phenylether	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Hexachlorobenzene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Pentachlorophenol	50 U	ug/l	50	50 UJ	ug/l	50	50 U	ug/l	50	50 U	ug/l	50
Phenanthrene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Anthracene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Di-n-butylphthalate	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10
Fluoranthene	10 U	ug/l	10	10 UJ	ug/l	10	10 U	ug/l	10	10 U	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22225001				22225001RE				22211001				22212003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SW				99-09-SW_RE				99-10-SW				99-10-SWA			
Collect Date:	14-JUL-92				14-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	UJ	ug/l	20	20	U	ug/l	20	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Chrysene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22211M01				22211D01				22211D03				22212001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-10-SWMS				99-10-SWMSD				99-10-SWMSD				99-11-SW			
Collect Date:	13-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzyl alcohol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Bis(2-Chloroisopropyl) ether	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzoic acid	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4,5-Trichlorophenol	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
3-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4-Dinitrophenol	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
4-Nitrophenol	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
N-Nitrosodiphenylamine (1)	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Pentachlorophenol	50	U	ug/l	50	50	U	ug/l	50	1900	U	ug/kg	1900	50	U	ug/l	50
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	10	U	ug/l	10	42	J	ug/kg	400	10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED RESULTS - SEMIVOLATILES COMPOUNDS

Lab Sample Number:	22211M01				22211D01				22211D03				22212001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-10-SWMS				99-10-SWMSD				99-10-SWMSD				99-11-SW			
Collect Date:	13-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	U	ug/l	20	800	U	ug/kg	800	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	400	U	ug/kg	400	10	U	ug/l	10

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22562004				22562006				22562002				22243008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SD-01				2-SD-01				3-SD-01				99-04-SD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
bis(2-Chloroethyl) ether	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2-Chlorophenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
1,3-Dichlorobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
1,4-Dichlorobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Benzyl alcohol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
1,2-Dichlorobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2-Methylphenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Bis(2-Chloroisopropyl) ether	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Methylphenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
N-Nitroso-di-n-propylamine	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Hexachloroethane	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Nitrobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	UJ	ug/kg	1900
Isophorone	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2-Nitrophenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,4-Dimethylphenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Benzoic acid	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	U	ug/kg	9400
bis(2-Chloroethoxy) methane	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,4-Dichlorophenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
1,2,4-Trichlorobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Naphthalene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Chloroaniline	420	UJ	ug/kg	420	430	UJ	ug/kg	430	400	UJ	ug/kg	400	1900	U	ug/kg	1900
Hexachlorobutadiene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Chloro-3-methylphenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2-Methylnaphthalene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Hexachlorocyclopentadiene	420	UJ	ug/kg	420	430	UJ	ug/kg	430	400	UJ	ug/kg	400	1900	UJ	ug/kg	1900
2,4,6-Trichlorophenol	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,4,5-Trichlorophenol	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	U	ug/kg	9400
2-Chloronaphthalene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2-Nitroaniline	2000	U	ug/kg	2000	2100	U	ug/kg	2100	2000	U	ug/kg	2000	9400	UJ	ug/kg	9400
Dimethylphthalate	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Acenaphthylene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,6-Dinitrotoluene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
3-Nitroaniline	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	U	ug/kg	9400
Acenaphthene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,4-Dinitrophenol	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	UJ	ug/kg	9400
4-Nitrophenol	2000	U	ug/kg	2000	2100	U	ug/kg	2100	2000	U	ug/kg	2000	9400	UJ	ug/kg	9400
Dibenzofuran	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
2,4-Dinitrotoluene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Diethylphthalate	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Chlorophenyl-phenylether	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Fluorene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Nitroaniline	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	U	ug/kg	9400
4,6-Dinitro-2-methylphenol	2000	UJ	ug/kg	2000	2100	UJ	ug/kg	2100	2000	UJ	ug/kg	2000	9400	U	ug/kg	9400
N-Nitrosodiphenylamine (1)	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
4-Bromophenyl-phenylether	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Hexachlorobenzene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Pentachlorophenol	2000	U	ug/kg	2000	2100	U	ug/kg	2100	2000	U	ug/kg	2000	9400	U	ug/kg	9400
Phenanthrene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Anthracene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Di-n-butylphthalate	420	UJ	ug/kg	420	430	U	ug/kg	430	400	UJ	ug/kg	400	1900	U	ug/kg	1900
Fluoranthene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Pyrene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22562004				22562006				22562002				22243008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SD-01				2-SD-01				3-SD-01				99-04-SD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Butylbenzylphthalate	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
3,3'-Dichlorobenzidine	840	UJ	ug/kg	840	870	UJ	ug/kg	870	810	UJ	ug/kg	810	3900	U	ug/kg	3900
Benzo (a) anthracene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Chrysene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
bis(2-Ethylhexyl) phthalate	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	9300	J	ug/kg	1900
Di-n-octylphthalate	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Benzo (b) fluoranthene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Benzo (k) fluoranthene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Benzo (a) pyrene	420	U	ug/kg	420	430	U	ug/kg	430	400	U	ug/kg	400	1900	U	ug/kg	1900
Indeno (1,2,3-cd) pyrene	420	UJ	ug/kg	420	430	UJ	ug/kg	430	400	UJ	ug/kg	400	1900	U	ug/kg	1900
Dibenz (a,h) anthracene	420	UJ	ug/kg	420	430	UJ	ug/kg	430	400	UJ	ug/kg	400	1900	U	ug/kg	1900
Benzo (g,h,i) perylene	420	UJ	ug/kg	420	430	UJ	ug/kg	430	400	UJ	ug/kg	400	1900	U	ug/kg	1900

U = NOT DETECTED J = ESTIMATED VALUE
'' = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22563003			22563004			22563M03			22563D03		
Site	WHITING			WHITING			WHITING			WHITING		
Locator	5-SD-01			5-SD-01A			5-SD-01MS			5-SD-01MSD		
Collect Date:	19-AUG-92			19-AUG-92			19-AUG-92			19-AUG-92		
	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL	VALUE	QUAL UNITS	DL
CLP SEMIVOLATILES 87-SOW												
Phenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
bis(2-Chloroethyl) ether	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2-Chlorophenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
1,3-Dichlorobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
1,4-Dichlorobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Benzyl alcohol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
1,2-Dichlorobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2-Methylphenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Bis(2-Chloroisopropyl) ether	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Methylphenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
N-Nitroso-di-n-propylamine	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Hexachloroethane	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Nitrobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Isophorone	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2-Nitrophenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4-Dimethylphenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Benzoic acid	2000	UJ ug/kg	2000	2000	UJ ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
bis(2-Chloroethoxy) methane	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4-Dichlorophenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
1,2,4-Trichlorobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Naphthalene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Chloroaniline	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Hexachlorobutadiene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Chloro-3-methylphenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2-Methylnaphthalene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Hexachlorocyclopentadiene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4,6-Trichlorophenol	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4,5-Trichlorophenol	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
2-Chloronaphthalene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2-Nitroaniline	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
Dimethylphthalate	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Acenaphthylene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,6-Dinitrotoluene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
3-Nitroaniline	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
Acenaphthene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4-Dinitrophenol	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
4-Nitrophenol	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
Dibenzofuran	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
2,4-Dinitrotoluene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Diethylphthalate	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Chlorophenyl-phenylether	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Fluorene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Nitroaniline	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
4,6-Dinitro-2-methylphenol	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
N-Nitrosodiphenylamine (1)	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
4-Bromophenyl-phenylether	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Hexachlorobenzene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Pentachlorophenol	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000	2000	U ug/kg	2000
Phenanthrene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Anthracene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420
Di-n-butylphthalate	420	UJ ug/kg	420	420	UJ ug/kg	420	68	J ug/kg	420	97	J ug/kg	420
Fluoranthene	420	U ug/kg	420	420	U ug/kg	420	420	U ug/kg	420	220	J ug/kg	420

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22563003				22563004				22563M03				22563D03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5-SD-01				5-SD-01A				5-SD-01MS				5-SD-01MSD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420
Butylbenzylphthalate	48	J	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420
3,3'-Dichlorobenzidine	840	U	ug/kg	840	840	U	ug/kg	840	840	U	ug/kg	840	840	U	ug/kg	840
Benzo (a) anthracene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	110	J	ug/kg	420
Chrysene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	140	J	ug/kg	420
bis(2-Ethylhexyl) phthalate	110	J	ug/kg	420	120	J	ug/kg	420	97	J	ug/kg	420	120	J	ug/kg	420
Di-n-octylphthalate	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420
Benzo (b) fluoranthene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	100	J	ug/kg	420
Benzo (k) fluoranthene	420	UJ	ug/kg	420	420	UJ	ug/kg	420	420	U	ug/kg	420	150	J	ug/kg	420
Benzo (a) pyrene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	120	J	ug/kg	420
Indeno (1,2,3-cd) pyrene	420	U	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420	83	J	ug/kg	420
Dibenz (a,h) anthracene	420	UJ	ug/kg	420	420	UJ	ug/kg	420	420	U	ug/kg	420	420	U	ug/kg	420
Benzo (g,h,i) perylene	420	UJ	ug/kg	420	420	UJ	ug/kg	420	420	U	ug/kg	420	65	J	ug/kg	420

U = NOT DETECTED J = ESTIMATED VALUE
UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22243002				22243005				22225008				22225005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SD				99-12-SD				99-07-SD				99-08-SD			
Collect Date:	15-JUL-92				15-JUL-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
bis(2-Chloroethyl) ether	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2-Chlorophenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
1,3-Dichlorobenzene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
1,4-Dichlorobenzene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Benzyl alcohol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
1,2-Dichlorobenzene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2-Methylphenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Bis(2-Chloroisopropyl) ether	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Methylphenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
N-Nitroso-di-n-propylamine	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Hexachloroethane	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Nitrobenzene	420	UJ	ug/kg	420	410	UJ	ug/kg	410	800	UJ	ug/kg	800	420	UJ	ug/kg	420
Isophorone	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2-Nitrophenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,4-Dimethylphenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Benzoic acid	2000	U	ug/kg	2000	2000	U	ug/kg	2000	3900	U	ug/kg	3900	2000	U	ug/kg	2000
bis(2-Chloroethoxy) methane	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,4-Dichlorophenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
1,2,4-Trichlorobenzene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Naphthalene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Chloroaniline	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Hexachlorobutadiene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Chloro-3-methylphenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2-Methylnaphthalene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Hexachlorocyclopentadiene	420	UJ	ug/kg	420	410	UJ	ug/kg	410	800	UJ	ug/kg	800	420	UJ	ug/kg	420
2,4,6-Trichlorophenol	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,4,5-Trichlorophenol	2000	U	ug/kg	2000	2000	U	ug/kg	2000	3900	U	ug/kg	3900	2000	U	ug/kg	2000
2-Chloronaphthalene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2-Nitroaniline	2000	UJ	ug/kg	2000	2000	UJ	ug/kg	2000	3900	UJ	ug/kg	3900	2000	UJ	ug/kg	2000
Dimethylphthalate	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Acenaphthylene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,6-Dinitrotoluene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
3-Nitroaniline	2000	U	ug/kg	2000	2000	U	ug/kg	2000	3900	U	ug/kg	3900	2000	U	ug/kg	2000
Acenaphthene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,4-Dinitrophenol	2000	UJ	ug/kg	2000	2000	UJ	ug/kg	2000	3900	UJ	ug/kg	3900	2000	UJ	ug/kg	2000
4-Nitrophenol	2000	UJ	ug/kg	2000	2000	UJ	ug/kg	2000	3900	UJ	ug/kg	3900	2000	UJ	ug/kg	2000
Dibenzofuran	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
2,4-Dinitrotoluene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Diethylphthalate	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Chlorophenyl-phenylether	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Fluorene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Nitroaniline	2000	UJ	ug/kg	2000	2000	UJ	ug/kg	2000	3900	UJ	ug/kg	3900	2000	UJ	ug/kg	2000
4,6-Dinitro-2-methylphenol	2000	U	ug/kg	2000	2000	U	ug/kg	2000	3900	U	ug/kg	3900	2000	U	ug/kg	2000
N-Nitrosodiphenylamine (1)	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
4-Bromophenyl-phenylether	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Hexachlorobenzene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Pentachlorophenol	2000	U	ug/kg	2000	2000	U	ug/kg	2000	3900	U	ug/kg	3900	2000	U	ug/kg	2000
Phenanthrene	420	U	ug/kg	420	410	U	ug/kg	410	330	J	ug/kg	800	420	U	ug/kg	420
Anthracene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Di-n-butylphthalate	420	UJ	ug/kg	420	410	UJ	ug/kg	410	800	UJ	ug/kg	800	420	UJ	ug/kg	420
Fluoranthene	420	U	ug/kg	420	410	U	ug/kg	410	350	J	ug/kg	800	420	U	ug/kg	420

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22243002				22243005				22225008				22225005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SD				99-12-SD				99-07-SD				99-08-SD			
Collect Date:	15-JUL-92				15-JUL-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	420	U	ug/kg	420	410	U	ug/kg	410	400	J	ug/kg	800	420	U	ug/kg	420
Butylbenzylphthalate	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
3,3'-Dichlorobenzidine	840	U	ug/kg	840	820	U	ug/kg	820	1600	U	ug/kg	1600	840	U	ug/kg	840
Benzo (a) anthracene	420	U	ug/kg	420	410	U	ug/kg	410	150	J	ug/kg	800	420	U	ug/kg	420
Chrysene	420	U	ug/kg	420	410	U	ug/kg	410	210	J	ug/kg	800	420	U	ug/kg	420
bis(2-Ethylhexyl) phthalate	64	UJ	ug/kg	420	57	J	ug/kg	410	860		ug/kg	800	420	U	ug/kg	420
Di-n-octylphthalate	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Benzo (b) fluoranthene	420	U	ug/kg	420	410	U	ug/kg	410	220	J	ug/kg	800	420	U	ug/kg	420
Benzo (k) fluoranthene	420	U	ug/kg	420	410	U	ug/kg	410	270	J	ug/kg	800	420	U	ug/kg	420
Benzo (a) pyrene	420	U	ug/kg	420	410	U	ug/kg	410	160	J	ug/kg	800	420	U	ug/kg	420
Indeno (1,2,3-cd) pyrene	420	U	ug/kg	420	410	U	ug/kg	410	85	J	ug/kg	800	420	U	ug/kg	420
Dibenz (a,h) anthracene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420
Benzo (g,h,i) perylene	420	U	ug/kg	420	410	U	ug/kg	410	800	U	ug/kg	800	420	U	ug/kg	420

U = NOT DETECTED J = ESTIMATED VALUE
UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22225002				22211003				22212005				22211M03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SD				99-10-SD				99-10-SDA				99-10-SDMS			
Collect Date:	14-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
bis(2-Chloroethyl) ether	440	U	ug/kg	440	400	U	ug/kg	400	420	UJ	ug/kg	420	400	U	ug/kg	400
2-Chlorophenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
1,3-Dichlorobenzene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
1,4-Dichlorobenzene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzyl alcohol	440	U	ug/kg	440	400	U	ug/kg	400	420	UJ	ug/kg	420	400	U	ug/kg	400
1,2-Dichlorobenzene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2-Methylphenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Bis(2-Chloroisopropyl) ether	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Methylphenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
N-Nitroso-di-n-propylamine	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Hexachloroethane	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Nitrobenzene	440	UJ	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Isophorone	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2-Nitrophenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4-Dimethylphenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzoic acid	2100	U	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
bis(2-Chloroethoxy) methane	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4-Dichlorophenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
1,2,4-Trichlorobenzene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Naphthalene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Chloroaniline	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Hexachlorobutadiene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Chloro-3-methylphenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2-Methylnaphthalene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Hexachlorocyclopentadiene	440	UJ	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4,6-Trichlorophenol	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4,5-Trichlorophenol	2100	U	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
2-Chloronaphthalene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2-Nitroaniline	2100	UJ	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
Dimethylphthalate	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Acenaphthylene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,6-Dinitrotoluene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
3-Nitroaniline	2100	U	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
Acenaphthene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4-Dinitrophenol	2100	UJ	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
4-Nitrophenol	2100	UJ	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
Dibenzofuran	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
2,4-Dinitrotoluene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Diethylphthalate	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Chlorophenyl-phenylether	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Fluorene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Nitroaniline	2100	UJ	ug/kg	2100	1900	UJ	ug/kg	1900	2100	UJ	ug/kg	2100	1900	U	ug/kg	1900
4,6-Dinitro-2-methylphenol	2100	U	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
N-Nitrosodiphenylamine (1)	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
4-Bromophenyl-phenylether	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Hexachlorobenzene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Pentachlorophenol	2100	U	ug/kg	2100	1900	U	ug/kg	1900	2100	U	ug/kg	2100	1900	U	ug/kg	1900
Phenanthrene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Anthracene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Di-n-butylphthalate	440	UJ	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	45	J	ug/kg	400
Fluoranthene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22225002				22211003				22212005				22211M03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SD				99-10-SD				99-10-SDA				99-10-SDMS			
Collect Date:	14-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Butylbenzylphthalate	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
3,3'-Dichlorobenzidine	880	U	ug/kg	880	800	U	ug/kg	800	850	U	ug/kg	850	800	U	ug/kg	800
Benzo (a) anthracene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Chrysene	440	U	ug/kg	440	400	U	ug/kg	400	420	UJ	ug/kg	420	400	U	ug/kg	400
bis(2-Ethylhexyl) phthalate	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Di-n-octylphthalate	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzo (b) fluoranthene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzo (k) fluoranthene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzo (a) pyrene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Indeno (1,2,3-cd) pyrene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Dibenz (a,h) anthracene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400
Benzo (g,h,i) perylene	440	U	ug/kg	440	400	U	ug/kg	400	420	U	ug/kg	420	400	U	ug/kg	400

U = NOT DETECTED J = ESTIMATED VALUE
U.! = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
' RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22212002
Site	WHITING
Locator	99-11-SD
Collect Date:	13-JUL-92

	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW				
Phenol	420	U	ug/kg	420
bis(2-Chloroethyl) ether	420	UJ	ug/kg	420
2-Chlorophenol	420	U	ug/kg	420
1,3-Dichlorobenzene	420	U	ug/kg	420
1,4-Dichlorobenzene	420	U	ug/kg	420
Benzyl alcohol	420	UJ	ug/kg	420
1,2-Dichlorobenzene	420	U	ug/kg	420
2-Methylphenol	420	U	ug/kg	420
Bis(2-Chloroisopropyl) ether	420	U	ug/kg	420
4-Methylphenol	420	U	ug/kg	420
N-Nitroso-di-n-propylamine	420	U	ug/kg	420
Hexachloroethane	420	U	ug/kg	420
Nitrobenzene	420	U	ug/kg	420
Isophorone	420	U	ug/kg	420
2-Nitrophenol	420	U	ug/kg	420
2,4-Dimethylphenol	420	U	ug/kg	420
Benzoic acid	2000	U	ug/kg	2000
bis(2-Chloroethoxy) methane	420	U	ug/kg	420
2,4-Dichlorophenol	420	U	ug/kg	420
1,2,4-Trichlorobenzene	420	U	ug/kg	420
Naphthalene	420	U	ug/kg	420
4-Chloroaniline	420	U	ug/kg	420
Hexachlorobutadiene	420	U	ug/kg	420
4-Chloro-3-methylphenol	420	U	ug/kg	420
2-Methylnaphthalene	420	U	ug/kg	420
Hexachlorocyclopentadiene	420	U	ug/kg	420
2,4,6-Trichlorophenol	420	U	ug/kg	420
2,4,5-Trichlorophenol	2000	U	ug/kg	2000
2-Chloronaphthalene	420	U	ug/kg	420
2-Nitroaniline	2000	U	ug/kg	2000
Dimethylphthalate	420	U	ug/kg	420
Acenaphthylene	420	U	ug/kg	420
2,6-Dinitrotoluene	420	U	ug/kg	420
3-Nitroaniline	2000	U	ug/kg	2000
Acenaphthene	420	U	ug/kg	420
2,4-Dinitrophenol	2000	U	ug/kg	2000
4-Nitrophenol	2000	U	ug/kg	2000
Dibenzofuran	420	U	ug/kg	420
2,4-Dinitrotoluene	420	U	ug/kg	420
Diethylphthalate	420	U	ug/kg	420
4-Chlorophenyl-phenylether	420	U	ug/kg	420
Fluorene	420	U	ug/kg	420
4-Nitroaniline	2000	UJ	ug/kg	2000
4,6-Dinitro-2-methylphenol	2000	U	ug/kg	2000
N-Nitrosodiphenylamine (1)	420	U	ug/kg	420
4-Bromophenyl-phenylether	420	U	ug/kg	420
Hexachlorobenzene	420	U	ug/kg	420
Pentachlorophenol	2000	U	ug/kg	2000
Phenanthrene	420	U	ug/kg	420
Anthracene	420	U	ug/kg	420
Di-n-butylphthalate	420	U	ug/kg	420
Fluoranthene	420	U	ug/kg	420

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22212002
Site	WHITING
Locator	99-11-SD
Collect Date:	13-JUL-92

	VALUE	QUAL	UNITS	DL
Pyrene	420	U	ug/kg	420
Butylbenzylphthalate	420	U	ug/kg	420
3,3'-Dichlorobenzidine	840	U	ug/kg	840
Benzo (a) anthracene	420	U	ug/kg	420
Chrysene	420	UJ	ug/kg	420
bis(2-Ethylhexyl) phthalate	420	U	ug/kg	420
Di-n-octylphthalate	420	U	ug/kg	420
Benzo (b) fluoranthene	420	U	ug/kg	420
Benzo (k) fluoranthene	420	U	ug/kg	420
Benzo (a) pyrene	420	U	ug/kg	420
Indeno (1,2,3-cd) pyrene	420	U	ug/kg	420
Dibenz (a,h) anthracene	420	U	ug/kg	420
Benzo (g,h,i) perylene	420	U	ug/kg	420

U = NOT DETECTED J = ESTIMATED VALUE
UL = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22243003				22243006				22225004RE				22225004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-SWSD-RB02				99-SWSD-RB03				99-SWSD-RBRE				99-SW_SD-RB			
Collect Date:	15-JUL-92				15-JUL-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzyl alcohol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Bis(2-Chloroisopropyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Nitrobenzene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzoic acid	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Hexachlorocyclopentadiene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Nitroaniline	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
3-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4-Dinitrophenol	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
4-Nitrophenol	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Nitroaniline	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
4,6-Dinitro-2-methylphenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50
N-Nitrosodiphenylamine (1)	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Pentachlorophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Di-n-butylphthalate	12		ug/l	10	13		ug/l	10	12	J	ug/l	10	14		ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22243003				22243006				22225004RE				22225004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-SWSD-RB02				99-SWSD-RB03				99-SWSD-RBRE				99-SW_SD-RB			
Collect Date:	15-JUL-92				15-JUL-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	U	ug/l	20	20	UJ	ug/l	20	20	U	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	3	J	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10

U = NOT DETECTED J = ESTIMATED VALUE
U' = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22562007				22562008				22225007RE				22225007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	SUR_SL-RB09				SUR_SL-FB-02				99-SWSD-FBRE				99-SW_SD-FB			
Collect Date:	19-AUG-92				19-AUG-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP SEMIVOLATILES 87-SOW																
Phenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2-Chlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Benzyl alcohol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
1,2-Dichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Bis(2-Chloroisopropyl) ether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Hexachloroethane	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Nitrobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Isophorone	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2-Nitrophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
Benzoic acid	50	UJ	ug/l	50	50	UJ	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
bis(2-Chloroethoxy) methane	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Naphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Chloroaniline	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	U	ug/l	10
2,4,5-Trichlorophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
2-Chloronaphthalene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	R	ug/l	50
Dimethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Acenaphthylene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
3-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	R	ug/l	50
Acenaphthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2,4-Dinitrophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
4-Nitrophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Dibenzofuran	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Diethylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Fluorene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Nitroaniline	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	R	ug/l	50
4,6-Dinitro-2-methylphenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
N-Nitrosodiphenylamine (1)	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Pentachlorophenol	50	U	ug/l	50	50	U	ug/l	50	50	UJ	ug/l	50	50	U	ug/l	50
Phenanthrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Di-n-butylphthalate	10		ug/l	10	12		ug/l	10	10	J	ug/l	10	10	R	ug/l	10
Fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10

CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - SEMIVOLATILES

Lab Sample Number:	22562007				22562008				22225007RE				22225007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	SUR_SL-RB09				SUR_SL-FB-02				99-SWSD-FBRE				99-SW_SD-FB			
Collect Date:	19-AUG-92				19-AUG-92				14-JUL-92				14-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Pyrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
3,3'-Dichlorobenzidine	20	U	ug/l	20	20	U	ug/l	20	20	UJ	ug/l	20	20	R	ug/l	20
Benzo (a) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Chrysene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Di-n-octylphthalate	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Benzo (k) fluoranthene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Indeno (1,2,3-cd) pyrene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Dibenz (a,h) anthracene	10	U	ug/l	10	10	U	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10
Benzo (g,h,i) perylene	10	UJ	ug/l	10	10	UJ	ug/l	10	10	UJ	ug/l	10	10	R	ug/l	10

U = NOT DETECTED J = ESTIMATED VALUE
UJ = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

A-4

PESTICIDES AND PCBs

TCL-PESTICIDES/PCBs

Lab Sample ID	ABB-ES Sample ID
22562003	WHF-2A-STA01-SW01
22562005	WHF-2A-STA02-SW01
22562001	WHF-2A-STA03-SW01
22243007	WHF-2A-STA04-SW01
22563001	WHF-2A-STA05-SW01
22563002	WHF-2A-STA05-SW01A
22243001	WHF-2A-STA06-SW01
22225009	WHF-2A-STA07-SW01
22225003	WHF-2A-STA08-SW01
22225001	WHF-2A-STA09-SW01
22211001	WHF-2A-STA10-SW01
22212003	WHF-2A-STA10-SW01A
22212001	WHF-2A-STA11-SW01
22243004	WHF-2A-STA12-SW01

TCL-PESTICIDES/PCBs

Lab Sample ID	ABB-ES Sample ID
22562004	WHF-2A-STA01-SD01
22562006	WHF-2A-STA02-SD01
22562002	WHF-2A-STA03-SD01
22243008	WHF-2A-STA04-SD01
22563003	WHF-2A-STA05-SD01
22563004	WHF-2A-STA05-SD01A
22243002	WHF-2A-STA06-SD01
22225008	WHF-2A-STA07-SD01
22225005	WHF-2A-STA08-SD01
22225002	WHF-2A-STA09-SD01
22211003	WHF-2A-STA10-SD01
22212005	WHF-2A-STA10-SD01A
22212002	WHF-2A-STA11-SD01
22243002	WHF-2A-STA12-SD01

CHEMICAL ANALYSIS RESULT FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22562003				22562005				22562001				22243007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SW-01				2-SW-01				3-SW-01				99-04-SW			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULT FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22563001				22563002				22563M01				22563D01			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5SW-01				5-SW01A				5-SW-01MS				5-SW-01MSD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
U.I= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
' ESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULT FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22243001				22243004				22225009				22225003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SW				99-12-SW				99-07-SW				99-08-SW			
Collect Date:	15-JUL-92				15-JUL-92				17-JUL-92				17-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
R= RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULT FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22225001				22211001				22212003				22211M01			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SW				99-10-SW				99-10-SWA				99-10-SWMS			
Collect Date:	17-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
U.!= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
ESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULT FOR SURFACE WATER ENVIRONMENTAL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22211D01				22212001			
Site	WHITING				WHITING			
Locator	99-10-SWMSD				99-11-SW			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW								
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1

U= NOT DETECTED J=ESTIMATED VALUE
UJ= REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22562004				22562006				22562002				22243008			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	1-SD-01				2-SD-01				3-SD-01				99-04-SD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				15-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
beta-BHC	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
delta-BHC	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
gamma-BHC (Lindane)	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
Heptachlor	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
Aldrin	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
Heptachlor epoxide	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
Endosulfan I	10	U	ug/kg	10	11	U	ug/kg	11	9.8	U	ug/kg	9.8	230	U	ug/kg	230
Dieldrin	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	87	J	ug/kg	460
4,4'-DDE	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	150	J	ug/kg	460
Endrin	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	460	U	ug/kg	460
Endosulfan II	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	460	U	ug/kg	460
4,4'-DDD	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	66	J	ug/kg	460
Endosulfan sulfate	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	460	U	ug/kg	460
4,4'-DDT	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	460	U	ug/kg	460
Methoxychlor	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Endrin ketone	20	U	ug/kg	20	21	U	ug/kg	21	20	U	ug/kg	20	460	U	ug/kg	460
alpha-Chlordane	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	54	J	ug/kg	2300
gamma-Chlordane	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	53	J	ug/kg	2300
Toxaphene	200	U	ug/kg	200	210	U	ug/kg	210	200	U	ug/kg	200	4600	U	ug/kg	4600
Aroclor-1016	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Aroclor-1221	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Aroclor-1232	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Aroclor-1242	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Aroclor-1248	100	U	ug/kg	100	110	U	ug/kg	110	98	U	ug/kg	98	2300	U	ug/kg	2300
Aroclor-1254	200	U	ug/kg	200	210	U	ug/kg	210	200	U	ug/kg	200	4600	U	ug/kg	4600
Aroclor-1260	200	U	ug/kg	200	210	U	ug/kg	210	200	U	ug/kg	200	450	J	ug/kg	4600

U = NOT DETECTED J = ESTIMATED VALUE
U.I = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22563003				22563004				22563M03				22563D03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	5-SD-01				5-SD-01A				5-SD-01MS				5-SD-01MSD			
Collect Date:	19-AUG-92				19-AUG-92				19-AUG-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
beta-BHC	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
delta-BHC	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
gamma-BHC (Lindane)	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
Heptachlor	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
Aldrin	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
Heptachlor epoxide	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
Endosulfan I	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41	41	U	ug/kg	41
Dieldrin	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
4,4'-DDE	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
Endrin	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
Endosulfan II	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
4,4'-DDD	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
Endosulfan sulfate	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
4,4'-DDT	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
Methoxychlor	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Endrin ketone	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81	81	U	ug/kg	81
alpha-Chlordane	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
gamma-Chlordane	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Toxaphene	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810
Aroclor-1016	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Aroclor-1221	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Aroclor-1232	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Aroclor-1242	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Aroclor-1248	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410	410	U	ug/kg	410
Aroclor-1254	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810
Aroclor-1260	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810	810	U	ug/kg	810

U = NOT DETECTED J = ESTIMATED VALUE
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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22243002				22243005				22225008				22225005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-06-SD				99-12-SD				99-07-SD				99-08-SD			
Collect Date:	15-JUL-92				15-JUL-92				17-JUL-92				17-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
beta-BHC	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
delta-BHC	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
gamma-BHC (Lindane)	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
Heptachlor	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
Aldrin	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
Heptachlor epoxide	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
Endosulfan I	10	U	ug/kg	10	9.9	U	ug/kg	9.9	49	U	ug/kg	49	10	U	ug/kg	10
Dieldrin	20	U	ug/kg	20	20	U	ug/kg	20	8.6	J	ug/kg	98	20	U	ug/kg	20
4,4'-DDE	20	U	ug/kg	20	20	U	ug/kg	20	62	J	ug/kg	98	20	U	ug/kg	20
Endrin	20	U	ug/kg	20	20	U	ug/kg	20	98	U	ug/kg	98	20	U	ug/kg	20
Endosulfan II	20	U	ug/kg	20	20	U	ug/kg	20	98	U	ug/kg	98	20	U	ug/kg	20
4,4'-DDD	20	U	ug/kg	20	20	U	ug/kg	20	35	J	ug/kg	98	20	U	ug/kg	20
Endosulfan sulfate	20	U	ug/kg	20	20	U	ug/kg	20	98	U	ug/kg	98	20	U	ug/kg	20
4,4'-DDT	20	U	ug/kg	20	20	U	ug/kg	20	98	U	ug/kg	98	20	U	ug/kg	20
Methoxychlor	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Endrin ketone	20	U	ug/kg	20	20	U	ug/kg	20	98	U	ug/kg	98	20	U	ug/kg	20
alpha-Chlordane	100	U	ug/kg	100	99	U	ug/kg	99	10	J	ug/kg	490	100	U	ug/kg	100
gamma-Chlordane	100	U	ug/kg	100	99	U	ug/kg	99	12	J	ug/kg	490	100	U	ug/kg	100
Toxaphene	200	U	ug/kg	200	200	U	ug/kg	200	980	U	ug/kg	980	200	U	ug/kg	200
Aroclor-1016	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Aroclor-1221	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Aroclor-1232	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Aroclor-1242	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Aroclor-1248	100	U	ug/kg	100	99	U	ug/kg	99	490	U	ug/kg	490	100	U	ug/kg	100
Aroclor-1254	200	U	ug/kg	200	200	U	ug/kg	200	980	U	ug/kg	980	200	U	ug/kg	200
Aroclor-1260	200	U	ug/kg	200	200	U	ug/kg	200	88	J	ug/kg	980	200	U	ug/kg	200

U = NOT DETECTED J = ESTIMATED VALUE
' ' = REPORTED QUANTITATION LIMIT IS QUALIFIED AS ESTIMATED
RESULT IS REJECTED AND UNUSABLE

CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22225002				22211003				22212005				22211M03			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-09-SD				99-10-SD				99-10-SDA				99-10-SDMS			
Collect Date:	17-JUL-92				13-JUL-92				13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
beta-BHC	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
delta-BHC	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
gamma-BHC (Lindane)	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
Heptachlor	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
Aldrin	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
Heptachlor epoxide	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
Endosulfan I	11	U	ug/kg	11	9.6	U	ug/kg	9.6	9.5	U	ug/kg	9.5	19	U	ug/kg	19
Dieldrin	1.7	J	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
4,4'-DDE	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
Endrin	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
Endosulfan II	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
4,4'-DDD	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
Endosulfan sulfate	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
4,4'-DDT	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
Methoxychlor	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Endrin ketone	21	U	ug/kg	21	19	U	ug/kg	19	19	U	ug/kg	19	39	U	ug/kg	39
alpha-Chlordane	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
gamma-Chlordane	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Toxaphene	210	U	ug/kg	210	190	U	ug/kg	190	190	U	ug/kg	190	390	U	ug/kg	390
Aroclor-1016	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Aroclor-1221	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Aroclor-1232	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Aroclor-1242	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Aroclor-1248	110	U	ug/kg	110	96	U	ug/kg	96	95	U	ug/kg	95	190	U	ug/kg	190
Aroclor-1254	210	U	ug/kg	210	190	U	ug/kg	190	190	U	ug/kg	190	390	U	ug/kg	390
Aroclor-1260	210	U	ug/kg	210	190	U	ug/kg	190	190	U	ug/kg	190	390	U	ug/kg	390

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CHEMICAL ANALYSIS RESULTS FOR SEDIMENTS
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22211D03				22212002			
Site	WHITING				WHITING			
Locator	99-10-SDMSD				99-11-SD			
Collect Date:	13-JUL-92				13-JUL-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW								
alpha-BHC	19	U	ug/kg	19	9.9	U	ug/kg	9.9
beta-BHC	19	U	ug/kg	19	9.9	U	ug/kg	9.9
delta-BHC	19	U	ug/kg	19	9.9	U	ug/kg	9.9
gamma-BHC (Lindane)	19	U	ug/kg	19	9.9	U	ug/kg	9.9
Heptachlor	19	U	ug/kg	19	9.9	U	ug/kg	9.9
Aldrin	19	U	ug/kg	19	9.9	U	ug/kg	9.9
Heptachlor epoxide	19	U	ug/kg	19	9.9	U	ug/kg	9.9
Endosulfan I	19	U	ug/kg	19	9.9	U	ug/kg	9.9
Dieldrin	39	U	ug/kg	39	20	U	ug/kg	20
4,4'-DDE	39	U	ug/kg	39	20	U	ug/kg	20
Endrin	39	U	ug/kg	39	20	U	ug/kg	20
Endosulfan II	39	U	ug/kg	39	20	U	ug/kg	20
4,4'-DDD	39	U	ug/kg	39	20	U	ug/kg	20
Endosulfan sulfate	39	U	ug/kg	39	20	U	ug/kg	20
4,4'-DDT	39	U	ug/kg	39	20	U	ug/kg	20
Methoxychlor	190	U	ug/kg	190	99	U	ug/kg	99
Endrin ketone	39	U	ug/kg	39	20	U	ug/kg	20
alpha-Chlordane	190	U	ug/kg	190	99	U	ug/kg	99
gamma-Chlordane	190	U	ug/kg	190	99	U	ug/kg	99
Toxaphene	390	U	ug/kg	390	200	U	ug/kg	200
Aroclor-1016	190	U	ug/kg	190	99	U	ug/kg	99
Aroclor-1221	190	U	ug/kg	190	99	U	ug/kg	99
Aroclor-1232	190	U	ug/kg	190	99	U	ug/kg	99
Aroclor-1242	190	U	ug/kg	190	99	U	ug/kg	99
Aroclor-1248	190	U	ug/kg	190	99	U	ug/kg	99
Aroclor-1254	390	U	ug/kg	390	200	U	ug/kg	200
Aroclor-1260	390	U	ug/kg	390	200	U	ug/kg	200

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CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22243003				22243006				22225004				22562007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	99-SWSD-RB02				99-SWSD-RB03				99-SW_SD-RB				SUR_SL-RB09			
Collect Date:	15-JUL-92				15-JUL-92				17-JUL-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW																
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1	1	U	ug/l	1

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CHEMICAL ANALYSIS RESULTS FOR FIELD QUALITY CONTROL SAMPLES
WHITING FIELD - VALIDATED DATA - PESTICIDES AND PCBS

Lab Sample Number:	22225007				22562008			
Site	WHITING				WHITING			
Locator	99-SW_SD-FB				SUR_SL-FB-02			
Collect Date:	17-JUL-92				19-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP PESTICIDES/PCBS 87-SOW								
alpha-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
beta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
delta-BHC	.05	U	ug/l	.05	.05	U	ug/l	.05
gamma-BHC (Lindane)	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor	.05	U	ug/l	.05	.05	U	ug/l	.05
Aldrin	.05	U	ug/l	.05	.05	U	ug/l	.05
Heptachlor epoxide	.05	U	ug/l	.05	.05	U	ug/l	.05
Endosulfan I	.05	U	ug/l	.05	.05	U	ug/l	.05
Dieldrin	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDE	.1	U	ug/l	.1	.1	U	ug/l	.1
Endrin	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan II	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDD	.1	U	ug/l	.1	.1	U	ug/l	.1
Endosulfan sulfate	.1	U	ug/l	.1	.1	U	ug/l	.1
4,4'-DDT	.1	U	ug/l	.1	.1	U	ug/l	.1
Methoxychlor	.5	U	ug/l	.5	.5	U	ug/l	.5
Endrin ketone	.1	U	ug/l	.1	.1	U	ug/l	.1
alpha-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5
gamma-Chlordane	.5	U	ug/l	.5	.5	U	ug/l	.5
Toxaphene	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1016	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1221	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1232	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1242	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1248	.5	U	ug/l	.5	.5	U	ug/l	.5
Aroclor-1254	1	U	ug/l	1	1	U	ug/l	1
Aroclor-1260	1	U	ug/l	1	1	U	ug/l	1

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APPENDIX B

SAMPLE DELIVERY GROUPS, LABORATORY SAMPLE IDENTIFICATION NUMBERS AND CCJM VALIDATION CASE NARRATIVES

Analytical data is tracked and classified as follows:

1. Sample Delivery Group (SDG)

2. Analytical Fraction

Inorganic Analysis	(I)
Organic Analysis	(O)
Total Petroleum HydroCarbon	(TPH)
Other	

3. Field Quality Control Samples (FQC)

Field Blank	(FB)
Trip Blank	(TB)
Rinsate Blank	(RB)
Isopropyl Alcohol	(IPA)
Matrix Spike/Matrix Spike Duplicate	(MS/MSD)
Field Duplicate	(FD)

4. Station ID # / Sample ID # : 1, 2, 3, ...

5. Symbols

   X : Applicable Cross Reference

SW/SD CROSS REFERENCE – SITE/SDG/STATION/FOC

	ANALYSIS		SW/SD SAMPLING STATION												FIELD QC SAMPLES				
SDG	I	O	1	2	3	4	5	6	7	8	9	10	11	12	FB	TB	RB	FD	MS/MSD
22211	X	X	X									X				1		10–A	10
22212	X	X										X	X						
22225	X	X							X	X	X				1	2	1		
22243	X	X						X						X		3	2,3	12	
22261	X	X																	
22562	X	X	X	X	X										2	9	9		
33711																			
22563	X	X					X											5–A	5
33710																			

EXPLANATION OF ORGANICS DATA QUALIFIERS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated quantitation limit.

R - Quality Control indicates that data are not usable (i.e. compound may or may not be present). Resampling and re-analysis are necessary to determine the presence or absence of the analyte in the sample.

UJ-B - The compound is considered to be <u>undetected</u> and the value reported is an estimated detection limit because the compound was identified in the laboratory blank as well as in the sample. The value of this reported detection limit (DL) is determined by the amount of the compound found in the sample:

1) the sample value was less than the CRDL: the DL is reported as equal to the CRDL.
2) the sample value was greater than CRDL but less than 5X the amount of the compound found in the laboratory blank (less than 10X for methylene chloride, acetone, 2-butanone, toluene and phthalates): the DL is reported as equal to the reported sample value.
3) the sample value was greater than 5X the laboratory blank value (10X for compounds noted above): see JB qualifier.

J-B - The reported value is an estimated amount. The compound was detected in the blank and the quantity reported in the sample is greater than 5X the amount found in the blank (greater than 10X for above compounds).

J - The associated numerical value is an estimated quantity because the amount detected is below the required detection limits or because quality control criteria were not met. (See qualifiers listed below)

J-C - The value reported was estimated due to instrument calibration problems.

J-H - The value reported was estimated due to holding time violation.

J-S - The value reported was estimated due to surrogate or matrix spike recovery problems.

J-I - The value reported was estimated due to internal standard recovery deficiencies.

J-E - The value reported was estimated due to interference problems.

J-M - Benzo(b) and Benzo(k) Fluoranthene not separated due to matrix.

J-N - Tentative identification of a compound. Resampling and re-analysis would be necessary for verification of identity.

J-A - TIC identified as an aldol condensate.

CCJM
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SILVER SPRING
GRAND RAPIDS
DETROIT
DENVER

CCJM DOCUMENT NO: WFIDS002.RW

INORGANICS DATA VALIDATION REPORT

Case No. 22211 Project NEESA Level D
Site Whiting Field Project Name Whiting Field - RI/FS Phase II A
Contract Laboratory CH2M Hill Client ABB Environmental
Sample Delivery Group (SDG) 22211 Sampling Date(Month/Year) 7/92
Type of Analyses/Special Request TAL Metals and Cyanide

Sample Number	Sample Matrix	T	D	C
WHF-2A-STA10-SD01	Soil	X	-	X
WHF-2A-STA10-SD01Dup	Soil	X	-	X
WHF-2A-STA10-SD01MS	Soil	X	-	X
# of Samples Analyzed:		2	-	2
Total # of Analyses:		6	-	6

Sample Number	Sample Matrix	T	D	C
WHF-2A-STA10-SW01	Water	X	-	X
WHF-2A-STA10-SW01Dup	Water	X	-	X
WHF-2A-STA10-SW01MS	Water	X	-	X

Laboratory QC Samples

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Kathy Wakeman Date 10/26/92
QA Review by Jeralyn Guthrie/Roger Simon Date 10/26/92
CCJM Approval by Richard Cheatham Date 10/26/92

Contractual violations found? Yes ____ No X Not Appl. ____
TPO action requested? Yes ____ No ____ Not Appl. X

Remarks:

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory QC Sample Summary Forms

Note:

-- The EPA Functional Guidelines for Evaluating Inorganics Analyses, 1988 (Data Review SOP) and project specific planning documents have been used by the data reviewer as a basis for reviewing the data and applying qualifiers, unless otherwise noted in review comments.

-- Please see data qualifier and sub-qualifier definitions on the last page. This scheme of qualifiers is intended to help indicate the reasons or problems which cause sample values to be qualified.

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Contract SOW 3/90

Inorganic Data Completeness Checklist

X	Inorganic Cover Page
X	Inorganic analysis data sheets (Form 1)
X	Initial calibration and calibration verification results (Form 2A)
X	Continuing calibration verification (Form 2A)
X	CRDL Analysis (Form 2B)
X	Blank results (Form 3)
X	ICP interference check sample (Form 4)
X	Spike results (Form 5A)
NR	Post-digest spike results (Form 5B)
X	Duplicate results (Form 6)
X	Laboratory Control Sample (LCS) Results (Form 7)
NR	Standard Addition Results (Form 8)
X	Serial Dilution Results (Form 9)
X	Instrument Detection Limits (Form 10)
X	ICP Interelement Correction Factors (Form 11)
X	ICP Linear Ranges (Form 12)
X	Preparation Log (Form 13)
X	Analysis Run Log (Form 14)
X	Raw data for samples
X	Raw data for calibration standards
X	Raw data for blanks
X	Raw data for ICP quality control (ICS and Serial Dilution)
X	Raw data for spikes
X	Raw data for duplicates
X	Raw data for LCS
X	Raw data for graphite furnace AA
X	Raw data for mercury analysis
X	Raw data for cyanide analysis
X	Percent solids calculation - soils only
X	Sample prep/digestion logs
X	Traffic Reports/Chain of Custody and/or tracking records
X	Sample description
X	Case narrative

X = Included in Original Data Package
O = Not Included and/or Not Available
NR = Not required
RS = Provided as Resubmission

I. Deliverables

All deliverables were provided as specified in the statement of work.

Yes __X__ No _____

Comments: No comments.

II. Detection Limits

All results met the contract required detection limits (CRDL).

Yes __X__ No _____

Comments: No comments.

III. Holding Times

All 40CFR136 recommended holding times for water samples, as specified in the Functional Guidelines were met. The water holding times have been applied to soil matrices, if applicable. Holding time is based on date sampled to date of analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

IV. Calibration Quality Control

A. All initial instrument calibrations were performed as specified in the statement of work.

Yes __X__ No _____

Comments: No comments.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed as required and had recoveries within the contract specified control limits.

Yes __X__ No _____

Comments: No comments.

C. The CRDL check standards (concentration = 2xCRDL for ICP and 1xCRDL for GFAA) were run at the contract specified frequency for the required analytes.

Yes __X__ No _____

Comments: No comments.

D. The 2xCRDL check standard for ICP (CRI) exhibited recoveries which indicate that linearity problems are not likely at the lower end of the calibration curve.

Yes _____ No __X__

Comments: For manganese and zinc, the difference between the true value of the CRI standard and the amount found is greater than five times the IDL. This indicates that sample results reported at the low end of the curve (i.e. near the IDL) may be inaccurate. However, since there are no control limits established for the recovery of this standard, no qualifiers have been added by the reviewer.

E. The 1xCRDL check standards for GFAA (CRA) exhibited values which indicate that an adequate response was found at the low end of the calibration curve.

Yes __X__ No _____

Comments: No comments.

V. Blank Quality Control

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed as required and were within the contract specified control limits.

Yes __X__ No _____

Comments:

1. The following is a table of samples, analytes, blank values and qualifiers associated with a contractually **compliant** ICB or CCB standard that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value (µg/L)	Qualifier
WHF-2A-STA10-SW01	Chromium	2.1B µg/L	1.9B	UJ-B
	Arsenic	1.00U µg/L	-1.5B	UJ-K
WHF-2A-STA10-SD01	Cadmium	1.0B mg/kg	4.6B,4.2B	UJ-B

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Cobalt and mercury were found in both the calibration and preparation blanks. Results have been qualified under the preparation blank section to avoid repetition.

B. A preparation blank was prepared and analyzed at the contract specified frequency.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the CRDL.

Yes __X__ No _____

Comments: No comments.

D. The absolute value of results reported for analytes in the preparation blank met the Functional Guidelines specified criterion of less than the instrument detection limit (IDL).

Yes _____ No __X__

Comments:

1. The following is a table of qualifiers, analytes, blank values and samples (with analyte values from the IDL to five times the blank amount) associated with a contractually compliant preparation blank that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value	Qualifier
WHF-2A-STA10-SW01	Beryllium	0.24U µg/L	-0.46B µg/L	UJ-K
	Cobalt	1.6U µg/L	-2.12B µg/L	UJ-K
	Sodium	3030B µg/L	756B µg/L	UJ-B
	Lead	6.0 µg/L	1.45B µg/L	UJ-B
	Mercury	0.17B µg/L	0.172B µg/L	UJ-B
WHF-2A-STA-10-SD01	Calcium	83.5B mg/kg	3.21 mg/kg	UJ-B
	Sodium	193B mg/kg	117B mg/kg	UJ-B
	Vanadium	0.91B mg/kg	-0.26B mg/kg	J-K

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Blank results whose absolute values were greater than the IDL were reported for aluminum, barium, calcium and iron in the water matrix and iron and lead in the soil matrix. However, no sample result qualification has occurred because the associated sample analyte values were greater than five times the blank amount.

4. Cadmium was found in both the calibration and preparation blanks for the soil matrix analyses. Results have been qualified under the calibration blank section to avoid repetition.

E. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Applicable _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks. Data has been qualified by the reviewer due to contaminants reported in these blanks.

Blank Type/ID	Analyte	Amount (µg/L)
Field Blank/99-SW/SD-FB	Aluminum	28.7B
	Barium	0.58B
	Calcium	237B
	Iron	40.8B
	Lead	1.0B
	Nickel	22.4B
	Sodium	897B
	Zinc	8.1B
Equipment Blank/99-SW/SD-RB	Aluminum	57.8B
	Barium	1.1B
	Calcium	272B
	Chromium	2.0B
	Cobalt	2.6B
	Copper	4.8B
	Iron	26.6B
	Lead	2.2B
	Manganese	1.7B
	Sodium	855B
	Zinc	14.4B

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinsate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
WHF-2A-STA10-SW01	Aluminum	114B µg/L	28.7B µg/L	UJ-B
	Calcium	961B µg/L	237B µg/L	UJ-B
	Copper	2.0B µg/L	4.8B µg/L	UJ-B
WHF-2A-STA10-SD01	Barium	0.86 B mg/kg	0.27 B mg/kg	UJ-B
	Chromium	0.62 B mg/kg	0.49 B mg/kg	UJ-B

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
WHF-2A-STA10-SW01 (continued)	copper	2.0 µg/L	4.8 B µg/L	UJ-B
WHF-2A-STA10-SD01	barium	0.86 B mg/kg	0.27 B mg/kg	UJ-B
	chromium	0.62 B mg/kg	0.49 B mg/kg	UJ-B
	copper	1.9 B mg/kg	1.2 B mg/kg	UJ-B
	lead	2.5 mg/kg	0.54 B mg/kg	UJ-B
	manganese	1.5 B mg/kg	0.42 B mg/kg	UJ-B
	zinc	3.9 B mg/kg	3.5 B mg/kg	UJ-B

3. Chromium, lead and sodium were found in the calibration and/or preparation blanks for the water matrix analyses. Results have been qualified under the calibration or preparation blank section to avoid repetition.

4. Calcium and sodium were found in the preparation blank for the soil matrix analyses. Results have been qualified under the preparation blank section to avoid repetition.

VI. Accuracy Statements

A. The matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used as the matrix spike samples.

B. Matrix spike recoveries were within contract specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following is a table of samples, analytes, recoveries and qualifiers associated with spike recoveries outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Recovery	Qualifier
WHF-2A-STA10-SD01	Soil	Lead	152.8	J-S

2. The result associated with the analyte having a high recovery may be biased high.

C. All analysis (post digest) spike requirements were met for the above samples that required "N" flags. This is not required for GFAA analyses.

Yes _____ No _____ Not Applicable __X__

Comments: No comments.

D. The laboratory control sample (LCS) frequency was met.

Yes __X__ No _____

Comments: No comments.

E. LCS recoveries were within contract specified control limits (aqueous = 80-120%, except Ag, Sb, Hg and CN; soil = as established for the specific material).

Yes __X__ No _____

Comments: No comments.

VII. Precision Statement

A. The matrix (pre-digest) duplicate frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used for duplicate sample analysis.

B. Matrix (pre-digest) duplicate differences were within contract specified control limits (±20 RPD or ± CRDL for results less than five times the CRDL).

Yes _____ No __X__

Comments:

1. The following is a table of samples, analytes, differences and qualifiers associated with duplicate control limits that are exceeded as specified in the Functional Guidelines (RPD ± 20% or ± CRDL for waters, RPD ± 35% or ± 2xCRDL for soils).

Samples Affected	Matrix	Analyte	Control Limit	Difference or RPD	Qualifier
WHF-2A-STA10-SD01	Soil	Copper	35%	139.4%	J-D

2. The laboratory has correctly flagged aluminum results associated with the duplicate analysis of sample WHF-2A-STA10-SD01 with a "*". However, for this sample, the duplicate difference(s) for the above analyte(s) were within the ± 35% or ± 2xCRDL control limits allowed by data validation for soil samples. The associated sample results were, therefore, not qualified by the data reviewer.

C. This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VIII. ICP Quality Control

A. Serial dilution frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used for serial dilution analysis.

B. Differences for the serial dilution were within contract specified control limits (10% difference).

Yes _____ No __X__

Comments: The following is a table of samples, analytes, differences and qualifiers associated with a serial dilution result outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Difference	Qualifier
WHF-2A-STA10-SW01	Water	Calcium	37.8	J-I
		Iron	26.4	J-I
		Sodium	92.9	J-I
WHF-2A-STA10-SD01	Soil	Aluminum	13.0	J-I

C. The interference check sample (ICS) was run at the required frequency for all required ICS analytes.

Yes __X__ No _____

Comments: No comments.

D. ICS percent recovery results were within contract specified control limits.

Yes __X__ No _____

Comments: No comments.

E. Results for ICP analytes not required to be present in a given ICS standard were within acceptable limits.

Yes _____ No __X__

Comments: For antimony, barium, cadmium, cobalt, copper, nickel and vanadium, the values reported indicate that interference correction factors may not have been properly established and/or applied. These analytes were reviewed individually in each sample to determine any potential interferent affects. Since potential interferent analyte concentrations in samples were below action levels for qualification on the basis of ICP interferences, no qualifiers have been applied by the reviewer.

IX. Graphite Furnace (GFAA) Quality Control

A. Duplicate injections were performed where required for all GFAA analyses and had RSD's (or CV's) of less than 20% where results were above the CRDL.

Yes __X__ No _____

Comments: No comments.

B. Analysis (post-digest) spikes for GFAA were performed on all required samples and at the concentration required.

Yes __X__ No _____

Comments: No comments.

C. Sample dilution and re-spiking was performed on all samples with an initial spike recovery of less than 40%.

Yes _____ No _____ Not Applicable __X__

Comments: All recoveries were greater than 40%.

D. The post-digestion (analysis) spike recoveries were all within the 85-115% control limits for those GFAA analysis sample results that were less than 50% of the post digest spike amount (absorbance).

Yes _____ No __X__ Not Applicable _____

Comments: The following table is a listing of laboratory QC samples (e.g., prep blank, LCS, duplicate) that had analysis spike recoveries that were not within 85-115%. No data qualifiers are required due to these deficiencies.

Sample Number	Analyte	Percent Recovery
LCSS	Selenium	79.2/73.3

E. MSA was performed when required for GFAA analysis and followed the criteria specified in Exhibit E of the Statement of Work.

Yes _____ No _____ Not Applicable __X__

Comments: No MSA analyses were required.

X. Calculations and Transcription

A. Correct contract/method calculations were performed.

Yes __X__ No _____

Comments: No comments.

B. Raw data was transcribed accurately to sample and QC summary sheets.

Yes _____ No __X__

Comments: The following is a table of transcription/calculation discrepancies noted by the reviewer during the routine data validation process. Copies of the raw data pages showing reviewer found results have been included in Attachment I.

Sample	Summary Form	Analyte	Laboratory reported	Reviewer found
Preparation Blank Solid	3	Cadmium	0.548U mg/kg	0.54B mg/kg
WHF-2A-STA10-SW01	13	Cyanide	prep date 7/29/92	prep date 7/21/92
WHF-2A-STA10-SD01	13	Cyanide	prep date 7/24/92	prep date 7/22/92

XI. System Performance

The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance throughout this case.

Yes __X__ No _____

Comments: The instrument detection limits (IDL's) utilized by the laboratory are very low for a number of analytes. In a number of instances the levels tend to be lower than normal background levels or baseline noise. Evidence for this is seen in the number of qualifiers resulting from blanks (i.e. calibration, preparation, field and rinsate blanks).

XII. Contract Requirements

All contract requirements were met by the laboratory in the preparation and analysis of the samples in the package.

Yes __X__ No _____

Comments: No comments.

XIII. Additional Comments

A. Unassociated and unused data are not marked as such by the laboratory.

B. The Analysis Run Logs (Form 14's) did not show the initial instrument calibration standards as required by SOW 3/90.

C. The summary form for the ICP Interference Check Sample (Form 4) for the ICP analysis dated 8/11/92 was not found in the data package. Since the only sample associated with that analytical run was the aqueous Laboratory Control Sample (LCS), no action was taken by the reviewer.

D. The reviewer found that the percent solids results used for cyanide quantitation in the soil sample was 83.43% as opposed to the solids value of 81.67% which was found in the raw data. Since the value of cyanide in the sample was undetected no action was taken by the reviewer. The appropriate sample result should have been 0.28 U mg/kg instead of 0.27 U mg/kg.

Definition of Qualifiers
(Used by Data Reviewer)

The following qualifiers are specified for use by the Functional Guidelines for Inorganic Data Validation.

(R) = Rejected - Data are unusable (Note: Analyte may or may not be present).

(UJ) = Undetected, but the number that is reported as the quantitation limit is an estimated value

(J) = Estimated value

The following subqualifiers give further detail of the type and amount of qualification a given data point has received.

-H = Qualified due to holding time violation

-I = Qualified due to interference problems (ICP serial dilution or ICS, or poor analytical spike recovery by graphite furnace)

-D = Qualified due to duplicate control limits being exceeded

-S = Qualified due to matrix spike recoveries outside control limits

-C = Qualified due to instrument calibration problems

-L = Qualified due to LCS recoveries outside control limits

-B = Qualified due to blank contamination problems

-K = Qualified due to negative blank value problems

-Q = Qualified for other reasons - refer to the text of the report

Example: The percent recovery of the Aluminum matrix spike was only 65%. Undetected values (e.g., Al = <u>200u</u>) will be flagged as follows:

Al = <u>200u</u> (UJ-S)

meaning the number being reported at the detection limit (200u) is estimated (UJ) due to spike recovery problems (-S).

Reported positive Aluminum values (e.g., Al = <u>250</u>) will be flagged as follows:

Al = <u>250</u> (J-S)

meaning the reported positive result (250) is estimated (J) due to spike recovery problems (-S).

CCJM

ENVIRONMENTAL ENGINEERS & SCIENTISTS

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CCJM DOCUMENT NO: WFODS003.RVW

ORGANICS DATA VALIDATION REPORT

Case No. 22211
Site Whiting Field
Contract Laboratory CH2M Hill
Sample Delivery Group (SDG) NA
Type of Analyses/Special Request Volatiles, Semivolatiles, Pesticide/PCB

Project NEESA Level D
Project Name
Client ABB
Sampling Date(Month/Year) 7/92

Client Sample Number	Lab Sample Number	Sample Matrix	V	B	P
WHF-2A-STA10-SW01	99-10-SW	Water	X	X	X
WHF-2A-STA10-SD01	99-10-SD	Soil	X	X	X
TRIP BLANK 1	TRIP	Water	X	-	-

Sample Number	Sample Matrix	V	B	P

Laboratory QC Samples

WHF-2A-STA10-SW01MS	99-10-SWMS	Water	X	X	X
WHF-2A-STA10-SW01MSD	99-10-SWMSD	Water	X	X	X
WHF-2A-STA10-SD01MS	99-10-SDMS	Soil	X	X	X
WHF-2A-STA10-SD01MSD	99-10-SDMSD	Soil	X	X	X
# of Samples Analyzed:			3	2	2
Total # of Analyses:			7	6	6

V = CLP Volatiles B = CLP Semiviolatiles P = CLP Pesticide/PCB's
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Vernon Yost Date 10/26/92
QA Review by Jeralyn Guthrie Date 10/26/92
CCJM Approval by Richard Cheatham Date 10/26/92

Contractual violations found? Yes X No ____ Not Appl. ____
TPO action requested? Yes ____ No X Not Appl. ____

Remarks:

Attachments:

I. Data Validator Worksheets
II. Laboratory Case Narratives, Telephone Logs and Correspondence
III. Qualified Sample Results (Form 1's)
IV. Laboratory Matrix QC Sample Summary Forms

Note:

-- The EPA Functional Guidelines for Evaluating Organics Analyses, 1988 - (Data Review SOP) and project specific planning documents have been used by the data reviewer as a basis for reviewing the data and applying qualifiers, except as specifically noted in review comments.

-- Please see data qualifier and sub-qualifier definitions on the last page. This scheme of qualifiers is intended to help indicate the reasons or problems which cause sample data values to be qualified.

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DATA COMPLETENESS CHECKLIST

Applicable SOW 2/88

Quality Control Summary Package

	VOA	BNA	P/PCB
Case Narrative	X	X	X
Surrogate Recovery Summary (Form II)	X	X	X
MS/MSD Summary (Form III)	X	X	X
Reagent Blank Summary (Form IV)	X	X	X
GC/MS Tuning and Mass Calibration (Form V)	X	X	
Internal Standard Area Summary (Form VIII)	X	X	

Sample Data Package

Holding Times (Traffic Reports, Custody and/or shipping records)	X	X	X
Organic Analysis Data Sheets (Form I) all pages for each sample, arranged in increasing sample number order	X	X	X
Reconstructed Ion Chromatogram(s) (RIC)	X	X	
GC/EC Chromatograms			X
Quantitation Reports	X	X	X
Mass Spectral Data	X	X	
EPA/NIH Mass Spectral Library Search for TIC's	X	X	

Standards Data Package

Current List of Laboratory/Instrumental Detection Limits	NR	NR	
Initial Calibration Data (Form VI) for each instrument	X	X	
Continuing Calibration Data (Form VII) for each instrument	X	X	
Pesticide Evaluation Standards Summary (Form VIII)			X
Pesticide/PCB Standards Summary (Form IX)			X
Pesticide/PCB Identification (Form X) if any positive results			X
VOA and BNA Standards Reconstructed Ion Chromatograms (RIC)	X	X	
VOA and BNA Standards Quantitation Reports	X	X	
Pesticide/PCB Standard Chromatograms and Data System Printouts			X

Raw QC Data Package

DFTPP and BFB mass spectra and mass listings	X	X	
Reagent Blank Data			
Organic Analysis Data Sheets (Form I)	X	X	X
Reconstructed Ion Chromatograms (RIC)	X	X	
Quantitation Reports	X	X	X
Mass Spectral Data	X	X	
EPA/NIH Library Search of TIC's	X	X	
GC/EC Chromatograms and Data System Printouts			X

Matrix Spike and Matrix Spike Duplicate Data			
Organic Analysis Data Sheets (Form I)	X	X	X
Reconstructed Ion Chromatograms (RIC)	X	X	
Quantitation Reports	X	X	X
GC/EC Chromatograms and Data System Printouts			X

X = Included in Data Package O = Not Included and/or Not Available
NR = Not Required RS = Provided as Resubmission

I. Holding Times

Samples were extracted and analyzed within holding times specified by the Functional Guidelines for water. For soils the holding times recommended by SW846, 3rd Edition (Table 4-1) have been used as guidance. See the following table for a summarization of sample holding times.

Yes __X__ No _____

Comments: No comments.

Holding Time Summary

Sample Number	Sampling Date	VTSR	VOA Analysis	BNA Extract	BNA Analysis	Pesticide/PCB Extract	Pesticide/PCB Analysis
99-10-SD	7/13/92	7/14	7/22	7/15	7/21	7/15	7/28
99-10-SDMS	7/13/92	7/14	7/22	7/15	7/21	7/15	7/28
99-10-SDMSD	7/13/92	7/14	7/22	7/15	7/21	7/15	7/28
99-10-SW	7/13/92	7/14	7/21	7/14	7/21	7/17	7/28
99-10-SWMS	7/13/92	7/14	7/21	7/14	7/21	7/17	7/28
99-10-SWMSD	7/13/92	7/14	7/21	7/14	7/21	7/17	7/28
TRIP	7/13/92	7/14	7/27	NA	NA	NA	NA

II. GC/MS Tuning and Mass Calibration

A. The DFTPP performance results were all included and found to be within specified criteria.

Yes __X__ No _____

Comments: No comments.

B. The BFB performance results were all included and found to be within specified criteria.

Yes __X__ No _____

Comments: No comments.

III. A. Instrument Calibration (VOA and SV)

1. The instrument response factor (RRF) data were reviewed for the initial and continuing calibrations. All appropriate information was present in the package and all response factors met the required criteria for volatile and semivolatile analyses.

   Yes __x__ No _____

   Comments: The compliant RRF values found to be outside of data validation specifications and a listing of qualifiers added to sample results on Form 1's are summarized on the attached Table 1.

2. The percent relative standard deviation (%RSD) data for the initial calibrations and the percent difference (%D) data for the continuing calibrations were reviewed and all required information was provided.

   Yes __X__ No ____

   Comments: No comments.

3. All %RSD and %D values met the SOW specified criteria for volatile and semivolatile analyses.

   Yes __X__ No _____

   Comments:

   a. The compliant %RSD and %D values found to be outside of data validation specifications and a listing of qualifiers added to sample results on Form 1's are summarized on the attached Table 1.

   b. The 50 µg/L RRF for bis(2-Chloroisopropyl)ether in the initial calibration of semivolatile instrument 4000 was incorrectly reported on Form 6, resulting in a %RSD of greater than 30% for this compound. The reviewer recalculated the RRF and %RSD from the raw data and found the %RSD to be within data validation specifications. The correct RRF for this compound was reported on the continuing calibration form 7B. No qualifiers were applied to the sample data on this basis.

B. Instrument Calibration (Pesticide/PCB)

1. All linearity check criteria were met with a %RSD value less than 10% for all quantitation column calibrations.

   Yes __X__ No _____

   Comments: No comments.

2. The breakdown of 4,4'-DDT and endrin was less than 20% for all evaluation B analyses.

   Yes __X__ No _____

   Comments: No comments.

3. The pesticide standard compounds showed a %D of the calibration factor of no more than 15% for quantitation and 20% for confirmation runs for all compounds identified.

   Yes __X__ No _____

   Comments: The laboratory performed single column analyses only since no positive results for pesticides/aroclors were detected in the samples or method blanks.

4. The retention time of 4,4'-DDT was greater than 12 minutes for packed columns (except OV-101).

   Yes _____ No _____ Not Applicable __X__

   Comments: No comments.

5. The retention time for the surrogate (DBC) was within criteria for every sample.

   Yes __X__ No _____

   Comments: No comments.

IV. Blanks

A. Method Blank - The blank analyses were reviewed. The frequency of method blank extractions and analyses and the contaminants found in blank samples were all within specified limits.

Yes __X__ No _____

Comments: Contaminant quantities found in contract compliant laboratory preparation blanks and a listing of qualifiers added to sample results on Form 1's are summarized on the attached Table 1.

B. Trip Blank - The associated trip/travel blank contained contaminants which affected samples in the package.

Yes __X__ No _____ None Identified _____

Comments: The following table lists the contaminated trip blanks found in the data package and the contaminant quantities reported. The associated samples found in the package, which have been qualified due to contamination potentially having occurred during handling and/or storage, are also shown.

Blank ID	Analyte	Amount (ug/L)	Associated Samples
TRIP	Methylene Chloride	1.0	99-10-SD, 99-10-SW

C. Other Blanks - The following table lists other blanks indicated by the client as being associated with samples in this data package. Sample data has been qualified by the reviewer based on the results of the rinsate blanks; however, no additional qualifiers were required due to the field blank. These blanks were validated and reported with data package #22225.

Blank ID/Type	Analyte	Amount (µg/L)
99-SW SD-RB/Rinsate	Methylene Chloride	23
	Acetone	27
	Di-n-bytylphthalate	14
99-SW SD-FB/Field	Methylene Chloride	3
	Acetone	10

V. Surrogate Recovery

The surrogate recoveries were reviewed. The recoveries were all within specified QC criteria.

Yes _____ No __X__

Comments:

A. Samples found to have surrogate recoveries outside specified criteria are summarized on Tables 1 and 2. Data qualifiers, when necessary, are indicated on Table 2.

B. The laboratory used inappropriate concentrations for the surrogate in volatile initial calibrations. Rather than adding surrogates at concentrations of 20, 50, 100, 150 and 200 µg/L as specified in SOW 2/88, the surrogates were added at 50 µg/L for all calibration levels. This deviation is considered to be non-compliant; however, no qualifiers were added to the sample data on this basis.

VI. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The matrix spike and matrix spike duplicate recovery data were reviewed. The spikes were performed and met all recommended QC specifications.

Yes _____ No __X__

Comments:

A. Sample number 99-10-SD was used for the soil MS/MSD. Sample number 99-10-SW was used for the water MS/MSD.

B. The following compounds, indicated by an asterisk (*), were found to be outside SOW 2/88 control limits:

Sample	Compound	Rec. % MS/MSD	RPD	Control Limits Rec. %/RPD
99-10-SW	Benzene	74*/79	7	76-127/11
	Toluene	72*/80	11	76-125/13
	Phenol	27/16	51*	12-110/42
	2-Chlorophenol	54/34	45*	27-123/40
	1,4-Dichlorobenzene	40/27*	39*	36-97/28
	N-Nitroso-di-n-propylamine	61/41	39*	41-116/38
	1,2,4-Trichlorobenzene	38*/26*	38*	39-98/28
	Acenaphthene	49/35*	33*	46-118/31

No qualifiers were added to the sample data on the basis of MS/MSD recoveries or RPD values outside control limits.

VII. Field Duplicate Results

This package contained a field duplicate sample.

Yes _____ No __X__ Not identified _____

Comments: No comments.

VIII. Internal Standard (IS) Performance

The internal standard results were reviewed for consistency in response (area counts) and retention time. All sample internal standards showed adequate performance and consistency.

Yes __X__ No _____

Comments: No comments.

IX. TCL Compound Identification

Positive results were evaluated to determine that all criteria were met in identifying TCL compounds from the sample data. In all cases, the reported compounds matched the retention time and, when applicable, the mass spectral profile.

Yes __X__ No _____

Comments: No comments.

X. Compound Quantitation and Reported Detection Limit

Quantitative results and reported detection limits were reviewed and were determined to be accurate except as noted in this report that data has been qualified.

Yes __X__ No _____

Comments: The reviewer found that the sample weight for 99-10-SD was reported incorrectly as 1000 g on the semivolatile Form 1's. The correct weight of 30g has been written in by the reviewer on the Form 1's. The sample results, as reported by the laboratory, were not affected by this transcription error and no qualifiers were added to the sample data on this basis.

XI. Tentatively Identified Compounds (TIC's)

Data for reported tentatively identified compounds were reviewed and found to meet quantitative and qualitative criteria.

Yes __X__ No _____

Comments: All TIC's not attributable to blank contamination have been qualified by the reviewer as tentatively identified and of estimated concentration (J-N). Any TIC's reported in samples that are also identified in associated blanks have been qualified as UJ-BN. Any TIC's identified as aldols have been qualified as UJ-AN.

XII. System Performance

The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance throughout this case.

Yes _____ No __X__

Comments: See Section III.A.3 for the discussion of an initial calibration problems.

XIII. Overall Assessment of Data in the Case

Data have met analytical quality criteria and are within applicable guideline limits except where qualifiers are noted within this report as being required.

Yes __X__ No _____

Comments: No comments.

XIV. Contract Requirements

All contract requirements were met by the laboratory in the analyses of the samples in the package.

Yes _____ No __X__

Comments: See Section V.B.

XV. General Comments

No comments.

EXPLANATION OF ORGANICS DATA QUALIFIERS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated quantitation limit.

R - Quality Control indicates that data are not usable (i.e. compound may or may not be present). Resampling and re-analysis are necessary to determine the presence or absence of the analyte in the sample.

UJ-B - The compound is considered to be <u>undetected</u> and the value reported is an estimated detection limit because the compound was identified in the laboratory blank as well as in the sample. The value of this reported detection limit (DL) is determined by the amount of the compound found in the sample:

1) the sample value was less than the CRDL: the DL is reported as equal to the CRDL.
2) the sample value was greater than CRDL but less than 5X the amount of the compound found in the laboratory blank (less than 10X for methylene chloride, acetone, 2-butanone, toluene and phthalates): the DL is reported as equal to the reported sample value.
3) the sample value was greater than 5X the laboratory blank value (10X for compounds noted above): see JB qualifier.

J-B - The reported value is an estimated amount. The compound was detected in the blank and the quantity reported in the sample is greater than 5X the amount found in the blank (greater than 10X for above compounds).

J - The associated numerical value is an estimated quantity because the amount detected is below the required detection limits or because quality control criteria were not met. (See qualifiers listed below)

J-C - The value reported was estimated due to instrument calibration problems.

J-H - The value reported was estimated due to holding time violation.

J-S - The value reported was estimated due to surrogate or matrix spike recovery problems.

J-I - The value reported was estimated due to internal standard recovery deficiencies.

J-E - The value reported was estimated due to interference problems.

J-M - Benzo(b) and Benzo(k) Fluoranthene not separated due to matrix.

J-N - Tentative identification of a compound. Resampling and re-analysis would be necessary for verification of identity.

J-A - TIC identified as an aldol condensate.

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CCJM DOCUMENT NO: WFIDS002.RVW

INORGANICS DATA VALIDATION REPORT

Case No. 22211 Project NEESA Level D
Site Whiting Field Project Name Whiting Field - RI/FS Phase II A
Contract Laboratory CH2M Hill Client ABB Environmental
Sample Delivery Group (SDG) 22211 Sampling Date(Month/Year) 7/92
Type of Analyses/Special Request TAL Metals and Cyanide

Sample Number	Sample Matrix	T	D	C
WHF-2A-STA10-SD01	Soil	X	-	X
WHF-2A-STA10-SD01Dup	Soil	X	-	X
WHF-2A-STA10-SD01MS	Soil	X	-	X
# of Samples Analyzed:		2	-	2
Total # of Analyses:		6	-	6

Sample Number	Sample Matrix	T	D	C
WHF-2A-STA10-SW01	Water	X	-	X
WHF-2A-STA10-SW01Dup	Water	X	-	X
WHF-2A-STA10-SW01MS	Water	X	-	X

Laboratory QC Samples

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Kathy Wakeman Date 10/26/92
QA Review by Jeralyn Guthrie/Roger Simon Date 10/26/92
CCJM Approval by Richard Cheatham for Date 10/26/92

Contractual violations found? Yes ____ No X Not Appl. ____
TPO action requested? Yes ____ No ____ Not Appl. X

Remarks:

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory QC Sample Summary Forms

Note:

-- The EPA Functional Guidelines for Evaluating Inorganics Analyses, 1988 (Data Review SOP) and project specific planning documents have been used by the data reviewer as a basis for reviewing the data and applying qualifiers, unless otherwise noted in review comments.

-- Please see data qualifier and sub-qualifier definitions on the last page. This scheme of qualifiers is intended to help indicate the reasons or problems which cause sample values to be qualified.

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Contract SOW 3/90

Inorganic Data Completeness Checklist

X	Inorganic Cover Page
X	Inorganic analysis data sheets (Form 1)
X	Initial calibration and calibration verification results (Form 2A)
X	Continuing calibration verification (Form 2A)
X	CRDL Analysis (Form 2B)
X	Blank results (Form 3)
X	ICP interference check sample (Form 4)
X	Spike results (Form 5A)
NR	Post-digest spike results (Form 5B)
X	Duplicate results (Form 6)
X	Laboratory Control Sample (LCS) Results (Form 7)
NR	Standard Addition Results (Form 8)
X	Serial Dilution Results (Form 9)
X	Instrument Detection Limits (Form 10)
X	ICP Interelement Correction Factors (Form 11)
X	ICP Linear Ranges (Form 12)
X	Preparation Log (Form 13)
X	Analysis Run Log (Form 14)
X	Raw data for samples
X	Raw data for calibration standards
X	Raw data for blanks
X	Raw data for ICP quality control (ICS and Serial Dilution)
X	Raw data for spikes
X	Raw data for duplicates
X	Raw data for LCS
X	Raw data for graphite furnace AA
X	Raw data for mercury analysis
X	Raw data for cyanide analysis
X	Percent solids calculation - soils only
X	Sample prep/digestion logs
X	Traffic Reports/Chain of Custody and/or tracking records
X	Sample description
X	Case narrative

X = Included in Original Data Package
O = Not Included and/or Not Available
NR = Not required
RS = Provided as Resubmission

I. Deliverables

All deliverables were provided as specified in the statement of work.

Yes __X__ No _____

Comments: No comments.

II. Detection Limits

All results met the contract required detection limits (CRDL).

Yes __X__ No _____

Comments: No comments.

III. Holding Times

All 40CFR136 recommended holding times for water samples, as specified in the Functional Guidelines were met. The water holding times have been applied to soil matrices, if applicable. Holding time is based on date sampled to date of analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

IV. Calibration Quality Control

A. All initial instrument calibrations were performed as specified in the statement of work.

Yes __X__ No _____

Comments: No comments.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed as required and had recoveries within the contract specified control limits.

Yes __X__ No _____

Comments: No comments.

C. The CRDL check standards (concentration = 2xCRDL for ICP and 1xCRDL for GFAA) were run at the contract specified frequency for the required analytes.

Yes __X__ No _____

Comments: No comments.

D. The 2xCRDL check standard for ICP (CRI) exhibited recoveries which indicate that linearity problems are not likely at the lower end of the calibration curve.

Yes _____ No __X__

Comments: For manganese and zinc, the difference between the true value of the CRI standard and the amount found is greater than five times the IDL. This indicates that sample results reported at the low end of the curve (i.e. near the IDL) may be inaccurate. However, since there are no control limits established for the recovery of this standard, no qualifiers have been added by the reviewer.

E. The 1xCRDL check standards for GFAA (CRA) exhibited values which indicate that an adequate response was found at the low end of the calibration curve.

Yes __X__ No _____

Comments: No comments.

V. Blank Quality Control

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed as required and were within the contract specified control limits.

Yes __X__ No _____

Comments:

1. The following is a table of samples, analytes, blank values and qualifiers associated with a contractually compliant ICB or CCB standard that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value (µg/L)	Qualifier
WHF-2A-STA10-SW01	Chromium	2.1B µg/L	1.9B	UJ-B
	Arsenic	1.00U µg/L	-1.5B	UJ-K
WHF-2A-STA10-SD01	Cadmium	1.0B mg/kg	4.6B,4.2B	UJ-B

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Cobalt and mercury were found in both the calibration and preparation blanks. Results have been qualified under the preparation blank section to avoid repetition.

B. A preparation blank was prepared and analyzed at the contract specified frequency.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the CRDL.

Yes __X__ No _____

Comments: No comments.

D. The absolute value of results reported for analytes in the preparation blank met the Functional Guidelines specified criterion of less than the instrument detection limit (IDL).

Yes _____ No __X__

Comments:

1. The following is a table of qualifiers, analytes, blank values and samples (with analyte values from the IDL to five times the blank amount) associated with a contractually compliant preparation blank that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value	Qualifier
WHF-2A-STA10-SW01	Beryllium	0.24U µg/L	-0.46B µg/L	UJ-K
	Cobalt	1.6U µg/L	-2.12B µg/L	UJ-K
	Sodium	3030B µg/L	756B µg/L	UJ-B
	Lead	6.0 µg/L	1.45B µg/L	UJ-B
	Mercury	0.17B µg/L	0.172B µg/L	UJ-B
WHF-2A-STA-10-SD01	Calcium	83.5B mg/kg	3.21 mg/kg	UJ-B
	Sodium	193B mg/kg	117B mg/kg	UJ-B
	Vanadium	0.91B mg/kg	-0.26B mg/kg	J-K

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Blank results whose absolute values were greater than the IDL were reported for aluminum, barium, calcium and iron in the water matrix and iron and lead in the soil matrix. However, no sample result qualification has occurred because the associated sample analyte values were greater than five times the blank amount.

4. Cadmium was found in both the calibration and preparation blanks for the soil matrix analyses. Results have been qualified under the calibration blank section to avoid repetition.

E. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Applicable _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks. Data has been qualified by the reviewer due to contaminants reported in these blanks.

Blank Type/ID	Analyte	Amount (µg/L)
Field Blank/99-SW/SD-FB	Aluminum	28.7B
	Barium	0.58B
	Calcium	237B
	Iron	40.8B
	Lead	1.0B
	Nickel	22.4B
	Sodium	897B
	Zinc	8.1B
Equipment Blank/99-SW/SD-RB	Aluminum	57.8B
	Barium	1.1B
	Calcium	272B
	Chromium	2.0B
	Cobalt	2.6B
	Copper	4.8B
	Iron	26.6B
	Lead	2.2B
	Manganese	1.7B
	Sodium	855B
	Zinc	14.4B

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinsate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
WHF-2A-STA10-SW01	Aluminum	114B µg/L	28.7B µg/L	UJ-B
	Calcium	961B µg/L	237B µg/L	UJ-B
	Copper	2.0B µg/L	4.8B µg/L	UJ-B
WHF-2A-STA10-SD01	Barium	0.86 B mg/kg	0.27 B mg/kg	UJ-B
	Chromium	0.62 B mg/kg	0.49 B mg/kg	UJ-B

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
WHF-2A-STA10-SW01 (continued)	copper	2.0 µg/L	4.8 B µg/L	UJ-B
WHF-2A-STA10-SD01	barium	0.86 B mg/kg	0.27 B mg/kg	UJ-B
	chromium	0.62 B mg/kg	0.49 B mg/kg	UJ-B
	copper	1.9 B mg/kg	1.2 B mg/kg	UJ-B
	lead	2.5 mg/kg	0.54 B [illegible]kg	UJ-B
	manganese	1.5 B mg/kg	0.42 B mg/kg	UJ-B
	zinc	3.9 B mg/kg	3.5 B mg/kg	UJ-B

3. Chromium, lead and sodium were found in the calibration and/or preparation blanks for the water matrix analyses. Results have been qualified under the calibration or preparation blank section to avoid repetition.

4. Calcium and sodium were found in the preparation blank for the soil matrix analyses. Results have been qualified under the preparation blank section to avoid repetition.

VI. Accuracy Statements

A. The matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used as the matrix spike samples.

B. Matrix spike recoveries were within contract specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following is a table of samples, analytes, recoveries and qualifiers associated with spike recoveries outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Recovery	Qualifier
WHF-2A-STA10-SD01	Soil	Lead	152.8	J-S

2. The result associated with the analyte having a high recovery may be biased high.

C. All analysis (post digest) spike requirements were met for the above samples that required "N" flags. This is not required for GFAA analyses.

Yes _____ No _____ Not Applicable __X__

Comments: No comments.

D. The laboratory control sample (LCS) frequency was met.

Yes __X__ No _____

Comments: No comments.

E. LCS recoveries were within contract specified control limits (aqueous = 80-120%, except Ag, Sb, Hg and CN; soil = as established for the specific material).

Yes __X__ No _____

Comments: No comments.

VII. Precision Statement

A. The matrix (pre-digest) duplicate frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used for duplicate sample analysis.

B. Matrix (pre-digest) duplicate differences were within contract specified control limits (±20 RPD or ± CRDL for results less than five times the CRDL).

Yes _____ No __X__

Comments:

1. The following is a table of samples, analytes, differences and qualifiers associated with duplicate control limits that are exceeded as specified in the Functional Guidelines (RPD ± 20% or ± CRDL for waters, RPD ± 35% or ± 2xCRDL for soils).

Samples Affected	Matrix	Analyte	Control Limit	Difference or RPD	Qualifier
WHF-2A-STA10-SD01	Soil	Copper	35%	139.4%	J-D

2. The laboratory has correctly flagged aluminum results associated with the duplicate analysis of sample WHF-2A-STA10-SD01 with a "*". However, for this sample, the duplicate difference(s) for the above analyte(s) were within the ± 35% or ± 2xCRDL control limits allowed by data validation for soil samples. The associated sample results were, therefore, not qualified by the data reviewer.

C. This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VIII. ICP Quality Control

A. Serial dilution frequency was met.

Yes __X__ No _____

Comments: Samples WHF-2A-STA10-SW01 and WHF-2A-STA10-SD01 were used for serial dilution analysis.

B. Differences for the serial dilution were within contract specified control limits (10% difference).

Yes _____ No __X__

Comments: The following is a table of samples, analytes, differences and qualifiers associated with a serial dilution result outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Difference	Qualifier
WHF-2A-STA10-SW01	Water	Calcium	37.8	J-I
		Iron	26.4	J-I
		Sodium	92.9	J-I
WHF-2A-STA10-SD01	Soil	Aluminum	13.0	J-I

C. The interference check sample (ICS) was run at the required frequency for all required ICS analytes.

Yes __X__ No _____

Comments: No comments.

D. ICS percent recovery results were within contract specified control limits.

Yes __X__ No _____

Comments: No comments.

E. Results for ICP analytes not required to be present in a given ICS standard were within acceptable limits.

Yes _____ No __X__

Comments: For antimony, barium, cadmium, cobalt, copper, nickel and vanadium, the values reported indicate that interference correction factors may not have been properly established and/or applied. These analytes were reviewed individually in each sample to determine any potential interferent affects. Since potential interferent analyte concentrations in samples were below action levels for qualification on the basis of ICP interferences, no qualifiers have been applied by the reviewer.

IX. Graphite Furnace (GFAA) Quality Control

A. Duplicate injections were performed where required for all GFAA analyses and had RSD's (or CV's) of less than 20% where results were above the CRDL.

Yes __X__ No _____

Comments: No comments.

B. Analysis (post-digest) spikes for GFAA were performed on all required samples and at the concentration required.

Yes __X__ No _____

Comments: No comments.

C. Sample dilution and re-spiking was performed on all samples with an initial spike recovery of less than 40%.

Yes _____ No _____ Not Applicable __X__

Comments: All recoveries were greater than 40%.

D. The post-digestion (analysis) spike recoveries were all within the 85-115% control limits for those GFAA analysis sample results that were less than 50% of the post digest spike amount (absorbance).

Yes _____ No __X__ Not Applicable _____

Comments: The following table is a listing of laboratory QC samples (e.g., prep blank, LCS, duplicate) that had analysis spike recoveries that were not within 85-115%. No data qualifiers are required due to these deficiencies.

Sample Number	Analyte	Percent Recovery
LCSS	Selenium	79.2/73.3

E. MSA was performed when required for GFAA analysis and followed the criteria specified in Exhibit E of the Statement of Work.

Yes _____ No _____ Not Applicable __X__

Comments: No MSA analyses were required.

X. Calculations and Transcription

A. Correct contract/method calculations were performed.

Yes __X__ No _____

Comments: No comments.

B. Raw data was transcribed accurately to sample and QC summary sheets.

Yes _____ No __X__

Comments: The following is a table of transcription/calculation discrepancies noted by the reviewer during the routine data validation process. Copies of the raw data pages showing reviewer found results have been included in Attachment I.

Sample	Summary Form	Analyte	Laboratory reported	Reviewer found
Preparation Blank Solid	3	Cadmium	0.548U mg/kg	0.54B mg/kg
WHF-2A-STA10-SW01	13	Cyanide	prep date 7/29/92	prep date 7/21/92
WHF-2A-STA10-SD01	13	Cyanide	prep date 7/24/92	prep date 7/22/92

XI. System Performance

The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance throughout this case.

Yes __X__ No _____

Comments: The instrument detection limits (IDL's) utilized by the laboratory are very low for a number of analytes. In a number of instances the levels tend to be lower than normal background levels or baseline noise. Evidence for this is seen in the number of qualifiers resulting from blanks (i.e. calibration, preparation, field and rinsate blanks).

XII. Contract Requirements

All contract requirements were met by the laboratory in the preparation and analysis of the samples in the package.

Yes __X__ No _____

Comments: No comments.

XIII. Additional Comments

A. Unassociated and unused data are not marked as such by the laboratory.

B. The Analysis Run Logs (Form 14's) did not show the initial instrument calibration standards as required by SOW 3/90.

C. The summary form for the ICP Interference Check Sample (Form 4) for the ICP analysis dated 8/11/92 was not found in the data package. Since the only sample associated with that analytical run was the aqueous Laboratory Control Sample (LCS), no action was taken by the reviewer.

D. The reviewer found that the percent solids results used for cyanide quantitation in the soil sample was 83.43% as opposed to the solids value of 81.67% which was found in the raw data. Since the value of cyanide in the sample was undetected no action was taken by the reviewer. The appropriate sample result should have been 0.28 U mg/kg instead of 0.27 U mg/kg.

Definition of Qualifiers
(Used by Data Reviewer)

The following qualifiers are specified for use by the Functional Guidelines for Inorganic Data Validation.

(R) = Rejected - Data are unusable (Note: Analyte may or may not be present).

(UJ) = Undetected, but the number that is reported as the quantitation limit is an estimated value

(J) = Estimated value

The following subqualifiers give further detail of the type and amount of qualification a given data point has received.

-H = Qualified due to holding time violation

-I = Qualified due to interference problems (ICP serial dilution or ICS, or poor analytical spike recovery by graphite furnace)

-D = Qualified due to duplicate control limits being exceeded

-S = Qualified due to matrix spike recoveries outside control limits

-C = Qualified due to instrument calibration problems

-L = Qualified due to LCS recoveries outside control limits

-B = Qualified due to blank contamination problems

-K = Qualified due to negative blank value problems

-Q = Qualified for other reasons - refer to the text of the report

Example: The percent recovery of the Aluminum matrix spike was only 65%. Undetected values (e.g., Al = 200u) will be flagged as follows:

Al = 200u (UJ-S)

meaning the number being reported at the detection limit (200u) is estimated (UJ) due to spike recovery problems (-S).

Reported positive Aluminum values (e.g., Al = 250) will be flagged as follows:

Al = 250 (J-S)

meaning the reported positive result (250) is estimated (J) due to spike recovery problems (-S).

TABLE 1

Summary of Sample Data Qualifiers

SDG#/Case 22211/22211 Site Name Whiting Field

Sample ID	Matrix	Al	As	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Hg
WHF-2A-STA10-SW01	Water	UJB	UJK	UJK		UJBI	UJB	U[illegible]	UJB	JI	UJB	UJB
WHF-2A-STA10-SD01	Soil	JI			UJB	UJB	UJB		UJBD		UJBS	

Sample ID	Matrix	Na	V	Ba	Mn	Zn
WHF-2A-STA10-SW01	Water	UJBI				
WHF-2A-STA10-SD01	Soil	UJB	JK	UJB	UJB	UJB

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INORGANICS DATA REVIEW REPORT

Case No. 22212 | Project NEESA Level C
Site Whiting Field NAS | Project Name
Contract Laboratory CH2M HILL MGM | Client ABB
Sample Delivery Group (SDG) 22212 | Sampling Date (Month/Year) 7/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C
99-11-SW	water	X	-	X
99-11-SD	soil	X	-	X
99-10-SW	water	X	-	X
99-10-SD	soil	X	-	X
# of Samples Analyzed:		4	-	4
Total # of Analyzed:		4	-	4

Laboratory QC Samples

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee Date 1/20/93
QA Review by Jeralyn Guthrie/Roger Simon Date 1/20/93
CCJM Approval by Richard Cheatham Date 1/20/93

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified in NEESA Requirements, Chapter 7 (Document No. NEESA 20.2-047B) have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions in Section 4 of Attachment I.

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CCJM DOCUMENT NO: WFIDS006.RVW

INORGANICS DATA REVIEW REPORT

Case No. 22212 Project NEESA Level C
Site Whiting Field NAS Project Name
Contract Laboratory CH2M HILL MGM Client ABB
Sample Delivery Group (SDG) 22212 Sampling Date (Month/Year) 7/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C	Sample Number	Sample Matrix	T	D	C
99-11-SW	water	X	-	X					
99-11-SD	soil	X	-	X					
99-10-SW	water	X	-	X					
99-10-SD	soil	X	-	X					

Laboratory QC Samples

# of Samples Analyzed:	4	-	4
Total # of Analyzed:	4	-	4

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee Date
QA Review by Jeralyn Guthrie/Roger Simon Date
CCJM Approval by Richard Cheatham Date

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified in NEESA Requirements, Chapter 7 (Document No. NEESA 20.2-047B) have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions on the last page of this report.

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes _____ No __X__

Comments: See the following Level C Data Deliverables Checklist for a listing of the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECK LIST - INORGANICS

KEY

__X__ Included in package
__O__ Not included and/or not available
__NR__ Not applicable or not required
__RS__ Provided as resubmission

__X__ Case Narrative
__X__ Sample results data sheets (Form 1 or spreadsheet)
__X__ CLP data flags used by laboratory
__X__ Initial calibration and calibration verification results (Form 2A or equivalent)
__RS__ Initial calibration curve data (not a NEESA required deliverable)
__X__ Continuing calibration verification (Form 2A or equivalent)
__X__ Continuing calibration blanks-10% frequency (Form 3 or equivalent)
__X__ Preparation blank results (Form 3 or equivalent)
__X__ ICP interference check sample (Form 4 or equivalent)
__O__ Matrix spike results (Form 5A or equivalent)
__NR__ Post-digest spike sample recovery for ICP (if needed) (Form 5B or equivalent)
__O__ Duplicate results (Form 6 or equivalent)
__X__ Blank spike/laboratory control sample(s) with each batch (Form 7 or equivalent)
__X__ Control charts developed by lab
__NR__ Standard addition results (Form 8 or equivalent)
__NR__ Serial dilution results for ICP analytes (Form 9 or equivalent)
__X__ Holding times summary form (Form 10 or equivalent, i.e. Forms 13 and 14 from EPA-CLP SOW 788 and 3/90)
__X__ Chain of Custody Records

II. Holding Times

Samples were prepared and analyzed within holding time specified by the NEESA data validation guidelines. Holding time is based on date sampled to date of final analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

III. Calibration Quality Control

A. The required summary forms were provided and information was present to determine that initial calibration curves met guidelines (correlation, number of calibration standards, etc.) or method criteria.

Yes __X__ No _____

Comments: Data related to initial calibration curves was not initially provided and is not shown on NEESA Table 7.6 as a specific deliverable requirement for the laboratory. However, this information was provided by the laboratory upon request since data validation requirements specify review of this data.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standard analyses were reported as required and had recoveries reported to be within the CLP specified control limits.

Yes __X__ No _____

Comments: No comments.

IV. Blank Quality Control

A. A preparation/method blank was prepared and analyzed at the specified frequency.

Yes __X__ No _____

Comments: No comments.

B. All analytes in the preparation blank were below the CRDL and thus compliant with NEESA requirements.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the instrument detection limit.

Yes _____ No __X__

Comments: The following is a table of samples and analytes requiring data qualifiers due to reported contaminants or problems in the preparation blank. The samples and analytes listed below were reported to be less than five times the absolute value of the amount reported in the blank.

Sample	Analyte	Sample Amount (µg/L)	Blank Amount (µg/L)	Qualifier
99-11-SW	aluminum	80.0 B	-22.47 B	J
	beryllium	0.24 U	-0.46 B	UJ
	cobalt	2.4 B	-2.12 B	J
	lead	3.8	1.45 B	J
	mercury	0.17 B	0.172 B	J
	sodium	3030 B	756.4 B	J
99-10-SW	aluminum	112 B	-22.47 B	J
	beryllium	0.24 U	-0.46 B	UJ
	cobalt	3.8 B	-2.12 B	J
	lead	3.4	1.45 B	J
	mercury	0.17 B	0.172 B	J
	sodium	3010 B	756.4 B	J
		(mg/kg)	(mg/kg)	
99-11-SD	calcium	102 B	32.07 B	J
	sodium	192 B	117.1 B	J
	vanadium	1.00 B	-0.26 B	J
99-10-SD	calcium	83.0 B	32.07 B	J
	sodium	251 B	117.1 B	J
	vanadium	0.92 B	-0.26 B	J

D. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Identified _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks. Data has been qualified by the reviewer due to contaminants reported in these blanks. The rinsate and field blanks were found in data package 22225.

Blank Type/ID	Analyte	Amount (µg/L)		Associated Samples
Rinsate/99-SW/SD-RB	Aluminum	57.8	B	All
	Barium	1.1	B	
	Calcium	272	B	
	Chromium	2.0	B	
	Cobalt	2.6	B	
	Copper	4.8	B	
	Iron	26.6	B	
	Lead	2.2	B	
	Manganese	1.7	B	
	Sodium	855	B	
	Zinc	14.4	B	
Field/99-SW/SD-FB	Aluminum	28.7	B	All
	Barium	0.58	B	
	Calcium	237	B	
	Iron	40.8	B	
	Lead	1.0	B	
	Nickel	22.4	B	
	Sodium	897	B	
	Zinc	8.1	B	

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinsate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)	Qualifier
99-11-SW	Calcium	942	B	272 B, 237 B	J
	Chromium	4.7	B	2.0 B	J
	Copper	5.3	B	4.8 B	J
	Zinc	10.9	B	14.4 B, 8.1 B	J

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
		(mg/kg)	(µg/L)	
99-11-SD	Barium	0.80 B	1.1 B	J
	Nickel	3.8 B	22.4 B	J
	Zinc	10.1 B	14.4 B, 8.1 B	J
		(µg/L)	(µg/L)	
99-10-SW	Calcium	920 B	272 B, 237 B	J
	Chromium	4.2 B	2.0 B	J
	Copper	5.3 B	4.8 B	J
	Zinc	10.2 B	14.4 B, 8.1 B	J
		(mg/kg)	(µg/L)	
99-10-SD	Barium	1.1 B	1.1 B	J
	Manganese	1.5 B	1.7 B	J
	Zinc	5.6 B	14.4 B, 8.1 B	J

3. Soil results for calcium, chromium and sodium, and water results for aluminum, cobalt, lead and sodium have been qualified due to method blank contamination. Repetitive qualifiers have not been shown.

V. Accuracy Statements

A. Blank spike/laboratory control sample (LCS) analyses were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP matrix spike control limits.

Yes __X__ No _____

Comments: No comments.

B. Laboratory control charts were provided in the package and the limits specified by the control charts were used for review.

Yes __X__ No _____

Comments: CLP control limits (80-120%) were used for evaluation of LCS results.

C. Matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Samples 99-10-SW and 99-10-SD from data package 22211 were used as the matrix spike samples.

D. Matrix spike recoveries were within the specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following matrix spike analytes were reported to be outside control limits:

Sample	Matrix	Analyte	% Recovery
99-10-SD	soil	lead	152.8

2. For those analytes having high recoveries the results may be biased high and false positives may be reported.

VI. Field Duplicates

This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VII. Additional Comments

The listing showing sample ID cross-references is included in Attachment I.

EXPLANATION OF DATA FLAGS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality control indicates that data is not usable (i.e. analyte may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

TABLE 1

Summary of Sample Data Flags

SDG#/Case 22212/22212 Site Name Whiting Field NAS

Sample ID	Matrix	Al	Ba	Be	Ca	Cr	Co	Cu
99-11-SW	water	J		UJ	J	J	J	J
99-11-SD	soil		J		J	J		
99-10-SW	water	J		UJ	J	J	J	J
99-10-SD	soil		J		J	J		

Sample ID	Matrix	Pb	Mn	Hg	Ni	Na	V	Zn
99-11-SW	water	J		J		J		J
99-11-SD	soil				J	J	J	J
99-10-SW	water	J		J		J		J
99-10-SD	soil		J			J	J	J

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CCJM DOCUMENT NO: WFODS007.RVWR

ORGANICS DATA REVIEW REPORT

Case No. see below
Site Whiting Field
Contract Laboratory CH2M Hill
Sample Delivery Group (SDG) NA
Type of Analyses/Special Request Volatiles, Semivolatiles, and Pesticides/PCB

Project NEESA Level C
Project Name Whiting Field
Client ABB Environmental Services
Sampling Date (Month/Year) 7/92

Client ID Number	Sample Number	Sample Matrix	V	B	P
Case No. 22243:					
WHF-2A-STA04-SW01	99-04-SW	Water	X	X	X
WHF-2A-STA06-SW01	99-06-SW	Water	X	X	X
WHF-2A-STA12-SW01	99-12-SW	Water	X	X	X
WHF-2A-STA04-SD01	99-04-SD	Soil	X	X	X
WHF-2A-STA06-SD01	99-06-SD	Soil	X	X	X
WHF-2A-STA12-SD01	99-12-SD	Soil	X	X	X
WHF-2A-SW/SD-TB03	99-SW/SD-TB03	Water	X	-	-
WHF-2A-SW/SD-RB02	99-SW/SD-RB02	Water	X	X	X
WHF-2A-SW/SD-RB03	99-SW/SD-RB03	Water	X	X	X
Case No. 22212:					
WHF-2A-STA10-SW01	99-10-SW	Water	X	X	X
WHF-2A-STA11-SW01	99-11-SW	Water	X	X	X
WHF-2A-STA11-SD01	99-11-SD	Soil	X	X	X
WHF-2A-STA10-SD01	99-10-SD	Soil	X	X	X
Trip Blank 1	Trip Blank 1	Water	X	-	-
Case No. 22261:					
WHF-2A-STA01-SD01	99-01-SD	Soil	X	-	-

Client ID Number	Sample Number	Sample Matrix	V	B	P
Case No. 22225:					
WHF-2A-STA07-SW01	99-07-SW	Water	X	X	X
WHF-2A-STA07-SW01RE	99-07-SWRE	Water	-	X	-
WHF-2A-STA08-SW01	99-08-SW	Water	X	X	X
WHF-2A-STA08-SW01RE	99-08-SWRE	Water	-	X	-
WHF-2A-STA09-SW01	99-09-SW	Water	X	X	X
WHF-2A-STA09-SW01RE	99-09-SWRE	Water	-	X	-
WHF-2A-SW/SD-TB02	99-SW/SD-TB02	Water	X	-	-
WHF-2A-SW/SD-RB	99-SW/SD-RB	Water	X	X	X
WHF-2A-SW/SD-RBRE	99-SW/SD-RBRE	Water	-	X	-
WHF-2A-SW/SD-FB	99-SW/SD-FB	Water	X	X	X
WHF-2A-SW/SD-FBRE	99-SW/SD-FBRE	Water	-	X	-
WHF-2A-STA07-SD01	99-07-SD	Soil	X	X	X
WHF-2A-STA08-SD01	99-07-SD	Soil	X	X	X
WHF-2A-STA09-SD01	99-08-SD	Soil	X	X	X

Laboratory QC Samples

Case No. 22211:					
	99-10-SWMS	Water	X	X	X
	99-10-SWMSD	Water	X	X	X
	99-10-SDMS	Soil	X	X	X
	99-10-SDMSD	Soil	X	X	X

Case No 22225:					
	99-07-SWMS	Water	X	-	-
	99-07-SWMSD	Water	X	-	-
Case No 22261:					
	99-01-SDMS	Soil	X	-	-
	99-07-SDMSD	Soil	X	-	-
# of Samples Analyzed			24	20	20
Total # of Analyses			32	29	24

V = CLP Volatiles B = CLP Semivolatiles P = CLP Pesticide/PCB's
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Nancy Fish NF Date 10-27-92
QA Review by Jeralyn Guthrie/Alan Alai JG Date 10-27-92
CCJM Approval by Richard Cheatham RS for Date 10-27-92

Contractual violations found? Yes ____ No X Not Appl. ____
TPO action requested? Yes ____ No ____ Not Appl. X

Remarks: Laboratory QC samples from case no. 22211 were provided to demonstrate the appropriate frequency was performed by the laboratory.

Attachments:
I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Data Validator Worksheets
III. Qualified Sample Results (Form 1's)
IV. Laboratory QC Sample Summary Forms

Notes:

-- The Level C Data Validation Guidelines as specified by NEESA in the Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NEESA 20.2-047B, June, 1988, have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.
-- Please see data flagging definitions on the last page of this report.

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MEMORANDUM

TO: Rao Angara, ABB Environmental/Tallahassee

FROM: Jeralyn Guthrie, Richard Cheatham, CCJM/Denver

DATE: October 27, 1992

DOCUMENT NO: WFTRS021.MEM

SUBJECT: Transmittal of Whiting Field Data Validation Reports

Enclosed are the data validation reports, and the attached copies of data results forms (Form I's) which have data reviewer qualifiers added. Each data review report is identified as follows:

Case No.	SDG No.	Analysis
22243	NA	Volatiles, Semivolatiles, Pesticide/PCB
22212	NA	Volatiles, Semivolatiles, Pesticide/PCB
22261	NA	Volatiles, Semivolatiles, Pesticide/PCB
22225	NA	Volatiles, Semivolatiles, Pesticide/PCB

If you have any questions concerning this transmittal, please call us at (303) 987-2928.

cc: Kathy Hodak, ABB/Tallahassee
PF - Whiting Field

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Quality Service Since 1979

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes __X__ No _____

Comments: The following Level C Data Deliverables Checklist shows the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECKLIST - ORGANICS

KEY
_X_ Included in package
_O_ Not included and/or Not available
_NA_ Not applicable or Not required
_RS_ Provided as resubmission

__X__ Method blank spikes with each batch
  __X__ Control chart developed by lab
__X__ Sample results - Form 1 or spreadsheet
  __X__ CLP data flags used by laboratory
  __X__ Sample chromatograms and mass spectra
__X__ Holding times (sampling, prep and analysis dates provided)
__X__ Surrogate recoveries - Form 2
__X__ Matrix spike/matrix spike duplicate (MS/MSD) - Form 3 (MS/MSD is to be 1 per 20 samples of similar matrix)
__X__ Method blank summary - Form 4
  __X__ Report form for method blank results (Form 1 or spreadsheet)
__X__ GC/MS tuning - Form 5
__X__ Initial calibration data, GC/MS - Form 6
__X__ Pesticide/PCB calibration standards summary - Form 8D (listed as Form 9 on NEESA Table 7.6)
__X__ Continuing calibration data, GC/MS - Form 7
__X__ Internal standard area summary, GC/MS - Form 8A, 8B, or 8C
__X__ Pesticide/PCB continuing calibration data - Form 9
  __X__ Pesticide/PCB 2nd column confirmation - chromatograms

II. Holding Times

Samples were extracted and analyzed within holding times specified by the NEESA data validation guidelines. See the following table for a summarization of sample holding times.

Yes _____ No __X__

Comments: An asterisk and number in parentheses indicate a sample fraction outside holding time specifications and the number of days exceeded based on the date sampled. Sample data for any fraction exceeding holding time specifications are flagged as estimated (J or UJ).

Holding Time Summary

Sample Number	Sampling Date	VTSR	VOA Analysis	BNA Extract	BNA Analysis	Pesticide Extract	Pesticide Analysis
Case no. 22243:							
99-04-SW	7/15/92	7/17	7/22	7/21	8/03	7/20	8/11
99-06-SW	7/15/92	7/17	7/22	7/21	8/03	7/20	8/11
99-12-SW	7/15/92	7/17	7/22	7/21	8/03	7/20	8/11
99-04-SD	7/15/92	7/17	7/24	7/20	8/03	7/20	8/11
99-06-SD	7/15/92	7/17	7/24	7/20	8/03	7/20	8/11
99-12-SD	7/15/92	7/17	7/24	7/20	8/03	7/20	8/11
99-SW/SD-RB02	7/15/92	7/17	7/22	7/21	8/03	7/20	8/11
99-SW/SD-RB03	7/15/92	7/17	7/22	7/21	8/03	7/20	8/11
99-SW/SD-TB03	7/15/92	7/17	7/22	—	—	—	—
Case no. 22225:							
99-07-SW	7/14/92	7/14	7/22	7/17	7/29	7/17	7/29
99-07-SWRE	7/14/92	7/14	—	7/30*(2)	7/31	—	—
99-08-SW	7/14/92	7/14	7/21	7/17	7/29	7/17	7/29
99-08-SWRE	7/14/92	7/14	—	7/30*(2)	7/31	—	—
99-09-SW	7/14/92	7/14	7/21	7/17	7/29	7/17	7/29
99-09-SWRE	7/14/92	7/14	—	7/30*(2)	7/31	—	—
99-07-SD	7/14/92	7/14	7/23	7/17	8/03	7/17	7/29
99-08-SD	7/14/92	7/14	7/23	7/17	8/03	7/17	7/29
99-09-SD	7/14/92	7/14	7/23	7/17	8/03	7/17	7/29
99-SW/SD-RB	7/14/92	7/14	7/21	7/17	7/29	7/17	7/29
99-SW/SD-TB02	7/14/92	7/14	7/22	—	—	—	—
99-SW/SD-FB	7/14/92	7/14	7/22	7/17	7/29	7/17	7/29
99-SW/SD-RBRE	7/14/92	7/14	—	7/30*(2)	7/31	—	—
99-SW/SD-FBRE	7/14/92	7/14	—	7/30*(2)	7/31	—	—

Holding Time Summary (cont.)

Sample Number	Sampling Date	VTSR	VOA Analysis	BNA Extract	BNA Analysis	Pesticide Extract	Pesticide Analysis
Case no. 22212:							
99-10-SW	7/13/92	7/14	7/21	7/15	7/21	7/17	7/29
99-10-SD	7/13/92	7/14	7/23	7/15	7/24	7/15	7/29
99-11-SW	7/13/92	7/14	7/21	7/15	7/21	7/17	7/28
99-11-SD	7/13/92	7/14	7/23	7/15	7/24	7/15	7/29
TRIPBLANK1	7/13/92	7/14	7/28*(1)	—	—	—	—
Case no. 22261:							
99-01-SD	7/16/92	7/20	7/24**	—	—	—	—

** As indicated in the case narrative the temperature of this sample when received was 20°C.

III. GC/MS Tuning and Mass Calibration

The BFB and/or DFTPP performance results summaries were included for all samples, and were reported to be within specified criteria at the appropriate frequency.

Yes __X__ No _____

Comments: No comments.

IV. A. Instrument Calibration (Volatiles)

1. The instrument response factor (RRF) data summaries were reviewed for the initial and continuing calibrations. All information was present and reported on the required summary forms. Response factors for the system performance check compounds (SPCC) met the required criteria for volatile analyses.

Yes __X__ No _____

Comments: The calibration for the following compound was outside data validation specifications. Associated sample data being flagged as estimated (J or UJ) or in those instances where a response factor of <0.050 was reported the data for the compound has been rejected (R) if reported as undetected in the sample.

Analyte	RRF	Associated Samples
4-Methyl-2-Pentanone	<0.05	99-SW/SD-RB
		99-SW/SD-TB02
		99-SW/SD-FB
		99-07-SW
		99-SW/SD-RB02
		99-SW/SD-RB03
		99-06-SW
		99-12-SW
		99-04-SW
		TRIPBLANK1
		99-SW/SD-TB03

2. The percent relative standard deviation (%RSD) for the initial calibrations and the percent difference (%D) for the continuing calibrations were reviewed for the calibration check compounds (CCC). The %RSD and %D values reported for the CCC's met the data validation criteria (i.e., < 30 %RSD and < 25 %D) for volatile analyses.

Yes __X__ No _____

Comments: All other volatile compounds have been reviewed using the same criteria (i.e., < 30 % RSD and < 25 % D). See the attached Table 1 for a summarization of compounds not meeting these criteria. (NOTE: This procedure has been used by the reviewer in order to prevent the qualification of compounds that had acceptable calibrations reported.) The out-of-control calibrations have resulted in associated sample data being flagged as estimated (J or UJ). The affected samples are also listed on the attached Table 1.

B. Instrument Calibration (Semi-Volatiles)

1. The instrument response factor (RRF) data summaries were reviewed for the initial and continuing calibrations. All information was present and reported on the required summary forms. Response factors for the system performance check compounds (SPCC) met the required criteria (i.e., minimum RRF = 0.050) for semi-volatile analyses, thus no data have been qualified.

   Yes __X__ No _____

   Comments: No comments.

2. The percent relative standard deviation (%RSD) for the initial calibrations and the percent difference (%D) for the continuing calibrations were reviewed for the calibration check compounds (CCC). The %RSD and %D values reported for the CCC's met the data validation criteria (i.e., < 30 %RSD and < 25 %D) for semi-volatile analyses.

   Yes __X__ No _____

   Comments: All other semivolatile compounds have been reviewed using the same criteria (i.e., < 30 % RSD and < 25 % D). See the attached Table 1 for a summarization of the compounds not meeting these criteria. (NOTE: This procedure has been used by the reviewer in order to prevent the qualification of compounds that had acceptable calibrations reported.) The out-of-control calibrations have resulted in associated sample data being flagged as estimated (J or UJ). The affected samples are also listed on the attached Table 1.

C. Instrument Calibration (Pesticide)

1. All reported linearity checks met criteria, with a %RSD value less than 10% for all quantitation column calibrations.

   Yes __X__ No _____

   Comments: No comments.

2. The breakdown of 4,4'-DDT and Endrin was reported as less than 20% for all Evaluation B analyses.

Yes __X__ No _____

Comments: No comments.

3. The reported pesticide standard compounds showed a %D of the calibration factor of no more than 15% for the quantitation and 20% for confirmation columns for all compounds identified.

Yes __X__ No _____

Comments: No comments.

V. Blanks

A. Method Blank - The blank analyses summaries were reviewed. The frequency of method blank extractions and analysis and the contaminants reported in blank samples were all within specified limits.

Yes __X__ No _____

Comments: Contaminant quantities reported in the laboratory preparation blanks are listed below. Associated samples which have been flagged "UJ" due to the blank contaminants are also shown.

Blank ID	Analyte	Amount (µg/kg)	Associated Samples
VBLKW (7/21/92)	Methylene Chloride	1	99-11-SW, 99-10-SW, 99-9-SW, 99-8-SW
VBLKS (7/24/92)	Methylene Chloride	5	99-01-SD
	Acetone	4	
VBLKW2 (7/21/92)	Methylene Chloride	4	99-SW/SD-RB, 99-SW/SD-TB02, 99-SW/SD-FB, 99-07-SW, 99-SW/SD-RB02, 99-SW/SD-RB03
	Acetone	8	

Blank ID	Analyte	Amount (µg/kg)	Associated Samples
VBLKS (7/22/92)	Methylene Chloride Acetone	2 6	99-11-SD, 99-10-SD, 99-8-SD
VBLKS2 (7/23/92)	Methylene Chloride Acetone	3 3	99-09-SD, 99-07-SD, 99-06-SD, 99-12-SD, 99-04-SD
VBLKW2 (7/22/92)	Methylene Chloride Acetone	8 12	99-SW/SD-TB03, 99-06-SW, 99-12-SW, 99-04-SW,
VBLKW2 (7/28/92)	Methylene Chloride	1	TRIP BLANK
SBLKS (EXT. 7/17/92)	Di-n-Butyl Phthalate	93	99-07-SD, 99-08-SD, 99-09-SD
SBLKS (EXT. 7/21/92)	Di-n-Butyl Phthalate	83	99-06-SD, 99-12-SD, 99-04-SD

B. Trip Blank - The associated trip/travel blank(s) contained contaminants which affected samples in the package.

Yes __X__ No _____ Not Identified _____

Comments: The contaminants found in the trip blanks were methylene chloride, acetone and toluene. No toluene was detected in any samples and methylene chloride and acetone were contaminants in all of the method blanks, so these compounds have already been qualified.

C. Other Blanks - The following table lists the contaminated field and rinsate blanks found in the data package and the contaminant quantities reported. Sample data has been qualified by the reviewer based on the results of the field blanks and rinsate blanks and the sample association information provided by the client.

Blank ID/Type	Analyte	Amount (µg/L)	Associated Samples
99-SW/SD-RB/Rinsate Blank	Methylene chloride	23	99-10-SW, 99-10-SD,
	Acetone	27	99-11-SW, 99-11-SD,
	di-n-butylphthalate	14	99-09-SW, 99-09-SD
99-SW/SD-FB/Field Blank	Methylene chloride	3	All
	Acetone	10	
	Carbon disulfide	2	
99-SW/SD-RB02/Rinsate Blank	di-n-butylphthalate	12	99-07-SW
	Methylene chloride	2	
	Acetone	7	
99-SW/SD-RB03/Rinsate Blank	di-n-butylphthalate	13	99-06-SW, 99-06-SD
	bis(2-ethylhexyl)phthalate	3	99-12-SW, 99-12-SD
	Methylene chloride	2	

VI. Surrogate Recovery

The surrogate recovery summaries were reviewed. The recoveries were all reported to be within specified CLP QC criteria.

Yes _____ No __X__

Comments:

A. Samples reported to have surrogate recoveries outside specified CLP criteria are summarized on the attached Tables 1 and 2. Data flags, when necessary, are indicated on Table 2. The method blank associated with samples 99-07-SW, 99-08-SW, 99-09-SW, 99-SW/SD-RB, and 99-SW/SD-FB had one base/neutral surrogate out of QC limits. The laboratory provided both the original and reanalysis results for these samples. Since surrogate recoveries for these samples (with the exception of 99-SW/SD-FB) were found to be within control limits in the original analyses, the reviewer has included all qualified Form 1's and crossed out the re-extraction/re-analyses which were performed outside holding times.

B. The initial analysis of sample 99-SW/SD-FB has severe recovery problems for the base/neutral surrogates resulting in the base/neutral compounds being qualified as rejected (R). The reanalysis showed successful recoveries for the base/neutrals, but was performed outside holding times, resulting in qualification as estimated (J/UJ). Form 1's from both analyses are attached.

VII. Blank Spike - Laboratory Control Sample(s)

A. Blank spike analyses (i.e., method blanks spiked with surrogates for volatiles and semivolatiles) were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP established control limits.

Yes __X__ No _____

Comments: The compounds used for the Pesticide/PCB blank spike were lindane, dieldrin and aroclor 1260.

B. Laboratory control charts were provided in the package; however, the CLP limits were used for review.

Yes __X__ No _____

Comments: No comments.

VIII. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The matrix spike and matrix spike duplicate recovery summary data were reviewed. The spiking procedures were performed and met all recommended QC specifications.

Yes _____ No __X__

Comments:

1. For case numbers 22261, 22225, and 22243, the laboratory included volatiles summary forms for samples 99-01-SD (soil) and 99-07-SW (water). All recoveries were found to be within control limits.

2. The laboratory provided summary information for samples 99-10-SW (water) and 99-10-SD (soil) from Case No. 22211, to demonstrated that the appropriate laboratory QC was performed for the volatile, semivolatile and pesticide/PCB analysis.

The following compounds, indicated by an asterisk (*), were found to be outside laboratory or project specific control limits:

Sample	Compound	Rec. % MS/MSD	RPD	Control Limits Rec. %/RPD
99-10-SW	Benzene	74*/79	7	76-127/11
	Toluene	72*/80	11	76-125/13
	Phenol	27/16	51*	12-110/42
	2-Chlorophenol	54/34	45*	27-123/40
	1,4-Dichlorobenzene	40/27*	39*	36-97/28
	N-Nitroso-di-n-propylamine	61/41	39*	41-116/38
	1,2,4-Trichlorobenzene	38*/26*	38*	39-98/28
	Acenaphthene	49/35*	33*	46-118/31

No qualifiers have been applied to the sample data on the basis of MS/MSD recoveries or RPD values outside control limits.

IX. Field Duplicate Results

This package contained a field duplicate sample.

Yes _____ No __X__ Not identified _____

Comments: No comments.

X. Additional Comments

A. Percent moisture results for samples 99-04-SD and 99-07-SD in this data package were greater than 50%. It could not be determined by the reviewer whether the results were an accurate representation of sample composition. It was also not clear if the sample was mixed to obtain homogeneous aliquots for both the sample analysis and the percent moisture analysis, or if the sample aliquot was based on a portion of sediment taken from a settled layer of solid material. In either case, sample aliquots used for moisture content are potentially unrepresentative of the aliquots for metals analysis. Significant uncertainty in sample results may be expected due to the inhomogeneity of a sample that is more than 50% water.

B. Sample number 99-04-SD contained 83% (86% on Form 1 for Pesticide/PCB) moisture. As there would be extreme difficulty in obtaining a representative sample for all types of analysis, positive results have been qualified as estimated.

C. On page 179 of the data package (Form 5) a transcription error was found. The first sample listed on this page should have been 99-08-SW not 98-08-SW.

D. The unknown TIC's were not labelled appropriately as specified in the 2/88 SOW. Instead of "Unknown" the laboratory used "Not Identified".

E. The laboratory qualified the pesticide data JX to indicate that the compound was detected and quantitated below the Contract Required Quantitation Limit.

F. Two sets of analyses were found for samples 99-10-SW and 99-10-SD. These analyses are found in two different data packages, Case 22211 and Case 22212, respectively.

EXPLANATION OF ORGANICS DATA FLAGS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

R - Quality Control indicates that data is not usable (i.e., compound may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

J - The associated numerical value is an estimated quantity because quality control criteria were not met or because the amount detected is below the detection limits required by analytical Statement of Work. The laboratory uses this flag in the latter situation.

B - The laboratory uses this flag when the reported analyte was also found in the method blank. Data validation guidelines do not specify the use of this flag.

JN - Tentative identification of a compound at an estimated concentration. Resampling and re-analysis would be necessary for verification.

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CCJM DOCUMENT NO: WFIDS005.RAW

INORGANICS DATA REVIEW REPORT

Case No. 22225 Project NEESA Level C
Site Whiting Field NAS Project Name
Contract Laboratory CH2M HILL MGM Client ABB
Sample Delivery Group (SDG) 22225 Sampling Date(Month/Year) 7/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C
99-09-SW	water	X	-	X
99-09-SD	soil	X	-	X
99-08-SW	water	X	-	X
99-SW/SD-RB	water	X	-	X
99-08-SD	soil	X	-	X
99-SW/SD-FB	water	X	-	X
99-07-SD	soil	X	-	X
99-07-SW	water	X	-	X

Laboratory QC Samples

99-09-SWMS	water	X	-	-
99-09-SWDup	water	X	-	-
# of Samples Analyzed:		8	-	8
Total # of Analyzed:		10	-	8

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee Date 1/20/93
QA Review by Jeralyn Guthrie/Roger Simon Date 1/20/93
CCJM Approval by Richard Cheatham Date 1/20/93

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified in NEESA Requirements, Chapter 7 (Document No. NEESA 20.2-047B) have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions in the Glossary of Terms.

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CCJM DOCUMENT NO: WFIDS005.RVW

INORGANICS DATA REVIEW REPORT

Case No. 22225 Project NEESA Level C
Site Whiting Field NAS Project Name
Contract Laboratory CH2M HILL MGM Client ABB
Sample Delivery Group (SDG) 22225 Sampling Date(Month/Year) 7/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C
99-09-SW	water	X	-	X
99-09-SD	soil	X	-	X
99-08-SW	water	X	-	X
99-SW/SD-RB	water	X	-	X
99-08-SD	soil	X	-	X
99-SW/SD-FB	water	X	-	X
99-07-SD	soil	X	-	X
99-07-SW	water	X	-	X
Laboratory QC Samples				
99-09-SWMS	water	X	-	-
99-09-SWDup	water	X	-	-
# of Samples Analyzed:		8	-	8
Total # of Analyzed:		10	-	8

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee Date
QA Review by Jeralyn Guthrie/Roger Simon Date
CCJM Approval by Richard Cheatham Date

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified in NEESA Requirements, Chapter 7 (Document No. NEESA 20.2-047B) have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions on the last page of this report.

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes __X__ No _____

Comments: See the following Level C Data Deliverables Checklist for a listing of the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECK LIST - INORGANICS

KEY

__X__ Included in package
__O__ Not included and/or not available
__NR__ Not applicable or not required
__RS__ Provided as resubmission

__X__ Case Narrative
__X__ Sample results data sheets (Form 1 or spreadsheet)
__X__ CLP data flags used by laboratory
__X__ Initial calibration and calibration verification results (Form 2A or equivalent)
__RS__ Initial calibration curve data (not a NEESA required deliverable)
__X__ Continuing calibration verification (Form 2A or equivalent)
__X__ Continuing calibration blanks-10% frequency (Form 3 or equivalent)
__X__ Preparation blank results (Form 3 or equivalent)
__X__ ICP interference check sample (Form 4 or equivalent)
__X__ Matrix spike results (Form 5A or equivalent)
__NR__ Post-digest spike sample recovery for ICP (if needed) (Form 5B or equivalent)
__X__ Duplicate results (Form 6 or equivalent)
__X__ Blank spike/laboratory control sample(s) with each batch (Form 7 or equivalent)
__X__ Control charts developed by lab
__NR__ Standard addition results (Form 8 or equivalent)
__NR__ Serial dilution results for ICP analytes (Form 9 or equivalent)
__X__ Holding times summary form (Form 10 or equivalent, i.e. Forms 13 and 14 from EPA-CLP SOW 788 and 3/90)
__X__ Chain of Custody Records

II. Holding Times

Samples were prepared and analyzed within holding time specified by the NEESA data validation guidelines. Holding time is based on date sampled to date of final analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

III. Calibration Quality Control

A. The required summary forms were provided and information was present to determine that initial calibration curves met guidelines (correlation, number of calibration standards, etc.) or method criteria.

Yes __X__ No _____

Comments: Data related to initial calibration curves was not initially provided and is not shown on NEESA Table 7.6 as a specific deliverable requirement for the laboratory. However, this information was provided by the laboratory upon request since data validation requirements specify review of this data.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standard analyses were reported as required and had recoveries reported to be within the CLP specified control limits.

Yes _____ No __X__

Comments: The arsenic CCV7 standard had a recovery of 2.5%; however, no samples in this package were affected by this out of control CCV.

IV. Blank Quality Control

A. A preparation/method blank was prepared and analyzed at the specified frequency.

Yes __X__ No _____

Comments: No comments.

B. All analytes in the preparation blank were below the CRDL and thus compliant with NEESA requirements.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the instrument detection limit.

Yes _____ No __X__

Comments: The following is a table of samples and analytes requiring data qualifiers due to reported contaminants or problems in the preparation blank. The samples and analytes listed below were reported to be less than five times the absolute value of the amount reported in the blank.

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)		Qualifier
99-09-SW	arsenic	1.00	U	-5.7	B	UJ
	beryllium	0.24	U	-0.58	B	UJ
	chromium	2.0	B	-1.97	B	J
	cobalt	4.2	B	-9.8	B	J
	potassium	756	B	-733.7	B	J
	silver	1.5	U	-2.03	B	UJ
	vanadium	1.3	U	-1.36	B	UJ
99-08-SW	arsenic	1.00	U	-5.7	B	UJ
	beryllium	0.24	U	-0.58	B	UJ
	chromium	1.9	U	-1.97	B	UJ
	cobalt	1.6	U	-9.8	B	UJ
	potassium	602	U	-733.7	B	UJ
	silver	1.5	U	-2.03	B	UJ
	sodium	3280	B	666.5	B	J
	vanadium	1.3	U	-1.36	B	UJ
99-SW/SD-RB	aluminum	57.8	B	-13.35	B	J
	arsenic	1.00	U	-5.7	B	UJ
	beryllium	0.24	U	-0.58	B	UJ
	calcium	272	B	170.1	B	J
	chromium	2.0	B	-1.97	B	J
	cobalt	2.6	B	-9.8	B	J
	iron	26.6	B	18.98	B	J
	potassium	602	U	-733.7	B	UJ
	silver	1.5	U	-2.03	B	UJ
	sodium	855	B	666.5	B	J
	vanadium	1.3	U	-1.36	B	UJ

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)		Qualifier
99-SW/SD-FB	aluminum	28.7	B	-13.35	B	J
	arsenic	1.00	U	-5.7	B	UJ
	beryllium	0.24	U	-0.58	B	UJ
	calcium	237	B	170.1	B	J
	chromium	1.9	U	-1.97	B	UJ
	cobalt	1.6	U	-9.8	B	UJ
	iron	40.8	B	18.98	B	J
	potassium	602	U	-733.7	B	UJ
	silver	1.5	U	-2.03	B	UJ
	sodium	897	B	666.5	B	J
	vanadium	1.3	U	-1.36	B	UJ
99-07-SW	arsenic	1.00	U	-5.7	B	UJ
	beryllium	0.24	U	-0.58	B	UJ
	chromium	1.9	U	-1.97	B	UJ
	cobalt	1.6	U	-9.8	B	UJ
	silver	1.5	U	-2.03	B	UJ
	vanadium	1.3	U	-1.36	B	UJ
		(mg/kg)		(mg/kg)		
99-09-SD	sodium	258	B	117.1	B	J
99-08-SD	calcium	110	B	32.07	B	J
	sodium	213	B	117.1	B	J
	vanadium	1.2	B	-0.26	B	J
99-07-SD	sodium	513	B	117.1	B	J

D. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Identified _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks.

Blank Type/ID	Analyte	Amount (µg/L)		Associated Samples
Rinsate/99-SW/SD-RB	aluminum	57.8	B	99-09-SW
	barium	1.1	B	99-09-SD
	calcium	272	B	
	chromium	2.0	B	
	cobalt	2.6	B	
	copper	4.8	B	

Blank Type/ID	Analyte	Amount (µg/L)		Associated Samples
Rinsate/99-SW/SD-RB, cont.	iron	26.6	B	
	lead	2.2	B	
	manganese	1.7	B	
	sodium	855	B	
	zinc	14.4	B	
Field/99-SW/SD-FB	aluminum	28.7	B	All
	barium	0.58	B	
	calcium	237	B	
	iron	40.8	B	
	lead	1.0	B	
	nickel	22.4	B	
	sodium	897	B	
	zinc	8.1	B	
Rinsate/99-SW/SD-RB02	Aluminum	33.4	B	99-07-SW
	Barium	0.78	B	99-07-SD
	Calcium	246	B	99-08-SW
	Chromium	2.2	B	99-08-SD
	Copper	18.6	B	99-SW/SD-FB
	Iron	26.8	B	
	Lead	1.2	B	
	Sodium	867	B	
	Zinc	23.4		

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinseate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)		Qualifier
99-09-SW	Copper	6.8	B	4.8	B	J
	Lead	2.2	B	2.2 B, 1.0 B		J
	Nickel	19.0	B	22.4	B	J
	Sodium	4070	B	897	B	J
	Zinc	20.7		8.1	B	J
		(mg/kg)		(µg/L)		
99-09-SD	Calcium	315	B	272 B, 237 B		J
	Cobalt	1.6	B	2.6	B	J
	Copper	6.0	B	4.8	B	J
	Nickel	12.0	B	22.4	B	J
	Zinc	12.9		8.1	B	J

Sample	Analyte	Sample Amount		Blank Amount		Qualifier
		(µg/L)		(µg/L)		
99-08-SW	Aluminum	159	B	57.8	B	J
	Calcium	954	B	272 B, 246 B		J
	Copper	12.1	B	18.6	B	J
	Lead	2.4	B	2.2 B, 1.2 B		J
	Nickel	43.2	B	22.4	B	J
	Zinc	25.6		23.4, 8.1 B		J
		(mg/kg)		(µg/L)		
99-08-SD	Chromium	1.0	B	2.2	B	J
	Copper	4.5	B	18.6	B	J
	Zinc	10.1		23.4, 8.1 B		J
		(µg/L)		(µg/L)		
99-SW/SD-RB	Barium	1.1	B	0.58	B	J
	Lead	2.2	B	1.0	B	J
	Zinc	14.4	B	8.1	B	J
99-SW/SD-FB	Barium	0.58	B	0.78	B	J
	Lead	1.0	B	1.2	B	J
	Zinc	8.1	B	23.4	B	J
99-07-SW	Lead	3.3	B	1.0 B, 1.2 B		J
	Zinc	9.2	B	8.1 B, 23.4		J

3. Many analytes found in the field and/or rinsate blanks were also found in the method blank. Repetitive qualifiers have not been shown.

V. Accuracy Statements

A. Blank spike/laboratory control sample (LCS) analyses were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP matrix spike control limits.

Yes __X__ No _____

Comments: No comments.

B. Laboratory control charts were provided in the package and the limits specified by the control charts were used for review.

Yes __X__ No _____

Comments: No comments.

C. Matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Sample 99-09-SW was used as the water matrix spike sample for ICP and GFAA analytes. Sample 99-04-SW from data package 22243 was used as the water matrix spike sample for mercury. Sample 99-10-SD from data package 22211 was used as the soil matrix spike sample for metals. Samples 99-10-SW and 99-10-SD from data package 22211 were used as the matrix spike samples for cyanide.

D. Matrix spike recoveries were within the specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following matrix spike analytes were reported to be outside control limits:

Sample	Matrix	Analyte	% Recovery
99-10-SD	soil	lead	152.8

2. For those analytes having high recoveries the results may be biased high and false positives may be reported.

VI. Field Duplicates

This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VII. Additional Comments

The listing showing sample ID cross-references is included in Attachment I.

EXPLANATION OF DATA FLAGS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality control indicates that data is not usable (i.e. analyte may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

TABLE 1

Summary of Sample Data Flags

SDG#/Case 22225 Site Name Whiting Field NAS

Sample ID	Matrix	Al	As	Ba	Be	Ca	Cr	Co	Cu
99-09-SW	water		UJ		UJ		J	J	J
99-09-SD	soil					J		J	J
99-08-SW	water	J	UJ		UJ	J	UJ	UJ	J
99-SW/SD-RB	water	J	UJ	J	UJ	J	J	J	
99-08-SD	soil					J	J		J
99-SW/SD-FB	water	J	UJ	J	UJ	J	UJ	UJ	
99-07-SD	soil								
99-07-SW	water		UJ		UJ		UJ	UJ	J

Sample ID	Matrix	Fe	Pb	Ni	K	Ag	Na	V	Zn
99-09-SW	water		J	J	J	UJ	J	UJ	J
99-09-SD	soil			J			J		J
99-08-SW	water		J	J	UJ	UJ	J	UJ	J
99-SW/SD-RB	water	J	J		UJ	UJ	J	UJ	J
99-08-SD	soil						J	J	J
99-SW/SD-FB	water	J	J		UJ	UJ	J	UJ	J
99-07-SD	soil						J		
99-07-SW	water		J			UJ		UJ	J

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INORGANICS DATA REVIEW REPORT

Case No. 22243 Project NEESA Level C
Site Whiting Field NAS Project Name
Contract Laboratory CH2M HILL MGM Client ABB
Sample Delivery Group (SDG) 22243 Sampling Date(Month/Year) 7/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C	Hg
99-06-SW	water	X	-	X	X
99-06-SD	soil	X	-	X	X
99-SWSD-RB02	water	X	-	X	X
99-12-SW	water	X	-	X	X
99-12-SD	soil	X	-	X	X
99-SWSD-RB03	water	X	-	X	X

Sample Number	Sample Matrix	T	D	C	Hg
99-04-SW	water	X	-	X	X
99-04-SD	soil	X	-	X	X

Laboratory QC Samples

99-06-SWMS	water	X	-	-	-
99-04-SWMS	water	-	-	-	X
99-12-SWMS	soil	-	-	-	X

99-06-SWDup	water	X	-	-	-
99-04-SWDup	water	-	-	-	X
99-12-SDDup	soil	-	-	-	X
# of Samples Analyzed:		8	-	8	8
Total # of Samples:		10	-	8	12

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee Date 1/20/93
QA Review by Jeralyn Guthrie/Roger Simon Date 1/20/93
CCJM Approval by Richard Cheatham Date 1/20/93

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified in NEESA Requirements, Chapter 7 (Document No. NEESA 20.2-047B) have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions on the last page of this report.

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CCJM DOCUMENT NO: WFIDS004.RVW

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99-06-SD	soil	X	-	X	X
99-SWSD-RB02	water	X	-	X	X
99-12-SW	water	X	-	X	X
99-12-SD	soil	X	-	X	X
99-SWSD-RB03	water	X	-	X	X

Sample Number	Sample Matrix	T	D	C	Hg
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99-04-SWMS	water	-	-	-	X
99-12-SWMS	soil	-	-	-	X

99-06-SWDup	water	X	-	-	-
99-04-SWDup	water	-	-	-	X
99-12-SDDup	soil	-	-	-	X
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-- Please see data flagging definitions on the last page of this report.

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes __X__ No _____

Comments: See the following Level C Data Deliverables Checklist for a listing of the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECK LIST - INORGANICS

KEY

__X__ Included in package
__O__ Not included and/or not available
__NR__ Not applicable or not required
__RS__ Provided as resubmission

__X__ Case Narrative
__X__ Sample results data sheets (Form 1 or spreadsheet)
__X__ CLP data flags used by laboratory
__X__ Initial calibration and calibration verification results (Form 2A or equivalent)
__RS__ Initial calibration curve data (not a NEESA required deliverable)
__X__ Continuing calibration verification (Form 2A or equivalent)
__X__ Continuing calibration blanks-10% frequency (Form 3 or equivalent)
__X__ Preparation blank results (Form 3 or equivalent)
__X__ ICP interference check sample (Form 4 or equivalent)
__X__ Matrix spike results (Form 5A or equivalent)
__NR__ Post-digest spike sample recovery for ICP (if needed) (Form 5B or equivalent)
__X__ Duplicate results (Form 6 or equivalent)
__X__ Blank spike/laboratory control sample(s) with each batch (Form 7 or equivalent)
__X__ Control charts developed by lab
__NR__ Standard addition results (Form 8 or equivalent)
__NR__ Serial dilution results for ICP analytes (Form 9 or equivalent)
__X__ Holding times summary form (Form 10 or equivalent, i.e. Forms 13 and 14 from EPA-CLP SOW 788 and 3/90)
__X__ Chain of Custody Records

II. Holding Times

Samples were prepared and analyzed within holding time specified by the NEESA data validation guidelines. Holding time is based on date sampled to date of final analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

III. Calibration Quality Control

A. The required summary forms were provided and information was present to determine that initial calibration curves met guidelines (correlation, number of calibration standards, etc.) or method criteria.

Yes __X__ No _____

Comments: Data related to initial calibration curves was not initially provided and is not shown on NEESA Table 7.6 as a specific deliverable requirement for the laboratory. However, this information was provided by the laboratory upon request since data validation requirements specify review of this data.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standard analyses were reported as required and had recoveries reported to be within the CLP specified control limits.

Yes __X__ No _____

Comments: No comments.

IV. Blank Quality Control

A. A preparation/method blank was prepared and analyzed at the specified frequency.

Yes __X__ No _____

Comments: No comments.

B. All analytes in the preparation blank were below the CRDL and thus compliant with NEESA requirements.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the instrument detection limit.

Yes _____ No __X__

Comments: The following is a table of samples and analytes requiring data qualifiers due to reported contaminants or problems in the preparation blank. The samples and analytes listed below were reported to be less than five times the absolute value of the amount reported in the blank.

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
99-06-SW	aluminum	116 B µg/L	58.05 B µg/L	J
	calcium	989 B µg/L	222.4 B µg/L	J
	lead	0.96 B µg/L	1.7 B µg/L	J
	sodium	3140 B µg/L	919 B µg/L	J
99-SWSD-RB02	aluminum	33.4 B µg/L	58.05 B µg/L	J
	barium	0.78 B µg/L	1.04 B µg/L	J
	calcium	246 B µg/L	222.4 B µg/L	J
	chromium	2.2 B µg/L	3.33 B µg/L	J
	iron	26.8 B µg/L	23.37 B µg/L	J
	lead	1.2 B µg/L	0.96 B µg/L	J
	sodium	867 B µg/L	919 B µg/L	J
99-12-SW	aluminum	120 B µg/L	58.05 B µg/L	J
	calcium	1010 B µg/L	222.4 B µg/L	J
	chromium	3.2 B µg/L	3.33 B µg/L	J
	cobalt	2.3 B µg/L	1.96 B µg/L	J
	lead	1.3 B µg/L	0.96 B µg/L	J
	sodium	3090 B µg/L	919 B µg/L	J
99-SWSD-RB03	aluminum	52.1 B µg/L	58.05 B µg/L	J
	barium	2.1 B µg/L	1.04 B µg/L	J
	calcium	300 B µg/L	222.4 B µg/L	J
	chromium	4.8 B µg/L	3.33 B µg/L	J
	iron	48.4 B µg/L	23.37 B µg/L	J
	lead	3.1 B µg/L	0.96 B µg/L	J
	sodium	901 B µg/L	919 B µg/L	J

Sample	Analyte	Sample Amount	Blank Amount	Qualifier
99-04-SW	aluminum	144 B µg/L	58.05 B µg/L	J
	calcium	900 B µg/L	222.4 B µg/L	J
	chromium	11.7 B µg/L	3.33 B µg/L	J
	cobalt	2.4 B µg/L	1.96 B µg/L	J
	lead	2.4 B µg/L	0.96 B µg/L	J
	sodium	3110 B µg/L	919 B µg/L	J
	vanadium	1.4 B µg/L	1.33 B µg/L	J
99-06-SD	calcium	93.2 B mg/kg	32.07 B mg/kg	J
	sodium	208 B mg/kg	117.1 B mg/kg	J
	vanadium	1.1 B mg/kg	-0.262 B mg/kg	J
99-12-SD	sodium	198 B mg/kg	117.1 B mg/kg	J
	vanadium	0.98 B mg/kg	-0.262 B mg/kg	J

D. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Identified _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks. The field blank 99-SW/SD-FB was found in data package 22225.

Blank Type/ID	Analyte	Amount (ug/L)		Associated Samples
Rinsate/99-SWSD-RB02	aluminum	33.4	B	None in this package
	barium	0.78	B	
	calcium	246	B	
	chromium	2.2	B	
	copper	18.6	B	
	iron	26.8	B	
	lead	1.2	B	
	sodium	867	B	
	zinc	23.4		
Rinsate/99-SWSD-RB03	aluminum	52.1	B	99-01-SW
	barium	2.1	B	99-06-SD
	calcium	300	B	99-12-SW
	chromium	4.8	B	99-12-SD
	copper	16.3	B	
	iron	48.4	B	
	lead	3.1		

Blank Type/ID	Analyte	Amount (ug/L)		Associated Samples
Rinsate/99-SWSD-RB03, cont.	manganese	2.1	B	
	sodium	901	B	
	zinc	30.7		
Field/99-SW/SD-FB	aluminum	28.7	B	All
	barium	58	B	
	calcium	23	B	
	iron	40.8	B	
	lead	1.0	B	
	nickel	22.4	B	
	sodium	897	B	
	zinc	8.1	B	

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinsate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount		Blank Amount		Qualifier
		(µg/L)		(µg/L)		
99-06-SW	copper	13.8	B	16.3	B	J
	zinc	27.1	B	30.7, 8.1	B	J
		(mg/kg)		(µg/L)		
99-06-SD	barium	0.90	B	2.1	B	J
	chromium	1.1	B	4.8	B	J
	copper	1.8	B	16.3	B	J
	lead	2.4		3.1		J
	zinc	5.0	B	30.7, 8.1	B	J
		(µg/L)		(µg/L)		
99-12-SW	copper	13.8	B	16.3	B	J
	zinc	20.2	B	30.7, 8.1	B	J
		(mg/kg)		(µg/L)		
99-12-SD	barium	0.57	B	2.1 B, 0.58	B	J
	calcium	364	B	300	B	J
	chromium	1.0	B	4.8	B	J
	copper	10.7	B	16.3	B	J
	lead	3.0		3.1		J
	manganese	1.5	B	2.1	B	J
	zinc	13.1		30.7		J

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)		Qualifier
99-04-SW	nickel	20.5	B	22.4	B	J
	zinc	21.6	B	8.1	B	J
		(mg/kg)		(µg/L)		
99-04-SD	calcium	1710	B	237	B	J
	sodium	1190	B	897	B	J

3. Many analytes that were found in the field and rinsate blanks were also found in the preparation blanks. Repetitive qualifiers have not been shown.

V. Accuracy Statements

A. Blank spike/laboratory control sample (LCS) analyses were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP matrix spike control limits.

Yes __X__ No _____

Comments: No comments.

B. Laboratory control charts were provided in the package and the limits specified by the control charts were used for review.

Yes __X__ No _____

Comments: CLP control limits (80-120%) were used for evaluation of LCS results.

C. Matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Samples 99-06-SW, 99-04-SW (mercury only), and 99-10-SW (cyanide only; from data package 22211) were used as the water matrix spike samples. Sample 99-10-SD from the 22211 package was used as the soil matrix spike sample.

D. Matrix spike recoveries were within the specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following matrix spike analytes were reported to be outside control limits:

Sample	Matrix	Analyte	% Recovery
99-06-SW	water	selenium	62.6
99-10-SD	soil	lead	152.8

2. The low recoveries for the above analytes indicate that the reported results may be biased low and that there is a possibility of false negatives being reported. For those analytes having high recoveries the results may be biased high and false positives may be reported.

VI. Field Duplicates

This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VII. Additional Comments

A cross reference showing client and laboratory ID's has been included in Attachment I.

EXPLANATION OF DATA FLAGS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality control indicates that data is not usable (i.e. analyte may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

TABLE 1

Summary of Sample Data Flags

SDG#/Case 22243 Site Name Whiting Field NAS

Sample ID	Matrix	Al	Ba	Ca	Cr	Co	Cu	Fe
99-06-SW	water	J		J			J	
99-06-SD	soil		J	J	J		J	
99-SWSD-RB02	water	J	J	J	J			J
99-12-SW	water	J		J	J	J		
99-12-SD	soil		J	J	J		J	
99-SWSD-RB03	water	J	J	J	J			J
99-04-SW	water	J		J	J	J		
99-04-SD	Soil			J				

Sample ID	Matrix	Pb	Mn	Ni	Na	V	Zn
99-06-SW	water	J			J		J
99-06-SD	soil	J			J	J	J
99-SWSD-RB02	water	J			J		
99-12-SW	water	J			J		
99-12-SD	soil	J			J	J	J
99-SWSD-RB03	water	J	J		J		
99-04-SW	water	J		J	J	J	J
99-04-SD	Soil	J					

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ENVIRONMENTAL ENGINEERS & SCIENTISTS

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INORGANICS DATA REVIEW REPORT

Case No. 22562
Site Whiting Field NAS
Contract Laboratory CH2M Hill
Sample Delivery Group (SDG) 22562
Type of Analyses/Special Request TAL Metals, Cyanide

Project NEESA Level C
Project Name Whiting Field
Client ABB Environmental
Sampling Date(Month/Year) 8/92

Sample Number	Sample Matrix	T	D	C	Hg
3-SW-01	Water	X	-	X	X
3-SD-01	Soil	X	-	X	X
1-SW-01	Water	X	-	X	X
1-SD-01	Soil	X	-	X	X
2-SW-01	Water	X	-	X	X
2-SD-01	Soil	X	-	X	X
SLR/SL-R809	Water	X	-	X	X
SLR/SL-FB-02	Water	X	-	X	X

Laboratory QC Samples

Sample Number	Sample Matrix	T	D	C	Hg
SLR/SL-R809MS	Water	X	-	-	-
SLR/SL-R809DUP	Water	X	-	-	-
3-SD-01MS	Soil	-	-	-	X
3-SD-01DUP	Soil	-	-	-	X
3-SW-01MS	Water	-	-	-	X
3-SW-01DUP	Soil	X	-	-	X
# of Samples Analyzed:		8	-	8	8
Total # of Analyses:		10	-	-	12

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MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee RS Date 1/22/93
QA Review by Jeralyn Guthrie/Roger Simon RS Date 1/22/93
CCJM Approval by Richard Cheatham Date 1/22/93

Contractual violations found? Yes ____ No X Not Appl. ____
Laboratory case narrative attached? Yes X No ____ Not Avail. ____

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
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Note:

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Site Whiting Field NAS Project Name Whiting Field
Contract Laboratory CH2M Hill Client ABB Environmental
Sample Delivery Group (SDG) 22562 Sampling Date(Month/Year) 8/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C	Hg
3-SW-01	Water	X	-	X	X
3-SD-01	Soil	X	-	X	X
1-SW-01	Water	X	-	X	X
1-SD-01	Soil	X	-	X	X
2-SW-01	Water	X	-	X	X
2-SD-01	Soil	X	-	X	X
SUR/SL-RB09	Water	X	-	X	X
SUR/SL-FB-02	Water	X	-	X	X

Laboratory QC Samples

Sample Number	Sample Matrix	T	D	C	Hg
SUR/SL-RB09MS	Water	X	-	-	-
SUR/SL-RB09DUP	Water	X	-	-	-
3-SD-01MS	Soil	-	-	-	X
3-SD-01DUP	Soil	-	-	-	X
3-SW-01MS	Water	-	-	-	X
3-SW-01DUP	Soil	X	-	-	X
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-- Please see data flagging definitions on the last page of this report.

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes __X__ No _____

Comments: See the following Level C Data Deliverables Checklist for a listing of the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECK LIST - INORGANICS

KEY
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__NR__ Standard addition results (Form 8 or equivalent)
__NR__ Serial dilution results for ICP analytes (Form 9 or equivalent)
__X__ Holding times summary form (Form 10 or equivalent, i.e. Forms 13 and 14 from EPA-CLP SOW 788 and 3/90)
__X__ Chain of Custody Records

II. Holding Times

Samples were prepared and analyzed within holding time specified by the NEESA data validation guidelines. Holding time is based on date sampled to date of final analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

III. Calibration Quality Control

A. The required summary forms were provided and information was present to determine that initial calibration curves met guidelines (correlation, number of calibration standards, etc.) or method criteria.

Yes __X__ No _____

Comments: Data related to initial calibration curves was not initially provided and is not shown on NEESA Table 7.6 as a specific deliverable requirement for the laboratory. However, this information was provided by the laboratory upon request since data validation requirements specify review of this data.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standard analyses were reported as required and had recoveries reported to be within the CLP specified control limits.

Yes __X__ No _____

Comments: No comments.

IV. Blank Quality Control

A. A preparation/method blank was prepared and analyzed at the specified frequency.

Yes __X__ No _____

Comments: No comments.

B. All analytes in the preparation blank were below the CRDL and thus compliant with NEESA requirements.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the instrument detection limit.

Yes _____ No __X__

Comments: The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the preparation blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount (µg/L)		Blank Amount (µg/L)		Qualifier
3-SW-01	Aluminum	140	B	47.53	B	J
	Mercury	0.03	U	-0.19	B	UJ
	Sodium	2720	B	736.5	B	J
1-SW-01	Aluminum	141	B	47.53	B	J
	Mercury	0.03	U	-0.19	B	UJ
	Sodium	2700	B	736.5	B	J
	Zinc	13.1	B	7.67	B	J
2-SW-01	Aluminum	142B		47.53	B	J
	Mercury	0.0.	U	-0.19	B	UJ
	Sodium	2700	B	736.5	B	J
	Zinc	10.1	B	7.67	B	J
SUR/SL-RB09	Aluminum	84.6	B	47.53	B	J
	Calcium	489	B	167.86	B	J
	Iron	20.0	B	25.65	B	J
	Mercury	0.03	U	-0.19	B	UJ
	Sodium	1040	B	736.5	B	J
	Zinc	11.0	B	7.67	B	J
SUR/SL-FB02	Aluminum	33.4	B	47.53	B	J
	Antimony	15.0	B	17.38	B	J
	Calcium	325	B	167.86	B	J
	Iron	18.3	B	25.65	B	J
	Mercury	0.26		-0.19	B	J
	Sodium	759	B	736.5	B	J
	Zinc	8.0	B	7.67	B	J

Sample	Analyte	Sample Amount (mg/kg)		Blank Amount (mg/kg)		Qualifier
3-SD-01	Calcium	55.3	B	22.4	B	J
	Chromium	1.3	B	0.618	B	J
	Sodium	183	B	108.2	B	J
1-SD-01	Calcium	78.8	B	22.4	B	J
	Chromium	2.0	B	0.618	B	J
	Sodium	188	B	108.2	B	J
2-SD-01	Calcium	81.7	B	22.4	B	J
	Chromium	2.1	B	0.618	B	J
	Sodium	209	B	108.2	B	J

D. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Identified _____

Comments:

1. The following list shows the other types of blanks included in the package and contaminants found in these blanks. Data has been qualified by the reviewer due to contaminants reported in these blanks.

Blank Type/ID	Analyte	Amount (ug/L)		Associated Samples
Rinsate/SUR/SL-RB09	Aluminum	84.6	B	All
	Barium	1.1	B	
	Calcium	489	B	
	Iron	20.0	B	
	Lead	1.9	B	
	Manganese	1.8	B	
	Silver	1.7	B	
	Sodium	1040	B	
	Zinc	11.0	B	
Field/SUR/SL-FB-02	Aluminum	33.4	B	All
	Antimony	15.0	B	
	Barium	1.1	B	
	Calcium	325	B	
	Iron	18.3	B	
	Mercury	0.26		
	Silver	1.5	B	
	Sodium	756	B	
	Zinc	8.0	B	

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinseate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount		Blank Amount		Qualifier
		(µg/L)		(µg/L)		
3-SW-01	Aluminum	140B	B	33.4	B	J
	Calcium	926B	B	325	B	J
	Sodium	2720	B	759	B	J
	Lead	3.0	B	1.9	B	J
		(mg/kg)		(µg/L)		
3-SD-01	Barium	0.53	B	1.1	B	J
	Calcium	55.3	B	325	B	J
	Mercury	0.20		0.26		J
	Sodium	183	B	759	B	J
	Lead	2.3		1.9	B	J
	Manganese	1.6	B	1.8	B	J
		(µg/L)		(µg/L)		
1-SW-01	Aluminum	141	B	33.4	B	J
	Calcium	1050	B	325	B	J
	Silver	2.9	B	1.5	B	J
	Sodium	2700	B	759	B	J
	Zinc	13.1	B	8.0	B	J
	Lead	4.6		1.9	B	J
		(mg/kg)		(µg/L)		
1-SD-01	Barium	1.2	B	1.1	B	J
	Calcium	78.8	B	33.4	B	J
	Mercury	0.25		0.26		J
	Sodium	188	B	759	B	J
	Zinc	3.7	B	8.0	B	J
	Lead	1.9		1.9	B	J
	Manganese	1.7	B	1.8	B	J
		(µg/L)		(µg/L)		
2-SW-01	Aluminum	142	B	33.4	B	J
	Calcium	1280	B	325	B	J
	Sodium	2700	B	759	B	J
	Zinc	10.1	B	8.0	B	J
	Lead	9.3		1.9	B	J

Sample	Analyte	Sample Amount (mg/kg)		Blank Amount (µg/L)		Qualifier
2-SD-01	Calcium	81.7	B	325	B	J
	Mercury	0.20		0.26		J
	Sodium	209	B	759	B	J
	Zinc	4.6	B	8.0	B	J
		(µg/L)		(µg/L)		
SUR/SL-RB09	Aluminum	84.6	B	33.4	B	J
	Barium	1.1	B	1.1	B	J
	Calcium	489	B	325	B	J
	Iron	20.0	B	18.3	B	J
	Silver	1.7	B	1.5	B	J
	Sodium	1040	B	759	B	J
	Zinc	11.0	B	8.0	B	J

V. Accuracy Statements

A. Blank spike/laboratory control sample (LCS) analyses were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP matrix spike control limits.

Yes __X__ No _____

Comments: No comments.

B. Laboratory control charts were provided in the package and the limits specified by the control charts were used for review.

Yes __X__ No _____

Comments: CLP control limits (80-120%) were used for evaluation of LCS results.

C. Matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Sample SUR/SL-RB09 was used as the water matrix spike sample for ICP and GFAA analytes. Samples 3-SD-01 and 3-SW-01 were used as the matrix spike samples for mercury. Sample 01-SL-03 from data package 22457 was used as the soil matrix spike sample. Sample 5-SW-01 from data package 22563 was used as the water matrix spike sample for cyanide. In the resubmission, the laboratory referenced soil matrix cyanide QC to data package 22457. Sample 01-SL-03 was used as the soil matrix spike sample in this package.

D. Matrix spike recoveries were within the specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following matrix spike analytes were reported to be outside control limits:

Sample	Matrix	Analyte	% Recovery
SUR/SL-RB09	Water	Arsenic	70.6
01-SL-03	Soil	Antimony	33.1
		Chromium	15.9
		Lead	74.8

2. The low recoveries for the above analytes indicate that the reported results may be biased low and that there is a possibility of false negatives being reported.

3. An analyte having a matrix spike recovery of <30% and reported as undetected in a sample has a high potential to be a false negative and is considered to be impacted by a severe situation.

VI. Field Duplicates

A. This package contained a field duplicate.

Yes _____ No __X__ Not Applicable _____

Comments: No comments.

VII. Additional Comments

A cross reference showing laboratory and client sample ID's is included in Attachment I.

EXPLANATION OF DATA QUALIFIERS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

J - The associated numerical value is an estimated quantity because quality control criteria were not met.

R - Quality control indicates that data is not usable (i.e., analyte may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

TABLE 1

Summary of Sample Data Qualifiers

SDG#/Case 22562 Site Name Whiting Field NAS

Sample ID	Matrix	Al	Sb	Ba	Ca	Cr	Fe	Hg	Ag	Na	Zn	Pb	Mn
3-SW-01	Water	J			J			UJ		J		J	
3-SD-01	Soil			J	J	J		J		J		J	J
1-SW-01	Water	J			J			UJ	J	J	J	J	
1-SD-01	Soil			J	J	J		J		J	J	J	J
2-SW-01	Water	J			J			UJ		J	J	J	
2-SD-01	Soil				J	J		J		J	J		
SUR/SL-RB09	Water	J		J	J		J	UJ	J	J	J		
SUR/SL-FB02	Water	J	J		J		J	J		J	J		

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CCJM DOCUMENT NO: WFODS012.RW

ORGANICS DATA REVIEW REPORT

Case No. 33711 and 22562
Site Whiting Field
Contract Laboratory CH2M Hill
Sample Delivery Group (SDG) NA
Type of Analyses/Special Request Volatiles, Semivolatiles, Pesticides/PCB's

Project NEESA Level C
Project Name Whiting Field
Client ABB Environmental Services
Sampling Date(Month/Year) 8/92

Sample Number	Sample Matrix	V	B	P
WHF-2A-SUR/SLRB-09	Water	X	X	X
WHF-2A-SUR/SLFB-02	Water	X	X	X
WHF-2A-STA1-SD-01	Soil	X	X	X
WHF-2A-STA1-SW-01	Water	X	X	X
WHF-2A-STA2-SD-01	Soil	X	X	X
WHF-2A-SUR/SLTB-09	Water	X	-	-
WHF-2A-STA3-SW-01	Water	X	X	X
WHF-2A-STA3-SD-01	Soil	X	X	X
WHF-2A-STA2-SW-01	Water	X	X	X

Sample Number	Sample Matrix	V	B	P
1-SW-01-RE	Water	-	X	-
2-SW-01-RE	Water	-	X	-

Laboratory QC Samples

Included in Case No. 33710:				
5-SW-01MS	Water	X	-	-
5-SW-01MSD	Water	X	-	-
5-SD-01MS/MSD	Soil	X/X	-	-

Included in Case No. 22563:			
5-SW-01MS	-	X	X
5-SW-01MSD	-	X	X
5-SD-01MS/MSD	-	X/X	X/X
# of Samples Analyzed:	9	8	8
Total # of Analyses:	13	14	12

V = CLP Volatiles B = CLP Semivolatiles P = CLP Pesticide/PCB's
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Nancy Fish Date 1/26/93
QA Review by Jeralyn Guthrie/Jeff Benson Date 1/26/93
CCJM Approval by Richard Cheatham Date 1/26/93

Contractual violations found? Yes ____ No X Not Appl. ____
TPO action requested? Yes ____ No ____ Not Appl. X

Remarks: Copies of correspondence concerning resubmissions are attached. Please see first page of Case Narrative (Attachment I) for correlation of Client ID and Laboratory ID. The laboratory has truncated the client ID on Form I's.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Data Validator Worksheets
III. Qualified Sample Results (Form 1's)
IV. Laboratory QC Sample Summary Forms

Note:

-- The Level C Data Validation Guidelines as specified by NEESA in the Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Restoration Program, NEESA 20.2-047B, June, 1988, have been used by the data reviewer as a basis for reviewing the data and applying flags, except as specifically noted in review comments.

-- Please see data flagging definitions on the last page of this report.

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Quality Service Since 1979

I. Deliverables

All data deliverables as specified for NEESA Level C quality control were found in the package.

Yes __X__ No _____

Comments: The following Level C Data Deliverables Checklist shows the Forms and data found in the package.

LEVEL C DELIVERABLES COMPLETENESS CHECKLIST - ORGANICS

KEY
__X__ Included in package
__O__ Not included and/or Not available
__NA__ Not applicable or Not required
__RS__ Provided as resubmission

__X__ Method blank spikes with each batch
  __X__ Control chart developed by lab
__X__ Sample results - Form 1 or spreadsheet
  __X__ CLP data flags used by laboratory
  __RS__ Sample chromatograms and mass spectra
__X__ Holding times (sampling, prep and analysis dates provided)
__X__ Surrogate recoveries - Form 2
__X__ Matrix spike/matrix spike duplicate (MS/MSD) - Form 3 (MS/MSD is to be 1 per 20 samples of similar matrix)
__X__ Method blank summary - Form 4
  __X__ Report form for method blank results (Form 1 or spreadsheet)
__X__ GC/MS tuning - Form 5
__X__ Initial calibration data, GC/MS - Form 6
__X__ Pesticide/PCB calibration standards summary - Form 8D (listed as Form 9 on NEESA Table 7.6)
__X__ Continuing calibration data, GC/MS - Form 7
__X__ Internal standard area summary, GC/MS - Form 8A, 8B, or 8C
__X__ Pesticide/PCB continuing calibration data - Form 9
  __X__ Pesticide/PCB 2nd column confirmation - chromatograms

II. Holding Times

Samples were initially extracted and analyzed within holding times specified by the NEESA data validation guidelines. See the following table for a summarization of sample holding times.

Yes __X__ No _____

Comments: An asterisk and number in parentheses indicate a sample fraction outside holding time specifications and the number of days exceeded based on the date sampled. Sample data for any fraction exceeding holding time specifications are flagged as estimated (J or UJ).

Holding Time Summary

Sample Number	Sampling Date	VTSR	VOA Analysis	BNA Extract	BNA Analysis	Pesticide Extract	Pesticide Analysis
SL-RB-09	8/19/92	8/19	8/27	8/25	9/23	8/25	9/13
SL-FB-01	8/19/92	8/19	8/27	8/25	9/23	8/25	9/13
1-SD-01	8/19/92	8/19	8/27	8/25	9/20	8/25	9/13
1-SW-01	8/19/92	8/19	8/27	8/25	9/23	8/25	9/13
2-SD-01	8/19/92	8/19	8/27	8/25	9/20	8/25	9/13
2-SW-01	8/19/92	8/19	8/27	8/25	9/23	8/25	9/13
3-SD-01	8/19/92	8/19	8/27	8/25	9/20	8/25	9/13
3-SW-01	8/19/92	8/19	8/27	8/25	9/23	8/25	9/13
SL-TB-09	8/19/92	8/19	8/27	--	--	--	--
1-SW-01-RE	8/19/92	8/19	--	9/24	9/24*(22)	--	--
2-SW-01-RE	8/19/92	8/19	--	9/24	9/24*(22)	--	--

III. GC/MS Tuning and Mass Calibration

The BFB and/or DFTPP performance results summaries were included for all samples, and were reported to be within specified criteria at the appropriate frequency.

Yes __X__ No _____

Comments: No comments.

IV. A. Instrument Calibration (Volatiles)

1. The instrument response factor (RRF) data summaries were reviewed for the initial and continuing calibrations. All information was present and reported on the required summary forms. Response factors for the system performance check compounds (SPCC) met the required criteria for volatile analyses.

Yes __X__ No _____

Comments: The RRF values outside of data validation guideline specifications are listed on the attached Table 1. All volatile compounds have been reviewed with a control limit of 0.050 being used as a minimum response factor. (NOTE: This procedure has been used by the reviewer in order to prevent the qualification of compounds that had acceptable response factors).

2. The percent relative standard deviation (%RSD) for the initial calibrations and the percent difference (%D) for the continuing calibrations were reviewed for the calibration check compounds (CCC). The %RSD and %D values reported for the CCC's met the data validation criteria (i.e., < 30 %RSD and < 25 %D) for volatile analyses.

Yes __X__ No _____

Comments: All volatile compounds have been reviewed using the same criteria (i.e., < 30 % RSD and < 25 % D). See the attached Table 1 for a summarization of the CCC's and other compounds not meeting these criteria. (NOTE: This procedure has been used by the reviewer in order to prevent the qualification of compounds that had acceptable calibrations reported.) The out-of-control calibrations have resulted in associated sample data being flagged as estimated (J or UJ). The affected samples are also listed on the attached Table 1.

B. Instrument Calibration (Semi-Volatiles)

1. The instrument response factor (RRF) data summaries were reviewed for the initial and continuing calibrations. All information was present and reported on the required summary forms. Response factors for the system performance check compounds (SPCC) met the required criteria (i.e., minimum RRF = 0.050) for semi-volatile analyses, thus no data have been qualified.

Yes __X__ No _____

Comments: No comments.

2. The percent relative standard deviation (%RSD) for the initial calibrations and the percent difference (%D) for the continuing calibrations were reviewed for the calibration check compounds (CCC). The %RSD and %D values reported for the CCC's met the data validation criteria (i.e., < 30 %RSD and < 25 %D) for semi-volatile analyses.

   Yes __X__ No _____

   Comments: All volatile compounds have been reviewed using the same criteria (i.e., < 30 % RSD and < 25 % D). See the attached Table 1 for a summarization of the CCC's and other compounds not meeting these criteria. (NOTE: This procedure has been used by the reviewer in order to prevent the qualification of compounds that had acceptable calibrations reported.) The out-of-control calibrations have resulted in associated sample data being flagged as estimated (J or UJ).

C. Instrument Calibration (Pesticide)

1. All reported linearity checks met criteria, with a %RSD value less than 10% for all quantitation column calibrations.

   Yes __X__ No _____

   Comments:

2. The breakdown of 4,4'-DDT and Endrin was reported as less than 20% for all Evaluation B analyses.

   Yes __X__ No _____

   Comments: No comments.

3. The reported pesticide standard compounds showed a %D of the calibration factor of no more than 15% for the quantitation and 20% for confirmation columns for all compounds identified.

   Yes __X__ No _____

   Comments: No comments.

V. Blanks

A. Method Blank - The blank analyses summaries were reviewed. The frequency of method blank extractions and analysis and the contaminants reported in blank samples were all within specified limits.

Yes __X__ No _____

Comments: Contaminant quantities reported in the laboratory preparation blanks are summarized on the attached Table 1.

B. Trip Blank - The associated trip/travel blank(s) contained contaminants which affected samples in the package.

Yes __X__ No _____ Not Identified _____

Comments: The following table lists the contaminated trip blanks found in the data package and the contaminant quantities reported. The associated samples found in the package, which are qualified (UJ) due to contamination potentially having occurred during handling and/or storage, are also shown.

Blank ID	Analyte	Amount (µg/L)	Associated Samples
SL-TB-09	Methylene Chloride	12	All
	Acetone	5	

C. Other Blanks - The following table lists the contaminated rinsate or field blanks found in the data package and the contaminant quantities reported. The associated samples found in the package, which are qualified (UJ) due to contamination potentially having occurred during handling and/or storage, are also shown.

Blank ID/Type	Analyte	Amount (µg/L)	Associated Samples
SUR/SL-RB-09	Di-n-Butylphthalate	10	All
	Methylene Chloride	12	
	Acetone	3	
SUR/SL-FB-02	Di-n-Butylphthalate	12	All
	Methylene Chloride	7	
	Acetone	7	

VI. Surrogate Recovery

The surrogate recovery summaries were reviewed. The recoveries were all reported to be within specified CLP QC criteria.

Yes _____ No __X__

Comments: Samples reported to have surrogate recoveries outside specified CLP criteria are summarized on the attached Tables 1 and 2. Data flags, when necessary, are indicated on Table 2.

VII. Blank Spike - Laboratory Control Sample(s)

A. Blank spike analyses (i.e., method blanks spiked with surrogates for volatiles and semivolatiles) were performed with each sample batch in the data package and were reported to be within laboratory control limits or within CLP established control limits.

Yes __X__ No _____

Comments: The compounds used for the Pesticide/PCB blank spike were lindane, dieldrin and aroclor 1260.

B. Laboratory control charts were provided in the package; however, the CLP limits were used for review.

Yes __X__ No _____

Comments: No comments.

VIII. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The matrix spike and matrix spike duplicate was performed and met all recommended QC specifications.

Yes _____ No __X__

Comments: Sample 5-SD-01 (case 33710) and 5-SW-01 (case 22563) were used for MS/MSD.

The following spike analytes were reported to be outside limits:

Analyte	% Recovery MS /MSD	RPD	Control Limits % Rec. / RPD
1,4-Dichlorobenzene	34*/37	-8	36-97/28

No data qualifiers have been added based on MS/MSD results.

IX. Field Duplicate Results

This package contained a field duplicate sample.

Yes _____ No __X__ Not identified _____

Comments: No comments.

X. Additional Comments

The unknown TIC's were not labeled appropriately as specified in the 2/88 SOW. Instead of "Unknown", the laboratory used "Not Identified".

EXPLANATION OF ORGANICS DATA QUALIFIERS

For the purposes of this data review document the following code letters and associated definitions are provided:

U - The material was analyzed for, but was not detected. The associated numerical value is the estimated detection limit.

R - Quality Control indicates that data is not usable (i.e., compound may or may not be present). Resampling and re-analysis would be necessary to determine the presence or absence of the analyte in the sample.

J - The associated numerical value is an estimated quantity because quality control criteria were not met or because the amount detected is below the detection limits required by analytical Statement of Work. The laboratory uses this flag in the latter situation.

B - The laboratory uses this flag when the reported analyte was also found in the method blank. Data validation guidelines do not specify the use of this flag.

JN - Tentative identification of a compound at an estimated concentration. Resampling and re-analysis would be necessary for verification.

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INORGANICS DATA VALIDATION REPORT

Case No. 22563 — Project NEESA - Level D
Site Whiting Field NAS — Project Name Whiting Field
Contract Laboratory CH2M Hill — Client ABB Environmental
Sample Delivery Group (SDG) 22563 — Sampling Date(Month/Year) 8/92
Type of Analyses/Special Request TAL Metals, Cyanide

Sample Number	Sample Matrix	T	D	C
5-SW-01	Water	X	-	X
5-SW-01A	Water	X	-	X
5-SD-01	Soil	X	-	X
5-SD-01A	Soil	X	-	X

Laboratory QC Samples

Sample Number	Sample Matrix	T	D	C
5-SW-01MS	Water	X	-	X
5-SD-01MS	Soil	X	-	X
5-SW-01Dup	Water	X	-	X
5-SD-01Dup	Soil	X	-	X
# of Samples Analyzed:		4		4
Total # of Analyses:		8		8

T = CLP Total Metals D = CLP Dissolved Metals C = CLP Cyanide
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Lawrence Yee — Date 12/17/92
QA Review by Jeralyn Guthrie/Roger Simon — Date 12/17/92
CCJM Approval by Richard Cheatham — Date 12/17/92

Contractual violations found? Yes X No ____ Not Appl. ____
TPO action requested? Yes ____ No ____ Not Appl. X

Remarks: Copies of correspondence concerning resubmissions are attached.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II. Qualified Sample Results (Form 1's)
III. Laboratory Matrix QC Sample Summary Forms

Note:

-- The EPA Functional Guidelines for Evaluating Inorganics Analyses, 1988 (Data Review SOP) and project specific planning documents have been used by the data reviewer as a basis for reviewing the data and applying qualifiers, unless otherwise noted in review comments.

-- Please see data qualifier and sub-qualifier definitions on the last page. This scheme of qualifiers is intended to help indicate the reasons or problems which cause sample values to be qualified.

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Inorganic Data Completeness Checklist

X	Inorganic Cover Page
X/RS	Inorganic analysis data sheets (Form 1)
X	Initial calibration and calibration verification results (Form 2A)
X	Continuing calibration verification (Form 2A)
X	CRDL Analysis (Form 2B)
X/RS	Blank results (Form 3)
X/RS	ICP interference check sample (Form 4)
X	Spike results (Form 5A)
X	Post-digest spike results (Form 5B)
X/RS	Duplicate results (Form 6)
X/RS	Laboratory Control Sample (LCS) Results (Form 7)
NR	Standard Addition Results (Form 8)
X	Serial Dilution Results (Form 9)
X	Instrument Detection Limits (Form 10)
X	ICP Interelement Correction Factors (Form 11)
X	ICP Linear Ranges (Form 12)
X	Preparation Log (Form 13)
X	Analysis Run Log (Form 14)
X	Raw data for samples
X	Raw data for calibration standards
X	Raw data for blanks
X	Raw data for ICP quality control (ICS and Serial Dilution)
X	Raw data for spikes
X	Raw data for duplicates
X	Raw data for LCS
X	Raw data for graphite furnace AA
X/RS	Raw data for mercury analysis
X	Raw data for cyanide analysis
X	Percent solids calculation - soils only
X	Sample prep/digestion logs
X	Traffic Reports/Chain of Custody and/or tracking records
X	Sample description
X	Case narrative

X = Included in Original Data Package
O = Not Included and/or Not Available
NR = Not required
RS = Provided as Resubmission

I. Deliverables

All deliverables were provided as specified in the statement of work.

Yes __X__ No _____

Comments: Form 1 for samples 5-SW-01A, 5-SD-01, and 5-SD-01A; as well as, Form 3, 4, 6, 7, and 10 were initially found to have problems or contain errors; corrected information was provided in the laboratory resubmission.

II. Detection Limits

All results met the contract required detection limits (CRDL).

Yes __X__ No _____

Comments: The IDL for mercury was reported as 0.0 µg/L on Form 10 but as 0.2 µg/L on Form 3. In the resubmission the laboratory stated that 0.03 µg/L was the correct IDL and provided corrected Forms 10 and 3.

III. Holding Times

All 40CFR136 recommended holding times for water samples, as specified in the Functional Guidelines were met. The water holding times have been applied to soil matrices, if applicable. Holding time is based on date sampled to date of analysis (with collection date not inclusive).

Yes __X__ No _____

Comments: No comments.

IV. Calibration Quality Control

A. All initial instrument calibrations were performed as specified in the statement of work.

Yes __X__ No _____

Comments: No comments.

B. The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed as required and had recoveries within the contract specified control limits.

Yes __X__ No _____

Comments: No comments.

C. The CRDL check standards (concentration = 2xCRDL for ICP and 1xCRDL for GFAA) were run at the contract specified frequency for the required analytes.

Yes __X__ No _____

Comments: No comments.

D. The 2xCRDL check standard for ICP (CRI) exhibited recoveries which indicate that linearity problems are not likely at the lower end of the calibration curve.

Yes _____ No __X__

Comments: For cobalt, the difference between the true value of the CRI standard and the amount found is greater than five times the IDL. This indicates that sample results reported at the low end of the curve (i.e. near the IDL) may be inaccurate. However, since there are no control limits established for the recovery of this standard, no qualifiers have been added by the reviewer.

E. The 1xCRDL check standards for GFAA (CRA) exhibited values which indicate that an adequate response was found at the low end of the calibration curve.

Yes _____ No __X__

Comments: For arsenic and mercury, the difference between the true value of the CRA standard and the reported value is greater than ± the IDL. However, since there are no control limits established for the recovery of this standard, no qualifiers have been added by the reviewer.

V. Blank Quality Control

A. The initial calibration blanks (ICB) and continuing calibration blanks (CCB) were analyzed as required and were within the contract specified control limits.

Yes __X__ No _____

Comments:

1. The following is a table of samples, analytes, blank values and qualifiers associated with a contractually **compliant** ICB or CCB standard that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value (µg/L)	Qualifier
5-SW-01	Lead	2.7B µg/L	-1.6B	J-K
	Vanadium	1.3U µg/L	-1.5B	UJ-K
5-SW-01A	Lead	2.1B µg/L	-1.6B,-2.3B	J-K
	Vanadium	1.3U µg/L	-1.5B	UJ-K
	Mercury	0.43 µg/L	-0.1B	J-K
5-SD-01	Mercury	0.02U mg/kg	-0.1B	UJ-K
5-SD-01A	Mercury	0.07B mg/kg	-0.1B	J-K

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Blank results whose absolute values were greater than the IDL were reported for cadmium and chromium (soil matrix); and cadmium and cobalt (water matrix). However, no sample result qualification has occurred because the associated sample analyte values were either greater than five times the blank amount or were reported as undetected.

B. A preparation blank was prepared and analyzed at the contract specified frequency.

Yes __X__ No _____

Comments: No comments.

C. All analytes in the preparation blank were below the CRDL.

Yes __X__ No _____

Comments: No comments.

D. The absolute value of results reported for analytes in the preparation blank met the Functional Guidelines specified criterion of less than the instrument detection limit (IDL).

Yes _____ No __X__

Comments:

1. The following is a table of qualifiers, analytes, blank values and samples (with analyte values from the IDL to five times the blank amount) associated with a contractually compliant preparation blank that exhibited contaminant levels or negative values which affect reported sample results:

Sample Number	Analyte	Sample Value	Blank Value	Qualifier
5-SW-01	Copper	5.3B µg/L	3.6B µg/L	UJ-B
	Zinc	20.2 µg/L	13.0B µg/L	UJ-B
5-SW-01A	Copper	5.6B µg/L	3.6B µg/L	UJ-B
	Zinc	17.8B µg/L	13.0B µg/L	UJ-B
	Mercury	0.43 µg/L	-0.112B µg/L	J-K

Sample Number	Analyte	Sample Value	Blank Value	Qualifier
5-SD-01	Calcium	109B mg/kg	22.2B mg/kg	UJ-B
	Sodium	260B mg/kg	102.8B mg/kg	UJ-B
	Mercury	0.02 U mg/kg	-0.054 B mg/kg	UJ-K
5-SD-01A	Sodium	211B mg/kg	102.8B mg/kg	UJ-B
	Mercury	0.07B mg/kg	-0.054B mg/kg	J-K

2. When blank results with negative values are reported and sample results are either less than five times the absolute value of the blank or undetected, there exists the possibility that positive values may be biased low and undetected values may be false negatives. Samples affected have been qualified as estimated (JK or UJK).

3. Blank results whose absolute values were greater than the IDL were reported for cadmium, calcium, iron, and sodium (water matrix); and barium, chromium, iron, and lead (soil matrix). However, no sample result qualification has occurred because the associated sample analyte values were either greater than five times the blank amount or were reported as undetected.

E. The package contained other types of blanks submitted to the laboratory with the field samples.

Yes __X__ No _____ Not Applicable _____

Comments:

1. The following list shows the other types of associated blanks and contaminants found in these blanks. Sample values have been qualified by the reviewer due to contaminants reported in these blanks. The field blank SUR/SL-FB-02 and rinsate blank SUR/SL-RB-09 were found in the 22562 package and are associated with the samples in this package.

Sample Number	Blank Type	Analyte	Amount (µg/L)
SUR/SL-FB-02	Field	Aluminum	33.4B
		Antimony	15.0B
		Barium	1.1B
		Calcium	325B
		Iron	18.3B
		Mercury	0.26
		Silver	1.5B
		Sodium	756B
		Zinc	8.0B

Sample Number	Blank Type	Analyte	Amount (µg/L)
SUR/SL-RB09	Rinsate	Aluminum	84.6B
		Barium	1.1B
		Calcium	489B
		Iron	20.0B
		Lead	1.9B
		Manganese	1.8B
		Silver	1.7B
		Sodium	1040B
		Zinc	11.0B

2. The following is a table of samples and analytes requiring data qualifiers due to reported contaminants in the rinsate or field blank. The samples and analytes listed below were reported to be less than five times the amount reported in the blank.

Sample	Analyte	Sample Amount	Blank Amount (µg/L)	Qualifier
5-SW-01	Mercury	0.59 µg/L	0.26	UJ-B
	Zinc	20.2 µg/L	8.0B	UJ-B
	Aluminum	195 B µg/L	84.6B	UJ-B
	Lead	2.7 B µg/L	1.9B	UJ-B
	Zinc	20.2 µg/L	11.0B	UJ-B
5-SW-01A	Aluminum	146B µg/L	33.4B	UJ-B
	Mercury	0.43 µg/L	0.26	UJ-B
	Zinc	17.8B µg/L	8.0B	UJ-B
	Lead	2.1B µg/L	1.9B	UJ-B
5-SD-01	Calcium	109B mg/kg	325B	UJ-B
	Silver	0.47B mg/kg	1.5B	UJ-B
	Sodium	260B mg/kg	756B	UJ-B
5-SD-01A	Calcium	121B mg/kg	325B	UJ-B
	Sodium	211B mg/kg	756B	UJ-B

VI. Accuracy Statements

A. The matrix (pre-digest) spike frequency was met.

Yes __X__ No _____

Comments: Samples 5-SD-01 and 5-SW-01 were used as the matrix spike samples.

B. Matrix spike recoveries were within contract specified control limits (75 - 125%).

Yes _____ No __X__

Comments:

1. The following is a table of samples, analytes, recoveries and qualifiers associated with spike recoveries outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Recovery	Qualifier
5-SD-01, 5-SD-01A	Soil	Barium	73.6	J-S
		Lead	169	J-S

2. Low recoveries for the above analytes indicate that the reported results may be biased low and that there is a possibility of false negatives being reported. The results for those analytes having high recoveries may be biased high and false positives may be reported.

C. All analysis (post digest) spike requirements were met for the above samples that required "N" flags. This is not required for GFAA analyses.

Yes __X__ No _____ Not Applicable _____

Comments:

1. The following is a table of samples and analytes for which analysis (post-digest) spikes were required and performed:

Sample Number	Matrix	Analyte	Post-digestion Spike Percent Recovery
5-SD-01	Soil	Barium	95.8

2. Data qualifiers are not added or eliminated based on the above post-digest spike results.

D. The laboratory control sample (LCS) frequency was met.

Yes __X__ No _____

Comments: No comments.

E. LCS recoveries were within contract specified control limits (aqueous = 80-120%, except Ag, Sb, Hg and CN; soil = as established for the specific material).

Yes __X__ No _____

Comments: No comments.

VII. Precision Statement

A. The matrix (pre-digest) duplicate frequency was met.

Yes __X__ No _____

Comments: Samples 5-SD-01 and 5-SW-01 were used for duplicate sample analysis.

B. Matrix (pre-digest) duplicate differences were within contract specified control limits (20% RPD or the duplicate difference less than the CRDL for results less than five times the CRDL).

Yes _____ No __X__

Comments: The following is a table of samples, analytes, differences and qualifiers associated with duplicate control limits that are exceeded as specified in the Functional Guidelines (20% RPD or difference less than the CRDL for waters, 35% RPD or 2xCRDL for soils).

Samples Affected	Matrix	Analyte	Control Limit	Difference or RPD	Qualifier
5-SD-01, 5-SD-01A	Soil	Barium	102 mg/kg	141 mg/kg	J-D
		Chromium	5.10 mg/kg	5.16 mg/kg	J-D
		Iron	± 35%	72.6%	J-D
		Lead	± 35%	48.9%	J-D
		Zinc	10.2 mg/kg	12.8 mg/kg	J-D

C. This package contained a field duplicate.

Yes __X__ No _____ Not Applicable _____

Comments: The positive results for the duplicate pairs and the RPD values for each analyte are reported on the attached table. Data are not qualified by the reviewer based on the field duplicate results.

VIII. ICP Quality Control

A. Serial dilution frequency was met.

Yes __X__ No _____

Comments: Samples 5-SD-01A and 5-SW-01A were used for serial dilution analysis.

B. Differences for the serial dilution were within contract specified control limits (10% difference).

Yes _____ No __X__

Comments: The following is a table of samples, analytes, differences and qualifiers associated with a serial dilution result outside of the contract specified control limits:

Samples Affected	Matrix	Analyte	Percent Difference	Qualifier
5-SW-01,5-SW-01A	Water	Sodium	15.6	J-I

C. The interference check sample (ICS) was run at the required frequency for all required ICS analytes.

Yes __X__ No _____

Comments: No comments.

D. ICS percent recovery results were within contract specified control limits.

Yes __X__ No _____

Comments: No comments.

E. Results for ICP analytes not required to be present in a given ICS standard were within acceptable limits.

Yes __X__ No _____

Comments: No comments.

IX. Graphite Furnace (GFAA) Quality Control

A. Duplicate injections were performed where required for all GFAA analyses and had RSD's (or CV's) of less than 20% where results were above the CRDL.

Yes __X__ No _____

Comments: No comments.

B. Analysis (post-digest) spikes for GFAA were performed on all required samples and at the concentration required.

Yes __X__ No _____

Comments: No comments.

C. Sample dilution and re-spiking was performed on all samples with an initial spike recovery of less than 40%.

Yes _____ No _____ Not Applicable __X__

Comments:

1. All recoveries were greater than 40%.

2. In sample 5-SD-01A, the lead post digest spike result was greater than the highest calibration standard. The laboratory did not dilute and reanalyze the sample. Since the percent recovery of this post-spike met criteria, no action was taken by the reviewer.

D. The post-digestion (analysis) spike recoveries were all within the 85-115% control limits for those GFAA analysis sample results that were less than 50% of the post digest spike amount (absorbance).

Yes _____ No __X__ Not Applicable _____

Comments:

1. The following is a table of samples, analytes, recoveries and qualifiers associated with **compliant** GFAA analyses which did not require MSA but whose spike recoveries were not within 85-115% and were greater than 40%:

Sample Number	Analyte	Percent Recovery	Qualifier
5-SW-01A	Thallium	78.6	UJ-I
5-SD-01A	Thallium	84.6	UJ - I

2. The following table is a listing of laboratory QC samples (e.g., prep blank, LCS, duplicate) that had analysis spike recoveries that were not within 85-115%. No data qualifiers are required due to these deficiencies.

Sample Number	Analyte	Percent Recovery
5-SW-01 Duplicate	Thallium	84.4
LCS	Thallium	73.0

3. The laboratory did not initially flag the thallium result in sample 5-SW-01A with a "W" as required. The laboratory, also, initially flagged the thallium results in samples 5-SD-01 with a "W". In the resubmission, the laboratory verified the flagging error in sample 5-SW-01A and provided a corrected Form 1 with the "W" flag added. The laboratory also verified the flagging error in sample 5-SD-01 and provided a corrected Form 1 with the "W" flag removed.

E. MSA was performed when required for GFAA analysis and followed the criteria specified in Exhibit E of the Statement of Work.

Yes _____ No _____ Not Applicable __X__

Comments: No MSA analyses were required.

X. Calculations and Transcription

A. Correct contract/method calculations were performed.

Yes _____ No __X__

Comments: Please see section VIII.B for a table summarizing **calculation** discrepancies noted in the routine data validation process.

B. Raw data was transcribed accurately to sample and QC summary sheets.

Yes _____ No __X__

Comments:

1. The following is a table of transcription/calculation discrepancies noted by the reviewer during the routine data validation process.

Sample	Summary Form	Analyte	Laboratory reported	Reviewer found
5-SD-01A	1	Mercury	0.07B mg/kg	0.08B mg/kg
ICSAI (9/6/92 run)	4	Iron	Not reported	180,800 µg/L
ICSAF (9/6/92 run)	4	Iron	Not reported	181,000 µg/L
ICSAI (9/7/92 run)	4	Iron	Not reported	178,000 µg/L
ICSAF (9/7/92 run)	4	Iron	Not reported	180,700 µg/L
5-SD-01 Duplicate	6	Arsenic	D = 0.0021B mg/kg	0.423B mg/kg
		Lead	D = 0.0646 mg/kg	12.92 mg/kg
		Lead	RPD = 197%	48.9%
		Selenium	D = 0.0027U mg/kg	0.536U mg/kg
		Thallium	D = 0.002U mg/kg	0.408U mg/kg
LCS	7	Arsenic	847.0 mg/kg	955.2 mg/kg
		Lead	202.5 mg/kg	211.1 mg/kg
		Selenium	32.3 mg/kg	28.6 mg/kg
		Thallium	38.8 mg/kg	41.3 mg/kg
		Mercury	11.7 mg/kg	12.0 mg/kg

2. The reviewer has confirmed the above errors with the laboratory and has received corrected resubmissions.

XI. System Performance

The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance throughout this case.

Yes __X__ No _____

Comments: No comments.

XII. Contract Requirements

All contract requirements were met by the laboratory in the preparation and analysis of the samples in the package.

Yes __X__ No _____

Comments: No comments.

XIII. Additional Comments

No comments.

Definition of Qualifiers
(Used by Data Reviewer)

The following qualifiers are specified for use by the Functional Guidelines for Inorganic Data Validation.

(R) = Rejected - Data are unusable (Note: Analyte may or may not be present).

(UJ) = Undetected, but the number that is reported as the quantitation limit is an estimated value

(J) = Estimated value

The following subqualifiers give further detail of the type and amount of qualification a given data point has received.

-H = Qualified due to holding time violation

-I = Qualified due to interference problems (ICP serial dilution or ICS, or poor analytical spike recovery by graphite furnace)

-D = Qualified due to duplicate control limits being exceeded

-S = Qualified due to matrix spike recoveries outside control limits

-C = Qualified due to instrument calibration problems

-L = Qualified due to LCS recoveries outside control limits

-B = Qualified due to blank contamination problems

-K = Qualified due to negative blank value problems

-Q = Qualified for other reasons - refer to the text of the report

Example: The percent recovery of the Aluminum matrix spike was only 65%. Undetected values (e.g., Al = 200u) will be flagged as follows:

Al = 200u (UJ-S)

meaning the number being reported at the detection limit (200u) is estimated (UJ) due to spike recovery problems (-S).

Reported positive Aluminum values (e.g., Al = 250) will be flagged as follows:

Al = 250 (J-S)

meaning the reported positive result (250) is estimated (J) due to spike recovery problems (-S).

TABLE 1

Summary of Sample Data Qualifiers

SDG#/Case 22563/22563 Site Name Whiting Field NAS

Sample ID	Matrix	Al	Ba	Ca	Cr	Cu	Fe	Pb	Hg	Ag	Na	Tl
5-SW-01	Water	UJB				UJB		UJKB	UJB		JI	
5-SW-01A	Water	UJB				UJB		UJKB	UJBK		JI	UJI
5-SD-01	Soil		JSD	UJB	JD		JD	JSD	UJK	UJB	UJB	
5-SD-01A	Soil		JSD	UJB	JD		JD	JSD	JK		UJB	UJI

Sample ID	Matrix	V	Zn
5-SW-01	Water	UJK	UJB
5-SW-01A	Water	UJK	UJB
5-SD-01	Soil		JD
5-SD-01A	Soil		JD

FIELD DUPLICATES

Site Whiting Field SDG/Case 22563/22563

Concentration Units (µg/L or mg/kg dry weight): µg/L

Analyte	Sample #: 5-SW-01	Sample #: 5-SW-01A	RPD
Aluminum	195 B	146 B	29
Antimony	12.4 U	10.7 U	NC
Arsenic	1.0 U	1.2 B	NC
Barium	12.6 B	12.4 B	1.6
Beryllium	0.24 U	0.24 U	NC
Cadmium	2.7 U	3.0 U	NC
Calcium	3480 B	3520 B	1.1
Chromium	1.9 U	2.9 U	NC
Cobalt	1.6 U	3.3 U	NC
Copper	5.3 B	5.6 B	5.5
Iron	767	770	0.4
Lead	2.7 B	2.1 B	25
Magnesium	773 B	789 B	2.0
Manganese	16.5	16.8	1.8
Mercury	0.59	0.43	31
Nickel	10.7 U	5.3 U	NC
Potassium	1500 B	794 B	62
Selenium	2.1 U	2.1 U	NC
Silver	1.5 U	2.0 U	NC
Sodium	12800	12800	0.0
Thallium	1.6 U	1.6 U	NC
Vanadium	1.3 U	2.6 U	NC
Zinc	20.2	17.8 B	13
Cyanide	2.2 U	0.84 U	NC

NC = Not calculable

FIELD DUPLICATES

Site Whiting Field SDG/Case 22563/22563

Concentration Units (µg/L or mg/kg dry weight): mg/kg

Analyte	Sample #: 5-SD-01	Sample #: 5-SD-01A	RPD
Aluminum	1840	1260	37
Antimony	2.7 U	3.2 U	NC
Arsenic	0.46 U	0.56 B	NC
Barium	145	4.9 B	187
Beryllium	0.09 B	0.06 U	NC
Cadmium	0.77 U	0.71 U	NC
Calcium	109 B	121 B	10
Chromium	3.6	7.1	65
Cobalt	0.84 U	0.41 U	NC
Copper	8.7	7.1	20
Iron	1510	1000	41
Lead	7.8	8.9	13
Magnesium	42.9 B	31.0 B	32
Manganese	4.7	2.9 B	47
Mercury	0.02 U	0.08 B	NC
Nickel	1.4 U	2.8 U	NC
Potassium	173 U	157 U	NC
Selenium	0.53 U	0.54 U	NC
Silver	0.51 U	0.39 U	NC
Sodium	260 B	211 B	21
Thallium	0.40 U	0.41 U	NC
Vanadium	4.0 B	2.5 B	46
Zinc	22.0	97.3	126
Cyanide	0.24 B	0.29 U	NC

NC = Not calculable

CCJM
ENVIRONMENTAL ENGINEERS & SCIENTISTS

SILVER SPRING
GRAND RAPIDS
DETROIT
DENVER

CCJM DOCUMENT NO: WFODS025.RVW

ORGANICS DATA VALIDATION REPORT

Case No. 22563, 33710
Site Whiting Field
Contract Laboratory CH2M Hill
Sample Delivery Group (SDG) NA
Type of Analyses/Special Request Volatiles, Semivolatiles, Pesticide/PCB

Project NEESA - Level D
Project Name Whiting Field
Client ABB Environmental
Sampling Date(Month/Year) 8/92

Client ID Number	Sample Matrix	V	B	P	Sample Number	Sample Matrix	V	B	P
WHF-2A-STA5-SW-01	Water	X	X	X					
WHF-2A-STA5-SW-01A	Water	X	X	X					
WHF-2A-STA5SD-01	Soil	X	X	X					
WHF-2A-STA5SD-01A	Soil	X	X	X					
					Laboratory QC Samples				
WHF-2A-STA5-SW-01MS	Water	X	X	X	5-SD-01MS	Soil	X	X	X
WHF-2A-STA5-SW-01MSD	Water	X	X	X	5-SD-01MSD	Soil	X	X	X
					# of Samples Analyzed:		4	4	4
					Total # of Analyses:		8	8	8

V = CLP Volatiles B = CLP Semivolatiles P = CLP Pesticide/PCB's
X = Analysis has been provided for validation.
0 = Analysis was requested per the Chain of Custody, however, no data was received for validation.
- = Analysis was not requested per the Chain of Custody or required to meet criteria.
MS = matrix spike MSD = matrix spike duplicate Dup = matrix duplicate RE = reanalysis DL = dilution analysis

Data Reviewer Nancy Fish Date 1/26/93
QA Review by Jeralyn Guthrie/Jeff Benson Date 1/26/93
CCJM Approval by Richard Cheatham Date 1/26/93

Contractual violations found? Yes X No ____ Not Appl. ____
TPO action requested? Yes ____ No X Not Appl. ____

Remarks: Copies of correspondence concerning resubmissions are attached. Please see page one of the Case Narrative (Attachment I) for correlation of Client ID and Laboratory ID. The laboratory has truncated the Client ID on Form I's.

Attachments:

I. Laboratory Case Narratives, Telephone Logs and Correspondence
II Data Validator Worksheets
III. Qualified Sample Results (Form 1's)
IV. Laboratory Matrix QC Sample Summary Forms

Note:

-- The EPA Functional Guidelines for Evaluating Organics Analyses, 1988 - (Data Review SOP) and project specific planning documents have been used by the data reviewer as a basis for reviewing the data and applying qualifiers, except as specifically noted in review comments.

-- Please see data qualifier and sub-qualifier definitions on the last page. This scheme of qualifiers is intended to help indicate the reasons or problems which cause sample data values to be qualified.

CCJM JOHNSON & MALHOTRA, P.C.
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DATA COMPLETENESS CHECKLIST

Applicable SOW 2/88

Quality Control Summary Package

	VOA	BNA	P/PCB
Case Narrative	X	X	X
Surrogate Recovery Summary (Form II)	X	X	X
MS/MSD Summary (Form III)	X	X	X
Reagent Blank Summary (Form IV)	X	X	X
GC/MS Tuning and Mass Calibration (Form V)	X/RS	X	
Internal Standard Area Summary (Form VIII)	X	X	

Sample Data Package

Holding Times (Traffic Reports, Custody and/or shipping records)	X/RS	X	X
Organic Analysis Data Sheets (Form I) all pages for each sample, arranged in increasing sample number order	X	X	X
Reconstructed Ion Chromatogram(s) (RIC)	X	X	
GC/EC Chromatograms			X
Quantitation Reports	X	X	X
Mass Spectral Data	X	X	
EPA/NIH Mass Spectral Library Search for TIC's	X	X	

Standards Data Package

Current List of Laboratory/Instrumental Detection Limits	NR	NR	
Initial Calibration Data (Form VI) for each instrument	X	X	
Continuing Calibration Data (Form VII) for each instrument	X	X	
Pesticide Evaluation Standards Summary (Form VIII)			X
Pesticide/PCB Standards Summary (Form IX)			X
Pesticide/PCB Identification (Form X) if any positive results			NR
VOA and BNA Standards Reconstructed Ion Chromatograms (RIC)	X	X	
VOA and BNA Standards Quantitation Reports	X	X	
Pesticide/PCB Standard Chromatograms and Data System Printouts			X

Raw QC Data Package

DFTPP and BFB mass spectra and mass listings	X	X	
Reagent Blank Data			
Organic Analysis Data Sheets (Form I)	X	X	X
Reconstructed Ion Chromatograms (RIC)	X	X	
Quantitation Reports	X	X	X
Mass Spectral Data	X	X	
EPA/NIH Library Search of TIC's	X	X	
GC/EC Chromatograms and Data System Printouts			X

Matrix Spike and Matrix Spike Duplicate Data			
Organic Analysis Data Sheets (Form I)	X	X	X
Reconstructed Ion Chromatograms (RIC)	X	X	
Quantitation Reports	X	X	X
GC/EC Chromatograms and Data System Printouts			X

X = Included in Data Package O = Not Included and/or Not Available
NR = Not Required RS = Provided as Resubmission

I. Holding Times

Samples were extracted and analyzed within holding times specified by the Functional Guidelines for water. For soils the holding times recommended by SW846, 3rd Edition (Table 4-1) have been used as guidance. See the following table for a summarization of sample holding times.

Yes __X__ No _____

Comments: No comments.

Holding Time Summary

Sample Number	Sampling Date	VTSR	VOA Analysis	BNA Extract	BNA Analysis	Pesticide/PCB Extract	Pesticide/PCB Analysis
5-SW-01	8/19/92	8/20	8/27	8/25	9/23	8/25	9/13
5-SW-01A	8/19/92	8/20	8/27	8/25	9/24	8/25	9/13
5-SD-01	8/19/92	8/20	8/27	8/25	9/24	8/25	9/14
5-SD-01A	8/19/92	8/20	8/27	8/25	9/24	8/25	9/14

II. GC/MS Tuning and Mass Calibration

A. The DFTPP performance results were all included and found to be within specified criteria.

Yes __X__ No _____

Comments: No comments.

B. The BFB performance results were all included and found to be within specified criteria.

Yes __X__ No _____

Comments: No comments.

III. A. Instrument Calibration (VOA and SV)

1. The instrument response factor (RRF) data were reviewed for the initial and continuing calibrations. All appropriate information was present in the package and all response factors met the required criteria for volatile and semivolatile analyses.

   Yes __X__ No _____

   Comments: No comments.

2. The percent relative standard deviation (%RSD) data for the initial calibrations and the percent difference (%D) data for the continuing calibrations were reviewed and all required information was provided.

   Yes __X__ No ____

   Comments: No comments.

3. All %RSD and %D values met the SOW specified criteria for volatile and semivolatile analyses.

   Yes __X__ No _____

   Comments: The compliant %RSD and %D values found to be outside of data validation specifications and a listing of qualifiers added to sample results on Form 1's are summarized on the attached Table 1.

B. Instrument Calibration (Pesticide/PCB)

1. All linearity check criteria were met with a %RSD value less than 10% for all quantitation column calibrations.

   Yes __X__ No _____

   Comments: No comments.

2. The breakdown of 4,4'-DDT and endrin was less than 20% for all evaluation B analyses.

   Yes __X__ No _____

   Comments: No comments.

3. The pesticide standard compounds showed a %D of the calibration factor of no more than 15% for quantitation and 20% for confirmation runs for all compounds identified.

   Yes __X__ No _____

   Comments: No comments.

4. The retention time for the surrogate (DBC) was within criteria for every sample.

   Yes __X__ No _____

   Comments: No comments.

IV. Blanks

A. Method Blank - The blank analyses were reviewed. The frequency of method blank extractions and analyses and the contaminants found in blank samples were all within specified limits.

   Yes __X__ No _____

   Comments: Contaminant quantities found in contract compliant laboratory preparation blanks and a listing of qualifiers added to sample results on Form 1's are summarized on the attached Table 1.

B. Trip Blank - The associated trip/travel blank(s) contained contaminants which affected samples in the package.

   Yes __x__ No _____ None Identified _____

   Comments: The following table lists the contaminated trip blanks associated with these samples and the contaminant quantities reported. The associated samples found in the package, which are qualified (UJ) due to contamination potentially having occurred during handling and/or storage, are also shown.

Blank ID	Analyte	Amount (µg/L)	Associated Samples
SL-TB-09	Methylene Chloride	12	All
	Acetone	5	

C. Other Blanks - The following table lists the contaminated rinseate or field blanks associated with these samples and the contaminant quantities reported. The associated samples found in the package, which are qualified (UJ) due to contamination potentially having occurred during handling and/or storage, are also shown.

Blank ID/Type	Analyte	Amount (µg/L)	Associated Samples
SUR/SL-RB-09	Di-n-Butylphthalate	10	All
	Methylene Chloride	12	
	Acetone	3	
SUR/SL-FB-02	Di-n-Butylphthalate	12	All
	Methylene Chloride	7	
	Acetone	7	

V. Surrogate Recovery

The surrogate recoveries were reviewed. The recoveries were all within specified QC criteria.

Yes _____ No __X__

Comments: Samples found to have surrogate recoveries outside specified criteria are summarized on Tables 1 and 2. Data qualifiers, when necessary, are indicated on Table 2.

VI. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

The matrix spike and matrix spike duplicate recovery data were reviewed. The spikes were performed and met all recommended QC specifications.

Yes _____ No __X__

Comments: Sample numbers 5-SW-01 and 5-SD-01 were used for MS/MSD. The MS for sample 5-SW-01 resulted in 1,4-dichlorobenzene being recovered at 34% (below the 36-97% QC limits). No qualifiers are required since this compound was not detected in the unspiked sample.

VII. Field Duplicate Results

This package contained a field duplicate sample.

Yes __X__ No _____ Not identified _____

Comments: Sample numbers 5-SD-01 and 5-SD-01A; and 5-SW-01 and 5-SW-01A were identified as duplicate pairs; however, no analytes were detected in either set of samples.

VIII. Internal Standard (IS) Performance

The internal standard results were reviewed for consistency in response (area counts) and retention time. All sample internal standards showed adequate performance and consistency.

Yes __X__ No _____

Comments: No comments.

IX. TCL Compound Identification

Positive results were evaluated to determine that all criteria were met in identifying TCL compounds from the sample data. In all cases, the reported compounds matched the retention time and, when applicable, the mass spectral profile.

Yes __X__ No _____

Comments: No comments.

X. Compound Quantitation and Reported Detection Limit

Quantitative results and reported detection limits were reviewed and were determined to be accurate except as noted in this report that data has been qualified.

Yes __X__ No _____

Comments: No comments.

XI. Tentatively Identified Compounds (TIC's)

Data for reported tentatively identified compounds were reviewed and found to meet quantitative and qualitative criteria.

Yes __X__ No _____

Comments: All TIC's not attributable to blank contamination have been qualified by the reviewer as tentatively identified and of estimated concentration (J-N). Any TIC's reported in samples that are also identified in associated blanks have been qualified as UJ-BN.

XII. System Performance

The instrumental and analytical systems used in the analysis of these samples maintained an acceptable level of performance throughout this case.

Yes __X__ No _____

Comments: No comments.

XIII. Overall Assessment of Data in the Case

Data have met analytical quality criteria and are within applicable guideline limits except where qualifiers are noted within this report as being required.

Yes __X__ No _____

Comments: No comments.

XIV. Contract Requirements

All contract requirements were met by the laboratory in the analyses of the samples in the package.

Yes __X__ No _____

Comments: No comments.

XV. General Comments

For semivolatile analysis, the unknown TIC's were not labeled appropriately as specified in 2/88 SOW. Instead of "Unknown" the laboratory used "Not Identified".