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FINAL

REMEDIAL INVESTIGATION AT OPERABLE UNIT NO. 10 (SITE 35, CAMP GEIGER AREA FUEL FARM)

MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0232

MARCH 10, 1995

Prepared For:

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL FACILITIES
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Norfolk, Virginia

Under:

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

Page

LIST OF TABLES

LIST OF TABLES
(Continued)

LIST OF TABLES
(Continued)

Number

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES
(Continued)

LIST OF ACRONYMS AND ABBREVIATIONS

ABS	adsorption factor
AF	soil to skin adherence factor
AQTESOLV	Aquifer Test Solver Program
AQUIRE	Aquatic Information Retrieval Database
ARARs	Applicable or Relevant and Appropriate Requirements
ARL	Aquatic Reference Level
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
AT	averaging time
ATc	averaging time carcinogen
ATnc	averaging time noncarcinogen
ATEC	ATEC Associates, Inc.
AWQC	Federal Ambient Water Quality Criteria
Baker	Baker Environmental, Inc.
BCF	bioconcentration factor
bgs	below ground surface
BI	biotoxic index
BOD	biological oxygen demand
BRA	baseline risk assessment
BTEX	benzene, toluene, ethylbenzene, xylenes
BW	body weight
CAMA	Coastal Area Management Act
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
Act	
CF	conversion factor
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action Navy
CLP	Contract Laboratory Program
COPC	contaminant of potential concern
COD	chemical oxygen demand
CRAVE	Carcinogen Risk Assessment Verification Endeavor
CRQL	Contract Required Quantitation Limit
CSA	Comprehensive Site Assessment
CSF	Cancer Slope Factor
DoN	Department of the Navy
1,2-DCE	1,2-dichloroethene
DEM	Division of Environmental Management
DDE	dichlorodiphenyldichloroethylene
DDT	diphenyltrichloroethane

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

ECD	electron capture detector
ED	exposure duration
EF	exposure frequency
EL	exposure level
ERA	ecological risk assessment
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESE	Environmental Science and Engineering, Inc.
ET	exposure time
FAWQC	Federal Ambient Water Quality Criteria
FFA	Federal Facilities Agreement
FFS	Focused Feasibility Study
F_i	fraction ingested from source
FID	flame ionization detector
f_{oc}	sediment particle grain size
FSAP	Field Sampling and Analysis Plan
FWS	Fish and Wildlife Service
FWQSV	Freshwater Water Quality Screening Values
gpd/ft	gallons per day per foot
gpm	gallons per minute
H	mean species diversity
HA	health advisory
HEAST	Health Effects Assessment Summary Tables
HHAG	Human Health Assessment Group
HHRA	Human Health Risk Assessment
HI	hazard index
HQ	hazard quotient
HQW	high quality water
i	hydraulic gradient
IAS	Initial Assessment Study
ICR	incremental cancer risk
ID	inside diameter
IDW	investigative derived wastes
IR	ingestion rate
IRA	interim remedial action
IRIS	Integrated Risk Information System
IRP	Installation Restoration Program
K	hydraulic conductivity
K_d	soil sorption coefficient
K_{oc}	organic carbon partition coefficient
K_{ow}	octanol-water partition coefficient

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

LANTDIV	Naval Facilities Engineering Command, Atlantic Division
LAW	Law Engineering
LOAEL	lowest observed adverse effect level
LUST	leaking underground storage tank
MBI	Macroinvertebrate Biotic Index
MCAS	Marine Corps Air Station
MCB	Marine Corps Base
MCL	maximum contaminant level
mg/kg	milligram per kilogram
mg/L	milligram per liter
MF	modifying factor
MI	mobility index
ml	milliliter
mL/g	milliliters per gram
msl	mean sea level
MTBE	methyl-tertiary-butyl-ether
MW	monitoring well
NACIP	Navy Assessment and Control of Installation Pollutants
NC DEHNR	North Carolina Department of Environment, Health and Natural Resources
NC DOT	North Carolina Department of Transportation
NCMFC	North Carolina Marine Fisheries Commission
NCSPCS	North Carolina State Plane Coordinate System
NCP	National Oil and Hazardous Substances Contingency Plan
NCWP	Near Coastal Waters Program
NCWQC	North Carolina Water Quality criteria
NCWQS	North Carolina Water Quality Standards
NCWRC	North Carolina Wildlife Resources Commission
N_e	effective porosity
NEESA	Naval Energy and Environmental Support Activity
NEP	National Estuary Program
NOAA	National Oceanic and Atmospheric Administration
NOAEL or NOEL	No observed adverse effect level
NPL	National Priorities List
NPS	National Park Service
NSW	nutrient sensitive waters
NUS	NUS Corporation
NWI	national wetlands inventory
O&G	oil and grease
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PC	permeability constant
PCBs	polychlorinated biphenyls

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

PCE	tetrachloroethene
PEF	particulate emissions factor
PHA	public health assessment
PID	photoionization detector
POL	petroleum, oil, lubricants
ppb	parts per billion
ppm	parts per million
psi	pounds per square inch
PVC	polyvinyl chloride
pw	pumping well
QA/QC	quality assurance/quality control
QI	quotient index
RA	risk assessment
RBC	risk based concentrations
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI/FS	remedial investigation/feasibility study
ROD	record of decision
RMC	RMC Environmental Services, Inc.
S	storativity, water solubility
SA	site assessment or surface area
SAP	Sample and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SB	soil boring
SCS	Soil Conservation Service
SD	sediment
SMCL	Secondary Drinking Water Regulations
SQC	sediment quality criteria
SOPs	standard operating procedures
SSV	sediment screening value
SU	standard units
SVOCs	semivolatile organic compounds
SW	surface water
SWQSVs	surface water quality screening values
T	transmissivity
TAL	target analyte list
TBC	to be considered
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TEF	toxicity equivalency factor

LIST OF ACRONYMS AND ABBREVIATIONS
(Continued)

TICs	tentatively identified compounds
TOC	total organic carbon
TPH	total petroleum hydrocarbons
Tracer	Tracer Research Corporation
trans-1,2-DCE	trans-1,2-dichloroethene
TRVs	terrestrial reference values
TSS	total suspended solids
UCL	upper confidence limit
UF	uncertainty factor
µg/g	micrograms per gram
µg/L	micrograms per liter
USDI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USCS	Unified Soil Classification System
USGS	United States Geological Survey
USMC	United States Marine Corps
UST	underground storage tank
VOCs	volatile organic compounds
VP	vapor pressure
V_x	average seepage velocity
WAR	Water and Air Research, Inc.
WOE	weight of evidence
WQS	water quality standards
WQSV	water quality screening values
WS	Wilderness Society

DRAFT

EVALUATION OF METALS IN GROUNDWATER

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA

CONTRACT TASK ORDER 0177

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Prepared for:

DEPARTMENT OF THE NAVY
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TABLE OF CONTENTS

1.0 INTRODUCTION

Numerous groundwater investigations have been conducted at Marine Corps Base (MCB), Camp Lejeune under the Department of the Navy (DON) Installation Restoration Program (IRP). These studies have identified elevated levels of total metals in shallow groundwater at almost every site. The degree of contamination, based on dissolved metals analysis of groundwater samples, is limited. It is believed that the presence of elevated metals are not always related to past disposal activities for several reasons, which is the basis of this study.

Currently, Records of Decision (ROD) are being prepared for Operable Units No. 1 (Sites 21, 24, and 78) and No. 5 (Site 2). Both RODs are proposing to not remediate shallow groundwater which contains elevated levels of total metals above State groundwater standards (i.e., North Carolina Water Quality Standards) and/or Federal drinking water standards (i.e., Maximum Contaminant Levels). Specifically, remediation of shallow groundwater due to elevated total metals is not cost effective, or practical, due to the following: (1) the shallow aquifer is not used for potable supply; (2) the source of metals in groundwater cannot be correlated with soil data or previous disposal practices; (3) the extent of shallow groundwater contamination (based on total metals analysis) is widespread and in many cases undefinable, since there are no apparent contaminant plumes or patterns associated with the metals; and (4) deep groundwater, which is the source of potable water, is not significantly contaminated with metals above the standards.

2.0 STUDY OBJECTIVES

The DON/Marine Corps initiated a study on inorganics in groundwater throughout MCB Camp Lejeune to assess whether total metals in groundwater are related to disposal practices or to other factors. The overall goal of this study is to provide information that would be used in consideration of not remediating shallow groundwater at Operable Units No. 1 and No. 5, and possibly other operable units where total metals are elevated without cause. The following study objectives were identified:

(1) Determine whether the elevated total metals detected in the shallow aquifer are related to past disposal practices, well construction factors, sampling techniques, or suspended particulates in the samples;

(2) Determine whether total metals in shallow groundwater are elevated throughout the region or MCB Camp Lejeune;

(3) Determine whether there is a correlation between elevated total metals in groundwater and metals in soil; and

(4) Determine whether the concentrations of total metals (i.e., low versus high) is related to shallow and deep aquifer characteristics.

3.0 SCOPE OF WORK

Groundwater and soil data from a total of 21 sites were compiled as part of the overall study. Three of the 21 sites are located outside the boundary of the base. These sites include the ABC Cleaners Superfund Site, located along Route 24 in Jacksonville, and two sites located along Highway 17 (Off-site Properties No. 1 and No. 2). The two sites along Route 17 were investigated by the DON/Marine Corps as part of a real estate survey. The other 18 sites are located throughout various portions of MCB Camp Lejeune (see Figure 1).

Information from studies conducted by Baker and other consultants were obtained to evaluate metal concentrations in groundwater. The study focused on 14 metals of potential concern to human health and the environment. Some of the information was collected under the IR Program whereas other information was obtained during other investigations (e.g., ABC Cleaners RI/FS). The following data tables were then prepared to determine why total metals are generally elevated in shallow groundwater.

Table 1 - Total Metal Concentrations in Shallow Groundwater by Site

Table 2 - Summary of Repeat Sampling of Shallow Wells (Sites 2 and 78)

Table 3 - Dissolved Metal Concentrations in Shallow Groundwater by Site

Table 4 - Summary of Total Metal Concentrations in Upgradient Wells

Table 5 - Comparison of Subsurface Metal Concentrations in Uncontaminated and Contaminated Wells

Table 6 - Total Metal Concentrations in Deep Groundwater by Site

Table 7 - Summary of Field Parameters in Shallow Monitoring Wells, Deep Monitoring Wells, and Supply Wells

The tables are presented at the end of this report.

4.0 DATA ANALYSIS

The following discussion represents an analysis of the information contained in each of the previously mentioned tables.

Table 1 (Total Metal Concentrations in Shallow Groundwater)

All of the sites had at least one (and in most cases several) metal which exceeded either State water quality standards or Federal drinking water standards. The most frequently detected metals included chromium, lead, and manganese, which were detected at almost every site above drinking water standards. Other frequently detected metals which exceeded drinking water standards included arsenic, beryllium, cadmium, and nickel.

An analysis of the data from Table 1 indicates that elevated total metals are present in shallow groundwater at every site, including the three sites which are located off base. The two sites which did not exhibit significant contamination include the ABC Cleaners site (only chromium exceeded the standards) and Site 48 (only manganese exceeded the standards).

Total metals detected in shallow groundwater at Site 2 exceeded State and/or Federal standards in seven of the 11 shallow monitoring wells. Manganese was the most frequently detected metal (7/11). Lead (3/11), chromium (2/11), and cadmium (1/11) were also detected above the standards,, but less frequently (see Figure 2).

With the exception of Wells 78GW03 and 78GW19, total metals were detected at Site 78 (Hadnot Point Industrial Area) above Federal MCLs or NCWQS in every shallow well (see Figure 3). The extent of elevated total metals in groundwater is widespread, encompassing approximately one square mile (or approximately 660 acres) in total area. The distribution and concentration of total metals in shallow groundwater makes it virtually impossible to identify or illustrate contaminant plumes (see Figure 3).

An analysis of the total metals results indicates the following pattern. Samples exhibiting elevated levels of lead, chromium, or other contaminants of concern, also exhibited elevated levels of other metals such as aluminum, antimony, iron, and zinc. Samples which did not exhibit elevated levels of lead, chromium, or manganese also did not exhibit elevated levels of other metals. This pattern indicates that the elevated total metals are not limited to one or

two contaminants, which would be the case if a lead or chromium plume in the groundwater truly existed. In other words, if a site is impacted by a particular metal due to disposal activities (say chromium for example), then other metals such as aluminum, lead, or zinc should not be consistently elevated as in the case of samples collected from the shallow aquifer at MCB Camp Lejeune. This point is depicted in the data summary tables provided in Appendix A for Sites 2 and 78. These tables were taken from the Remedial Investigation Reports for Operable Units No. 1 and No. 5. As an example, note that sample numbers 78-MW08, 78-MW10, 78-MW11, and 78-MW12 all had elevated levels of total metals when compared to samples 78-MW09-2 and 78-MW09-3. It is clear that most of the metal concentrations in a particular sample follow a consistent pattern throughout.

Table 2 (Comparison of Repeat Sampling of Shallow Wells

Five wells from Sites 2 and 78 were randomly chosen to evaluate total metals concentrations between sampling rounds. The comparison was limited to only chromium, lead, and manganese since these contaminants were frequently detected throughout MCB Camp Lejeune. In several cases, metal concentrations were significantly different between the sampling rounds. If the shallow aquifer was impacted due to former disposal activities, a contaminant plume would be present and concentrations would not significantly deviate. The deviation in metal concentrations may indicate that sampling results are biased due to suspended particulates in the samples.

Table 3 (Dissolved Metal Concentration in Shallow Groundwater by Site)

The data base for Table 3 was limited to 12 sites since many of the previous investigations (i.e., prior to Navy CLEAN) did not analyze for dissolved metals. Nevertheless, an analysis of the 12 sites revealed that elevated levels of dissolved metals in groundwater is limited. Manganese was the most frequently detected metal above drinking water standards (10 of 12 sites exhibited elevated levels). Lead was detected at only one site (Site 21) above drinking water standards. Chromium was also detected at only one site (Site 78) above drinking water standards. No other metal was detected above the standards.

Literature searches have indicated that manganese is a naturally occurring metal in North Carolina. Therefore, the presence of manganese may not be attributable to site-related activities (Greenhorne & O'Mara, 1992).

An analysis of the data from Table 3 clearly shows a significant reduction in metal concentrations when compared to Table 1 (total metals in shallow groundwater). One possible reason for this reduction is that suspended solids or particles are not being introduced into the analysis of the sample due to filtering. A second possibility is that the metals are not significantly present in a dissolved state in shallow groundwater due to the species of metals under site conditions. It should be noted that calcium and sodium did not exhibit such a pattern since the salts of these metals are more soluble in water. For example, the concentrations of total calcium and total sodium versus dissolved calcium and dissolved sodium are similar and are not affected by the removal of the particulates during filtering. The fact that these salts do not exhibit the pattern that the other metals show supports the possibility that total metal concentrations are influenced by particulates in the sample.

Table 4 (Total Metals in Upgradient Shallow Wells)

The data base for Table 4 consists of groundwater results from 14 upgradient shallow monitoring wells (i.e., one well per site). These wells were installed to determine baseline groundwater quality to which on-site groundwater conditions could be compared. In some cases, the upgradient wells were located in areas where other base activities may have influenced groundwater quality.

The analysis of this data shows that manganese was the most frequently detected metal above Federal or State standards in upgradient shallow wells. Manganese was detected in 7 of the 14 upgradient wells above drinking water standards. Chromium and lead were also frequently detected above drinking water standards in upgradient (background) wells. These contaminants were detected in 6 of the 14 upgradient wells. At Site 2, samples collected from an upgradient well (2GW9) exhibited elevated levels of chromium (83µ/l), lead (27.2µ/l) and manganese (747µ/l). At Site 78, samples collected from upgradient wells 96W4 and 78GW26 did not exhibit elevated levels of total metals. The concentration range for metals detected above NC WQS and/of Federal MCLs in upgradient wells is provided below:

- beryllium (ND-46.5 µ/l)
- cadmium (ND-10 µ/l)
- chromium (ND-198 µ/l)
- lead (ND-78.8 µ/l)
- manganese (ND-747 µ/l)
- mercury (ND-1.6J µ/l)

Based on the above range representing upgradient wells, none of the on-site wells at Site 2 exhibited total metals above the maximum background concentrations. However, at Site 78, lead and chromium were detected above the maximum background in several on-site wells.

An analysis of the data from Table 4 indicates that shallow groundwater upgradient of some sites contains total metals above drinking water standards. A comparison of Table 4 data against Table 1 data indicates that shallow groundwater samples from upgradient wells are less contaminated than samples collected from on-site monitoring wells. However, it should be noted that the data base for Table 4 consists of only 14 wells whereas the data base for Table 1 consists of over 130 wells. Therefore, to assume that upgradient groundwater quality is better than on-site groundwater quality may not be justified due to the different data bases.

Table 5 (Comparison of Subsurface Metal Concentrations in Uncontaminated and Contaminated Wells)

The purpose of this table is to determine whether metal concentrations in soils correlate with the elevated levels of metals in shallow groundwater.

To evaluate this, metals in subsurface soils, representing an area of groundwater contamination, were compared to metals in subsurface soil in areas which did not exhibit groundwater contamination. If the elevated total metals in shallow groundwater are present due to former disposal activities, subsurface metals in soil representing an area of groundwater contamination would be expected to be elevated or higher than metals in subsurface soil representing a non-contaminated area. This evaluation assumes that the well exhibiting elevated total metals is within a source area and that the soil sample is representative of soil impacted by metal contamination.

As shown on Table 5, there is no clear pattern or correlation which indicates that elevated total metals are due to soil contamination. Note that in many cases, the concentration of metals which represent "non-contaminated" areas are greater than the metals which represent "contaminated" areas. Also note that the metals in subsurface soil are within or close to background subsurface metal concentrations. Therefore, this supports the possibility that in many cases at MCB Camp Lejeune, the elevated total metals in shallow groundwater cannot be attributable to a source or to past disposal practices.

Table 6 (Total Metals in Deep Monitoring Wells)

Table 6 presents total metal concentrations in deep groundwater for each site. The data base is limited to only 8 sites. Metal concentrations in supply wells were also included for comparison purposes.

As shown on Table 6, total metals in deep groundwater are below drinking water standards with a few exceptions. Arsenic and cadmium were detected above the standards in one deep monitoring well at Site 78 (see Figure 4). Manganese was detected in deep groundwater at three sites and a few of the supply wells. Lead was detected in one supply well at 16 µ/l, which is slightly above the drinking water standard of 15 µ/l.

Elevated total metals are not widespread in deep groundwater for two possible reasons. First, most metals are not very mobile in the environment. Second, deep groundwater samples may not have significant amounts of suspended particulates due to different geologic conditions. Soils in the deeper aquifer are more compacted and consist primarily of calcareous sands, clays, and limestone fragments. Soils in the shallow aquifer are loosely compacted and consist primarily of fine-grained sands, silts, and clays. This classification may support the possibility that suspended solids are collected during sampling, thereby influencing the analysis for total metals.

Table 7 (Summary of Field Parameters in Shallow, Deep, and Supply Wells)

Table 7 provides a range of pH and specific conductivity values representative of shallow and deep groundwater. In general, lower pH values were noted more often in shallow wells than in deep wells (including the supply wells). This condition may influence the leachability and speciation of metals in groundwater.

Deep groundwater usually exhibited higher specific conductivity values. High specific conductivity values are representative of high dissolved conditions. The fact that deep groundwater generally exhibited higher specific conductivity values indicates that most of the metals, if present, are in a dissolved state. The high specific conductivity values could also indicate less suspended particulates due to the geologic conditions of the deep aquifer. The lower specific conductivity values observed in shallow wells indicates that the metals in the shallow aquifer are not in a dissolved state. This also supports the possibility that suspended particulates in the shallow aquifer are influencing the analysis of total metals.

5.0 ANALYSIS OF THE STUDY OBJECTIVES

Each of the objectives identified for this study are analyzed below based on the information collected.

Objective No. 1 (Determine whether the elevated total metals in the shallow aquifer are related to past disposal practices, well construction factors, sampling techniques, or suspended particulates in the samples)

Based on the analysis of information provided in Tables 1 through 7 and Appendix A, it appears that suspended particulates in groundwater samples could influence the concentration of total metals in groundwater. Well construction factors and sampling techniques are probably not a significant factor since the data base is representative of data obtained by Baker, ESE (Site 28 and 30), Roy F. Weston (ABC Cleaners), and Halliburton NUS (Site 7). No particular pattern was noted between sites which Baker obtained the samples versus sites in which other consultants obtained the data. Sampling methods were also considered. For Sites 63 and 65 for example, samples were collected with a bailer. At Sites 2 and 78, samples were collected with a low flow pump. All four sites exhibited elevated levels of total metals in groundwater samples. In addition, due to the fact that deep groundwater quality is not significantly impacted with metals indicates that well construction or sampling techniques are probably not factors related to elevated total metals in groundwater.

With respect to past disposal practices, Table 5 clearly shows that soil concentrations do not correlate with elevated total metals in groundwater. Based on this analysis, and on many of the sites previously investigated, the source of total metals in groundwater cannot be attributable to soil contamination or disposal practices in many cases. This is based on both the history of the site as well as the analytical soil results. In some cases, total metals were detected at elevated levels even when the site history did not correlate with the contaminants found. For example, Sites 2 and 21 have a history of pesticide storage and handling, and there are no known disposal areas (i.e., buried debris) within the site boundary. Nevertheless, both of these sites exhibited several metals above drinking water standards that would not be expected to be present at high concentrations based on the historical use of the site. These metals included lead, chromium, beryllium, cadmium, and manganese.

Objective No. 2 (Determine whether total metals in shallow groundwater are elevated throughout the region or MCB Camp Lejeune)

Based on groundwater data obtained from both upgradient wells and off base wells, total metals were detected above drinking water standards in shallow groundwater in areas that would not be influenced by former disposal activities at the sites. Given that some of the upgradient wells are contaminated, it is apparent that total metals in shallow groundwater are elevated in certain areas of the base outside of the influence of site-related disposal activities. However, it is unknown whether the shallow aquifer upgradient of the sites is contaminated due to other base-related activities or whether the levels in groundwater samples are also elevated due to the influence of suspended fines in the samples.

Objective No. 3 (Determine whether there is a correlation between elevated total metals in groundwater and metals in soil)

An evaluation of the data presented in Table 5 shows that metals in soil samples collected in areas of groundwater contamination are not elevated when compared to metals in soil samples collected in areas that did not exhibit groundwater contamination. This supports the possibility that in many cases, elevated levels of total metals in shallow groundwater are not related to the disposal history at the site. As previously mentioned, sites which did not exhibit soil contamination (when compared to background soil levels) or did not have a history of disposal indicative of metals contamination still exhibited elevated levels of total metals in groundwater. Since there is no apparent correlation between metals in soil and total metals in groundwater, then the possibility exists that the elevated total metals in groundwater are biased high due to suspended particulates.

Objective No. 4 (Determine whether the concentrations of total metals in groundwater is related to shallow and deep aquifer characteristics)

There is some evidence that the geologic conditions of the shallow and deep aquifers influence the amount of total metals detected in groundwater samples. The fact that the deep aquifer generally exhibited higher specific conductivity values indicates that there is more dissolved constituents in the deep aquifer when compared to the shallow aquifer. This was evident when comparing Table 1 (total metals in shallow groundwater) to Table 6 (total metals in deep groundwater). Table 6 did not indicate significant levels of total metals in deep groundwater throughout MCB Camp Lejeune.

The geologic conditions of the shallow aquifer would tend to result in samples that may contain suspended particulates. The suspended particulates could influence the total metals concentrations in the samples.

6.0 CONCLUSIONS

1. Elevated levels of total metals in the shallow aquifer are probably influenced to some degree by the geologic conditions of the site.

2. There is no correlation between metal levels in soil and total metals in groundwater. Therefore, elevated total metals in groundwater cannot be attributable to soil contamination of past disposal practices.

3. Elevated levels of total metals in the shallow aquifer may be biased high due to suspended particulates in the samples.

4. Dissolved metals in groundwater were generally below Federal MCLs and NC WQS and therefore, do not present a significant problem at MCB Camp Lejeune.

5. Total and dissolved metal concentrations in the Castle Hayne aquifer were generally below drinking water standards and therefore, do not present a significant problem at MCB Camp Lejeune.

6. The presence of manganese in shallow and deep groundwater may be due to naturally occurring geologic conditions.

7.0 RECOMMENDATIONS

1. Remediation of total metals in the shallow aquifer at Operable Units 1 and 5 is not recommended based on the following:

   - Elevated metals in groundwater at both operable units does not appear to be related to soil contamination or past disposal practices;
   - The distribution of total metals in groundwater is not characteristic of a plume that would be present due to a source of contamination;
   - Remediation of total metals would not be practical from an engineering or cost standpoint; and
   - Currently, there is no human or environmental exposure to shallow groundwater.

2. Additional background wells should be installed at all sites in order to provide a baseline for comparing on-site groundwater quality.

Tables

TABLE 1
TOTAL METALS BY SITE
SHALLOW MONITORING WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

Site Number / Units	NCWQS ug/L	FEDERAL MCL ug/L	Site 1 ug/L	Site 2 ug/L	Site 6 ug/L	Site 7 ug/L	Site 9 ug/L	Site 21 ug/L	Site 24 ug/L	Site 28 ug/L	Site 30 ug/L	Site 41 ug/L	Site 43 ug/L	Site 44 ug/L
Arsenic	50	50	7.2 - 57.4	2.2 - 23.6	ND - 23.3	ND - 43.4J	ND	ND - 101	ND - 116J	5.4 - 13J	6.4 - 12J	2.4 - 36.3	ND - 23.4	ND - 570
Barium	2000	2000	335 - 833	46 - 1420	ND - 1020	427 - 641	ND - 1060	ND - 647	ND - 1120	78.8 - 576	60.1 - 396	55.2 - 999	220 - 745	315 - 3180
Beryllium	NE	4	2.7 J - 43.4	1 - 3	ND - 7.5	ND - 10.3J	ND	ND - 8	ND - 19	ND - 1.2J	ND - 2.4	0.80 - 42.8	1.5 - 4.2	1.4 - 36.6
Cadmium	5	5	ND - 12.9	7	ND	ND	ND	ND	ND - 12	3.3J - 17.3J	ND - 10.7J	3.2 - 110	ND - 6.9	ND - 32
Calcium	NA	NA	8850 - 726000	5710 - 450000	5430 - 64900	5050 - 51300	16100 - 90700	6130J - 63000J	ND - 151000	20200 - 160000	1730 - 11900	8750 - 828000	10300 - 91900	2430 - 191000
Chromium	50	100	172 - 627	11 - 117	ND - 201	47.8 - 220	ND - 214	ND - 348J	19 - 316	9.0J - 140	42.8 - 106J	10.5 - 244	161 - 249	126 - 895
Copper	1000	1300	44.6 - 117	3 - 23	ND - 175	17.7 - 36.4	ND - 39.7	ND - 84	ND - 52	18.8J - 75.4	15.8 - 42.5	16.3 - 1030	64.2 - 104	28.6 - 313
Lead	15	15	40.8J - 176J	2.7 - 44.8	ND - 200	23 - 37.3	ND - 127	ND - 2000J	5.1 - 89	20.3J - 234J	7.7J - 115J	4.8 - 9340	16.5 - 28.8	15.8 - 508
Manganese	50	50 (1)	125 - 1720	21 - 190	ND - 362	56.9 - 220	ND - 91.3	59 - 276J	29 - 518	82.2 - 304	78.5 - 578	56.6 - 2110	72.6 - 297	88 - 1730
Mercury	1.1	2	ND - 1.2J	ND	ND - .46	0.2 - 0.36	ND - 1.4	ND - 2.4J	ND - 3.2	ND - 1.4J	0.88J - 0.9J	0.13 - 0.92	ND - 0.24	ND - 1.1
Nickel	100	100	28.5 - 426	ND	ND - 41.9	ND	ND	ND - 123	ND - 140	ND - 59.8	17.1J - 52.6J	28.8 - 137	20.5 - 143	21.9 - 486
Sodium	NA	NA	9090 - 19000	ND - 103000	1110 - 68700	7040 - 156000	1390 - 4170	7950 - 15700	5230 - 19200	9480 - 74700	5320 - 8100	2080 - 40200	9160 - 22100	4060 - 12600
Vanadium	NE	NE	214 - 640	9 - 184	ND - 330	37.8 - 423	ND - 175	ND - 419	ND - 408	6.1 - 164	57 - 101	20.4 - 244	122 - 233	184 - 759
Zinc	2100	5000 (1)	ND - 1110	6 - 146	ND - 1620	83.6 - 133	ND - 118	27J - 487J	20 - 650	ND	79.2 - 104	25.7 - 5180	19 J - 661J	87.3 - 2800J

Site Number / Units	Site 48 ug/L	Site 63 ug/L	Site 65 ug/L	Site 69 ug/L	Site 78 ug/L	Site 82 ug/L	ABC Cleaners ug/L	Offsite Property #1 ug/L	Offsite Property #2 ug/L
Arsenic	ND	ND - 23.4	ND - 308	2.9 - 29.0	ND - 405J	ND - 67.8	ND - 12	10.3 - 160	ND
Barium	18 - 51.3	56.1 - 5410	105 - 638	46.5 - 850	ND - 1250	ND - 540	35 - 220	ND - 468	ND
Beryllium	ND	ND - 3.1	ND	1.3 - 10.6	ND - 19	ND	NA	ND - 8.5	ND
Cadmium	2.2 - 3.3	ND	ND	2.4 - 11.4	ND - 21	ND	NA	ND	ND
Calcium	30600 - 115000	2830 - 24300	33300 - 181000	2010 - 38700	ND - 642000	6580 - 60800	790 - 16000	ND - 22800	ND - 5200
Chromium	5.8 - 17.5	4.4 - 134	50.1 - 364	15.1 - 159	ND - 858J	ND - 174	ND - 57	52.8 - 636	ND - 94
Copper	3.1 - 13.5	10.7 - 126	28.2 - 127	16.2 - 70.8	ND - 699	ND - 29.3	ND - 89	ND - 140	ND
Lead	ND	4.3 J - 369	19.1 - 132	7.8 - 188	ND - 360J	ND - 89	ND - 10	12.3 - 345	6.3 - 62.3
Manganese	38.1 - 585	50.3 - 1020	56.2 - 474	13.0 - 912	26 - 714	26.9 - 283	4 - 44	56 - 973	ND - 60.1
Mercury	0.04 - 0.09	ND - 0.20	ND - 0.29	0.10 - 0.94	ND - 1.5	ND - 0.66	NA	ND	ND
Nickel	ND	19.8 - 54.2	19.4 - 84.3	13.6 - 99.8	ND - 234	ND - 34.6	ND - 77	40.2 - 380	ND
Sodium	5750 - 8760	3150 - 7100	3850 - 11700	4790 - 41300	ND - 42500	5670 - 36500	5800 - 33000	ND - 9390	ND - 7630
Vanadium	3.4 - 12.8	7.9 - 163	59.8 - 433	17.3 - 210	ND - 1700	ND - 256	ND - 45	70 - 739	ND - 64.7
Zinc	ND - 30.3	58.5J - 1110J	148J - 406J	36.2 - 12100	6J - 967J	ND - 204	14 - 220	ND - 736	ND - 40.8

NOTES:
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NE - Not established.
NA - Not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 2
COMPARISON OF REPEAT SAMPLING OF SHALLOW WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

Well	2GW01		2GW03		2GW06		2GW08		2GW09	
Date	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994	5/1993	3/1994
Chromium	18	ND	11	ND	15	ND	ND	ND	25	83
Lead	15.5 J	ND	3.5 J	ND	6.7 J	ND	ND	3.4	27.2 J	23.6
Manganese	55	47	21	ND	79	140	53	415	290	747

Well	78GW05		78GW08		78GW15		78GW16		78GW19	
Date	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994	1/1991	4/1994
Chromium	ND	17 J	91.8	491 J	21.4	215 J	209	353 J	13.8	ND
Lead	13.6	13.1 J	54.1	131 J	16.6	53	100	224	31.7	8.3
Manganese	162	161 J	46.5	213 J	18.3	115	98.3	150	79	26

NOTES:
J - Value is estimated..
ND - Not detected.

TABLE 3
DISSOLVED METALS BY SITE
SHALLOW MONITORING WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

Site Number / Units	NCWQS ug/L	FEDERAL MCL ug/L	Site 1 ug/L	Site 2 ug/L	Site 6 ug/L	Site 7 ug/L	Site 9 ug/L	Site 21 ug/L	Site 24 ug/L	Site 28 ug/L	Site 30 ug/L	Site 41 ug/L	Site 43 ug/L	Site 44 ug/L
Arsenic	50	50	NA	2.2 - 7.1	ND	NA	ND	ND - 10.6	ND - 16.3	NA	NA	2.2 - 4.7	NA	NA
Barium	2000	2000	NA	25 - 149	ND	NA	ND	ND	ND	NA	NA	12.4 - 451	NA	NA
Beryllium	NE	4	NA	1	ND	NA	ND	ND	ND	NA	NA	0.80 - 3.2	NA	NA
Cadmium	5	5	NA	ND	ND	NA	ND	ND - 5	ND	NA	NA	3.2 - 4.2	NA	NA
Calcium	NA	NA	NA	5800 - 441000	6230 - 57400	NA	15800 - 82400	35900	ND - 113000	NA	NA	4710 - 138000	NA	NA
Chromium	50	100	NA	10	ND	NA	ND	ND	ND	NA	NA	8.3 - 9.6	NA	NA
Copper	1000	1300	NA	2 - 9	ND	NA	ND	ND	ND	NA	NA	16.3 - 23.9	NA	NA
Lead	15	15	NA	2.1	ND	NA	ND	ND - 94	ND	NA	NA	1.0	NA	NA
Manganese	50	50 (1)	NA	17 - 129	ND - 92.7	NA	ND	40 - 134	ND - 320	NA	NA	7.1 - 521	NA	NA
Mercury	1.1	2	NA	ND	ND	NA	ND	ND	ND - 0.5	NA	NA	0.13 - 0.20	NA	NA
Nickel	100	100	NA	ND	ND	NA	ND	ND	ND - 57	NA	NA	28.8 - 31.2	NA	NA
Sodium	NA	NA	NA	ND - 103000	1420 - 70500	NA	1280 - 3860	16200	ND - 183000	NA	NA	2500 - 34200	NA	NA
Vanadium	NE	NE	NA	43	ND	NA	ND	ND	ND	NA	NA	20.4	NA	NA
Zinc	2100	5000 (1)	NA	8 - 35	ND - 350	NA	ND	68 - 50	ND - 437	NA	NA	10.6 - 125	NA	NA

Site Number / Units	Site 48 ug/L	Site 63 ug/L	Site 65 ug/L	Site 69 ug/L	Site 78 ug/L	Site 82 ug/L	ABC Cleaners ug/L	Offsite Property #1 ug/L	Offsite Property #2 ug/L
Arsenic	ND	NA	NA	2.9	ND - 21.6	ND	NA	ND - 18.8	ND
Barium	16.8 - 27.6	NA	NA	13.7 - 35.8	ND	ND	NA	ND	ND
Beryllium	ND	NA	NA	1.3	ND	ND	NA	ND	ND
Cadmium	ND - 3.1	NA	NA	2.4	ND	ND	NA	ND	ND
Calcium	72600 - 80700	NA	NA	764 - 10600	ND - 296000	15200 - 58500	NA	ND - 7710	ND
Chromium	ND	NA	NA	7.2	ND - 59	ND	NA	ND - 30.0	ND
Copper	2.6 - 7.6	NA	NA	16.2	ND - 121	ND	NA	ND - 10.7	ND
Lead	ND	NA	NA	1	ND - 17.2	ND	NA	ND - 15.8	ND
Manganese	39.7 - 539	NA	NA	8.5 - 139	ND - 152	21 - 127	NA	ND - 63.8	ND - 21.3
Mercury	0.05 - 0.09	NA	NA	0.1	ND - 0.6	ND	NA	ND	ND
Nickel	ND	NA	NA	13.6	ND	ND	NA	ND	ND
Sodium	6430 - 8920	NA	NA	5170 - 41100	ND - 42200	5980 - 36000	NA	ND - 9540	ND - 6750
Vanadium	ND	NA	NA	16.6	ND	ND	NA	ND	ND
Zinc	ND	NA	NA	7.0 - 7670	ND - 58	ND - 119	NA	ND - 468	ND - 222

NOTES:
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NE - Not established.
NA - Not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 4
SUMMARY OF TOTAL METALS IN UPGRADIENT WELLS
SHALLOW MONITORING WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

Well Number	NCWQS	FEDERAL MCL	Upgradient of Site 1	Upgradient of Site 2	Upgradient of Site 6	Upgradient of Site 7	Upgradient of Site 9	Upgradient of Sites 21 and 78	Upgradient of Site 24	Upgradient of Site 28	Upgradient of Site 30	Upgradient of Site 41	Upgradient of Site 43	Upgradient of Site 44
			1GW06	2GW09	6BP6S	7GW03	9GW4S	78GW26	24GW07	28GW04		41GW05		
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L		ug/L		
Arsenic	50	50	17.8 J	12.9	ND	ND	ND	ND	3.7 J	7.4 J	No Upgradient Well Sites	13.1	No Upgradient Well Sites	No Upgradient Well Sites
Barium	2000	2000	548	328	257	428	71.3	ND	ND	576		55.7		
Beryllium	NE	4	3.2 J	3	ND	ND	ND	ND	ND	9.3 J		1.6		
Cadmium	5	5	ND	ND	ND	ND	ND	not reported	ND	3.3 J		10		
Chromium	50	100	193	75	198	124	ND	13	37	122		54.4		
Copper	1000	1300	64.8	25	35.6	36.4	ND	ND	ND	20.7 J		27		
Lead	15	15	78.8 J	27.2	64.4	30.3 J	ND	9	11.4	22.4 J		23.7		
Manganese	50	50 (1)	202	747	84.5	56.9 J	ND	ND	39	206		203		
Mercury	1.1	2	1.6 J	ND	ND	0.36	ND	ND	ND	ND		0.16		
Nickel	100	100	51.6	ND	ND	ND	ND	ND	ND	59.8		38		
Vanadium	NE	NE	214	86	209	152	ND	149	64	85.3		38.1		
Zinc	2100	5000 (1)	ND	103	56.6	86.4 J	ND	68.1	41	ND		173		

Well Number	Upgradient of Site 48	Upgradient of Site 63	Upgradient of Site 65	Upgradient of Site 69	Upgradient of Site 78	Upgradient of Site 82	Upgradient of ABC Cleaners	Upgradient of Offsite Property #1	Upgradient of Offsite Property #2
	48GW1			69GW07	9GW04	6MW3S	MW-S01		
Units	ug/L			ug/L	ug/L	ug/L	ug/L		
Arsenic	ND	No Upgradient Well Sites	No Upgradient Well Sites	2.9	ND	ND	ND	No Upgradient Well Sites	No Upgradient Well Sites
Barium	29.4 J			46.5	ND	ND	35		
Beryllium	ND			1.3	ND	ND	NA		
Cadmium	2.5 J			2.4	ND	ND	NA		
Chromium	ND			15.8	ND	ND	ND		
Copper	ND			16.2	ND	ND	ND		
Lead	ND			7.8	ND	ND	3		
Manganese	70.6			13	ND	ND	10		
Mercury	ND			0.1	ND	ND	NA		
Nickel	ND			13.6	ND	ND	ND		
Vanadium	3.4 J			17.3	ND	ND	9		
Zinc	ND			36.2	ND	ND	23		

NOTES:
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NE - Not established.
NA - Not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 5
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

	Camp Lejeune Background Subsurface Soil Data	Site 1		Site 2		Site 6		Site 7		Site 9		Site 21	
Units	mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
Well Number		–	–	2GW07	2GW09	6GW18	6GW15	7GW03	7GW02	9GW5	9GW1	21GW03	21GW02
Soil Sample Number		–	–	*2-GW07-01*	*2 - GW09-02*	*6-GW18-0303*	*6-GW15-03*	*GW03-002*	*GW02-7595*	*9-GW5-03*	*9-SB35-03*	*21-GW03*	*21-GW02*
Arsenic	0.03 - 0.47	NA	NA	1.7 J	ND	ND	ND	1.5	ND	ND	ND	ND	0.55 J
Barium	2 - 11	NA	NA	12.5 J	ND	ND	ND	6.6	71	ND	ND	ND	4.4 J
Beryllium	0.03 - 0.23	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	0.17 - 1.2	NA	NA	ND	ND	ND	ND	1.3	4.5	ND	ND	ND	ND
Chromium	2 - 9	NA	NA	10.9 J	4.6	ND	1.6	5.2	6	ND	2.6 J	15.2	3.2 J
Copper	0.47 - 2	NA	NA	0.97 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead	1 - 12	NA	NA	8 J	4.3	3.3 J	1.2	2.5	34.4	1.6	8.3	7.1	6.9 J
Manganese	0.40 - 8	NA	NA	4.3 J	4.1	ND	1.8 B	3	11.4	ND	3.7 J	9.8	3.4 J
Mercury	0.01 - 0.11	NA	NA	0.3 J	ND	ND	ND	10.13	0.48	ND	ND	ND	ND
Nickel	0.70 - 5.0	NA	NA	ND	ND	ND	ND	3.4	11.8	ND	ND	ND	ND
Vanadium	0.75 - 13	NA	NA	13.8 J	ND	ND	2.9 B	5.5	4.5	ND	ND	15.5	4.4 J
Zinc	0.40 - 12	NA	NA	ND	ND	ND	ND	1.3	ND	ND	6.1 J	5.7	3 J

NOTES:
Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NA - No available wells to compare OR compound was not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 5
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

	Site 24		Site 28		Site 30		Site 41		Site 43		Site 44	
Units	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg	"Clean" mg/kg	"Contaminated" mg/kg
Well Number	24GW10	24GW02	--	--	--	--	41GW04	41-GW11	43GW01	43GW02	44GW02	44GW01
Soil Sample Number	24-GW10	24-BDA-SB09	--	--	--	--	41-GW04-DW	41-GW11-01	43-GW01-00	43-GW02-00	44-GW02-035	--
Arsenic	ND	ND	NA	NA	NA	NA	0.51	1.6	ND	ND	ND	1.7
Barium	ND	ND	NA	NA	NA	NA	9.4	22.6	ND	ND	ND	17.9
Beryllium	ND	ND	NA	NA	NA	NA	0.18	0.18	ND	ND	ND	ND
Cadmium	ND	ND	NA	NA	NA	NA	0.73	0.73	8.3	ND	ND	ND
Chromium	11.2	9.1	NA	NA	NA	NA	3.6	11.2	8.3	6.7	5.6 J	10 J
Copper	ND	ND	NA	NA	NA	NA	3.7	22.5	3.4	ND	6.2 J	25.4 J
Lead	4.6 J	6.2 J	NA	NA	NA	NA	4.8	110	9.8	6.1	5.5	10.7
Manganese	4.7	8.4 J	NA	NA	NA	NA	39.7	75.9	31.2	8.2	3.5	20.4
Mercury	ND	ND	NA	NA	NA	NA	0.06	0.31	ND	ND	ND	ND
Nickel	ND	ND	NA	NA	NA	NA	6.6	6.6	7.6	7.3	3.1	5.4
Vanadium	18.4	10	NA	NA	NA	NA	6.8	9.3	7.2	5.8	5	14.7
Zinc	ND	7.8	NA	NA	NA	NA	7.7	130	20.1	3	3.2	34.9

NOTES:
Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.
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JB - Value is estimated below the CRDL, but greater than the IDL.
NA - No available wells to compare OR compound was not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 5
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

	Site 48		Site 63		Site 65		Site 69		Site 78		Site 82	
	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Well Number	48-GW01	48-GW03	63MW03	63MW02	65MW03	65MW02	69-GW11	69-GW03	78GW34	78GW24-1	6-GW28	82MW3
Soil Sample Number	48-GW1A-01	48-C3-03	63-MW03-04	63-MW02-06	65-MW03-11	65-MW02-06	69-GW11-04	69-CSA-SB23-00	78-GW34	78-B903-SB03	6-GW28-09	6-GW27D-06
Arsenic	1.3	0.77 J	ND	ND	ND	1.3	0.68	0.63	ND	ND	0.31	15.9
Barium	21.1	15	ND	ND	3.4	6.8	5.6	3	ND	ND	ND	ND
Beryllium	0.2	0.19	ND	ND	ND	ND	0.3	0.28	ND	ND	ND	ND
Cadmium	1.4	1.8 J	ND	ND	NA	NA	0.56	0.52	ND	ND	ND	ND
Chromium	18.2	18.6	7.7	ND	3.9	5.7	6.8	1.7	18.5	9.3	2.6	3
Copper	3.5	3.8	ND	ND	1.5	3.1	3.8	3.5	3.4 B	ND	ND	ND
Lead	32.3	14.3	4.2	2.6	1.7	3.2	4.3	1.1	4.5 J	2.6 J	2.7	4.3
Manganese	411	7	4.9	18.4	3.5	6.9	4	1.2	9.2	ND	ND	ND
Mercury	ND	ND	ND	ND	NA	NA	0.06	0.05	ND	ND	ND	ND
Nickel	2.2	1.9 J	ND	ND	ND	ND	3.2	3	ND	ND	ND	ND
Vanadium	28.3	20.8 J	ND	ND	4.4	3	4.4	3.6	18.7	19.2	ND	ND
Zinc	ND	ND	ND	ND	2.7	5	3.2	1.9	7.9	ND	ND	ND

NOTES:
Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NA - No available wells to compare OR compound was not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 5
COMPARISON OF INORGANIC SUBSURFACE SOIL CONCENTRATIONS IN "CLEAN" AND "CONTAMINATED" WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

	ABC Cleaners		Offsite Property #1		Offsite Property #2	
	"Clean"	"Contaminated"	"Clean"	"Contaminated"	"Clean"	"Contaminated"
Units	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Well Number	–	–	–	–	–	–
Soil Sample Number	–	–	–	–	–	–
Arsenic	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA
Beryllium	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA
Copper	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA
Manganese	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA

NOTES:
Shaded area indicates inorganic which exceeded a MCL and/or NCWQS in groundwater sample.
J - Value is estimated.
JB - Value is estimated below the CRDL, but greater than the IDL.
NA - No available wells to compare OR compound was not analyzed.
ND - Not detected.
NCWQS - North Carolina Water Quality Standard
MCL - Maximum Contaminant Level
(1) - Secondary MCL

TABLE 6
TOTAL METALS BY SITE
DEEP MONITORING WELLS
MCB, CAMP LEJEUNE, NORTH CAROLINA

	Site 1	Site 2	Site 6	Site 7	Site 9	Site 21	Site 24	Site 28	Site 30	Site 41	Site 43	Site 44	Site 48	Site 63	Site 65	Site 69	Site 78	Site 82	ABC Cleaners	Base Supply Wells (1)
Arsenic	No Deep Wells	ND	ND	No Deep Wells	ND	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	2.2 - 9.6	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	No Deep Wells	2.2 - 3.5	2 - 118 J	ND	ND - 14	ND
Barium		1420	ND		ND					22.6 - 186						42.3 - 58.0	ND - 547	ND	4 - 36	ND
Beryllium		ND	ND		ND					3.2						0.80 - 0.89	ND	ND	NA	NA
Cadmium		ND	ND		ND					4.2 - 4.7						3.2	ND - 21	ND	NA	ND
Chromium		16	ND		ND					9.6 - 40.5						8.3 - 20.7	ND - 10	ND	ND - 32	ND
Copper		ND	ND		ND					23.9						16.3	ND	ND	ND - 41	ND - 130
Lead		ND	ND		ND					1.0 - 11.1						3.1 - 6.8	ND	ND	ND - 10	ND - 16
Manganese		ND	ND - 33.5		ND					16.9 - 101						53.7 - 114	ND - 591	ND - 21.6	ND - 45	10 - 120
Mercury		ND	ND		ND					0.15 - 0.17						0.16 - 0.17	ND - 0.3	ND	NA	ND
Nickel		ND	ND		ND					31.2						28.8	ND	ND	ND - 14	NA
Vanadium		ND	ND		ND					20.4 - 49.8						20.4	ND - 24 J	ND	ND - 15	NA
Zinc		ND	ND		ND					17.8 - 83.8						31.1 - 48.7	ND - 181 J	ND	58 - 390	ND - 120

NOTES:
J - Value is estimated.
NA - Not analyzed.
ND - Not detected.
(1) - Range is based on 67 supply wells located throughout MCB, Camp Lejeune, NC.

TABLE 7
SUMMARY OF FIELD PARAMETERS IN SHALLOW, DEEP, AND SUPPLY WELLS MCB, CAMP LEJEUNE, NORTH CAROLINA

	Shallow Wells		Deep Wells		Supply Wells	
	Range (1)	Average Maximum	Range (2)	Average Maximum	Range (3)	Average Maximum
pH (standard units)	4.5 - 7.28	6.08	7.52 - 11.34	8.88	6.91 - 7.45	7.32
Specific Conductivity (micromhos/cm)	40 - 580	267	149 - 525	350	212 - 511	353

(1) - Based on data from 11 sites.
(2) - Based on data from 6 sites.
(3) - Based on data from 9 supply wells.

Figures

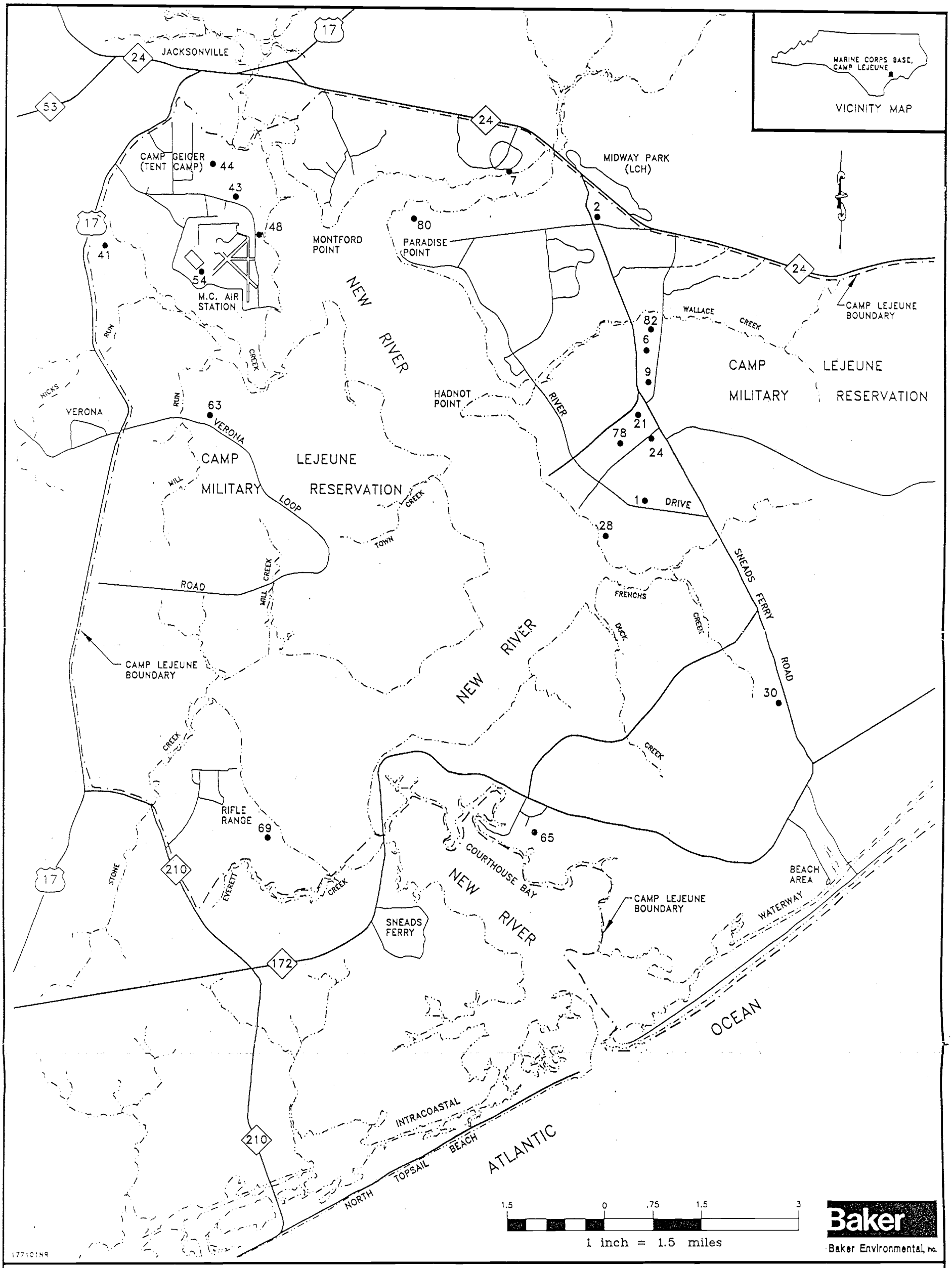
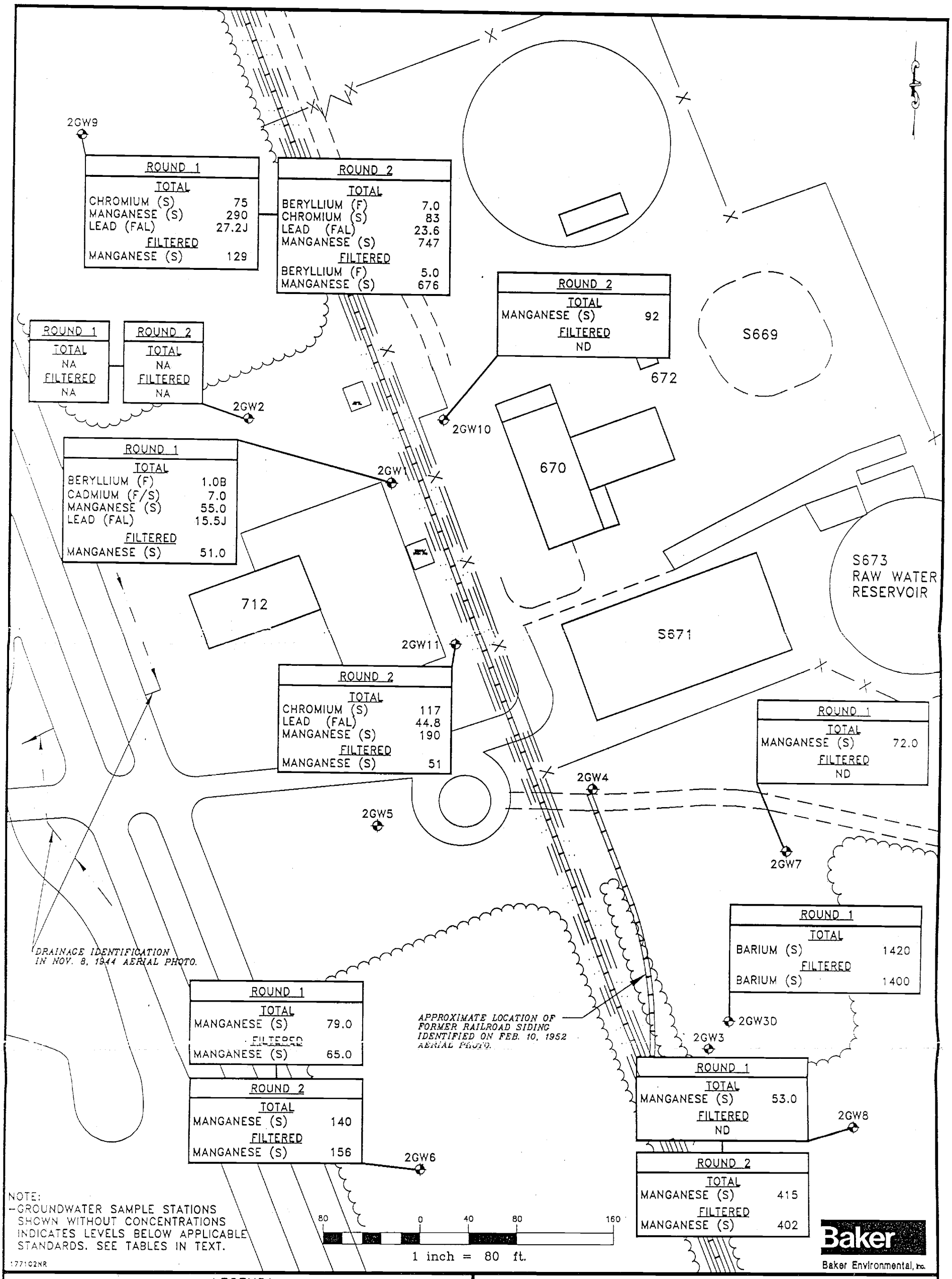


FIGURE 1
SITE LOCATION MAP
INORGANIC GROUNDWATER STUDY

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

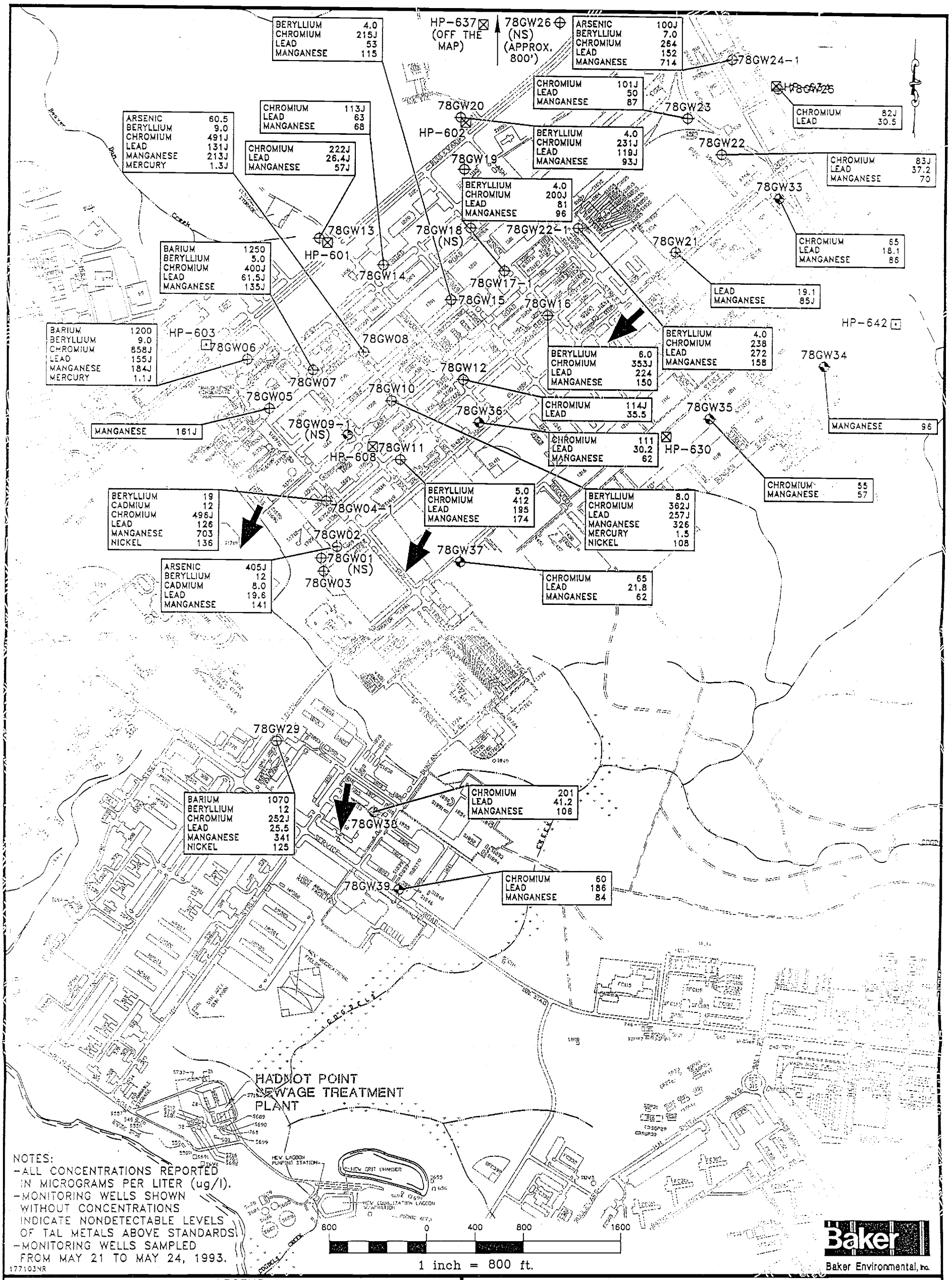
0152UBIZ



LEGEND

2GW1 GROUNDWATER WELL
(F) EXCEEDS FEDERAL STANDARD
(S) EXCEEDS STATE STANDARD
(FAL) FEDERAL ACTION LEVEL
ND NOT DETECTED ABOVE APPLICABLE STANDARDS
NA NOT ANALYZED
J ESTIMATED CONCENTRATIONS
CONCENTRATIONS EXPRESSED IN ug/l(ppb)
SOURCE: LANTDIV, FEB. 1992

FIGURE 2
POSITIVE DETECTIONS ABOVE APPLICABLE FEDERAL AND STATE STANDARDS FOR TOTAL AND FILTERED INORGANIC ANALYTES IN GROUNDWATER
SITE 2
REMEDIAL INVESTIGATION CTO-0174
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

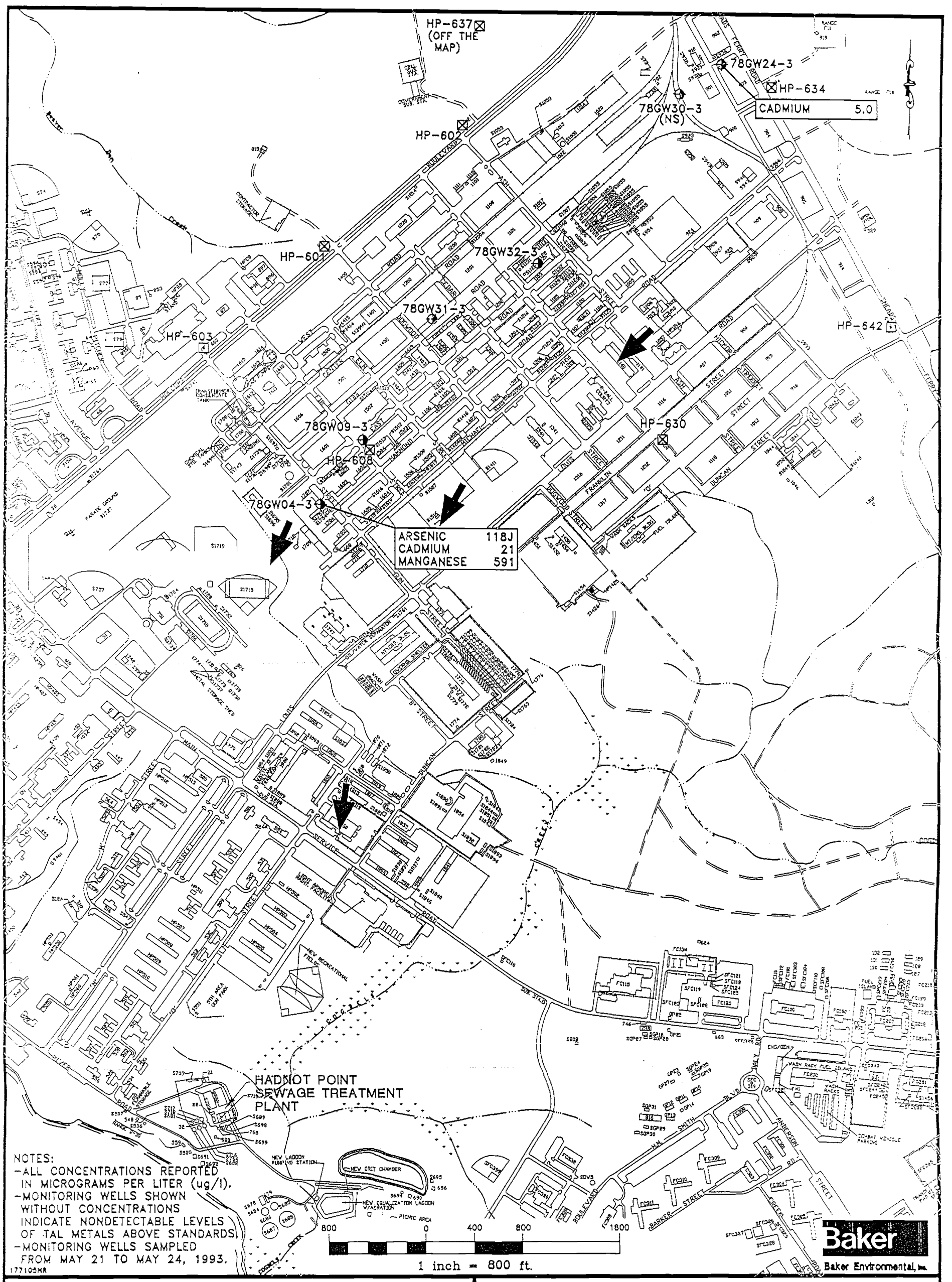


LEGEND

- 78GW02 — EXISTING SHALLOW MONITORING WELL INSTALLED BY ESE, 1984-1991
- 78GW33 — SHALLOW MONITORING WELL INSTALLED BY BAKER ENVIRONMENTAL, INC., 1993
- → APPROXIMATE DIRECTION OF GROUNDWATER FLOW
- (NS) NOT SAMPLED FOR TAL METALS
- HP-603 — WATER SUPPLY WELL (ACTIVE)-NOT SAMPLED
- HP-601 — WATER SUPPLY WELL (INACTIVE)-NOT SAMPLED

SOURCE: LANTDIV, FEBRUARY 1992

FIGURE 3
POSITIVE DETECTIONS OF TAL METALS ABOVE FEDERAL MCLs AND/OR NCWQS IN SHALLOW WELLS
SITE 78
REMEDIAL INVESTIGATION CTO-0177
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA



LEGEND

78GW04-3	EXISTING DEEP MONITORING WELL INSTALLED BY ESE, 1991
→	APPROXIMATE DIRECTION OF GROUNDWATER FLOW
(NS)	NOT SAMPLED FOR TAL METALS
HP-603	WATER SUPPLY WELL (ACTIVE)–NOT SAMPLED
HP-601	WATER SUPPLY WELL (INACTIVE)–NOT SAMPLED

SOURCE: LANTDIV, FEBRUARY 1992

FIGURE 4
POSITIVE DETECTIONS OF TAL METALS ABOVE FEDERAL MCLs AND/OR NCWQS IN DEEP WELLS
SITE 78
REMEDIAL INVESTIGATION CTO-0177
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

Appendix A
Data Summary Tables for Sites 2 and 78

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

	MINIMUM NONDETECTED UG/L	MAXIMUM NONDETECTED UG/L	MINIMUM DETECTED UG/L	MAXIMUM DETECTED UG/L	LOCATION OF MAXIMUM DETECTED	FREQUENCY OF DETECTION
ALUMINUM	NA	NA	68 J	542000 J	78-GW06-01	59 / 59
ANTIMONY	3 U	20 U	3.3 B	169 J	78-GW02-01	7 / 33
ARSENIC	2 U	10 U	2.3 J	405 J	78-GW02-01	44 / 48
BARIUM	NA	NA	17 B	1250	78-GW07-01	59 / 59
BERYLLIUM	1 U	4 U	1 B	19	24-GW02-01	52 / 59
CADMIUM	5 U	25 U	5	21	78-GW04-3-01	9 / 59
CALCIUM	NA	NA	2420 B	642000	78-GW04-1-01	59 / 59
CHROMIUM	10 U	50 U	10	858 J	78-GW06-01	46 / 59
COBALT	8 U	8 U	8 B	170	78-GW22-2-01	25 / 59
COPPER	2 U	2 U	3 B	699	78-GW39-01	58 / 59
IRON	NA	NA	32 B	523000	78-GW04-3-01	59 / 59
LEAD	1.8 U	4.9 U	2.9 B	2000 J	21-GW0B-01	50 / 59
MAGNESIUM	NA	NA	88 B	37100	24-GW03-01	59 / 59
MANGANESE	2 U	2 U	2 B	714	78-GW24-1-01	57 / 59
MERCURY	0.2 U	0.2 U	0.23 J	3.2	24-GW06-01	24 / 52
NICKEL	20 U	20 U	20 B	234	78-GW22-2-01	31 / 59
POTASSIUM	NA	NA	982 B	67300	78-GW32-3-01	59 / 59
SELENIUM	1 U	5 U	1.1 J	99.5 J	78-GW32-2-01	41 / 54
SILVER	3 U	15 U	5 J	5 J	78-GW09-3-01	1 / 59
SODIUM	NA	NA	2450 B	42500	78-GW32-3-01	59 / 59
THALLIUM	1 U	1 U	1 B	7.3 J	78-GW32-2-01	16 / 59
VANADIUM	4 U	4 U	4 J	1700	78-GW08-01	55 / 59
ZINC	6 U	6 U	6 J	967 J	78-GW22-2-01	57 / 59
CYANIDE	10 U	10 U	ND	ND	ND	0 / 54

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	21-GW01-01	21-GW02-01	21-GW03-01	21-GW04-01	21-GW0A-01	21-GW0B-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	4910 J	319000 J	4820 J	20100 J	16900 J	118000 J
ANTIMONY	7 UJ	7 U	7 U	7 U	7 R	7 U
ARSENIC	15	10	2 U	11.8	45.2 J	30.4
BARIUM	32 B	647	51 B	119 B	100 B	386
BERYLLIUM	1 B	5	1 B	1 B	1 B	6
CADMIUM	5 U	10 U	5 U	5 U	5 U	10 U
CALCIUM	63000 J	24100 J	6130 J	21700 J	23800	6250 J
CHROMIUM	10 UJ	348 J	10 UJ	33 J	21 J	192 J
COBALT	8 U	18 B	8 U	10 B	8 U	36 B
COPPER	4 B	79	7 B	28	24 B	38
IRON	9920 J	122000 J	13400 J	24900 J	38900 J	72900 J
LEAD	1.8 UJ	214 J	4.9 UJ	33 J	29	2000 J
MAGNESIUM	5070	15400	4550 B	5490	4850 B	11600
MANGANESE	64 J	179 J	134 J	193 J	59	276 J
MERCURY	0.2 R	2.4 J	0.2 R	0.2 R	0.2 U	0.2 R
NICKEL	20 U	86	20 U	20 U	20 U	60
POTASSIUM	2390 B	10500	2240 B	3800 B	2360 B	9520
SELENIUM	1 U	11 J	1 U	1 U	1 UJ	3.7 J
SILVER	3 U	3 U	3 U	3 U	3 UJ	3 U
SODIUM	15700	12600	7950	14400	12600	14400
THALLIUM	1 U	1 UJ	1 U	1 UJ	1 UJ	1 U
VANADIUM	30 B	281	11 B	42 B	48 B	243
ZINC	65 J	136 J	27 J	57 J	41 J	175 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	21-GW0C-01	24-GW01-01	24-GW02-01	24-GW03-01	24-GW04-01	24-GW06-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	209000 J	262000	93700	50200	58900	19800
ANTIMONY	7 U	3 U	3 UJ	3 U	4.6 B	3.5 B
ARSENIC	101	10 UJ	2.3 J	4.7 J	116 J	10.1 J
BARIUM	467	380	1120	480	290	159 B
BERYLLIUM	8	3 B	19	5	2 B	9
CADMIUM	10 U	5 U	12	5 U	5 U	5
CALCIUM	35200 J	4120 B	2420 B	124000	65600	151000
CHROMIUM	291 J	296	316	110	153	78
COBALT	60	8 U	41 B	66	8 U	35 B
COPPER	84	49	52	22 B	31	15 B
IRON	106000 J	58600	395000	16300	70500	69500
LEAD	92.5 J	89	17.9	21.6	23.6	7.4
MAGNESIUM	16300	12200	7240	37100	7690	4320 B
MANGANESE	273 J	117	518	393	66	431
MERCURY	0.23 J	0.23	2.6	0.2 U	0.2 U	3.2
NICKEL	123	38 B	140	85	20 U	93
POTASSIUM	11800	12000	7550	15400	6130	3370 B
SELENIUM	4.3 B	1.3 J	1.1 J	16.2 J	4.3 J	1 UJ
SILVER	3 U	3 UJ	15 UJ	3 UJ	3 UJ	3 UJ
SODIUM	15200	6030	11600	19200	5230	7280
THALLIUM	1 U	1 U	1 U	2.4 B	1 U	1 B
VANADIUM	419	304	408	92	202	83
ZINC	487 J	118	461	650	80	489
CYANIDE	10 U					

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

	SAMPLE NO.	24-GW07-01	24-GW08-01	24-GW09-01	24-GW10-01	78-GW02-01	78-GW03-01
	UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM		36000	61100	12800	23300	29200 J	23900 J
ANTIMONY		3 U	3 U	3.3 B	5.7 B	169 J	38.5 J
ARSENIC		3.7 J	8 J	4.3 J	2.5 J	405 J	5.7 J
BARIUM		85 B	112 B	164 B	59 B	109 B	36 B
BERYLLIUM		1 B	2 B	1 B	1 U	12	2 B
CADMIUM		5 U	5 U	5 U	5 U	8	5 U
CALCIUM		4960 B	27000	9530	3820 B	37000	32900
CHROMIUM		37	85	19	21	18 J	10 UJ
COBALT		8 U	8 U	11 B	8 U	8 U	8 U
COPPER		19 B	24 B	11 B	13 B	20 B	8 B
IRON		13700	27500	13100	7010	427000 J	5020 J
LEAD		11.4	23.8	5.1	7.3	19.6	3.4
MAGNESIUM		2670 B	5050	7630	1760 B	3650 B	2210 B
MANGANESE		39	47	180	29	141	27
MERCURY		0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL		20 U	20 U	20 U	20 U	20 U	20 U
POTASSIUM		3870 B	5580	4280 B	2620 B	2770 B	1320 B
SELENIUM		2.1 J	1.9 J	2.6 J	1 UJ	19.8 J	2.4 J
SILVER		3 UJ	3 UJ	3 UJ	3 UJ	15 UJ	3 UJ
SODIUM		6520	6550	6010	6650	5120	4270 B
THALLIUM		1 U	1 U	1 U	1 U	1 UJ	1 UJ
VANADIUM		64	129	26 B	34 B	1660	50
ZINC		41	47	50	20	58 J	12 J
CYANIDE		10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW04-1-01	78-GW04-2-01	78-GW04-3-01	78-GW05-01	78-GW06-01	78-GW07-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	297000 J	286	115 B	23000 J	542000 J	207000 J
ANTIMONY	7 R	7 R	7 R	7 U	7 U	7 U
ARSENIC	18.6 J	2 R	118 J	5.2 J	26 B	16.2
BARIUM	728	519	547	54 B	1200	1250
BERYLLIUM	19	1 B	1 B	2 B	9	5
CADMIUM	12	5 U	21	5 U	5 U	5 U
CALCIUM	642000	170000	105000	90200 J	7180 J	18700 J
CHROMIUM	496 J	10 U	50 U	17 J	858 J	400 J
COBALT	28 B	8 U	8 U	8 U	11 B	20 B
COPPER	87	4 B	7 B	8 B	127	53
IRON	267000 J	32 B	523000	14900 J	142000 J	96700 J
LEAD	126	2 U	2 U	13.1 J	155 J	61.5 J
MAGNESIUM	25500	88 B	3210 B	12700	24000	20000
MANGANESE	703	51	591	161 J	184 J	135 J
MERCURY	0.75	0.2 U	0.3	0.2 R	1.1 J	0.44 J
NICKEL	136	20 B	20 U	20 U	86	54
POTASSIUM	18800	21800	11300	4770 B	25600	13200
SELENIUM	9 J	1 R	1 R	6.4	5.5 B	9.1
SILVER	6 UJ	3 U	15 U	3 U	3 U	3 U
SODIUM	8870	11500	9290	23900	5090	9260
THALLIUM	1.2 J	1 U	1 U	1 UJ	1.1 B	1 UJ
VANADIUM	591	4 UJ	24 J	28 B	811	406
ZINC	373 J	7 J	79 J	32 J	223 J	158 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW08-01	78-GW09-2-01	78-GW09-3-01	78-GW10-01	78-GW11-01	78-GW12-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	483000 J	68 J	2710 J	404000 J	332000	108000 J
ANTIMONY	7 U	7 R	7 R	7 R	7 R	7 R
ARSENIC	60.5	2 R	2 R	43 J	10 R	9.6 J
BARIUM	740	27 B	41 B	582	631	155 B
BERYLLIUM	9	1 U	1 B	8	5	2 B
CADMIUM	25 U	5 U	5 U	10 U	25 U	10 U
CALCIUM	28200 J	114000	99100	54400	9130	31200
CHROMIUM	491 J	10 UJ	10 UJ	362 J	412	114 J
COBALT	29 B	8 U	8 U	31 B	8 U	8 U
COPPER	86	4 B	4 B	91	84	30
IRON	138000 J	955 J	99 J	157000 J	120000	26400 J
LEAD	131 J	2 U	2 U	257	195	35.5
MAGNESIUM	18500	2550 B	249 B	17400	15400	7220
MANGANESE	213 J	19	2 U	326	174	47
MERCURY	1.3 J	0.2 U	0.2 U	1.5	0.75	0.2 U
NICKEL	89	20 U	20 U	108	79	20 U
POTASSIUM	14700	1220 B	7820	15800	13000	6090
SELENIUM	25.3	1 UJ	1 UJ	18 J	12 J	3.6 J
SILVER	3 U	3 UJ	5 J	3 UJ	3 U	3 UJ
SODIUM	4710 B	5820	7280	3340 B	3490 B	5420
THALLIUM	1.3 J	1 UJ	1 UJ	1 UJ	1 U	1 UJ
VANADIUM	1700	4 U	9 B	499	526	145
ZINC	200 J	11 J	181 J	217 J	120 J	64 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW13-01	78-GW14-01	78-GW15-01	78-GW16-01	78-GW17-1-01	78-GW17-2-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	61800 J	103000 J	205000 J	341000 J	168000 J	541 J
ANTIMONY	7 U	7 R	7 R	7 R	7 R	7 R
ARSENIC	38.3	18.4 J	4 R	19 J	11.6 J	2 R
BARIUM	236	321	469	511	261	57 B
BERYLLIUM	3 B	1 B	4 B	6	4 B	1 B
CADMIUM	5 U	10 U	5 U	5 U	10 U	5 U
CALCIUM	4040 J	5300	29100	62700	86900	144000
CHROMIUM	222 J	113 J	215 J	353 J	200 J	10 UJ
COBALT	20 B	8 U	9 B	13 B	9 B	8 U
COPPER	18 B	33	49	80	40	5 B
IRON	61800 J	49600 J	43300 J	80900 J	48700 J	2120 J
LEAD	26.4 J	63	53	224	81	5.9
MAGNESIUM	11800	10600	13400	10800	9940	2570 B
MANGANESE	57 J	68	115	150	96	33
MERCURY	0.3 J	0.38	0.2 U	0.38	0.2 U	0.2 U
NICKEL	40	34 B	29 B	61	30 B	20 U
POTASSIUM	8210	6460	12000	14000	11600	1630 B
SELENIUM	4.7 B	12.4 J	2.1 J	14.5 J	5 UJ	1 UJ
SILVER	3 U	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
SODIUM	15000	15400	6410	4120 B	3180 B	9480
THALLIUM	1 U	1 UJ	1 J	1.4 J	1 J	1 UJ
VANADIUM	158	122	248	371	289	4 U
ZINC	96 J	51 J	116 J	157 J	98 J	6 UJ
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

	SAMPLE NO.	78-GW19-01	78-GW20-01	78-GW21-01	78-GW22-01	78-GW22-1-01	78-GW22-2-01
	UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM		4110 J	149000 J	23800 J	78900 J	257000	190000 J
ANTIMONY		7 R	7 U	7 U	14 J	7 R	7 UJ
ARSENIC		3.1 J	30.3	6.3 J	10 J	59.5 J	75.6
BARIUM		101 B	430	382	107 B	411	471
BERYLLIUM		1 B	4 B	2 B	1 B	4 B	12
CADMIUM		5 U	5 U	5 U	10 U	25 U	6
CALCIUM		3700 B	5450 J	32900 J	90100	44500	118000 J
CHROMIUM		10 UJ	231 J	22 J	83 J	238	389 J
COBALT		8 U	35 B	10 B	8 U	8 U	170
COPPER		3 B	61	11 B	34	54	92
IRON		8500 J	101000 J	26400 J	27600 J	62300	140000 J
LEAD		8.3	119 J	19.1 J	37.2	272	360 J
MAGNESIUM		5740	13100	9110	5500	12000	13000
MANGANESE		26	93 J	85 J	70	158	348 J
MERCURY		0.2 U	0.37 J	0.2 R	0.3	0.45	0.2 R
NICKEL		20 U	75	20 U	21 B	99	234
POTASSIUM		2130 B	9100	4100 B	6180	12000	10200
SELENIUM		1 UJ	4.2 B	1.1 B	4.2 J	7.5 J	45
SILVER		3 UJ	3 U	3 U	3 UJ	3 U	3 U
SODIUM		24000	11900	9480	12100	9910	8230
THALLIUM		1 UJ	1.8 B	1 U	1.7 J	1 U	3 B
VANADIUM		9 B	236	86	114	269	547
ZINC		6 J	250 J	108 J	50 J	150 J	967 J
CYANIDE		10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW23-01	78-GW24-1-01	78-GW24-2-01	78-GW24-3-01	78-GW25-01	78-GW29-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	111000 J	160000	1340	304	101000 J	78800 J
ANTIMONY	7 R	7 R	7 R	7 R	7 R	7 R
ARSENIC	7.6 J	100 J	2 R	2 R	11.4 J	19 J
BARIUM	230	396	34 B	17 B	119 B	1070
BERYLLIUM	2 B	7	1 B	1 U	2 B	12
CADMIUM	5 U	5 U	5	5	5 U	5 U
CALCIUM	10800	34400	107000	73400	37800	41600
CHROMIUM	101 J	264	10	10 U	82 J	252 J
COBALT	8 B	39 B	8 U	8 U	8 U	17 B
COPPER	25	71	6 B	5 B	26	34
IRON	30800 J	159000	2320	2370	26300 J	125000 J
LEAD	50	152	3.3	2.9 B	30.5	25.5
MAGNESIUM	7110	11600	1740 B	1500 B	4500 B	21900
MANGANESE	87	714	21	41	33	341
MERCURY	0.3	0.75	0.2 U	0.2 U	0.2 U	0.2 U
NICKEL	42	91	20 U	20 U	20 U	125
POTASSIUM	5450	9090	1050 B	982 B	4950 B	11600
SELENIUM	4.4 J	17.6 J	1 R	1 R	1.6 J	2.5 J
SILVER	3 UJ	3 U	3 U	3 U	3 UJ	3 UJ
SODIUM	7450	10800	8350	7050	16400	21200
THALLIUM	1.7 J	1.5 B	1 U	1 U	1.3 J	1 UJ
VANADIUM	108	436	4 J	4 UJ	144	183
ZINC	67 J	291 J	11 J	16 J	34 J	330 J
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW31-2-01	78-GW31-3-01	78-GW32-2-01	78-GW32-3-01	78-GW33-01	78-GW34-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	110 B	1200	112000 J	539 J	78200	6870
ANTIMONY	7 R	7 R	7 R	7 R	3 U	3 U
ARSENIC	2 R	2 R	21.6 J	2 R	5.6 J	4.4 J
BARIUM	17 B	415	476	42 B	162 B	173 B
BERYLLIUM	1 B	1 B	10	1 B	1 B	1 U
CADMIUM	5 U	5 U	10	5 U	5 U	5 U
CALCIUM	77600	308000	94600	5440	64800	10400
CHROMIUM	10 U	21	215 J	10 UJ	65	10 U
COBALT	8 U	8 U	84	8 U	8 U	8 U
COPPER	3 B	5 B	87	2 U	20 B	11 B
IRON	280	72 B	98500 J	112 J	14900	7250
LEAD	2 U	2 U	146	2 U	18.1	5.5
MAGNESIUM	2200 B	151 B	13700	319 B	7290	2880 B
MANGANESE	8 B	2 B	328	2 U	86	96
MERCURY	0.3	0.2 U	0.3	0.2 U	0.2 U	0.2 U
NICKEL	20 U	20 U	166	20 U	20 B	20 U
POTASSIUM	1640 B	61600	8460	67300	6900	2620 B
SELENIUM	1 R	1.7 J	99.5 J	1 UJ	12.8 J	1 UJ
SILVER	3 U	3 U	3 UJ	3 UJ	3 UJ	3 UJ
SODIUM	10400	26100	7510	42500	7030	4070 B
THALLIUM	1 U	1 UJ	7.3 J	1.3 J	1 U	1 U
VANADIUM	4 J	10 J	462	5 B	74	15 B
ZINC	23 J	10 J	826 J	6 UJ	37	59
CYANIDE	10 U	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 1 - SITES 21, 24, 78
SHALLOW, INTERMEDIATE AND DEEP MONITORING WELLS
GROUNDWATER DATA AND FREQUENCY SUMMARY
REMEDIAL INVESTIGATION CTO - 19177
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	78-GW35-01	78-GW36-01	78-GW37-01	78-GW38-01	78-GW39-01
UNITS	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	47100	120000	73500	102000	60000
ANTIMONY	3 U	20 U	3 U	20 U	20 U
ARSENIC	2 UJ	3.1 J	4 J	33.6 J	4 UJ
BARIUM	261	152 B	123 B	420	256
BERYLLIUM	1 B	2 U	2 B	4 U	1 U
CADMIUM	5 U	5 U	5 U	25 U	5 U
CALCIUM	7480	35400	10100	62200	16800
CHROMIUM	55	111	65	201	60
COBALT	8 U	8 U	8 U	8 U	10 B
COPPER	15 B	29	22 B	110	699
IRON	11800	21200	18800	67500	28800
LEAD	13.2	30.2	21.8	41.2	186
MAGNESIUM	5680	5740	4600 B	17500	14300
MANGANESE	57	62	62	106	84
MERCURY	0.2 U	0.3	0.2 U	0.2 U	0.52
NICKEL	20 U	24 B	20 U	32 B	32 B
POTASSIUM	6150	5820	5990	8180	3840 B
SELENIUM	3.5 J	1.7 J	1.1 J	1.3 J	4.3 J
SILVER	3 UJ	3 UJ	3 UJ	3 UJ	3 UJ
SODIUM	10300	2450 B	7270	10300	19500
THALLIUM	1 U	1 U	1 U	1 U	1 U
VANADIUM	59	98	106	235	67
ZINC	30	57	58	134	138
CYANIDE	10 U	10 U	10 U	10 U	10 U

OPERABLE UNIT NO. 5 - SITE 2
SHALLOW AND DEEP MONITORING WELLS
GROUNDWATER STATISTICAL SUMMARY
REMEDIAL INVESTIGATION CTO - 19174
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	2-GW01-01	2-GW02-01	2-GW03-01	2-GW03DW-01	2-GW04-01	2-GW05-01
UNITS	UG/L		UG/L	UG/L	UG/L	UG/L
ALUMINUM	36000		5200	269	16800	4050
ANTIMONY	10 U		10 U	3.5 U	10 U	10 U
ARSENIC	21.2		2.5 B	1 UJ	23.6	2.2 B
BARIUM	52 B		46 B	1420	95 B	100 B
BERYLLIUM	1 B		0.5 U	0.5 U	2 B	0.5 U
CADMIUM	7		2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	23700		8460	450000	11100	21000
CHROMIUM	18		11	16	5 U	5 U
COBALT	10 B		4 U	4 U	4 U	4 U
COPPER	10 B		4 B	8 B	5 B	3 B
IRON	10300		7190	127	28100	12700
LEAD	15.5 J		3.5 J	1.1 UJ	2.7 J	0.5 UJ
MAGNESIUM	5660		1600 B	75 B	1920 B	4800 B
MANGANESE	55		21	2 U	21	46
MERCURY	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U		10 U	10 U	10 U	10 U
POTASSIUM	2560 B		1030 B	187000	1210 B	2130 B
SELENIUM	4.2 B		0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U		1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	4040 B		5490	103000	5560	10100
THALLIUM	0.5 U		0.5 U	0.5 UJ	0.5 U	0.5 U
VANADIUM	72		10 B	2 U	89	9 B
ZINC	146		13 B	9 B	16 B	6 B
CYANIDE	5 U		5 U	5 U	5 U	5 U

OPERABLE UNIT NO. 5 - SITE 2
SHALLOW AND DEEP MONITORING WELLS
GROUNDWATER STATISTICAL SUMMARY
REMEDIAL INVESTIGATION CTO - 19174
MCB CAMP LEJEUNE, NORTH CAROLINA
TAL METALS AND CYANIDE

SAMPLE NO.	2-GW06-01	2-GW07-01	2-GW08-01	2-GW09-01
UNITS	UG/L	UG/L	UG/L	UG/L
ALUMINUM	13600	8550	6380	56300
ANTIMONY	10 U	10 U	3.5 UJ	10 U
ARSENIC	5.4 B	5.7 B	9.2 B	12.9
BARIUM	173 B	98 B	98 B	328
BERYLLIUM	0.5 U	0.5 U	0.5 U	3 B
CADMIUM	2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	7940	9350	5710	22100
CHROMIUM	15	15	5 U	75
COBALT	12 B	4 U	4 U	10 B
COPPER	5 B	7 B	6 B	25
IRON	11700	12500	9150	42000
LEAD	6.7 J	8.3 J	1.8 UJ	27.2 J
MAGNESIUM	4120 B	3620 B	2020 B	9980
MANGANESE	79	72	53	290
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U	10 U	10 U	25 B
POTASSIUM	2570 B	1940 B	1550 B	6610
SELENIUM	0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	21900	8180	11800	18300
THALLIUM	0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	15 B	18 B	12 B	86
ZINC	26	22	27	103
CYANIDE	5 U	5 U	5 U	5 U

OPERABLE UNIT NO. 5 - SITE 2
SHALLOW AND DEEP MONITORING WELLS
GROUNDWATER STATISTICAL SUMMARY
REMEDIAL INVESTIGATION CTO - 19174
MCB CAMP LEJEUNE, NORTH CAROLINA
DISSOLVED METALS

SAMPLE NO.	2-GW01D-01	2-GW02D-01	2-GW03D-01	2-GW03DWD-01	2-GW04D-01	2-GW05D-01
UNITS	UG/L		UG/L	UG/L	UG/L	UG/L
ALUMINUM	1930		66 B	89 B	60 B	1990
ANTIMONY	10 U		10 U	3.5 UJ	10 U	10 U
ARSENIC	2.2 B		1 U	1 UJ	6.1 B	1 U
BARIUM	42 B		25 B	1400	64 B	98 B
BERYLLIUM	1 B		0.5 U	0.5 U	0.5 U	1 B
CADMIUM	2.5 U		2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	24400		7100	441000	11300	21800
CHROMIUM	5 U		5 U	11	5 U	5 U
COBALT	4 U		4 U	4 U	4 U	4 U
COPPER	4 B		2 B	6 B	9 B	4 B
IRON	2560		2170	10 U	2720	7400
LEAD	2.1 J		0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
MAGNESIUM	5220		1030 B	26 B	1840 B	4900 B
MANGANESE	51		4.5 U	1 U	17	46
MERCURY	0.1 U		0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U		10 U	10 U	10 U	10 U
POTASSIUM	2140 B		589 B	188000	1130 B	2170 B
SELENIUM	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U		1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	3590 B		5400	103000	5710	9970
THALLIUM	0.5 U		0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	2 U		2 U	2 U	2 U	2 U
ZINC	28		3 U	3 U	8 B	9 B
CYANIDE						

OPERABLE U[illegible]O. 5 - SITE 2
SHALLOW AND DEEP MONITORING WELLS
GROUNDWATER STATISTICAL SUMMARY
REMEDIAL INVESTIGATION CTO - 19174
MCB CAMP LEJEUNE, NORTH CAROLINA
DISSOLVED METALS

SAMPLE NO.	2-GW06D-01	2-GW07D-01	2-GW08D-01	2-GW09D-01
UNITS	UG/L	UG/L	UG/L	UG/L
ALUMINUM	149 B	43 B	95 B	1230
ANTIMONY	10 U	10 U	3.5 U	10 U
ARSENIC	2.9 B	1 U	7.1 B	1 U
BARIUM	126 B	49 B	62 B	149 B
BERYLLIUM	0.5 U	0.5 U	0.5 U	1 B
CADMIUM	2.5 U	2.5 U	2.5 U	2.5 U
CALCIUM	8080	9590	5800	20800
CHROMIUM	5 U	5 U	5 U	10
COBALT	10 B	8 B	4 U	14 B
COPPER	2 B	5 B	4 B	5 B
IRON	7070	4660	6180	7040
LEAD	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
MAGNESIUM	3610 B	3060 B	1730 B	6890
MANGANESE	65	48	40	129
MERCURY	0.1 U	0.1 U	0.1 U	0.1 U
NICKEL	10 U	10 U	10 U	10 U
POTASSIUM	1970 B	1490 B	1150 B	2790
SELENIUM	0.5 U	0.5 U	0.5 U	0.5 U
SILVER	1.5 U	1.5 U	1.5 U	1.5 U
SODIUM	22600	8720	12100	17200
THALLIUM	0.5 U	0.5 U	0.5 U	0.5 U
VANADIUM	2 U	2 U	2 U	2 U
ZINC	12 B	13 B	19 B	35
CYANIDE				

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
REPORT NO.: D94-4917

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 06-16-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: Zh H 6-16-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

WESTON
MANAGERS DESIGNERS/CONSULTANTS

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
REPORT NO.: D94-4917

INTRODUCTION

This quality assurance review is based upon a review of all data generated from six water samples collected on 04-26-94. The samples were analyzed according to criteria set forth in MethodS 601 and 602 for specific Volatile target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the Method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in the Method. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

	• Data Completeness
*	• Holding Time
	• Calibration
*	• Blank
	• Surrogate Recoveries
*	• Matrix Spike/Spike Duplicate
*	• Laboratory Control Sample
*	• Instrument Performance
	• Field Duplicate Results
*	• Compound Identification
*	• Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

The raw data (chromatograms) were not provided for the sample and QC analysis results. The laboratory was contacted and confirmed that the laboratory contract did not require submission of the information; therefore, the sample results cannot be verified. However, no action has been taken on this basis since the contract requirements were fulfilled.

CALIBRATION

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

SURROGATE RECOVERIES

All surrogate recoveries were within 75-125%. It is the validator's opinion that this range of surrogate QC criteria is acceptable and represents the data adequately.

FIELD DUPLICATE RESULTS

A field duplicate analysis was not identified with this batch of samples. The sample data are not adversely affected due to the lack of this QC analysis.

CONCLUSION

The sample data package was complete based on the laboratory contract and applied method. All positive results and detection limits are considered representative, and the sample data are accepted without qualification.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

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ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE / REPORT NO.: D94-4917

Client Sample ID:	35-MW06S-02	35-MW09D-02	35-MW02S-02	35-MW26S-02	35-MW04S-02	35-MW10S-02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	25/10*	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene						
Trans-1,2-Dichloroethene						
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene						
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 602						
Benzene			6		0.2	
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene			44	0.8		
Methyl Tertiary Butyl Ether			*			
Toluene		0.4	12	0.9	0.4	
Xylenes	1.0	0.8	50	2.0	0.6	1.8
METHOD: EPA 602						
Benzene	NA	NA	12	NA		NA
Ethylbenzene	NA	NA	15	0.3	NA	NA
Toluene	NA		17	0.4		NA
Xylenes			36	1.0	0.3	0.8

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4120

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 06-16-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 6-16-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4120

INTRODUCTION

This quality assurance review is based upon a review of all data generated from seven water samples, eight trip blanks, one rinsate blank, and one duplicate analysis collected on 04-12,13,14-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- * Holding Time
- GC/MS Tuning
- Calibration
- * Blank
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- * Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Semivolatiles

The incorrect sample IDs were reported on all the forms for samples 35-SW05, 35-SW06, 35-SW02, and 35-SW01. The laboratory has been contacted for resubmission.

Pesticide/PCBs

The Form IX Pest-1 (florisil check) was missing from the data package. The laboratory had been contacted for resubmission.

General

The chain-of-custody for soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

GC/MS TUNING

Semivolatile

The incorrect dates and times for the instrument performance check and calibrations were listed on the Form V, page 216. The laboratory has been contacted for resubmission.

CALIBRATION

Volatiles and Semivolatiles

The following %RSD and %D results in the initial and continuing calibrations exceeded the 30% and 25% QC limits, respectively. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %RSD/%Ds outside the criteria. However, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
VOLATILES			
CC 04-21-94	HP4	2-Butanone	41.5

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
SEMIVOLATILES			
CC 04-26-94	HP1	Bis(2-ethylhexyl)phthalate	-34.5
		Di-n-octylphthalate	-29.1

Pesticide/PCBs

The percent resolution for endosulfan sulfate (56.7) was below the 60% requirement in the resolution check mixture on the DB1701 column and the percent recovery for alpha-BHC (76%) was below the QC limits of 80-120% in the Florisil cartridge check. Since these compounds were not detected in the samples and no specific validation criteria have been established, the sample results are accepted unqualified for these compounds.

The %RPD for beta-BHC (25.1) and decachlorobiphenyl (31.0) in PEMB exceeded the 25% QC limit on the DB1701 column. Since this compound was not detected in the associated samples, no qualification is applied on this basis.

SURROGATE RECOVERIES

Semivolatiles

The following surrogate recoveries were below the QC limits in the analysis of sample 35-SW03:

SURROGATE COMPOUND	RECOVERY	LIMITS
2-Chlorophenol-d_4	30	33-110
Nitrobenzene-d_5	26	35-114
2-Fluorobiphenyl	32	43-116
Teryphenyl-d_{14}	24	33-141

Since this sample was not re-extracted/reanalyzed, the base neutral fraction for this sample has all non-detects qualified estimated, "UJ"; positive results were not detected in this sample.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	TCX RECOVERY DB608/DB1701	REASON
35-SW06	55/47	Advisory Criteria 60-150%

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles

The matrix spike/spike duplicate recoveries for benzene (74/70%) were slightly below the QC limits of 76-127% in the analyses of 35-SW04 MS/MSD. This compound was not detected in the unspiked sample; therefore, no qualification was applied.

Semivolatiles

The following MS/MSD recoveries were below the QC limits in the analyses of 35-SW04 MS/MSD:

SPIKE COMPOUND	RECOVERY (MS/MSD)	LIMITS
Phenol	10/10	12-110
2-Chlorophenol	10/11	27-123
4-Chloro-3-methylphenol	7/8	23-97
4-Nitrophenol	0/0	10-80
Pentachlorophenol	8/8	9-103

These compounds were not detected in the unspiked sample; therefore, no qualification was applied.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements as established in the NEESA guidelines.

Semivolatiles

The following LCS recoveries were below the QC limits in the analysis of SLCSA:

SPIKE COMPOUND	RECOVERY	LIMITS
Phenol	10	12-110
2-Chlorophenol	11	27-123
1,4-Dichlorobenzene	104	36-97
1,2,4-Trichlorobenzene	112	39-98
4-Chloro-3-methylphenol	6	23-97
4-Nitrophenol	0	10-80
Pentachlorophenol	7	9-103

These compounds were not detected in any of the samples; therefore, no qualification is required.

FIELD DUPLICATE RESULTS

Sample 35-SW02D is a duplicate analysis of sample 35-SW02. Target compound results were not detected in any of the parameters; therefore, the sample result reproducibility is considered satisfactory.

WESTON
MANAGERS DESIGNERS CONSULTANTS

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SW03	35-SW04	35-SW05	35-SW06	35-TB01	35-TB02	35-TB03
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
Chloromethane							
Bromomethane							
Vinyl Chloride							
Chloroethane							
Methylene Chloride							
Acetone							
Carbon Disulfide							
1,1-Dichloroethene							
1,1-Dichloroethane							
1,2-Dichloroethene							
Chloroform							
1,2-Dichloroethane							
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
Cis-1,3-Dichloropropene							
Trichloroethene							
Dibromochloromethane							
1,1,2-Trichloroethane							
Benzene							
Trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone							
Tetrachloroethene							
1,1,2,2-Tetrachloroethane							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylene (total)							
Chloromethane							

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SW01	35-SW02	35-SW02D	35-TB04	35-TB05	35-SDER01	35-TB06
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
Chloromethane							
Bromomethane							
Vinyl Chloride							
Chloroethane						5 J	
Methylene Chloride							
Acetone							
Carbon Disulfide							
1,1-Dichloroethene							
1,1-Dichloroethane							
1,2-Dichloroethene							
Chloroform							
1,2-Dichloroethane							
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
Cis-1,3-Dichloropropene							
Trichloroethene							
Dibromochloromethane							
1,1,2-Trichloroethane							
Benzene							
Trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone							
Tetrachloroethene							
1,1,2,2-Tetrachloroethane							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylene (total)							
Chlorome[illegible]e							

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35–RB01	35–TB07	35–TB08
Matrix:	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L
COMPOUND			
Chloromethane			
Bromomethane			
Vinyl Chloride			
Chloroethane			5 J
Methylene Chloride			
Acetone			
Carbon Disulfide			
1,1–Dichloroethene			
1,1–Dichloroethane			
1,2–Dichloroethene			
Chloroform			
1,2–Dichloroethane			
2–Butanone	UJ	UJ	UJ
1,1,1–Trichloroethane			
Carbon Tetrachloride			
Bromodichloromethane			
1,2–Dichloropropane			
Cis–1,3–Dichloropropene			
Trichloroethene			
Dibromochloromethane			
1,1,2–Trichloroethane			
Benzene			
Trans–1,3–Dichloropropene			
Bromoform			
4–Methyl–2–Pentanone			
2–Hexanone			
Tetrachloroethene			
1,1,2,2–Tetrachloroethane			
Toluene			
Chlorobenzene			
Ethylbenzene			
Styrene			
Xylene (total)			
Chloromethane			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SW03	35-SW04	35-SW05	35-SW06	35-SW01	35-SW02	35-SW02D
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol							
bis(2-Chloroethyl)ether	UJ						
2-Chlorophenol							
1,3-Dichlorobenzene	UJ						
1,4-Dichlorobenzene	UJ						
1,2-Dichlorobenzene	UJ						
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)	UJ						
4-Methylphenol							
N-Nitroso-di-n-propylamine	UJ						
Hexachloroethane	UJ						
Nitrobenzene	UJ						
Isophorone	UJ						
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane	UJ						
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene	UJ						
Naphthalene	UJ						
4-Chloroaniline	UJ						
Hexachlorobutadiene	UJ						
4-Chloro-3-methylphenol							
2-Methylnaphthalene	UJ						
Hexachlorocyclopentadiene	UJ						
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene	UJ						
2-Nitroaniline	UJ						
Dimethylphthalate	UJ						
Acenaphthylene	UJ						
2,6-Dinitrotoluene	UJ						
3-Nitroaniline	UJ						
Acenaphthene	UJ						

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SW03	35-SW04	35-SW05	35-SW06	35-SW01	35-SW02	35-SW02D
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol							
4-Nitrophenol							
Dibenzofuran	UJ						
2,4-Dinitrotoluene	UJ						
Diethylphthalate	UJ						
4-Chlorophenyl-phenylether	UJ						
Fluorene	UJ						
4-Nitroaniline	UJ						
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine	UJ						
4-Bromophenyl-phenylether	UJ						
Hexachlorobenzene	UJ						
Pentachlorophenol							
Phenanthrene	UJ						
Anthracene	UJ						
Carbazole	UJ						
Di-n-butylphthalate	UJ						
Fluoranthene	UJ						
Pyrene	UJ						
Butylbenzylphthalate	UJ						
3,3-Dichlorobenzidine	UJ						
Benzo(a)anthracene	UJ						
Chrysene	UJ						
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ						
Benzo(k)fluoranthene	UJ						
Benzo(a)pyrene	UJ						
Indeno(1,2,3-cd)pyrene	UJ						
Dibenz(a,h)anthracene	UJ						
Benzo(g,h,i)perylene	UJ						

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35–SDER01	35–RB01
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L

Phenol
bis(2–Chloroethyl)ether
2–Chlorophenol
1,3–Dichlorobenzene
1,4–Dichlorobenzene
1,2–Dichlorobenzene
2–Methylphenol
2,2'–oxybis(1–Chloropropane)
4–Methylphenol
N–Nitroso–di–n–propylamine
Hexachloroethane
Nitrobenzene
Isophorone
2–Nitrophenol
2,4–Dimethylphenol
bis(2–Chloroethoxy)methane
2,4–Dichlorophenol
1,2,4–Trichlorobenzene
Naphthalene
4–Chloroaniline
Hexachlorobutadiene
4–Chloro–3–methylphenol
2–Methylnaphthalene
Hexachlorocyclopentadiene
2,4,6–Trichlorophenol
2,4,5–Trichlorophenol
2–Chloronaphthalene
2–Nitroaniline
Dimethylphthalate
Acenaphthylene
2,6–Dinitrotoluene
3–Nitroaniline
Acenaphthene

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SDER01	35-RB01
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
2,4-Dinitrophenol		
4-Nitrophenol		
Dibenzofuran		
2,4-Dinitrotoluene		
Diethylphthalate		
4-Chlorophenyl-phenylether		
Fluorene		
4-Nitroaniline		
4,6-Dinitro-2-methylphenol		
N-Nitrosodiphenylamine		
4-Bromophenyl-phenylether		
Hexachlorobenzene		
Pentachlorophenol		
Phenanthrene		
Anthracene		
Carbazole		
Di-n-butylphthalate		
Fluoranthene		
Pyrene		
Butylbenzylphthalate		
3,3-Dichlorobenzidine		
Benzo(a)anthracene		
Chrysene		
bis(2-Ethylhexyl)phthalate	UJ	UJ
Di-n-octylphthalate	UJ	UJ
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(a)pyrene		
Indeno(1,2,3-cd)pyrene		
Dibenz(a,h)anthracene		
Benzo(g,h,i)perylene		

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4120

Client Sample ID:	35-SW03	35-SW04	35-SW05	35-SW06	35-SW01	35-SW02	35-SW02D	35-SDER01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND								
alpha-BHC								
beta-BHC								
delta-BHC								
gamma-BHC(Lindane)								
Heptachlor								
Aldrin								
Heptachlor Epoxide								
Endosulfan I								
Dieldrin								
4,4'-DDE								
Endrin								
Endosulfan II								
4,4'-DDD								
Endosulfan Sulfate								
4,4'-DDT								
Methoxychlor								
Endrin Ketone								
Endrin Aldehyde								
alpha-Chlordane								
gamma-Chlordane								
Toxaphene								
Aroclor 1016								
Aroclor 1221								
Aroclor 1232								
Aroclor 1242								
Aroclor 1248								
Aroclor 1254								
Aroclor 1260								

1 WESTON WAY
WEST CHESTER, PA 19380-1449
PHONE: 215-692-3030
FAX: 215-430-3124

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG: BA4120

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 6-16-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: Zhh 6-16-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA4120

CASE SUMMARY

This data validation review consists of nine (9) water samples including one rinsate blank collected on 04-12,13,14-94. Laboratory analyses were performed by NDRC Laboratories, Inchcape Testing Services for Target Analyte List (TAL), Molybdenum, and Hardness.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35RB01 *	35SW02	35SW05
35SDER *	35SW03	35SW06
35SW01	35SW04	35SW2D

* This sample was not analyzed for Hardness.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. No major problems were encountered during the sample analyses. The minor deficiencies are summarized under each parameter:

*	• Holding Times
*	• Calibration
	• Contract Required Detection Limit Samples
	• Blank Samples
*	• Interference Check Samples
	• Matrix Spike
	• Duplicate Digestion Samples
	• Laboratory Control Sample
*	• Serial Dilution Sample
	• Graphite Furnace Analysis
*	• Quarterly Verification of Instrument Parameters
*	• Sample Result Verification
*	• Preparation Logs
*	• Run Logs
	• Data Package Completeness

* All criteria were met for this classification.

CALIBRATION VERIFICATION

The initial and continuing calibrations met the requirement limits.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Al (20% analyzed by AA), Cr (121% analyzed by GFAA), Co (123.8/132.8% analyzed by ICP) were outside the data validation requirement limits of 80-120%. The positive results greater than IDLs but less than 3X the CRDLs for chromium and cobalt and all data for aluminum are qualified estimated due to the uncertainty near the detection limits.

The recoveries for molybdenum (-70/-120%) were extremely below the requirement limits. This analyte has not been classified as a CLP TAL analyte. Therefore, the data are not rejected and the results near the detection limits and non-detected values are considered biased low and flagged "J" and "UJ", respectively.

BLANK ANALYSES

The laboratory blank had the following contaminations:

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Barium	2.467	12
Calcium	357	1785
Copper	3.2	16
Iron	59.3	296.5
Magnesium	137.9	689.5
Sodium	-695	3475
Vanadium	-6.467	**
Zinc	30.267	150 ***

* Action level = 5X the blank concentration

** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL.

*** The analyte was detected in the laboratory blank at a level above the CRDL.

BLANK ANALYSES (continued)

The laboratory reanalyzed zinc in samples (35SW06 and 35SW04L). The concentrations for zinc were above the CRDLs in these two samples. The reported sample results for the other samples are contractually rejected due to the blank contaminations. However, it is the data reviewer's opinion that the results should be considered as the detection limits and should be flagged with the "U" qualifier code.

The results for copper are qualified "U" and are considered as not detected in the samples.

The sample results for barium, calcium, iron, and magnesium in all samples, with the exception of samples 35SDER and 35RB01 were above the action levels and were considered as true values.

The reported sample result for sodium up to the action level are qualified "J" and are considered biased low due to the baseline drift in the preparation blank.

One rinsate blank was analyzed with this batch of samples. The reported sample results, with the exception of manganese, are qualified "U" due to the laboratory blank contamination. The reported sample data are not impacted by the rinsate blank contamination.

MATRIX SPIKE

The matrix spike recoveries for Cd (72.4%), Fe (61.5%), and Se (71%) were below the lower control limits of 75%. The reported sample data are biased low.

The post digestion spike analysis was performed for iron as required by CLP. The spike recovery was within the control limits.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in laboratory duplicate sample analysis were within the control limits, with the exception of mercury (79.9%). The reported positive sample results are qualified estimated.

One set of field duplicate samples (35SW02/35SW2D) was analyzed with this batch. The comparison of the reported data gave a satisfactory precision.

LABORATORY CONTROL SAMPLE

The percent recovery for cadmium (30%) was below the control limit of 80%. The reported data are considered estimated.

SERIAL DILUTION SAMPLE

The percent differences for all analytes with the concentration above 50X the IDL were within the control limits.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recovery outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	%RECOVERY
35SW03	Be/Se	74/79
35SW04	Be/Se	77/73
35SW05	Be/Se	75/78
35SW06	Be/Se	70/78
35SW01	Be/Se	72/77
35SW02	Be/Se	68.3/82
35SW2D	Be/Se	72/75
35SDER	Be	68
35RB01	Be	71.71

The reported data are qualified estimated.

SAMPLE RESULTS

Aluminum was analyzed by flame AA for all samples, the results obtained by ICP for this analyte were higher than the reported results by flame AA. Antimony, arsenic, beryllium, cadium, chromium, lead, selenium, silver, and thallium were analyzed by graphite furnace.

SAMPLE RESULTS (continued)

The results for sodium in all field samples and the corresponding QC samples were recorded incorrectly. The raw data have been reviewed and the sample results are corrected on the data summary. The laboratory should correct and resubmit the entire data package for this element.

DATA PACKAGE COMPLETENESS

The instrument detection limit (IDL) for magnesium was not listed on the Form X. The laboratory has been contacted. This information was found on Form III and listed on the data summary.

The chain-of-custody for soil/sediment samples were included in this data package. However, the sample analysis was not included within this SDG number.

The case number was not identified for the SDG number.

SUMMARY

The data package and quality of the data was fair. Major problems were not encountered during the analyses, with the exception of the laboratory blank contamination. The laboratory reanalyzed the affected samples as recommended by the CLP program. The results for hardness analysis are accepted as reported. The reported sample data could be accepted with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Resubmissions (if applicable)

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY
Units: ug/L

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4120

Client Sample ID:			35SW03	35SW04	35SW05	35SW06	35SW01	35SW02	35SW2D	35SDER	35RB01
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
		IDL									
INORGANIC ELEMENTS											
Aluminium	A	1.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Antimony	F	1.0	1.8	1.5							
Arsenic	F	2.0									
Barium	P	2.0	19.5	19.0	18.2	23.3	16.9	16.7	18.6		
Beryllium	F	1.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Cadmium	F	1.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Calcium	P	308	59500	59300	58800	63900	58000	58100	60400	550 U	610 U
Chromium	F	1.0	1.0 J			1.2 J					
Cobalt	P	9.0	9.5 J	11.7 J	16.8 J					13.3 J	
Copper	P	2.0	6.3 U	6.6 U	3.4 U	10.4 U	6.5 U	4.4 U	5.2 U	6.2 U	8.4 U
Iron	P	18	1060 J	1230 J	842 J	1750 J	764 J	850 J	886 J	47.9 J	51.4 J
Lead	F	1.0	2.1	2.1		2.4		1.4	1.0	1.0	
Magnesium	P	102	3120	3140	3470	5180	2380	2390	2470	111 U	128 U
Manganese	P	2.0	36.9	44.9	38.7	77.4	30.1	29.1	29.6		2.3
Mercury	AV	0.2		3.2 J			3.0 J				
Nickel	P	10.0									
Potassium	P	1674	3210	2760	2810	3840	2460	2150	2540		
Selenium	F	1.0	UJ	1.3 J	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Silver	F	1.0									
Sodium	P	339	57000	59100	57300	68800	47000	42600	44600	2290 J	2457 J
Thallium	F	1.0									
Vanadium	P	4.0									
Zinc	P	2.0	19.8 R	14.0 R	19.1 R	26.3 U	18.3 R	17.9 R	12.8 R	10.2 R	6.5 R
Molybdenum	P	33	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

P = ICP
A = Flam AA
F = Furnace AA
AV = Automated Cold Vapor AA

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY
Units: mg/L CaC03

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4120

Client Sample ID:	35SW03	35SW04	35SW05	35SW06	35SW01	35SW02	35SW2D
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
INORGANIC ELEMENTS							
Hardness	166	174	164	182	142	164	186

1 WESTON WAY
WEST CHESTER, PA 19380-1449
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BAKER ENVIRONMENTAL, INC.
TCL ORGANIC QUALITY ASSURANCE REVIEW
SITE: MCB CAMP LEJEUNE / SDG: B4375

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 06-27-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 6-27-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4375

INTRODUCTION

This quality assurance review is based upon a review of all data generated from seven water samples, three trip blanks, four rinsate blanks, and one duplicate analysis collected on 04-16,17,18,19,20-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
* - GC/MS Tuning
- Calibration
- Blank
- Surrogate Recoveries
* - Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
* - Instrument Performance
- Field Duplicate Results
* - Compound Identification
* - Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The chain-of-custody for soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

HOLDING TIME

Volatiles

The technical holding time (7 days from collection), which differs from the contractual holding time (10 days from VTSR), has been exceeded for samples 35-RB03, 35-RB05, 35-TB11, 35-TB12, 36-RB06, 36-SW05, 36-SW07, 36-SW06, and 36-SW05D. The positive results and non-detects are qualified estimated in these analyses.

Pesticide/PCBs

All samples were extracted beyond the technical holding time (7 days from collection), which differs from the laboratory contractual holding time (10 days from VTSR). All positive results and non-detects are qualified estimated.

CALIBRATION

Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limits. These calibrations are considered acceptable since less than four (BNA) check (*) compounds had %Ds outside the criteria. However, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 04-26-94	HP1	Bis(2-ethylhexyl)phthalate	-34.5
		Di-n-octylphthalate	-29.1

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-03-94	HP1	Phenol	-26.7
		Dimethylphthalate	89.7
		4-Nitrophenol	32.9
		N-Nitrosodiphenylamine	92.1
		Butylbenzylphthalate	27.0
		Bis(2-ethylhexyl)phthalate	37.0
		Di-n-octylphthalate	25.5
CC 05-05-94	HP1	Phenol	-26.8
		Bis(2-chloroethyl)ether	28.3
		2,2'-oxybis(1-chloropropane)	34.6
		N-Nitroso-di-n-propylamine	36.3
		2,4-Dinitrophenol	32.5
		4,6-Dinitro-2-methylphenol	25.3

Pesticide/PCBs

The %RSD for endrin aldehyde (28.2%) exceeded the 20% QC limit in the initial calibration analyzed on the DB1701 column. Therefore, the positive result for endrin aldehyde in sample 35-RB05 is qualified estimated. This compound was not detected in the other samples.

The retention time for beta-BHC was below the retention time window for PEME analyzed on the DB1701 column. Since this performance evaluation mix was analyzed at the end of the sequence and this compound was not detected in the samples, no qualification is applied.

The %RPDs for methoxychlor (88.6%) in INDAM03 (column SPB-608) and decachlorobiphenyl (35.0%) in PEMA (column DB1701) exceeded the 25% QC limit. The positive result for methoxychlor in sample 35-RB05 is considered estimated since this sample was analyzed immediately after the standard.

BLANKS

Volatiles

The following trip and rinsate blanks contained common laboratory contaminants. Since these compounds were not detected in any of the samples, no action is required.

BLANK	COMPOUND	LEVEL
35-TB11	Acetone	25 ug/L
36-RB06	Methylene Chloride	5 ug/L

Pesticide/PCBs

The following method and rinsate blanks contained target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts, are elevated to the CRQL, and are flagged "U".

BLANK	COMPOUND	LEVEL
35-RB05	Endrin Aldehyde	0.11 ug/L
	Methoxychlor	0.50 ug/L
36-RB06	Methoxychlor	0.50 ug/L
Method Blank	Methoxychlor	0.39 ug/L

SURROGATE RECOVERIES

Semivolatiles

The following surrogate recoveries were below the QC limits in the analysis of sample 36-SW05:

SURROGATE COMPOUND	RECOVERY	LIMITS
2-Chlorophenol-d_4	28	33-110
Nitrobenzene-d_5	28	35-114
2-Fluorobiphenyl	35	43-116

Since this sample was not re-extracted/reanalyzed as a straight sample, the base neutral fraction for this sample has all non-detects qualified estimated, "UJ"; positive results were not detected for this fraction.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
36-SW05 MSD	40/51	DCB	Advisory Criteria 60-150%
36-SW02	39/48	DCB	Advisory Criteria 60-150%
36-SW03	49/59	TCX	Advisory Criteria 60-150%
36-SW05	39/55	DCB	Advisory Criteria 60-150%
36-SW07	44/-	DCB	Advisory Criteria 60-150%
36-SW06	42/-	DCB	Advisory Criteria 60-150%
36-SW04	-/59	TCX	Advisory Criteria 60-150%
36-SW01	-/46	TCX	Advisory Criteria 60-150%
	49/0	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements as established in the NEESA guidelines.

Pesticide/PCBs

The percent recovery for aldrin (34%) was outside the QC limits of 40-120% in the LCS analysis. Since the compound was not detected in the samples, no action is required.

INTERNAL STANDARD

Semivolatiles

The following internal standard areas were below the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
36-RB06	Perylene-d_{12}	19730	378922-1515688
36-SW05	Perylene-d_{12}	71974	378922-1515688

Since these samples were not re-extracted/reanalyzed, the non-detects quantified in reference to perylene are qualified estimated in these samples. Positive results were not detected in these samples.

FIELD DUPLICATE RESULTS

Sample 36-SW05D is a duplicate analysis of sample 36-SW05. Target compound results were not detected in any of the parameters for these samples; therefore, the sample result reproducibility is considered satisfactory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (610) 701-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	35-RB03	35-RB05	35-TB11	35-TB12	36-SW01	36-SW02	36-SW03	36-RB06
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND								
Bromomethane	UJ	UJ	UJ	UJ				UJ
Vinyl Chloride	UJ	UJ	UJ	UJ				UJ
Chloroethane	UJ	UJ	UJ	UJ				UJ
Methylene Chloride	UJ	UJ	UJ	UJ				5 J
Acetone	UJ	UJ	25 J	UJ				UJ
Carbon Disulfide	UJ	UJ	UJ	UJ				UJ
1,1-Dichloroethene	UJ	UJ	UJ	UJ				UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ				UJ
1,2-Dichloroethene	UJ	UJ	UJ	UJ		7		UJ
Chloroform	UJ	UJ	UJ	UJ				UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ				UJ
2-Butanone	UJ	UJ	UJ	UJ				UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ				UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ				UJ
Bromodichloromethane	UJ	UJ	UJ	UJ				UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ				UJ
Cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ				UJ
Trichloroethene	UJ	UJ	UJ	UJ				UJ
Dibromochloromethane	UJ	UJ	UJ	UJ				UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ				UJ
Benzene	UJ	UJ	UJ	UJ				UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ				UJ
Bromoform	UJ	UJ	UJ	UJ				UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ				UJ
2-Hexanone	UJ	UJ	UJ	UJ				UJ
Tetrachloroethene	UJ	UJ	UJ	UJ				UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ				UJ
Toluene	UJ	UJ	UJ	UJ				UJ
Chlorobenzene	UJ	UJ	UJ	UJ				UJ
Ethylbenzene	UJ	UJ	UJ	UJ				UJ
Styrene	UJ	UJ	UJ	UJ				UJ
Xylene (total)	UJ	UJ	UJ	UJ				UJ
Chloromethane	UJ	UJ	UJ	UJ				UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	36-SW05	36-SW07	36-SW06	36-SW05D	35-RB07	36-SW04	36-TB14
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
Bromomethane	UJ	UJ	UJ	UJ			
Vinyl Chloride	UJ	UJ	UJ	UJ			
Chloroethane	UJ	UJ	UJ	UJ			
Methylene Chloride	UJ	UJ	UJ	UJ			
Acetone	UJ	UJ	UJ	UJ			
Carbon Disulfide	UJ	UJ	UJ	UJ			
1,1-Dichloroethene	UJ	UJ	UJ	UJ			
1,1-Dichloroethane	UJ	UJ	UJ	UJ			
1,2-Dichloroethene	UJ	UJ	UJ	UJ			
Chloroform	UJ	UJ	UJ	UJ			
1,2-Dichloroethane	UJ	UJ	UJ	UJ			
2-Butanone	UJ	UJ	UJ	UJ			
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ			
Carbon Tetrachloride	UJ	UJ	UJ	UJ			
Bromodichloromethane	UJ	UJ	UJ	UJ			
1,2-Dichloropropane	UJ	UJ	UJ	UJ			
Cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ			
Trichloroethene	UJ	UJ	UJ	UJ			
Dibromochloromethane	UJ	UJ	UJ	UJ			
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ			
Benzene	UJ	UJ	UJ	UJ			
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ			
Bromoform	UJ	UJ	UJ	UJ			
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ			
2-Hexanone	UJ	UJ	UJ	UJ			
Tetrachloroethene	UJ	UJ	UJ	UJ			
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ			
Toluene	UJ	UJ	UJ	UJ			
Chlorobenzene	UJ	UJ	UJ	UJ			
Ethylbenzene	UJ	UJ	UJ	UJ			
Styrene	UJ	UJ	UJ	UJ			
Xylene (total)	UJ	UJ	UJ	UJ			
Chloromethane	UJ	UJ	UJ	UJ			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	35–RB03	35–RB05	36–SW01	36–SW02	36–SW03	36–RB06	36–SW05
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol			UJ	UJ	UJ	UJ	UJ
bis(2–Chloroethyl)ether							UJ
2–Chlorophenol							
1,3–Dichlorobenzene							UJ
1,4–Dichlorobenzene							UJ
1,2–Dichlorobenzene							UJ
2–Methylphenol							
2,2'–oxybis(1–Chloropropane)							UJ
4–Methylphenol							
N–Nitroso–di–n–propylamine							UJ
Hexachloroethane							UJ
Nitrobenzene							UJ
Isophorone							UJ
2–Nitrophenol							
2,4–Dimethylphenol							
bis(2–Chloroethoxy)methane							UJ
2,4–Dichlorophenol							
1,2,4–Trichlorobenzene							UJ
Naphthalene							UJ
4–Chloroaniline							UJ
Hexachlorobutadiene							UJ
4–Chloro–3–methylphenol							
2–Methylnaphthalene							UJ
Hexachlorocyclopentadiene							UJ
2,4,6–Trichlorophenol							
2,4,5–Trichlorophenol							
2–Chloronaphthalene							UJ
2–Nitroaniline							UJ
Dimethylphthalate			UJ	UJ	UJ	UJ	UJ
Acenaphthylene							UJ
2,6–Dinitrotoluene							UJ
3–Nitroaniline							UJ
Acenaphthene							UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	35–RB03	35–RB05	36–SW01	36–SW02	36–SW03	36–RB06	36–SW05
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,4–Dinitrophenol			UJ	UJ	UJ	UJ	UJ
4–Nitrophenol							
Dibenzofuran							UJ
2,4–Dinitrotoluene							UJ
Diethylphthalate							UJ
4–Chlorophenyl–phenylether							UJ
Fluorene							UJ
4–Nitroaniline							UJ
4,6–Dinitro–2–methylphenol							
N–Nitrosodiphenylamine			UJ	UJ	UJ	UJ	UJ
4–Bromophenyl–phenylether							UJ
Hexachlorobenzene							UJ
Pentachlorophenol							
Phenanthrene							UJ
Anthracene							UJ
Carbazole							UJ
Di–n–butylphthalate							UJ
Fluoranthene							UJ
Pyrene							UJ
Butylbenzylphthalate			UJ	UJ	UJ	UJ	UJ
3,3–Dichlorobenzidine							UJ
Benzo(a)anthracene							UJ
Chrysene							UJ
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Di–n–octylphthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene						UJ	UJ
Benzo(k)fluoranthene						UJ	UJ
Benzo(a)pyrene						UJ	UJ
Indeno(1,2,3–cd)pyrene						UJ	UJ
Dibenz(a,h)anthracene						UJ	UJ
Benzo(g,h,i)perylene						UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	36-SW07	36-SW06	36-SW05D	35-RB07	36-SW04
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol	UJ	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether					UJ
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					UJ
4-Methylphenol					
N-Nitroso-di-n-propylamine					UJ
Hexachloroethane					
Nitrobenzene					
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline					
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate	UJ	UJ	UJ	UJ	
Acenaphthylene					
2,6-Dinitrotoluene					
3-Nitroaniline					
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	36-SW07	36-SW06	36-SW05D	35-RB07	36-SW04
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol					UJ
4-Nitrophenol	UJ	UJ	UJ	UJ	
Dibenzofuran					
2,4-Dinitrotoluene					
Diethylphthalate					
4-Chlorophenyl-phenylether					
Fluorene					
4-Nitroaniline					
4,6-Dinitro-2-methylphenol					UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ	
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di-n-butylphthalate					
Fluoranthene					
Pyrene					
Butylbenzylphthalate	UJ	UJ	UJ	UJ	
3,3-Dichlorobenzidine					
Benzo(a)anthracene					
Chrysene	UJ	UJ	UJ	UJ	
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	
Di-n-octylphthalate					
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(a)pyrene					
Indeno(1,2,3-cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	35-RB05	36-SW01	36-SW02	36-SW03	36-RB06	36-SW05	36-SW07
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
alpha-BHC	UJ	UJ	UJ	UJ	UJ	UJ	UJ
beta-BHC	UJ	UJ	UJ	UJ	UJ	UJ	UJ
delta-BHC	UJ	UJ	UJ	UJ	UJ	UJ	UJ
gamma-BHC(Lindane)	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Heptachlor	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aldrin	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Heptachlor Epoxide	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Endosulfan I	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dieldrin	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,4'-DDE	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Endrin	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Endosulfan II	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,4'-DDD	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Endosulfan Sulfate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,4'-DDT	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methoxychlor	0.50 J	UJ	0.50 U	0.50 U	0.50 J	0.50 U	0.50 U
Endrin Ketone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Endrin Aldehyde	0.11 J	0.10 U	UJ	UJ	UJ	UJ	UJ
alpha-Chlordane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
gamma-Chlordane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Toxaphene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1016	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1221	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1232	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1242	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1248	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1254	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Aroclor 1260	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4375

Client Sample ID:	36-SW06	36-SW05D	36-SW04
Matrix:	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L
COMPOUND			
alpha-BHC	UJ	UJ	UJ
beta-BHC	UJ	UJ	UJ
delta-BHC	UJ	UJ	UJ
gamma-BHC(Lindane)	UJ	UJ	UJ
Heptachlor	UJ	UJ	UJ
Aldrin	UJ	UJ	UJ
Heptachlor Epoxide	UJ	UJ	UJ
Endosulfan I	UJ	UJ	UJ
Dieldrin	UJ	UJ	UJ
4,4'-DDE	UJ	UJ	UJ
Endrin	UJ	UJ	UJ
Endosulfan II	UJ	UJ	UJ
4,4'-DDD	UJ	UJ	UJ
Endosulfan Sulfate	UJ	UJ	UJ
4,4'-DDT	UJ	UJ	UJ
Methoxychlor	0.50 U	0.50 U	0.50 U
Endrin Ketone	UJ	UJ	UJ
Endrin Aldehyde	UJ	UJ	UJ
alpha-Chlordane	UJ	0.16 J	UJ
gamma-Chlordane	UJ	UJ	UJ
Toxaphene	UJ	UJ	UJ
Aroclor 1016	UJ	UJ	UJ
Aroclor 1221	UJ	UJ	UJ
Aroclor 1232	UJ	UJ	UJ
Aroclor 1242	UJ	UJ	UJ
Aroclor 1248	UJ	UJ	UJ
Aroclor 1254	UJ	UJ	UJ
Aroclor 1260	UJ	UJ	UJ

WESTON
MANAGERS DESIGNERS/CONSULTANTS

END OF DATA VALIDATION REPORT

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WEST CHESTER, PA 19380-1449
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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4375

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 6-27-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA4375

CASE SUMMARY

This data validation review consists of twelve (12) water samples including four rinsate blank collected on 04-16,17,18,19-94. Laboratory analyses were performed by NDRC Laboratories, Inchcape Testing Services for Target Analyte List (TAL), Molybdenum, and Hardness.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35RB03 *	36RB06 *	36SW03	36SW06
35RB05 *	36SW01	36SW04	36SW07
35RB07 *	36SW02	36SW05	35SW5D *

* These samples were not analyzed for Hardness.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. No major problems were encountered during the sample analyses. The minor deficiencies are summarized under each parameter:

*	• Holding Times
*	• Calibration
	• Contract Required Detection Limit Samples
	• Blank Samples
	• Interference Check Samples
	• Matrix Spike
	• Duplicate Digestion Samples
*	• Laboratory Control Sample
*	• Serial Dilution Sample
	• Graphite Furnace Analysis
*	• Quarterly Verification of Instrument Parameters
*	• Sample Result Verification
*	• Preparation Logs
*	• Run Logs
	• Data Package Completeness

* All criteria were met for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for lead (160%, 126%, & 153%) and zinc (142%) were outside the data validation requirement limits of 80-120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes should be qualified estimated due to the uncertainty near the detection limits. However, due to the laboratory and rinsate blank contamination, the reported results are considered as "non-detect" and are flagged "U" on the data summary.

The CRDL standard was not analyzed for molybdenum. This analyte has not been classified as a TAL metal analyte by CLP.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs:

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Calcium	642	3210
Copper	4.53	22.65
Iron	37.2	186
Lead	1.7	8.5
Magnesium	223.1	1115.5
Mercury	0.110	0.55
Nickel	-17.5	**
Sodium	1023	5115
Zinc	5.93	29.65

* Action level = 5X the blank concentration

** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL.

The reported sample results up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

BLANK ANALYSES (continued)

The results up to five times the rinsate blank concentration for antimony, arsenic, barium, calcium, chromium, cobalt, copper, lead, magnesium, manganese, potassium, silver, and zinc are qualified "U" due to the rinsate blank contaminations.

Note: Four rinsate blanks were analyzed with this batch of samples. However, the individual associated samples were not identified. The data are qualified based on the highest contamination levels in rinsate blanks 35RB07 and 36RB06 with collection dates 4-18,19-94.

INTERFERENCE CHECK SAMPLES

The percent recoveries for all TAL analytes analyzed by ICP were within the 80-120% range. This standard was not analyzed for molybdenum.

MATRIX SPIKE

The matrix spike recoveries for Ag (136.5%) and Tl (73.8%) were outside the control limits of 75-125%. The reported sample results for silver are considered biased high and qualified "J". The reported data for Tl are biased low. The positive results and non-detected values are qualified "J" and "UJ", respectively.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in the laboratory duplicate sample analysis were within the control limits, with the exception of iron (20.9%). The reported positive sample results are qualified estimated.

One set of field duplicate samples (36SW05/36SW5D) was analyzed with this batch. The comparison of the reported data demonstrated satisfactory precision for the analytes detected at concentrations above the CRDLs. The field duplicate analysis was not performed for Hardness analysis.

SERIAL DILUTION SAMPLE

ICP serial dilution sample analyses for calcium, potassium, sodium, and molybdenum were performed on the rinsate blank.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	%RECOVERY
35RB03	Cd	84
35RB06	Sb	73
35RB07	Sb/Pb/Tl	76/115.1*/117*
36SW01	Sb/Se	77/51
36SW02	Cr/Se	120.5*/77
36SW04	Sb	77
36SW06	As/Cr/Se	121*/135*/83
36SW07	Sb/Cr	84/116.5*
36SW5D	Sb/As/Cr	81/120*/130*

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

The results for chromium and lead are qualified "U" due to the blank contaminations; therefore, no additional qualifier codes have been applied.

SAMPLE RESULTS

Aluminum was analyzed by flame AA for all samples. Antimony, arsenic, beryllium, cadium, chromium, lead, selenium, silver, and thallium were analyzed by graphite furnace.

The lead result in sample 36SW01 was obtained by Method of Standard Addition (MSA). The linearity met the requirement limit of "$r \geq 0.995$". The reported results is reliable.

SAMPLE RESULTS (continued)

The results for sodium in the organic sample analysis exceeded the calibration range in all field samples. The samples were reanalyzed at five fold dilutions. However the original sample results are reported on the Form I by the laboratory. The reanalysis results are reported on the data validation data summary.

DATA PACKAGE COMPLETENESS

The instrument detection limit (IDL) for molybdenum was not listed on the Form X.

The data for antimony in sample 35RB05 was inadvertently flagged with "W". The analytical spike recovery for Sb in this sample was (105) within the control range. The reported data for Sb in sample 35RB06 should be flagged with "W". The Form I for these two samples are corrected by the data validator.

The case number was not identified for this batch. The sample analyses were only classified under an SDG number.

SUMMARY

The data package and quality of the data were satisfactory. Major problems were not encountered during the analyses. The reported data for molybdenum are considered estimated since the CRDL and ICP interferences check samples were not analyzed for this element. Also, the instrument detection limit was not listed on the Form X. The results for hardness analysis are accepted as reported.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (610) 701-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY
Units: ug/L

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4375

Client Sample ID:			35RB03	35RB05	35RB07	36RB06	36SW01	36SW02	36SW03
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER	WATER
		IDL							
INORGANIC ELEMENTS									
Aluminium	A	1.0							2.4
Antimony	F	1.0	1.7		UJ	UJ	2.0 J		2.8
Arsenic	F	2.0			1				
Barium	P	2.0	9.8	9.4			12.1	27.3	39.8
Beryllium	F	1.0							
Cadmium	F	1.0	UJ						
Calcium	P	308	13400	13300	541 U	564 U	19500	44400	44300 U
Chromium	F	1.0	1.2			1.4	1.7 U	1.7 U	5.8 U
Cobalt	P	9.0				19.1	24.3 U		
Copper	P	2.0	27.4	30.7	3.4 U	4.5 U	56.5	15.8 U	16.5 U
Iron	P	18	156 U	112 U	34 U	63.3 U	2710 J	2320 J	4840 J
Lead	F	1.0	2.4 U	7.2 U	11.1 J	1.6 U	15.9 U	8.5 U	20.9 U
Magnesium	P	102	2280	2310	104 U	99.9 U	719 U	1550	7850
Manganese	P	2.0	4.3	3.6			58.4	91.2	126
Mercury	AV	0.2	0.21 U	0.23 U	0.3 U	0.18 U	0.14 U	0.11 U	0.22 U
Nickel	P	10.0					28.3	31.4	16.4
Potassium	P	1674	2770	2470			18800	5310	8020
Selenium	F	1.0					UJ	UJ	
Silver	F	1.0				1.2 J			
Sodium	P	339	37000	37700	972 U	1630 U	330000	99500	82000
Thallium	F	1.0	1.1 J	UJ	UJ	UJ	UJ	UJ	UJ
Vanadium	P	4.0					387	131	79
Zinc	P	2.0	17 U	12 U	22.3 U	8.6 U	55.8 U	38.2 U	55.4 U
Molybdenum	P	33	UJ	UJ	UJ	UJ	UJ	UJ	50 J

P = ICP
A = Flam AA
F = Furnace AA
AV = Automated Cold Vapor AA

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY
Units: ug/L

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4375

Client Sample ID:			36SW04	36SW05	36SW06	36SW07	36SW5D
Matrix:			WATER	WATER	WATER	WATER	WATER
		IDL					
INORGANIC ELEMENTS							
Aluminium	A	1.0		1.3	1.2 J	1	
Antimony	F	1.0	1.9 J	3.9		2.4 J	6.8 J
Arsenic	F	2.0	1.3 U	2.4 U			
Barium	P	2.0	22.2 U	19.6 U	18.2 U	18.3 U	17.4 U
Beryllium	F	1.0					
Cadmium	F	1.0					
Calcium	P	308	33700	41700	44000	48800	41400
Chromium	F	1.0	3.8 U	1.7 U	1.9 U	2.7 U	2.4 U
Cobalt	P	9.0					
Copper	P	2.0	12.3 U	7 U	8 U	5.3 U	4.9 U
Iron	P	18	1370 J	967 J	1070 J	1380 J	751 J
Lead	F	1.0	21 U	3.3 U	3.1 U	2.9 U	2 U
Magnesium	P	102	6420	17900	13200	9300	16400
Manganese	P	2.0	12.7 U	31.9	29.5	24.5	25.7
Mercury	AV	0.2	0.33 U	0.17 U	0.35 U	0.33 U	0.36 U
Nickel	P	10.0	23.2				22.8
Potassium	P	1674	6170	8210	7490	5920	8380
Selenium	F	1.0			UJ		
Silver	F	1.0					1.3 U
Sodium	P	339	95500	192000	136000	103000	106500
Thallium	F	1.0	1.1 J	UJ	UJ	UJ	UJ
Vanadium	P	4.0	85	11.2	9	4.5	9.7
Zinc	P	2.0	42.1 U	28.1 U	14.6 U	16.3 U	9.5 U
Molybdenum	P	33	35 J	65 J	57 J	46 J	73 J

P = ICP
A = Flam AA
F = Furnace AA
AV = Automated Cold Vapor AA

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY
Units: mg/L CaC03

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4375

Client Sample ID:	36-SW01	36-SW02	36-SW03	36-SW05	36-SW07	36-SW06	36-SW04
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
INORGANIC ELEMENTS							
Hardness	74	122	130	194	158	180	116

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4581

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 07-13-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: Zohreh Hamid 7-13-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4581

INTRODUCTION

This quality assurance review is based upon a review of all data generated from one water sample, six trip blanks, six rinsate blanks, and two field blanks collected on 04-20,21,26,28,29,30-94 and 05-02,03,04-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The chain-of-custody for soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

Volatiles

Sample LCS was not listed on the Form IV, page 47. The laboratory should correct and resubmit this document.

Sample 35-TB24 was listed twice on the Form II, page 43. The second entry, line 20, should be removed from this form.

The RIC and internal standard summary pages for sample 35-TB15 were missing from the data package. The laboratory should provide these forms.

The first page of the quantitation report for the continuing calibration analyzed on 04-29-94, was missing from the data package. The laboratory should resubmit this page.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (7 days from collection to analysis), has been exceeded for all of these water samples. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 04-29-94	HP4.i	2-Hexanone	27.5
CC 05-11-94	HP4.i	Chloromethane	55.0
		Bromoform	54.6
		2-Hexanone	25.6
		Tetrachloroethene	33.2
CC 05-05-94	HP1.i	Bis(2-chloroethyl)ether	28.3
		2,2'-oxybis(1-chloropropane)	34.6
		N-Nitroso-di-n-propylamine	36.3
		2,4-Dinitrophenol	32.5
		4,6-Dinitro-2-methylphenol	25.3
		3-Nitroaniline	46.0
		Benzidine	95.6
CC 05-05-94	HP1	2,2'-oxybis(1-chloropropane)	27.1
		Dimethylphthalate	90.0
		N-Nitrosodiphenylamine	85.1
		Carbazole	86.2
		Butylbenzylphthalate	32.3
		Di-n-octylphthalate	25.6
		2-Nitroaniline	92.4
		3-Nitroaniline	34.1
		4-Nitroaniline	89.8

Pesticide/PCBs

The retention times for all compounds were outside the retention time windows for INDBM04 analyzed on the DB1701 column. All positive results in the samples are qualified estimated and are flagged "J".

The %RPDs for 4,4-DDE (31.2%) in INDBM02 (column SPB-608) and decachlorobiphenyl (46.7%) in INDAM02 (column SPB-608) exceeded the 25% QC limit. Since 4,4-DDE was not detected in any of the samples, no action is required.

BLANKS

Volatiles

The following trip, field, and rinsate blanks contained common laboratory contaminants along with several other target compounds. Since these compounds were not detected in the water sample, no action is required.

BLANK	COMPOUND	LEVEL
35-RB11	Acetone	11 ug/L
35-FB01	Chloroform	8 ug/L
	Bromodichloromethane	10 ug/L
35-FB02	Dibromochloromethane	10 ug/L
	Acetone	43 ug/L
35-TB24	Acetone	36 ug/L
35-RB13	Methylene Chloride	5 ug/L

Pesticide/PCBs

The following method blanks contained target compound methoxychlor at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U". This compound was also detected in rinsate blank 35-RB08; however, this result is flagged "U" due to the associated method blank contamination.

BLANK	COMPOUND	LEVEL
Method Blank (PBLKA)	Methoxychlor	0.50 ug/L
Method Blank (PBLKB)	Methoxychlor	0.046 ug/L

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound (SMC) recovery was above the QC limits in the analysis of sample 35-TB15.

SURROGATE COMPOUND	RECOVERY	LIMITS
4-Bromofluorobenzene	118	86-115

Since this sample was not reanalyzed, and the recovery exceeded the QC, all positive results should be qualified estimated; however, target compounds are not detected. Therefore, no additional action is taken.

Semivolatiles

The following surrogate recovery was above the QC limits in the analysis of sample 35-RB08:

SURROGATE COMPOUND	RECOVERY	LIMITS
2-Fluorobiphenyl	137	43-116

Since only one surrogate recovery was outside the QC limits, no qualification is required due to this surrogate outlier.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
35-SW07	44/-	DCB	Advisory Criteria 60-150%
35-FB02	6/4	TCX	Advisory Criteria 60-150%
	-/77	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/MATRIX SPIKE DUPLICATES

As per the laboratory case narrative, MS/MSD samples are not included with this batch of samples, since no sample was specified for quality control in this SDG. No qualification is applied due to the lack of these QC samples.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements as established in the NEESA guidelines.

Volatiles

The LCS recovery for benzene was inadvertently listed as 39.4%, the correct value is 79.4%, which falls within the QC limits.

Semivolatiles

The percent recoveries for 2-chlorophenol-d_4 (127%) and 1,2-dichlorobenzene (120%) were above the QC limits of 33-110 and 16-110%, respectively. Since these compounds were not detected in the samples, no action is required.

INTERNAL STANDARD

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKA	Perylene-d_{12}	128092	297018-1188074
SBLKB	Perylene-d_{12}	93980	297018-1188074
35-RB10	Perylene-d_{12}	199981	256532-1026128

Sample 35-RB10 was re-extracted/reanalyzed, but this analysis was not reported; therefore, the non-detects quantified in reference to perylene in the original analyses are qualified estimated since positive results were not detected. The blanks results quantified in reference to perylene are also considered estimated.

FIELD DUPLICATE RESULTS

A field duplicate analysis was not provided for this batch of samples. No qualification is required due to the lack of this QC sample.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35–SW07	33–RB08	35–TB15	35–RB09	35–TB21	35–TB22	35–TB23	35–RB10
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND								
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acetone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1–Dichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1–Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2–Dichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2–Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2–Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1–Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2–Dichloropropane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Cis–1,3–Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2–Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trans–1,3–Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4–Methyl–2–Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2–Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2–Tetrachloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35–RB11	35–FB01	35–FB02	35–TB24	35–RB12	35–RB13	35–TB28
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ	UJ	UJ	5 J	UJ
Acetone	11 J	UJ	43 J	36 J	UJ	UJ	UJ
Carbon Disulfide	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1–Dichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1–Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2–Dichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroform	UJ	8 J	UJ	UJ	UJ	UJ	UJ
1,2–Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2–Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1–Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	10 J	UJ	UJ	UJ	UJ	UJ
1,2–Dichloropropane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Cis–1,3–Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	10 J	UJ	UJ	UJ	UJ	UJ
1,1,2–Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trans–1,3–Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4–Methyl–2–Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2–Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2–Tetrachloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35-SW07	35-RB08	35-RB09	35-RB10	35-RB11	35-FB01	35-FB02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol							
bis(2-Chloroethyl)ether	UJ	UJ	UJ				
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Methylphenol							
N-Nitroso-di-n-propylamine	UJ	UJ	UJ				
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline				UJ	UJ	UJ	UJ
Dimethylphthalate				UJ	UJ	UJ	UJ
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acenaphthene							

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SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35-SW07	35-RB08	35-RB09	35-RB10	35-RB11	35-FB01	35-FB02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol	UJ	UJ	UJ				
4-Nitrophenol							
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chlorophenyl-phenylether							
Fluorene							
4-Nitroaniline				UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ				
N-Nitrosodiphenylamine				UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole				UJ	UJ	UJ	UJ
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate				UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine							
Benzo(a)anthracene							
Chrysene							
bis(2-Ethylhexyl)phthalate							
Di-n-octylphthalate				UJ	UJ	UJ	UJ
Benzo(b)fluoranthene				UJ			
Benzo(k)fluoranthene				UJ			
Benzo(a)pyrene				UJ			
Indeno(1,2,3-cd)pyrene				UJ			
Dibenz(a,h)anthracene				UJ			
Benzo(g,h,i)perylene				UJ			

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SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35–RB12	35–RB13
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
Phenol		
bis(2–Chloroethyl)ether		
2–Chlorophenol		
1,3–Dichlorobenzene		
1,4–Dichlorobenzene		
1,2–Dichlorobenzene		
2–Methylphenol		
2,2'–oxybis(1–Chloropropane)	UJ	UJ
4–Methylphenol		
N–Nitroso–di–n–propylamine		
Hexachloroethane		
Nitrobenzene		
Isophorone		
2–Nitrophenol		
2,4–Dimethylphenol		
bis(2–Chloroethoxy)methane		
2,4–Dichlorophenol		
1,2,4–Trichlorobenzene		
Naphthalene		
4–Chloroaniline		
Hexachlorobutadiene		
4–Chloro–3–methylphenol		
2–Methylnaphthalene		
Hexachlorocyclopentadiene		
2,4,6–Trichlorophenol		
2,4,5–Trichlorophenol		
2–Chloronaphthalene		
2–Nitroaniline	UJ	UJ
Dimethylphthalate	UJ	UJ
Acenaphthylene		
2,6–Dinitrotoluene		
3–Nitroaniline	UJ	UJ
Acenaphthene		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35–RB12	35–RB13
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
2,4–Dinitrophenol		
4–Nitrophenol		
Dibenzofuran		
2,4–Dinitrotoluene		
Diethylphthalate		
4–Chlorophenyl–phenylether		
Fluorene		
4–Nitroaniline	UJ	UJ
4,6–Dinitro–2–methylphenol		
N–Nitrosodiphenylamine	UJ	UJ
4–Bromophenyl–phenylether		
Hexachlorobenzene		
Pentachlorophenol		
Phenanthrene		
Anthracene		
Carbazole	UJ	UJ
Di–n–butylphthalate		
Fluoranthene		
Pyrene		
Butylbenzylphthalate	UJ	UJ
3,3–Dichlorobenzidine		
Benzo(a)anthracene		
Chrysene		
bis(2–Ethylhexyl)phthalate		
Di–n–octylphthalate	UJ	UJ
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(a)pyrene		
Indeno(1,2,3–cd)pyrene		
Dibenz(a,h)anthracene		
Benzo(g,h,i)perylene		

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B4581

Client Sample ID:	35–SW07	35–RB08	35–FB01	35–FB02	35–RB12	35–RB13
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND						
alpha–BHC						
beta–BHC						
delta–BHC						
gamma–BHC(Lindane)						
Heptachlor						
Aldrin						
Heptachlor Epoxide						
Endosulfan I						
Dieldrin						
4,4'–DDE						
Endrin						
Endosulfan II						
4,4'–DDD						
Endosulfan Sulfate						
4,4'–DDT						
Methoxychlor	0.59 UJ	0.60 UJ				
Endrin Ketone						
Endrin Aldehyde						
alpha–Chlordane						
gamma–Chlordane						
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

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MANAGERS DESIGNERS/CONSULTANTS

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4581

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: Zohreh Hamid 7-14-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA4581

CASE SUMMARY

This data validation review consists of one water sample, six rinsate blanks, and two field blanks collected on 04-20,26,29,30-94 and 05-02,03,04-94. Laboratory analyses were performed by NDRC Laboratories, Inchcape Testing Services for Target Analyte List (TAL) and Molybdenum.

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35FB01	35RB09	35RB12
35FB02	35RB10	35RB13
35RB08	35RB11	35SW07

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. No major problems were encountered during the sample analyses. The minor deficiencies are summarized under each parameter:

- Holding Times
- Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- Interference Check Samples
- Matrix Spike
- Duplicate Digestion Samples
* - Laboratory Control Sample
- Serial Dilution Sample
- Graphite Furnace Analysis
* - Quarterly Verification of Instrument Parameters
* - Sample Result Verification
* - Preparation Logs
* - Run Logs
- Data Package Completeness

* All criteria were met for this classification.

HOLDING TIMES

The preparation/analysis holding time exceeded the requirement limits (28 days from collection) in mercury analysis; therefore, the reported results and non-detected values are qualified estimated.

CALIBRATION

The continuing calibration blank CCB17 was not analyzed after the continuing calibration verification CCV17 in analysis of Ca, K, Na, and Mo. The data are not impacted since the CCBs analyzed prior and after sample analyses were free of contaminations, however, this lack of CCB analysis contractually violates the CLP contract.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for lead (163.3%, 183.3%, & 166.7%) and selenium (130%) in graphite furnace and all ICP analytes with the exception of silver were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes in the field sample are qualified estimated due to the uncertainty near the detection limits. The field blanks and rinsate blanks were not qualified based on these outliers.

The CRDL standard was extremely below the lower control limit (-185/-180) for molybdenum. This analyte has not been classified as a TAL metal analyte by CLP; therefore, the data are not rejected and the non-detected values and reported results up to 3X the CRDL are accepted with the qualifier codes.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs:

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Copper	7.767	39
Selenium	1.2	6
Sodium	727	3636

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Zinc	-9.167	[46]
Molybdenum	-43	**

* Action level = 5X the blank concentration
** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL.

The reported sample results and the field QC blanks up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

The reported results and non-detected values for zinc are considered estimated and are qualified "J" and "UJ", respectively, due to the baseline drift in the preparation blank.

The results up to five times the associated rinsate blank (35RB08) concentration are qualified "U" in the field sample (35SW07) due to the field contaminations.

The first continuing calibration analysis had silver at a level of CRDL. The data are not rejected since the silver concentration did not exceed the CRDL. The positive results are considered as the detection limits and are qualified "U".

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits. The true value for molybdenum was not reported. Therefore, the recovery could not be calculated.

Calcium was not included in ICS A standard solution. This element was analyzed along with K, Na, and Mo. The recoveries were 0.0%. The concentration of the analytes were relatively low and the ICP interelement correction factors (Form XIA) for calcium are reported "one" for all elements. It is the validator's opinion that the laboratory did not spike the ICP standard solution with calcium. This should be clarified by the laboratory. Therefore, the data could be accepted without the qualifier codes.

MATRIX SPIKE

Samples 35FB01 and 35RB09 were spiked with elements analyzed by graphite furnace. The spike recovery for arsenic in sample 35RB09S (73.2%) was below the lower control limit. The associated sample data are qualified estimated.

Sample 35RB08 was spiked with elements analyzed by ICP. The spike recoveries were within the control limits.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in the laboratory duplicate sample analysis were within the control limits. The field duplicate was not analyzed with this batch.

SERIAL DILUTION SAMPLE

ICP serial dilution sample analyses for calcium, potassium, sodium, and molybdenum were not reported on Form IX. Also, rinsate blank sample (35RB08) was analyzed as the ICP serial dilution sample which violates the CLP contract. Since the samples were mostly rinsate blanks and field blanks, the data are not impacted.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	%RECOVERY
35FB01	Se	84
35FB02	Cd	121*
35RB08	Tl	83
35RB11	Cd	118*
35RB12	Cd	135*
35RB13	Cd/Se	130.5*/82

SAMPLE ID	ANALYTE	%RECOVERY
35SW07	Cd/Pb/Se/Tl	129.5*/119.8*/60/50

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

The results for selenium are qualified "U" due to the blank contamination, additional qualifier was not applied to the sample result.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, and thallium were analyzed by graphite furnace. Other elements were analyzed by ICP. Mercury was analyzed by automated cold vapor AA.

DATA PACKAGE COMPLETENESS

The instrument detection limit (IDL) for molybdenum was not listed on the Form X.

The case number was not identified for this batch. The sample analyses were classified under an SDG number.

The ICP interelement correction factor (Form XI, Part II) was not included in this data package.

SUMMARY

The quality of the data was fair. The continuing calibration blank had silver at the CRDL level. The calcium analysis was not performed with the ICP elements in the ICP interference check sample. The reported data for molybdenum are considered estimated since the CRDL recovery was extremely low and ICP interferences check and serial dilution sample analyses were not performed for this element. The results for mercury are qualified estimated since the holding time exceeded the requirement limit. Also, the data for arsenic are qualified estimated due to the low matrix spike recovery. The CRDL recoveries exceeded the upper control limit of 120% for all elements (with the exception of silver) and lead and selenium in graphite furnace.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG # BA4581

CLIENT SAMPLE ID:			35FB01	35FB02	35RB08	35RB09	35RB10	35RB11	35RB12
MATRIX:			WATER	WATER	WATER	WATER	WATER	WATER	WATER
UNITS:			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND		IDL ug/L							
Aluminum	P	72.0	78.1			143			
Antimony	P	39.0							
Arsenic	F	1.0			UJ	1.2 J	3.3		
Barium	P	2.0	2.1						
Beryllium	P	5.0							
Cadmium	F	1.0							
Calcium	P	50	14500		370	2900	126	96	94
Chromium	P	5.0			6.1				
Cobalt	P	9.0							
Copper	P	2.0	13.7 U	2.7 U	2.5 U	2.6 U	9.4 U	5.7 U	4.9 U
Iron	P	18.0	173			77.7			
Lead	F	1.0			2.1 J	1.1 J			
Magnesium	P	26.0	3730			44.5			
Manganese	P	2.0				2.9			
Mercury	AV	0.1	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Nickel	P	10.0							36.3
Potassium	P	1674	5450						
Selenium	F	1.0	1.3 U	1.0 U	1 U	1.3 U	1.0 U	1.2 U	
Silver	P	2.0			2.3 U	3.3 U			
Sodium	P	339	45200	402 U	340 U	2040 U	1290 U	906 U	656 U
Thallium	F	1.0			UJ				
Vanadium	P	4.0				UJ			
Zinc	P	2.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Molybdenum	P	33	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG # BA4581

CLIENT SAMPLE ID:			35RB13	35SW07
MATRIX:			WATER	WATER
UNITS:			ug/L	ug/L
COMPOUND		IDL ug/L		
Aluminum	P	72.0		6580
Antimony	P	39.0		
Arsenic	F	1.0		2.7 J
Barium	P	2.0		48.5 J
Beryllium	P	5.0		
Cadmium	F	1.0		
Calcium	P	50	98	58500
Chromium	P	5.0		17 U
Cobalt	P	9.0		9 J
Copper	P	2.0	3.1 U	19.2 U
Iron	P	18.0		9500
Lead	F	1.0		97 J
Magnesium	P	26.0		4610 J
Manganese	P	2.0		113
Mercury	AV	0.1	UJ	UJ
Nickel	P	10.0		
Potassium	P	1674		4780 J
Selenium	F	1.0	1.8 U	4.3 U
Silver	P	2.0		4 U
Sodium	P	339	1090 U	59600
Thallium	F	1.0		1 J
Vanadium	P	4.0		14.8 J
Zinc	P	2.0	UJ	129 J
Molybdenum	P	33	UJ	UJ

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B4585

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-10-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-16-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B4585

INTRODUCTION

This quality assurance review is based upon a review of all data generated from nineteen soil samples collected on 04-20,26,29,30-94 and 05-02-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- * Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Semivolatiles

The mass spectra and mass list were missing for the Form V 06-06-94/10:51 on page 0415. The laboratory should resubmit this document.

Pesticide/PCBs

The florisil check summary Form IX Pest-1 was not included in the data package. The laboratory should provide this form.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged, "J" and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 04-30-94 (08:56)	HP3.i	Acetone	60.8
		2-Butanone	69.5
		Bromoform	31.9
		4-Methyl-2-pentanone	40.1
		2-Hexanone	38.2
CC 04-30-94 (18:53)	HP3.i	Acetone	30.3
		2-Butanone	35.2
		4-Methyl-2-pentanone	33.6
		2-Hexanone	36.0
		1,1,2,2-Tetrachloroethane	28.8
CC 05-01-94	HP3.i	Acetone	25.9
		2-Butanone	33.1
		4-Methyl-2-pentanone	35.1
		2-Hexanone	39.3
CC 05-12-94	HP3.i	Carbon Tetrachloride	25.7

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-13-94	HP3.i	Acetone	36.8
		2-Butanone	33.6
		4-Methyl-2-pentanone	33.1
		2-Hexanone	29.1
CC 05-17-94	HP1.i	3-Nitroaniline	35.5
		4-Nitroaniline	42.7
		3,3-Dichlorobenzidine	26.1
		2,2-Oxybis(1-chloropropane)	99.7
		N-Nitroso-di-n-propylamine	31.8
		2,4-Dinitrophenol	26.6
		4-Nitrophenol	36.9
		Bis(2-ethylhexyl)phthalate	30.3
CC 05-21-94	HP1.i	3-Nitroaniline	41.9
		4-Nitroaniline	34.8
		3,3-Dichlorobenzidine	29.9
		4-Nitrophenol	42.9
		Bis(2-ethylhexyl)phthalate	27.8
CC 06-03-94	HP1.i	4-Chloroaniline	68.8
		3-Nitroaniline	37.5
		4-Nitroaniline	25.5
		3,3-Dichlorobenzidine	33.1
		2,6-Dinitrotoluene	28.8
		2,4-Dinitrophenol	26.3
		4-Nitrophenol	40.9
		Bis(2-ethylhexyl)phthalate	35.0

BLANKS

Semivolatiles

The following method blank contained a common laboratory contaminant at a level less than the CRQL. Since this compound was not detected in the other water samples, no action is required.

BLANK	COMPOUND	LEVEL
SBLKB	Bis(2-ethylhexyl)phthalate	298 ug/kg

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were outside the QC limits:

SAMPLE	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35SD04612	1,2-Dichloroethane-d_4	53	70-121
35SD0206	Toluene-d_8	139	84-138
35SD0206MSD	1,2-Dichloroethane-d_4	144	70-121
35SD02612	1,2-Dichloroethane-d_4	143	70-121
35SD02612DL	1,2-Dichloroethane-d_4	158	70-121

Samples 35SD0206 and 35SD2612 are exhibiting matrix effects. Results are reported from all analyses; therefore, in the case that the recovery was below the QC limits, all sample results are qualified estimated, but if the recovery exceeded the QC limits, only the positive results are qualified.

Semivolatiles

The following surrogate recoveries were outside the QC limits. Also, several of the 2-chlorophenol-d4 and 1,2-dichlorobenzene-d_4 recoveries were outside the limits; however, since these surrogates are advisory; the outliers are not used to qualify the data.

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35-SS08-00	All compounds	<23	Various
35-SD02-612	2-Fluorophenol	17	25-121
SBLKB	Nitrobenzene-d_5	15	23-120
	2-Fluorobiphenyl	26	30-115
	Phenol-d_5	10	24-113
	2-Fluorophenol	6	25-121
	2,4,6-Tribromophenol	11	19-122
GWDS05-3	Nitrobenzene-d_5	19	23-120
	Phenol-d_5	18	24-113
	2-Fluorophenol	10	25-121
GWDS05-3MS	2-Fluorophenol	20	25-121

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
SLCS	2-Fluorophenol	10	25-121
35-SD04-06	2-Fluorophenol	19	25-121

These compounds were not reanalyzed; therefore, a matrix effect can not be determined. Analyses LCS, 35-SD04-06, 35-SD02-612, and GWDS05-3MS only have one outlier per fraction; therefore, no action is taken. Sample 35-SS08-00 had all recoveries diluted out and since a straight analysis was not provided, all positive results and non-detects are quantified estimated. Sample GWDS05-3 has only the acid-extractable results qualified estimated. Due to the number of blank outliers, this is believed to be an associated problem; therefore, the sample results are unaffected.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
35-SD02-06	52/52	TCX	Advisory Criteria 60-150%
35-SD02-06 MS	46/51	TCX	Advisory Criteria 60-150%
35-SD02-06 MSD	53/-	TCX	Advisory Criteria 60-150%
35-SD02-612	50/-	TCX	Advisory Criteria 60-150%
35-SD07-06	54/59	TCX	Advisory Criteria 60-150%
35-SD07-612	52/53	TCX	Advisory Criteria 60-150%

TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles

The following MS/MSD recoveries and RPD results were outside the QC limits. Since positive results were not detected in these samples and no action is required due to MS/MSD outliers, no qualification is applied to the sample data on this basis.

SAMPLE	COMPOUND	RESULT	LIMITS
35SD0206 RPD	1,1-Dichloroethene	15	14
RPD	Trichloroethene	20	14
MSD/RPD	Benzene	145/35	76-125/11
MS/MSD	Toluene	153/160	76-125
MSD/RPD	Chlorobenzene	146/19	75-130/13
35GWDS0503 MSD	Benzene	135	76-127
	Toluene	140/142	76-125

Semivolatile

The following MS/MSD recoveries were outside the QC limits:

SAMPLE	COMPOUND	RECOVERY/RPD	LIMITS
35-SD02-06 MSD	2,4-Dinitrotoluene	92	28-89
MSD/RPD	Pyrene	152/44	35-142/36
35-GWDS05-03 MS/RPD	1,4-Dichlorobenzene	17/61	28-104/27
MS/MSD/RPD	N-nitroso-di-n-propylamine	26/34/43	41-126/38
MS/RPD	1,2,4-Trichlorobenzene	26/54	38-107/23
RPD	4-Chloro-3-methylphenol	38	33

Since these compounds were not detected in the unspiked sample, and no qualification is required based on MS outliers, the sample data are accepted unqualified.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

Volatiles

The LCS recovery for benzene (128.77%) in VLCSA was above the QC limits of 76-125. Since the compound was not detected in most samples and no action is required based on this outlier, no qualification is applied on this basis.

INTERNAL STANDARD

Volatiles

The following internal standard areas were outside the laboratory's control limits:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35SD0406	BCM	112757	200582-802330
	DFB	238736	541163-2164652
	CBZ	627021	685584-2742334
35SD04612	DFB	403495	541163-2164652
35SD0106	DFB	180397	541163-2164652
	CBZ	323547	685584-2742334
35SD0206 MSD	DFB	535232	541163-2164652
	CBZ	518137	685584-2742334
35SD02612DL	BCM	186513	218330-873322
35SS0600	CBZ	524697	532987-2131948
35SS0500	DFB	497316	530232-2120926
	CBZ	437634	532987-2131948
35MW3502	DFB	496326	530232-2120926
	CBZ	518509	532987-2131948

BCM = Bromochloromethane
DFB = 1,4-Difluorobenzene
CBZ = Chlorobenzene-d_5

All reported results quantified in reference to the internal standard outliers are qualified estimated, since all IS outliers were below the control limits.

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKA	Perylene-d_{12}	739030	816468-3265870

The blank results quantified in reference to perylene are considered estimated; however, since all of the sample internal standard areas were within QC limits, no qualification is applied to the sample data on this basis.

FIELD DUPLICATE RESULTS

Two sets of field duplicate analyses were provided with this batch of samples (35-SD04-06/35-SD04-06D) and (35-SD02-06/35-SD02-06D). The sample result reproducibility was satisfactory except for the following:

Volatiles

The %RPD between acetone results in analyses 35-SD02-06/D exceed 50%; therefore, the results in the samples are qualified estimated.

Pesticide/PCBs

The %RPD between 4,4-DDE results in analyses 35-SD04-06/D and 4,4-DDE, 4,4-DDD, alpha-chlordane and gamma-chlordane in samples 35-SD02-06/D, exceed 50%; therefore, these positive results are flagged "J".

COMPOUND QUANTITATION

Volatiles

Samples 35SD07612, 35SD0406D, and 35SD04612 were analyzed at 50, 10, and 50-fold dilutions, respectively. Since target compounds were not detected in these analyses, all sample data are qualified estimated.

Semivolatiles

Sample 35-SS08-00 was analyzed at a 10-fold dilution. Positive results were not detected for this analysis; therefore, all sample data are qualified estimated.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4585

Client Sample ID:	35SD0706	35SD07612	35GWDS0103	35MW29B03	35GWDS0503	35SS0800	35SS0600	35SS0500
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	50.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND								
Bromomethane		UJ						
Vinyl Chloride		UJ						
Chloroethane		UJ						
Methylene Chloride		UJ						
Acetone	UJ	UJ				UJ		
Carbon Disulfide		UJ						
1,1-Dichloroethene		UJ						
1,1-Dichloroethane		UJ						
1,2-Dichloroethene (TOTAL)		UJ						
Chloroform		UJ						
1,2-Dichloroethane		UJ						
2-Butanone	UJ	UJ				UJ		
1,1,1-Trichloroethane		UJ						UJ
Carbon Tetrachloride		UJ	UJ	UJ	UJ		UJ	UJ
Bromodichloromethane		UJ						UJ
1,2-Dichloropropane		UJ						UJ
cis-1,3-Dichloropropene		UJ						UJ
Trichloroethene		UJ						UJ
Dibromochloromethane		UJ						UJ
1,1,2-Trichloroethane		UJ						UJ
Benzene		UJ						UJ
Trans-1,3-Dichloropropene		UJ						UJ
Bromoform		UJ						UJ
4-Methyl-2-Pentanone	UJ	UJ				UJ	UJ	UJ
2-Hexanone	UJ	UJ				UJ	UJ	UJ
Tetrachloroethene		UJ					UJ	UJ
1,1,2,2-Tetrachloroethane		UJ					UJ	UJ
Toluene		UJ					UJ	19 J
Chlorobenzene		UJ					UJ	UJ
Ethylbenzene		UJ					UJ	UJ
Styrene		UJ					UJ	UJ
Xylene (total)		UJ					UJ	UJ
Chloromethane		UJ					UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4585

Client Sample ID:	35SD0406D	35SD0406DRE	35SD04612	35SD0106	35SD01612	35SD0206D	35SD0206	35SD02612DL
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	10.0	1.0	50.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND								
Bromomethane	UJ		UJ					UJ
Vinyl Chloride	UJ		UJ					UJ
Chloroethane	UJ		UJ					UJ
Methylene Chloride	UJ		UJ					UJ
Acetone	UJ	UJ	UJ		128 J	16 J	UJ	UJ
Carbon Disulfide	UJ		UJ					UJ
1,1-Dichloroethene	UJ		UJ					UJ
1,1-Dichloroethane	UJ		UJ					UJ
1,2-Dichloroethene (TOTAL)	UJ		UJ					UJ
Chloroform	UJ		UJ					UJ
1,2-Dichloroethane	UJ		UJ					UJ
2-Butanone	UJ	UJ	UJ		UJ	UJ	UJ	UJ
1,1,1-Trichloroethane	UJ		UJ	UJ				
Carbon Tetrachloride	UJ		UJ	UJ				
Bromodichloromethane	UJ		UJ	UJ				
1,2-Dichloropropane	UJ		UJ	UJ				
cis-1,3-Dichloropropene	UJ		UJ	UJ				
Trichloroethene	UJ		UJ	UJ				
Dibromochloromethane	UJ		UJ	UJ				
1,1,2-Trichloroethane	UJ		UJ	UJ				
Benzene	UJ		UJ	UJ				
Trans-1,3-Dichloropropene	UJ		UJ	UJ				
Bromoform	UJ		UJ	UJ	UJ	UJ	UJ	
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ		UJ	UJ				
1,1,2,2-Tetrachloroethane	UJ		UJ	UJ				
Toluene	UJ		UJ	UJ				
Chlorobenzene	UJ		UJ	UJ				
Ethylbenzene	UJ		UJ	UJ				
Styrene	UJ		UJ	UJ				
Xylene (total)	UJ		UJ	UJ				
Chloromethane	UJ		UJ	UJ				

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4585

Client Sample ID:	35SS0300	35MW4003D	35MW3103	35MW3502
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane				UJ
Vinyl Chloride				UJ
Chloroethane				UJ
Methylene Chloride				UJ
Acetone			11 J	31
Carbon Disulfide				UJ
1,1-Dichloroethene				UJ
1,1-Dichloroethane				UJ
1,2-Dichloroethene (TOTAL)				UJ
Chloroform				UJ
1,2-Dichloroethane				UJ
2-Butanone				UJ
1,1,1-Trichloroethane				UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane				UJ
1,2-Dichloropropane				UJ
cis-1,3-Dichloropropene				UJ
Trichloroethene				UJ
Dibromochloromethane				UJ
1,1,2-Trichloroethane				UJ
Benzene				UJ
Trans-1,3-Dichloropropene				UJ
Bromoform				UJ
4-Methyl-2-Pentanone				UJ
2-Hexanone				UJ
Tetrachloroethene				UJ
1,1,2,2-Tetrachloroethane				UJ
Toluene				UJ
Chlorobenzene				UJ
Ethylbenzene				UJ
Styrene				UJ
Xylene (total)				UJ
Chloromethane				UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD02-612	35-SD07-06	35-SD07-612	35-GWDS01-03	GWDS05-3	35-SS08-00	35-SS06-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	10.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Phenol					UJ	UJ	
bis(2-Chloroethyl)ether						UJ	
2-Chlorophenol					UJ	UJ	
1,3-Dichlorobenzene						UJ	
1,4-Dichlorobenzene						UJ	
1,2-Dichlorobenzene						UJ	
2-Methylphenol					UJ	UJ	
2,2'-oxybis(1-Chloropropane)	UJ					UJ	
4-Methylphenol					UJ	UJ	
N-Nitroso-di-n-propylamine	UJ					UJ	
Hexachloroethane						UJ	
Nitrobenzene						UJ	
Isophorone						UJ	
2-Nitrophenol					UJ	UJ	
2,4-Dimethylphenol					UJ	UJ	
bis(2-Chloroethoxy)methane						UJ	
2,4-Dichlorophenol					UJ	UJ	
1,2,4-Trichlorobenzene						UJ	
Naphthalene						UJ	
4-Chloroaniline				UJ	UJ	UJ	UJ
Hexachlorobutadiene						UJ	
4-Chloro-3-methylphenol					UJ	UJ	
2-Methylnaphthalene						UJ	
Hexachlorocyclopentadiene						UJ	
2,4,6-Trichlorophenol					UJ	UJ	
2,4,5-Trichlorophenol					UJ	UJ	
2-Chloronaphthalene						UJ	
2-Nitroaniline						UJ	
Dimethylphthalate						UJ	
Acenaphthylene						UJ	
2,6-Dinitrotoluene				UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acenaphthene						UJ	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD02-612	35-SD07-06	35-SD07-612	35-GWDS01-03	GWDS05-3	35-SS08-00	35-SS06-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	10.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
2,4-Dinitrophenol	UJ			UJ	UJ	UJ	UJ
Dibenzofuran						UJ	
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene						UJ	
Diethylphthalate						UJ	
Fluorene						UJ	
4-Chlorophenyl-phenylether						UJ	
4-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol					UJ	UJ	
N-Nitrosodiphenylamine						UJ	
4-Bromophenyl-phenylether						UJ	
Hexachlorobenzene						UJ	
Pentachlorophenol					UJ	UJ	
Phenanthrene						UJ	
Anthracene						UJ	
Carbazole						UJ	
Di-n-butylphthalate						UJ	
Fluoranthene						UJ	
Pyrene						UJ	
Butylbenzylphthalate						UJ	
Benzo(a)anthracene						UJ	
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chrysene						UJ	
bis(2-Ethylhexyl)phthalate	UJ	UJ	318 J	UJ	UJ	UJ	UJ
Di-n-octylphthalate						UJ	
Benzo(b)fluoranthene						UJ	
Benzo(k)fluoranthene						UJ	
Benzo(a)pyrene						UJ	
Indeno(1,2,3-cd)pyrene						UJ	
Dibenz(a,h)anthracene						UJ	
Benzo(g,h,i)perylene						UJ	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD04-06	35-SD04-06D	35-SD04-612	35-SD01-06	35-SD01-612	35-SD02-06	35SD02-06D
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Phenol							
bis(2-Chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ		UJ	UJ	UJ
4-Methylphenol							
N-Nitroso-di-n-propylamine	UJ	UJ	UJ		UJ	UJ	UJ
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acenaphthene							

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD04-06	35-SD04-06D	35-SD04-612	35-SD01-06	35-SD01-612	35-SD02-06	35SD02-06D
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
2,4-Dinitrophenol	UJ	UJ	UJ		UJ	UJ	UJ
Dibenzofuran							
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene							
Diethylphthalate							
Fluorene							
4-Chlorophenyl-phenylether							
4-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine							
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole							
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
Benzo(a)anthracene							
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chrysene							
bis(2-Ethylhexyl)phthalate	UJ	UJ	625 J	UJ	UJ	UJ	UJ
Di-n-octylphthalate							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							
Indeno(1,2,3-cd)pyrene							
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene							

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35–SS05–00	35–SS03–00
Matrix:	SOIL	SOIL
Dilution Factor:	1.0	1.0
Units:	UG/KG	UG/KG
Phenol		
bis(2–Chloroethyl)ether		
2–Chlorophenol		
1,3–Dichlorobenzene		
1,4–Dichlorobenzene		
1,2–Dichlorobenzene		
2–Methylphenol		
2,2'–oxybis(1–Chloropropane)		
4–Methylphenol		
N–Nitroso–di–n–propylamine		
Hexachloroethane		
Nitrobenzene		
Isophorone		
2–Nitrophenol		
2,4–Dimethylphenol		
bis(2–Chloroethoxy)methane		
2,4–Dichlorophenol		
1,2,4–Trichlorobenzene		
Naphthalene		
4–Chloroaniline	UJ	UJ
Hexachlorobutadiene		
4–Chloro–3–methylphenol		
2–Methylnaphthalene		
Hexachlorocyclopentadiene		
2,4,6–Trichlorophenol		
2,4,5–Trichlorophenol		
2–Chloronaphthalene		
2–Nitroaniline		
Dimethylphthalate		
Acenaphthylene		
2,6–Dinitrotoluene	UJ	UJ
3–Nitroaniline	UJ	UJ
Acenaphthene		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SS05-00	35-SS03-00
Matrix:	SOIL	SOIL
Dilution Factor:	1.0	1.0
Units:	UG/KG	UG/KG
2,4-Dinitrophenol	UJ	UJ
Dibenzofuran		
4-Nitrophenol	UJ	UJ
2,4-Dinitrotoluene		
Diethylphthalate		
Fluorene		
4-Chlorophenyl-phenylether		
4-Nitroaniline	UJ	UJ
4,6-Dinitro-2-methylphenol		
N-Nitrosodiphenylamine		
4-Bromophenyl-phenylether		
Hexachlorobenzene		
Pentachlorophenol		
Phenanthrene	1186	
Anthracene		
Carbazole	183 J	
Di-n-butylphthalate		
Fluoranthene	1567	
Pyrene	1173	
Butylbenzylphthalate		
Benzo(a)anthracene	566	
3,3-Dichlorobenzidine	UJ	UJ
Chrysene	683	
bis(2-Ethylhexyl)phthalate	UJ	UJ
Di-n-octylphthalate		
Benzo(b)fluoranthene	1186	
Benzo(k)fluoranthene		
Benzo(a)pyrene	625	
Indeno(1,2,3-cd)pyrene	381	
Dibenz(a,h)anthracene	184 J	
Benzo(g,h,i)perylene	366	

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD02-612	35-SD07-06	35-SD07-612
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG
COMPOUND			
alpha-BHC			
beta-BHC		0.59 J	
delta-BHC			0.92 J
gamma-BHC(Lindane)			
Heptachlor		0.91 J	
Aldrin			
Heptachlor Epoxide	1.2 J	0.78 J	1.4 J
Endosulfan I			
Dieldrin	1.7 J	1.4 J	2.6 J
4,4'-DDE	38	34	57
Endrin	0.44 J		0.7 J
Endosulfan II	1.4 J	1.3 J	0.88 J
4,4'-DDD	40	40	60
Endosulfan Sulfate			
4,4'-DDT	1.6 J	2.3 J	2.1 J
Methoxychlor	2.2 J		3.4 J
Endrin Ketone			
Endrin Aldehyde			
alpha-Chlordane	6	7	8.5
gamma-Chlordane	6.7	6.1	9.7
Toxaphene			
Aroclor 1016			
Aroclor 1221			
Aroclor 1232			
Aroclor 1242			
Aroclor 1248			
Aroclor 1254			
Aroclor 1260			

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B4585

Client Sample ID:	35-SD04-06	35-SD04-06D	35-SD04-612	35-SD01-06	35-SD01-612	35-SD02-06	35-SD02-06D
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND							
alpha-BHC							
beta-BHC							
delta-BHC							0.5 J
gamma-BHC(Lindane)							
Heptachlor							
Aldrin							
Heptachlor Epoxide		2.6 J	1.2 J	0.74 J		0.43 J	0.46 J
Endosulfan I							
Dieldrin	1.6 J		3.1 J				0.94 J
4,4'-DDE	31 J	170 J	82		1 J	1.8 J	27 J
Endrin		1.8 J	0.59 J				
Endosulfan II	1.3 J	4.4 J	3.5 J				1.1 J
4,4'-DDD	43	128	111		1.1 J	2.3 J	31 J
Endosulfan Sulfate							
4,4'-DDT	4.9 J	13	5.2		0.73 J	0.66 J	2.6 J
Methoxychlor	0.86 J	3.5 J		2.7 J	0.65 J	0.49 J	
Endrin Ketone			2.8 J				
Endrin Aldehyde							
alpha-Chlordane	4	8.8	5.6			0.51 J	4.9 J
gamma-Chlordane	3.6	10	7.6			UJ	4.8 J
Toxaphene							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							

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MANAGERS DESIGNERS/CONSULTANTS

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: CAMP LEJEUNE
SDG: BA4585

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: _____ 8-10-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA4585

CASE SUMMARY

This data validation review consists of sixteen (16) soil samples received on 04-22,28-94 and 05-03-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

D01612	D07612	SD0106	SD0406	SS0300	SS0600
D02612	DS0103	SD0206	SD046D	SS0500	SS0800
D04612	DS0503	SD026D	SD0706		

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

- Holding Time
- * Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- Interference Check Samples
- Matrix Spike
- Duplicate Digestion Samples
- Laboratory Control Sample
- * Serial Dilution Sample
- Graphite Furnace Analysis
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIME

The analysis holding time for mercury in sample SD02-06 and the corresponding QC samples exceeded the requirement limit. The reported sample data is qualified estimated.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for lead (163.7%, 163.3%, 16.3%, and 156.7%) in four different analysis runs, As (126%), Se (130%) in graphite furnace and Sb (171.9/162.9%) in ICP were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code is not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	10	50
Be	-0.107	**
Cr	0.91	5
Co	-1.7	**
Cu	0.353	1.6
Fe	5.7	30
Pb	0.13	0.6
Mg	9.28	50
Ni	1.73	9
Ag	-0.02	**

* Action level = 5X the blank concentration.

** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL.

The reported sample results and the field QC blanks up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

Zinc was detected in the preparation blank at a level above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

Antinomy was detected in the initial calibration blank at a level above the CRDL. The reported sample results are rejected.

Beryllium was detected in the continuing calibration blank at a level above the CRDL. The reported sample results are below 10X the blank contamination. The reported positive results are rejected.

Mercury was detected in the continuing calibration blank at a level below the negative CRDL. The reported sample results are considered estimated and the non-detected values are rejected due to the extremely baseline drift in the calibration blank.

In the second laboratory preparation blank, mercury was detected at a level above the CRDL. The reported sample data for mercury is considered unreliable. Other target analytes, Ba, Be, Cu, Fe, Pb, Mn, and Ag were detected at levels below the CRDLs. The corresponding sample data were qualified "U" and considered as the laboratory artifacts.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recoveries for As (58%), Cd (0.0%), and Se (73.1%) in matrix spike sample SD0206 and the matrix spike recoveries for Sb (19.9%), As (66.5%), Cd (0.0%), Pb (11.0%), and Se (47%) in matrix spike sample DS0503 were below the requirement limit of 75%. The reported positive sample results and non-detected values for As and Se are qualified estimated. The reported sample data are biased low.

The positive results for Cd, Sb, and Pb are qualified estimated and the non-detected values are rejected, due to the extremely low matrix spike recovery. The reported results are biased low and the possibility of false negatives exist.

LABORATORYDUPLICATE SAMPLES

Two sets of laboratory duplicate sample analyses were performed. The RPDs for Fe (30%) and Zn (57%) in SD0206D and Cr (60.2%), Fe (102%), Pb (126.5%), Mn (172%), V (122%), and Zn (63.1%) in sample DS0503 were above the analysis and the data validation requirement limits. The reported positive results are qualified estimated, due to the very poor reproducibility.

Two sets of field duplicate analyses were analyzed with this batch of samples. The RPDs for Zn and Fe in field duplicate SD020616D and Al, Cr, Fe, Pb, Mn, and Zn in SD040616D were above the 50% requirement. The results for all analytes, with the exception of Al, have already been qualified. The reported results for Al in the field sample and the corresponding field duplicate are qualified estimated.

LABORATORYCONTROL SAMPLE ANALYSIS

The percent recoveries for Cd (0.0%) were below the lower control limit of 80% in two LCS analyses. The reported sample data have already been rejected, due to the 0.0% matrix spike recovery. The reported data are unreliable.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
D01612	Ag/Tl	128*/116*
D02612	As/Ag/Tl	82.5/127*/117.5*
D04612	As/Pb/Ag	69.0/79.7/118.5*
D07612	Se/Ag/Tl	66/132.5*/120.5*
DS0103	Ag/Tl	130.5*/118*
DS0503	Ag	116*
SD0106	As/Ag/Tl	80.4/129.5*/116.5*
SD026D	Ag/Tl	135/116.5*
SD0406	As/Pb/Ag/Tl	79.5/81.9/116*/118*
SD046D	As/Pb/Se/Ag	72.5/78.3/76/118*
SD0706	As/Se/Ag/Tl	75/74/130.5*/118*
SS0300	Pb/Ag/Tl	81.5/136*/118.5*
SS0500	As/Se/Ag	81.5/77/125*
SS0600	Se/Ag	78/128.5*
SS0800	Se/Ag/Tl	84/129*/122.5*
SD0206	Cd/Ag	126.5*/117*

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, silver and thallium were analyzed by graphite furnace. Other elements were analyzed by ICP. Mercury was analyzed by automated cold vapor AA.

Arsenic in sample D07612, lead in samples D01612, DS0503, DS0503D, SD0106, and selenium in samples D01612, DS0503, and DS0503D were analyzed by Method of Standard Addition (MSA).

DATA PACKAGE COMPLETENESS

The case number was not identified for this batch. The sample analyses were classified under an SDG number.

The ICP interelement correction factor (Form XI, Part II) was not included in this data package. Also, the analysis was performed after the sample analysis.

The CRDL analysis for As in the 3rd analysis run was not analyzed/reported. Affected sample D07612. The analysis time for As in sample SD0206 was not correctly identified on Form XIV.

The result for As in samples D01612 and SD0206D were incorrectly qualified with "W". The analytical spike recoveries 95.8% and 85%, respectively, were within the control limits. The results for Cd in sample SD0206, Se in sample SS0500, 600, and 800 and Ag in sample SD0206 should be flagged by "W".

The result for calcium in sample SD0206 was not reported on the Form I.

SUMMARY

The results for Hg, Zn, Sb, and Be were rejected due to the laboratory blank contaminations above the CRDLs. The reported non-detected results for Cd, Sb, and Pb are rejected due to the low matrix spike recovery. The laboratory duplicate analyses demonstrated very poor reproducibility. The result for cadmium are unreliable, due to the 0.0% recovery in the laboratory control sample analysis.

Overall, the data are not satisfactory and are summarized in the data summary with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES -- DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4585

Client Sample ID:			D01612	D02612	D04612	D07612	DS0103	DS0503	SD0106
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			67.4	82.5	64	58.1	84.1	74.5	51.7
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	20	19200	903	4240	8820	2910	6210	37300
Antimony	P	46	R	5.7 R	10.3 R	8.4 R	R	6.7 R	R
Arsenic	F	1.2	UJ	0.34 J	1 J	2.3 J	UJ	2.7 J	2.3 J
Barium	P	1.0	58.8	6.5	30.1	48.6	5.5	15.8	129
Beryllium	P	1.0	1 R		0.16 R	0.4 R			1.6 R
Cadmium	F	0.2	R	R	R	R	R	R	R
Calcium	P	1700	3160 J	4970 J	4110 J	3800 J	456 J	1040 J	5040 J
Chromium	P	7.0	17 J	3.3 U	14.8 J	20 J	4.4 U	14.4 J	28.4 J
Cobalt	P	11	3.2			3.2			6.6
Copper	P	2.0	0.98 U	24.8	8.4	10.6	1.1 U	2.2 U	4.1
Iron	P	13	6210 J	1970 J	7110 J	7220 J	442 J	10500 J	10400 J
Lead	F	0.6	12.4 J	26.3 J	34.4 J	79 J	8.1 J	16.7 J	21.1 J
Magnesium	P	13	480	145	405	359	63.5	403	685
Manganese	P	2	13.1 J	5.2 J	15.9 J	37 J	5.6 J	3.8 J	29.7 J
Mercury	CV	0.1	R	R	R	R	R	R	R
Nickel	P	11	5.3 U	1.6 U	3.8 U	7.3 U	2.1 U	1.7 U	9.5 U
Potassium	P	2440						562	498
Selenium	F	1.4	UJ	UJ	UJ	0.28 J	UJ	0.67 J	1.6 J
Silver	F	0.2	0.03 U			0.03 U	0.39 J		0.04 U
Sodium	P	2370			461				
Thallium	F	0.5	0.43 J		0.22 J	0.38		0.51	0.66 J
Vanadium	P	11	14.5 J	1.9 J	8.8 J	15.9 J	3 J	19.9 J	24.2 J
Zinc	P		14.2 R	17.7 R	101 J	104 J	5.2 R	9 R	21.3 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4585

Client Sample ID:			SS0600	SS0800
Matrix:			SOIL	SOIL
% Solids:			94.6	44.9
Units:			MG/KG	MG/KG
INORGANIC ELEMENTS		IDL (ug/L)		
Aluminium	P	20	6510	3600
Antimony	P	46	10.5 R	R
Arsenic	F	1.2	0.89 J	66.1 J
Barium	P	1.0	13.6	20
Beryllium	P	1.0	0.12 R	
Cadmium	F	0.2	R	R
Calcium	P	1700	1330 J	621 J
Chromium	P	7.0	8.6 J	7.9 U
Cobalt	P	11		
Copper	P	2.0	2 U	4.0
Iron	P	13	3470 J	29900 J
Lead	F	0.6	13.2 J	36.1 J
Magnesium	P	13	255	194
Manganese	P	2	6.7 J	32.9 J
Mercury	CV	0.1	R	R
Nickel	P	11		
Potassium	P	2440		
Selenium	F	1.4	UJ	0.94 J
Silver	F	0.2		
Sodium	P	2370		
Thallium	F	0.5	0.14	0.53 J
Vanadium	P	11	12.5 J	15 J
Zinc	P		12.5 R	24.9 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4585

Client Sample ID:			SD0206	SD026D	SD0406	SD046D	SD0706	SS0300	SS0500
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			78.3	80.5	56.9	39.8	63.5	98.4	96.9
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS		IDL (ug/L)							
Aluminium	P	20	484	333	1950 J	8310 J	3960	2260	3550
Antimony	P	46	R	6.6 R	R	R	R	4.9 R	7.5 R
Arsenic	F	1.2	0.46 J	UJ	0.97 J	2 J	1.2 J	0.5 J	0.74 J
Barium	P	1.0	3.8	3.3	10	39.3	19.5	9.1	13.5
Beryllium	P	1.0	0.18 R			0.33 R	0.2 R		
Cadmium	F	0.2	R	R	R	R	R	R	R
Calcium	P	1700	3831 J	1900 J	4940 J	6100 J	2530 J	1420 J	3030 J
Chromium	P	7.0	1.7 U	1.9 U	5.7 U	27.4 J	7.1 J	3.8 U	5.1 U
Cobalt	P	11	1.8			3.5	7.8	1.7	
Copper	P	2.0	1.2 U	0.44 U	4.2	20.6	9.4	1.7 U	4.1
Iron	P	13	1050 J	558 J	3560 J	14600 J	5340 J	1750 J	1950 J
Lead	F	0.6	4.7 J	4 J	32 J	52 J	42 J	6.4 J	67.6 J
Magnesium	P	13	88.1	46.8 U	260	1000	227	148	241
Manganese	P	2	3.2 J	2 J	11 J	23.4 J	28.6 J	9.6 J	13.1 J
Mercury	CV	0.1	0.07 J	R	R	R	R	R	R
Nickel	P	11	1.4 U	1.9 U	2.4 U	6.5 U	6.4 U	1.4 U	2.2 U
Potassium	P	2440							
Selenium	F	1.4	0.23 J	UJ	UJ	0.45 J	0.25 J	UJ	UJ
Silver	F	0.2	0.03 U				0.14 U	0.19 J	
Sodium	P	2370			518	875			
Thallium	F	0.5				0.33	0.22 J		0.12
Vanadium	P	11	0.94 J	0.91 J	4.8 J	17.7 J	8.7 J	4.2 J	6.1 J
Zinc	P		17.3 R	9.1 R	45 R	213 J	60.4 J	17.2 R	15.6 R

END OF DATA VALIDATION REPORT

Roy F. Weston, Inc.
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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B4970

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-22-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-22-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B4970

INTRODUCTION

This quality assurance review is based upon a review of all data generated from twenty soil samples collected on 04-14,15,17-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The sample IDs reported throughout the data package were abbreviated versions of the revised sample numbers provided from Baker Environmental. Due to the complexity of the changes and to alleviate confusion, the complete revised sample IDs are provided in the data validation report.

Semivolatiles

Samples 35-FS02-AE-WB01, 35-FS03-AE-WB01, 35-FS03-PS-WB01, 35-FS03-PS-WB01, and 35-FS03-MC-F01 were not listed on the Form IV or Form V. The laboratory should correct and resubmit these forms.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (14 days from collection to analysis), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by Functional Guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

Semivolatiles and Pesticide/PCBs

The technical holding time established in the Functional Guidelines (14 days from collection to extraction), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to extraction) established in the CLP SOW differs for these validation requirements; however, the validator is required by Functional Guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged, "J" and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-12-94	HP3.i	2-Butanone	30.1
		4-Methyl-2-pentanone	34.8
		2-Hexanone	30.9
CC 06-15-94	HP3.i	Acetone	26.7
		1,2-Dichloroethane	32.0
CC 06-16-94	HP3.i	2-Butanone	92.8
		4-Methyl-2-pentanone	35.0
		2-Hexanone	33.5
CC 06-16-94	HP1.i	4-Chloroaniline	65.5
		3-Nitroaniline	30.8
		3,3-Dichlorobenzidine	29.5
		2,6-Dinitrotoluene	29.9
		2,4-Dinitrophenol	31.4
		4-Nitrophenol	36.5
CC 06-17-94	HP1.i	4-Chloroaniline	36.9
		3-Nitroaniline	46.4
		3,3-Dichlorobenzidine	28.9
		2,6-Dinitrotoluene	32.1
		2,4-Dinitrophenol	42.8
		Diethylphthalate	25.2
CC 07-17-94	HP1.i	4-Chloroaniline	37.3
		4-Nitroaniline	57.9
		Phenol	39.6
		2-Methylphenol	32.4
		2,2-Oxysis(1-chloropropane)	89.8
		Hexachloroethane	40.2
		Carbazole	34.1

Pesticide/PCBs

The percent resolutions for endosulfan I and endosulfan sulfate (44.2/58.1%), respectively, were below the 60% requirement limit. Since these compounds were not detected in the samples, no action is required on this basis.

BLANKS

Pesticide/PCBs

The following method blank contained several target compounds at levels below the CRQL. All results less than 5X the blank level are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
PBLKA	Beta-BHC	0.50 ug/kg
	Aldrin	1.3 ug/kg
	Methoxychlor	2.5 ug/kg

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were outside the QC limits:

SAMPLE	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35-FS03-PS-WB01	1,2-Dichloroethane-d_4	122	70-121
35-FS03-LG-F01	1,2-Dichloroethane-d_4	130	70-121
35-FS03-LG-F02	1,2-Dichloroethane-d_4	140	70-121
35-FS03-MC-WB01	1,2-Dichloroethane-d_4	149	70-121
35-FS03-SM-F01	1,2-Dichloroethane-d_4	147	70-121
35-FS03-LG-WB01	1,2-Dichloroethane-d_4	124	70-121
36-FS01-SM-F01	1,2-Dichloroethane-d_4	129	70-121

Most of the samples were not reanalyzed straight; therefore, since all of the outliers exceeded the QC limits, only the positive results are qualified estimated in these analyses.

Semivolatiles

The following surrogate recoveries were outside the QC limits. Since there was only one outlier per fraction, no qualification is applied on this basis.

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35-FS01-SM-WB01	2,4,6-Tribromophenol	17	19-122
35-FS01-SM-F01	2-Fluorophenol	24	25-121

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLKA	207/249	DCB	Advisory Criteria 60-150%
PLCSA	237/250	DCB	Advisory Criteria 60-150%
	170/180	TCX	Advisory Criteria 60-150%
35-FS02-AE-WB01	181/158	TCX	Advisory Criteria 60-150%
	207/340	DCB	Advisory Criteria 60-150%
35-FS03-AE-WB01	355/338	TCX	Advisory Criteria 60-150%
	393/469	DCB	Advisory Criteria 60-150%
35-FS03-PS-WB01	313/311	TCX	Advisory Criteria 60-150%
	335/574	DCB	Advisory Criteria 60-150%
35-FS03-PS-WB01	213/188	TCX	Advisory Criteria 60-150%
	248/407	DCB	Advisory Criteria 60-150%
35-FS03-PS-WB02	-/270	DCB	Advisory Criteria 60-150%
35-FS01-LG-F01	-/251	DCB	Advisory Criteria 60-150%
35-FS03-LG-F01	156/154	TCX	Advisory Criteria 60-150%
	176/277	DCB	Advisory Criteria 60-150%
35-FS03-LG-F02	190/182	TCX	Advisory Criteria 60-150%
	206/322	DCB	Advisory Criteria 60-150%
35-FS03-LG-WB02	-/193	DCB	Advisory Criteria 60-150%
35-FS02-MC-F01	180/160	TCX	Advisory Criteria 60-150%
	170/338	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
35-FS03-MC-F01	-/219	DCB	Advisory Criteria 60-150%
35-FS03-MC-WB01	-/223	DCB	Advisory Criteria 60-150%
35-FS02-CFWB01	348/335	TCX	Advisory Criteria 60-150%
	371/490	DCB	Advisory Criteria 60-150%
35-FS03-WM-F01	163/-	TCX	Advisory Criteria 60-150%
	-/0	DCB	Advisory Criteria 60-150%
35-FS03-SM-F01	-/176	DCB	Advisory Criteria 60-150%
35-FS03-BG-F01	-/450	DCB	Advisory Criteria 60-150%
36-FS01-SM-WB01	-/356	DCB	Advisory Criteria 60-150%
36-FS01-SM-F01	156/242	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles and Semivolatiles

As requested by the client and due to the lack of specified QC sample, MS/MSD analyses were not performed for this batch of samples. No action is required due to the lack of these QC analyses.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

Pesticide/PCBs

All LCS recoveries exceeded the QC limits. Since these compounds were not detected in the samples and no action is required based on LCS outliers, no qualification is required on this basis.

INTERNAL STANDARD

Volatiles

The following internal standard areas were outside the laboratory's control limits:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-FS03-PS-WB01	BCM	92160	138617-554468
	DFB	191949	394862-1579448
	CBZ	151124	432562-1730250
35-FS03-PS-WB02	BCM	102277	138617-554468
	DFB	173203	394862-1579448
	CBZ	156984	432562-1730250
35-FS01-LG-F01	DFB	378989	394862-1579448
	CBZ	320980	432562-1730250
35-FS03-LG-F01	DFB	359098	394862-1579448
	CBZ	314289	432562-1730250
35-FS03-LG-F02	BCM	94790	138617-554468
	DFB	225390	394862-1579448
	CBZ	168065	432562-1730250
35-FS02-MC-F01	BCM	80767	138617-554468
	DFB	109212	394862-1579448
	CBZ	93029	432562-1730250
35-FS03-MC-F01	BCM	66699	138617-554468
	DFB	89613	394862-1579448
	CBZ	67726	432562-1730250
35-FS03-MC-WB01	BCM	52086	138617-554468
	DFB	151791	394862-1579448
	CBZ	91087	432562-1730250
35-FS03-SM-F01	BCM	62268	138617-554468
	DFB	128948	394862-1579448
	CBZ	75499	432562-1730250
36-FS01-SM-F01	CBZ	386622	441626-1766502

BCM = Bromochloromethane
DFB = 1,4-Difluorobenzene
CBZ = Chlorobenzene-d_5

All reported results quantified in reference to the internal standard outliers are qualified estimated, since all IS outliers were below the control limits.

Semivolatiles

The following internal standard areas were outside the control limits:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-FS03-PS-WB02	Perylene-d_{12}	1023366	1050094-4200376
35-FS03-LG-WB01	Perylene-d_{12}	1026059	1277113-5108452
35-FS02-MC-F01	Phenathrene-d_{10}	2486238	2510114-10040458
35-FS03-MC-WB01	Perylene-d_{12}	1083331	1277113-5108452
35-FS03-WM-F01	Perylene-d_{12}	1040921	1277113-5108452
35-FS03-B6-F01	Perylene-d_{12}	1249743	1277113-5108452
35-FS01-SM-WB01	Phenathrene-d_{10}	424050	2510114-10040458
	Chrysene-d_{12}	785582	1649548-6598190
35-FS02-SM-F01	Phenathrene-d_{10}	1785424	2510114-10040458
	Perylene-d_{12}	1219698	1277113-5108452

Since all these internal standard areas were below the control limits, all sample results quantified in reference to these outliers are qualified estimated.

FIELD DUPLICATE RESULTS

A set of field duplicate analyses was not provided with this batch of samples. No qualification is required due to the lack of field QC samples.

COMPOUND QUANTITATION

General

The matrix for most of these samples were fish tissue; therefore, the higher content of moisture in these tissue resulted in elevated detection limits.

Volatiles

The following compound results were reported on the Form I's; however, they were not reported on the quantitation reports and library search spectra were not provided. These results are reported as the CRQLs on the data validation summary. Also, there was much confusion with the results for 35-FS03-SM-F01. Acetone was not reported on the original or dilution quantitation reports and carbon disulfide in the dilution Form I. The actual values are reported on the summaries.

SAMPLE	COMPOUND
35-FS03-PS-WB01	2-Butanone 4-Methyl-2-hexanone 2-Hexanone
35-FS03-PS-WB02	2-Butanone
35-FS03-LG-F02	Acetone
35-FS03-MC-WB01	2-Butanone

Samples 35-FS03-LG-F01, 35-FS03-LG-F02, 35-FS03-LG-WB01, 35-FS02-MC-F01, 35-FS03-MC-F01, 35-FS03-SM-F01, and 36-FS01-SM-F01 were either analyzed or reanalyzed at 5-fold dilutions due to the high levels of target compounds. No qualification is applied on this basis.

Pesticide/PCBs

All samples were analyzed a 2-fold dilutions due to high levels of target compounds. No qualification is required on this basis.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4970

Client Sample ID:	35-FS03-PS-WB01	35-FS03-PS-WB02	35-FS01-LG-F01	35-FS03-LG-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0/5.0*
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ
Methylene Chloride	17 J	UJ	26 J	UJ
Acetone	39 J	UJ	263 J	465 J
Carbon Disulfide	467 J	835 J	502 J	2036 *J
1,1-Dichloroethene	UJ	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ
2-Butanone	31 UJ	35 UJ	UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	31 UJ	UJ	UJ	UJ
2-Hexanone	31 UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ
Xylene (total)	UJ	56 J	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4970

Client Sample ID:	35-FS03-LG-F02	35-FS03-LG-WB01	35-FS02-MC-F01	35-FS03-MC-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0/5.0*	5.0	1.0/5.0*	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ	UJ
Acetone	42 UJ	137 J	303 J	UJ
Carbon Disulfide	424 *J	469 J	850 *J	196 J
1,1-Dichloroethene	UJ	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ
2-Butanone	26 J	UJ	UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4970

Client Sample ID:	35-FS03-MC-WB01	35-FS03-SM-F01	35-FS01-SM-F01
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0/5.0*	1.0
Units:	UG/KG	UG/KG	UG/KG
COMPOUND			
Bromomethane	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ
Acetone	24684 EJ	36 UJ	UJ
Carbon Disulfide	1064 EJ	1370 *J	1006 J
1,1-Dichloroethene	UJ	UJ	UJ
1,1-Dichloroethane	37 J	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ
2-Butanone	38 UJ	UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ
Benzene	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ
Toluene	UJ	24 J	UJ
Chlorobenzene	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ
Styrene	UJ	UJ	UJ
Xylene (total)	UJ	50 J	UJ
Chloromethane	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

one of these is FS02-PS-WB0

Client Sample ID:	35-FS01-AE-WB01	35-FS02-AE-WB01	35-FS03-AE-WB01	35-FS03-PS-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS01-AE-WB01	35-FS02-AE-WB01	35-FS03-AE-WB01	35-FS03-PS-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-MC-WB01	35-FS02-CF-WB01	35-FS03-WM-F01	35-FS03-SM-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-MC-WB01	35-FS02-CF-WB01	35-FS03-WM-F01	35-FS03-SM-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-LG-F02	35-FS03-LG-WB02	35-FS02-MC-F01	35-FS03-MC-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acena[illegible]ne	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-LG-F02	35-FS03-LG-WB02	35-FS02-MC-F01	35-FS03-MC-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

one of these is FS02-PS-WB01

Client Sample ID:	35-FS03-PS-WB01	35-FS03-PS-WB02	35-FS01-LG-F01	35-FS03-LG-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-PS-WB01	35-FS03-PS-WB02	35-FS01-LG-F01	35-FS03-LG-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-BG-F01	35-FS03-SM-WB01	35-FS01-SM-F01	35-FS02-SM-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acena[illegible]ene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4970

Client Sample ID:	35-FS03-BG-F01	35-FS03-SM-WB01	35-FS01-SM-F01	35-FS02-SM-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4970

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: Zohreh Hamid 8-22-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

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BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA4970

CASE SUMMARY

This data validation review consists of eighteen (18) soil samples received on 04-25-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

FS01F0	FS02AE	FS03PS	FS03LG	FS03SM	FSLG01
FS01LG	FS02CF	FS02SM	FS03MC	FS03WB	FSLG02
FS01SM	FS02MC	FS03B6	FS03PS	FS03WM	PSWB02

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

	• Holding Time
*	• Calibration
	• Contract Required Detection Limit Samples
	• Blank Samples
	• Interference Check Samples
	• Matrix Spike
*	• Duplicate Digestion Samples
*	• Laboratory Control Sample
*	• Serial Dilution Sample
	• Graphite Furnace Analysis
*	• Quarterly Verification of Instrument Parameters
*	• Sample Result Verification
*	• Preparation Logs
*	• Run Logs
*	• Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIME

The analysis holding time for mercury in all the samples and the corresponding QC samples exceeded the requirement limit. The reported sample data is qualified estimated.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for As (126.0%) and Pb (130.0%) in graphite furnace and Sb (129.7%) in ICP were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code is not applied if the sample result has already been qualified "U" due to blank contamination.

The CRDL recovery for Se (72.0%) in graphite furnace were below the data validation requirement limit of 80%. The positive results greater than the IDLs but less than 3X the CRDLs and non-detected values for Se are qualified estimated due to the uncertainty near the detection limit.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	4.42	22.1
Cd	0.044	0.22
Cu	0.40	2.00
Fe	7.143	36
Mg	6.62	33
Tl	0.06	0.3

* Action level = 5X the blank concentration.

The reported sample results up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

Zinc was detected in the preparation blank at a level above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

Silver was detected in the continuing calibration blank at a level above the CRDL. The reported sample results are rejected.

Mercury was detected in the continuing calibration blank at a level below the negative CRDL. The reported sample results are considered estimated and the non-detected values are rejected due to the extremely baseline drift in the calibration blank.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recoveries for As (53.1%) and Se (60.5%) in matrix spike sample FS03WM were below the requirement limit of 75%. The reported positive sample results and non-detected values for As and Se are qualified estimated. The reported sample data are biased low.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
FS01FO	As/Se	72.5/42.0
FS01LG	As/Se	60.0/42.0

SAMPLE ID	ANALYTE	% RECOVERY
FS02SM	As/Se	40.0/57.0
FS02AE	As/Se/Tl	51.5/44.6/83.0
FS02CF	As/Cd/Se	71.5/115.5*/52.0
FS02MC	As/Se	46.5/50.0
FS03PS	As/Se	34.0/43
FS02SM	As/Se/Tl	50.0/59.0/80.0
FS03B6	As/Se/Tl	66.0/41.0
FS03LG	As/Se	60.0/49.0/80.0
FS03MC	As/Se	56.5/67.0
FS03PS	As/Se	42.5/43.0
FS03SM	As/Se/Tl	48.0/43.6/72.0
FS03WB	As/Se	57.0/58.0
FS03WM	As/Se	74.5/36.0
FSLG01	As/Se	61.5/63.0
FSLG02	As/Se	72.5/53.0
PSWB02	As/Se	46.0/50

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

SUMMARY

The data package completeness was fair. The results for lead in samples FS02CF and FS03SM were not reported on the Forms I and XIV. The raw data indicated that the insufficient sample remained to reanalyzed the sample.

The quality of the data was fair. The reported non-detected values for mercury are rejected due to the baseline drift in the blanks. Also, the results for zinc in some samples were rejected, due to the high level of blank contamination.

The minor issues have been discussed. The data are presented with the applied qualifer codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

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ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4970

Client Sample ID:			FS01F0	FS01LG	FS01SM	FS02AE	FS02CF	FS02MC	FS03PS
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			27.6	22.3	31.5	25.7	22.9	20.6	28.4
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS		IDL (ug/L)							
Aluminium	P	20	16.5 U	25.8	45.8	23.7	53.2	21.7 U	24.4
Antimony	P	46							
Arsenic	F	1.2	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Barium	P	1.0	0.41	0.52	5.0	0.89	3.3		1.6
Beryllium	P	1.0							
Cadmium	F	0.2	0.08 U	0.35	0.08 U	0.88	0.21 U	0.10 U	0.11 U
Calcium	P	1700	839 J	878 J	11000 J	21600 J	17800 J	UJ	35200 J
Chromium	P	7.0			2.7				2.3
Cobalt	P	11							
Copper	P	2.0	3.3	3.3	10.9	6.6	70.3	3.9	3.3
Iron	P	13	40.6	29.4 U	145	113	244	38.2	99.5
Lead	F	0.6			0.73 UJ	2.5	--		0.63 UJ
Magnesium	P	13	929	1330	832	1100	705	1190	1270
Manganese	P	2	1.0	1.9	3.6	2.4	11.2	3.1	4.3
Mercury	CV	0.1	R	0.98 J	R	R	0.70 J	R	R
Nickel	P	11							
Potassium	P	2440	12400	14200	8970	10100	9970	16400	9630
Selenium	F	1.4	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Silver	F	0.2		2.9 R	2.3 R			1.3 R	
Sodium	P	2370	2160	2550	2710	17200	7090	2770	3150
Thallium	F	0.6				0.20 U			
Vanadium	P	0.5							
Zinc	P	11	32.0 R	32.7 R	54.0	83.8	102	27.5 R	86.7

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4970

Client Sample ID:			FS02SM	FS03B6	FS03LG	FS03MC	FS03PS	FS03SM	FS03WB
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			26	24.6	21.3	20.1	31.8	28	26.3
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	20	24.7	20.0	22.1 U	25.9	11.2 U	27.3	35.5
Antimony	P	46							
Arsenic	F	1.2	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Barium	P	1.0	2.2	0.64	0.53	0.54	1	0.76	1.1
Beryllium	P	1.0							
Cadmium	F	0.2	0.18 U	0.11 U	0.5	0.19 U	0.19 U	0.14 U	0.12 U
Calcium	P	1700	7070 J	13200 J	995 J	925 J	50800 J	1140 J	20400 J
Chromium	P	7.0					2.6		
Cobalt	P	11							
Copper	P	2.0	3.5	2.8	3.1	4.5	3.2	5.6	4.8
Iron	P	13	41.7	32.4 U	28.8 U	48	72	39.1	160
Lead	F	0.6		2.0 U		1.2 U	0.47 UJ	--	0.49 U
Magnesium	P	13	1070	1260	1230	1420	1540	833	1250
Manganese	P	2	1.1	2.1	1.6	1.1	3.4		7.3
Mercury	CV	0.1	R	R	0.49 J	R	R	R	0.68 J
Nickel	P	11							
Potassium	P	2440	12300	13500	13900	19000	8970	12500	11600
Selenium	F	1.4	UJ	UJ	UJ	UJ	0.43 J	UJ	UJ
Silver	F	0.2	1.1 R				0.87 R		
Sodium	P	2370	2480	5720	2900	2920	3600	21900	4260
Thallium	F	0.6	UJ	UJ				UJ	
Vanadium	P	0.5							
Zinc	P	11	38.0	40.5	31.7 R	33.2 R	77.9	28.7 R	58.3

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4970

Client Sample ID:			FS03WM	FSLG01	FSLG02	PSWB02
Matrix:			SOIL	SOIL	SOIL	SOIL
% Solids:			33.8	24.3	23.9	28.9
Units:			MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS						
		IDL (ug/L)				
Aluminium	P	20	11.9 U	18.5 U	17.8 U	10.9 U
Antimony	P	46				
Arsenic	F	1.2	UJ	UJ	UJ	UJ
Barium	P	1.0	0.43			1
Beryllium	P	1.0				
Cadmium	F	0.2	0.08 U	0.16 U	0.33	0.25
Calcium	P	1700	13300 J	1910 J	676 J	49700 J
Chromium	P	7.0				2.3
Cobalt	P	11				
Copper	P	2.0	2.3	3.9	2.7	3.8
Iron	P	13	17 U	392	25.8 U	60.9
Lead	F	0.6	0.86 U			0.8 U
Magnesium	P	13	1000	1130	1160	1370
Manganese	P	2	1.5	1.6	1.5	4.5
Mercury	CV	0.1	0.33 J	R	0.3 J	R
Nickel	P	11				
Potassium	P	2440	9180	11000	12200	9310
Selenium	F	1.4	UJ	UJ	UJ	UJ
Silver	F	0.2	0.75 R	1.2 R		UJ
Sodium	P	2370	1970	3730	2660	3460
Thallium	F	0.6		0.22 U		
Vanadium	P	0.5				
Zinc	P	11	30.2 R	42.3	18.9 R	87.1

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B4971

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-24-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-24-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B4971

INTRODUCTION

This quality assurance review is based upon a review of all data generated from twelve soil samples collected on 04-18,20-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

Due to composite of samples and length of sample IDs, the IDs reported in the data package are abbreviated versions. To alleviate confusion, the full sample IDs are used in the data validation reports.

Raw data was not provided for sample 35-FS03-LG-F01 and undiluted analyses were not performed for samples 36-FS03-LMB-F01DL and 36-FS03-WM-F01DL. The laboratory should provide this documentation.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (14 days from collection to analysis), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

Semivolatiles and Pesticide/PCBs

The technical holding time established in the Functional Guidelines (14 days from collection to extraction), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to extraction) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

GC/MS TUNING

Volatiles

The continuing calibration standards were not listed on the Form V's, pages 057 and 059. The laboratory should correct and resubmit these forms.

The mass spectra and mass list for the tune file ID BA7909D1009D (Form V, page 056) were missing from the data package. The laboratory should provide these documents.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged "J" and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 04-25-94	HP3.i	2-Butanone	30.1
		4-Methyl-2-pentanone	34.8
		2-Hexanone	30.9
CC 06-15-94	HP3.i	Acetone	26.7
		1,2-Dichlorethane	32.0
CC 06-16-94	HP3.i	2-Butanone	92.8
		4-Methyl-2-pentanone	35.0
		2-Hexanone	33.5
CC 06-17-94	HP1.i	4-Chloroaniline	36.9
		3-Nitroaniline	46.4
		3,3-Dichlorobenzidine	28.9
		2,6-Dinitrotoluene	32.1
		2,4-Dinitrophenol	42.8
		Diethylphthalate	25.2
CC 06-20-94	HP1.i	4-Chloroaniline	45.6
		3-Nitroaniline	38.5
		3,3-Dichlorobenzidine	37.2
		2,6-Dinitrotoluene	38.0
		2,4-Dinitrophenol	67.4
		4-Nitrophenol	29.7
		2,4-Dinitrotoluene	27.0
		Diethylphthalate	25.4

BLANKS

Pesticide/PCBs

The following method blank contained several target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLK)	4,4-DDT	0.35 ug/Kg
	Methoxychlor	0.53 ug/Kg

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were outside the QC limits:

SAMPLE NO.	SURROGATE	RECOVERY	QC LIMITS
VLCSA	1,2-Dichloroethane-d_{14}	123	70-121
36-FS03-SM-F01MS	1,2-Dichloroethane-d_{14}	130	70-121
	Toluene-d_8	139	84-138
36-FS03-SM-F01MSD	1,2-Dichloroethane-d_{14}	135	70-121
	Toluene-d_8	139	84-138
36-FS03-SM-F01	1,2-Dichloroethane-d_{14}	228	70-121
36-FS01-WC-F01	1,2-Dichloroethane-d_{14}	129	70-121
36-FS02-WC-F01	1,2-Dichloroethane-d_{14}	124	70-121
36-FS02-WC-WB01	1,2-Dichloroethane-d_{14}	131	70-121
	Toluene-d_8	148	84-138
36-FS02-WC-WB02	1,2-Dichloroethane-d_{14}	126	70-121
	Toluene-d_8	139	84-138
	4-Bromofluorobenzene	53	59-113
36-FS03-WC-F01245	1,2-Dichloroethane-d_{14}	130	70-121
36-FS03-WC-F01187	Toluene-d_8	141	84-138
	1,2-Dichloroethane-d_{14}	123	70-121

SAMPLE NO.	SURROGATE	RECOVERY	QC LIMITS
36-FS03-WC-WB01	1,2-Dichloroethane-d_{14}	138	70-121
	Toluene-d_8	181	84-138
	4-Bromofluorobenzene	46	59-113
36-FS02-LMB-F01	1,2-Dichloroethane-d_{14}	131	70-121
	Toluene-d_8	150	84-138
36-FS03-LG-F01	1,2-Dichloroethane-d_{14}	134	70-121
	Toluene-d_8	142	84-138
36-FS01-WC-F01DL	1,2-Dichloroethane-d_{14}	132	70-121
36-FS03-WC-F01245DL	1,2-Dichloroethane-d_{14}	128	70-121
VBLKC	1,2-Dichloroethane-d_{14}	229	70-121
36-FS02-LMB-F01DL	1,2-Dichloroethane-d_{14}	122	70-121
36-FS03-LMB-F01DL	1,2-Dichloroethane-d_{14}	138	70-121
	Toluene-d_8	57	84-138
36-FS03-WM-F01DL	Toluene-d_8	153	84-138

Some of these samples are exhibiting matrix effects. If the surrogate recovery exceeded the QC limits, only positive results are qualified estimated. If the recovery was below the QC limit, both positive results and non-detects are qualified estimated.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLK	161/192	DCB	Advisory Criteria 60-150%
PLCS	178/209	DCB	Advisory Criteria 60-150%
36-FS03-SM-F01	-/233	DCB	Advisory Criteria 60-150%
36-FS01-WC-F01	-/258	DCB	Advisory Criteria 60-150%
36-FS02-WC-F01	-/246	DCB	Advisory Criteria 60-150%
36-FS02-WC-WB01	164/-	TCX	Advisory Criteria 60-150%
	-/424	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
36-FS02-WC-WB02	152/-	TCX	Advisory Criteria 60-150%
	-/344	DCB	Advisory Criteria 60-150%
36-FS03-WC-F01245	-/222	DCB	Advisory Criteria 60-150%
36-FS03-WC-F01187	-/264	DCB	Advisory Criteria 60-150%
36-FS03-WC-WB01	160/-	TCX	Advisory Criteria 60-150%
	152/240	DCB	Advisory Criteria 60-150%
36-FS02-LMB-F01	-/162	TCX	Advisory Criteria 60-150%
	-/271	DCB	Advisory Criteria 60-150%
36-FS03-LMB-F01	-/297	DCB	Advisory Criteria 60-150%
36-FS03-WM-F01	-/311	DCB	Advisory Criteria 60-150%
36-FS03-LG-F01	-/246	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

General

As per the laboratory's case narrative MS/MSD analyses were not performed since no sample was specified for these QC analyses. No action is required, due to the lack of these QC samples.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

Pesticide/PCBs

All LCS recoveries exceeded the QC limits, since these compounds were not detected in the samples, no action is taken on this basis.

INTERNAL STANDARD

Volatiles

The following internal standard areas were below the laboratory's control limits:

SAMPLE	STANDARD	AREA	CONTROL LIMITS
36-FS03-SM-F01	BCM	108857	138617-554468
	CBZ	393288	432562-1730250
36-FS01-WC-F01	CBZ	355288	432562-1730250
36-FS02-WC-F01	CBZ	355856	432562-1730250
36-FS02-WC-WB01	BCM	137923	138617-554468
	CBZ	275210	432562-1730250
36-FS02-WC-WB02	BCM	132931	138617-554468
	DFB	380046	394862-1579448
	CBZ	248157	432562-1730250
36-FS03-WC-F01187	CBZ	330219	432562-1730250
36-FS03-WC-F01245	CBZ	428305	432562-1730250
36-FS03-WC-WB01	BCM	135390	138617-554468
	CBZ	202895	432562-1730250
36-FS02-LMB-F01	CBZ	256761	432562-1730250
36-FS03-LMB-F01	BCM	0	138617-554468
	DFB	0	394862-1579448
	CBZ	134787	432562-1730250
36-FS03-LG-F01	BCM	29048	138617-554468
	DFB	42424	394862-1579448
	CBZ	215070	432562-1730250
36-FS03-SM-F01DL	BCM	48706	143278-573114
	DFB	274417	327406-1309624
36-FS03-LG-F01DL	CBZ	368006	441626-1766502
36-FS03-LG-F01DL	BCM	111843	118866-475462
	DFB	157918	245369-981476

BCM = Bromochloromethane
CBZ = Chlorobenzene-d_5
DFB = 1,4-Difluorobenzene

All sample results quantified in reference to these outliers are qualified estimated.

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	STANDARD	AREA	CONTROL LIMITS
36-FS03-WC-WB01	Perylene-d_{12}	963524	1038966-4155866
36-FS03-WC-WB01	Perylene-d_{12}	959977	1038966-4155866
36-FS03-WM-F01	Perylene-d_{12}	1000469	1038966-4155866

The non-detects quantified in reference to perylene in the analyses are qualified estimated, since positive results were not detected.

FIELD DUPLICATE RESULTS

A set of field duplicate analyses was not provided with this batch of samples; however, no action is required due to the lack of this field QC sample.

COMPOUND QUANTITATION

Volatiles

Several compound results were missing from the quantitation reports an library spectra were not provided; therefore, results are reported as the CRQLs in the data validation summary.

SAMPLE	COMPOUND RESULT
36-FS03-SM-F01	1,1-Dichloroethane 2-Butanone Toluene
36-FS02-WC-F01	Methylene Chloride 2-Butanone
36-FS02-WC-WB01	2-Butanone Ethylbenzene
36-FS02-WC-WB02	Methylene Chloride 2-Butanone

SAMPLE	COMPOUND RESULT
36-FS03-WC-F01245	Methylene Chloride 4-Methyl-2-pentanone 2-Hexanone
36-FS03-WC-F01187	2-Butanone
36-FS03-WC-WB01	Trichloroethene 1,1,2,2-Tetrachloroethane Ethylbenzene
36-FS03-LG-F01DL	Acetone 2-Butanone

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4971

Client Sample ID:	36-FS02-LMB-F01	36-FS03-LG-F01	36-FS03-LMB-F01	36-FS03-WM-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0/5.0*	1.0/5.0*	1.0/5.0	1.0/5.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ	UJ
Acetone	1550 J*	58 J	2788 J	UJ
Carbon Disulfide	1145 J	752 J*	752 J	796 J
1,1-Dichloroethene	UJ	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ
2-Butanone	UJ	63 J	5108 J	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS03-SM-F01	36-FS01-WC-F01	36-FS02-WC-F01	36-FS02-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS03-SM-F01	36-FS01-WC-F01	36-FS02-WC-F01	36-FS02-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS02-WC-WB02	36-FS03-WC-F01245	36-FS03-WC-F01187	36-FS03-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS02-WC-WB02	36-FS03-WC-F01245	36-FS03-WC-F01187	36-FS03-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS02-LMB-F01	36-FS03-LMB-F01	36-FS03-WM-F01	36-FS03-LG-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol	UJ	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS02-LMB-F01	36-FS03-LMB-F01	36-FS03-WM-F01	36-FS03-LG-F01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ	UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	UJ	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ	UJ
4-Chlorophenyl-phenylether	UJ	UJ	UJ	UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ	UJ	UJ	UJ
4-Bromophenyl-phenylether	UJ	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS03-WM-F01	36-FS03-LG-F01
Matrix:	SOIL	SOIL
Dilution Factor:	2.0	2.0
Units:	UG/KG	UG/KG
COMPOUND		
alpha-BHC	UJ	UJ
beta-BHC	11 J	UJ
delta-BHC	UJ	UJ
gamma-BHC(Lindane)	4.9 J	UJ
Heptachlor	UJ	UJ
Aldrin	UJ	UJ
Heptachlor Epoxide	UJ	UJ
Endosulfan I	UJ	UJ
Dieldrin	40 J	UJ
4,4'-DDE	394 J	186 J
Endrin	4.6 J	UJ
Endosulfan II	4.5 J	UJ
4,4'-DDD	133 J	47 J
Endosulfan Sulfate	UJ	UJ
4,4'-DDT	26 UJ	26 UJ
Methoxychlor	UJ	UJ
Endrin Ketone	UJ	UJ
Endrin Aldehyde	UJ	UJ
alpha-Chlordane	27 J	14 J
gamma-Chlordane	UJ	UJ
Toxaphene	UJ	UJ
Aroclor 1016	UJ	UJ
Aroclor 1221	UJ	UJ
Aroclor 1232	UJ	UJ
Aroclor 1242	UJ	UJ
Aroclor 1248	UJ	UJ
Aroclor 1254	UJ	UJ
Aroclor 1260	UJ	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS03-WC-F01~~245~~	36-FS03-WC-F01~~167~~ 2.	36-FS03-WC-WB01	36-FS02-LMB-F01	36-FS03-LMB-F01
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	2.0	2.0	2.0	2.0	2.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND					
alpha-BHC	UJ	UJ	UJ	UJ	UJ
beta-BHC	UJ	UJ	UJ	UJ	UJ
delta-BHC	UJ	UJ	UJ	UJ	UJ
gamma-BHC(Lindane)	UJ	UJ	UJ	UJ	UJ
Heptachlor	UJ	UJ	UJ	UJ	UJ
Aldrin	UJ	5.7 J	2.6 J	UJ	UJ
Heptachlor Epoxide	UJ	UJ	UJ	UJ	UJ
Endosulfan I	UJ	UJ	UJ	UJ	UJ
Dieldrin	13 J	11 J	3.2 J	8.0 J	5.2 J
4,4'-DDE	110 J	80 J	39 J	45 J	39 J
Endrin	UJ	UJ	UJ	UJ	UJ
Endosulfan II	UJ	UJ	UJ	UJ	UJ
4,4'-DDD	70 J	22 J	18 J	50 J	22 J
Endosulfan Sulfate	UJ	UJ	UJ	UJ	UJ
4,4'-DDT	33 UJ	38 UJ	22 UJ	31 UJ	34 UJ
Methoxychlor	UJ	UJ	UJ	UJ	UJ
Endrin Ketone	UJ	UJ	UJ	UJ	UJ
Endrin Aldehyde	UJ	UJ	UJ	UJ	UJ
alpha-Chlordane	10 J	14 J	5.0 J	UJ	3.5 J
gamma-Chlordane	UJ	UJ	UJ	UJ	UJ
Toxaphene	UJ	UJ	UJ	UJ	UJ
Aroclor 1016	UJ	UJ	UJ	UJ	UJ
Aroclor 1221	UJ	UJ	UJ	UJ	UJ
Aroclor 1232	UJ	UJ	UJ	UJ	UJ
Aroclor 1242	UJ	UJ	UJ	UJ	UJ
Aroclor 1248	UJ	UJ	UJ	UJ	UJ
Aroclor 1254	UJ	UJ	UJ	UJ	UJ
Aroclor 1260	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B4971

Client Sample ID:	36-FS03-SM-F01	36-FS01-WC-F01	36-FS02-WC-F01	36-FS02-WC-WB01	36-FS02-WC-WB02
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	2.0	2.0	2.0	2.0	2.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND					
alpha-BHC	UJ	UJ	UJ	UJ	UJ
beta-BHC	UJ	9.6 J	4.2 J	4.8 J	8.3 J
delta-BHC	UJ	UJ	UJ	UJ	UJ
gamma-BHC(Lindane)	UJ	UJ	UJ	UJ	UJ
Heptachlor	UJ	UJ	UJ	UJ	UJ
Aldrin	6.6 J	UJ	UJ	UJ	UJ
Heptachlor Epoxide	UJ	UJ	UJ	UJ	UJ
Endosulfan I	UJ	UJ	UJ	UJ	UJ
Dieldrin	48 J	7.8 J	10 J	10 J	31 J
4,4'-DDE	444 J	148 J	72 J	239 J	208 J A m B
Endrin	17 J	8.8 J	UJ	23 J	12 J
Endosulfan II	UJ	UJ	UJ	3.4 J	UJ
4,4'-DDD	256 J	40 J	22 J	74 J	138 J
Endosulfan Sulfate	UJ	UJ	UJ	UJ	UJ
4,4'-DDT	26 UJ	36 UJ	32 UJ	26 UJ	27 UJ
Methoxychlor	UJ	UJ	UJ	130 UJ	UJ
Endrin Ketone	UJ	UJ	UJ	UJ	UJ
Endrin Aldehyde	13 J	UJ	UJ	UJ	UJ
alpha-Chlordane	46 J	22 J	12 J	42 J	30 J
gamma-Chlordane	UJ	UJ	UJ	UJ	UJ
Toxaphene	UJ	UJ	UJ	UJ	UJ
Aroclor 1016	UJ	UJ	UJ	UJ	UJ
Aroclor 1221	UJ	UJ	UJ	UJ	UJ
Aroclor 1232	UJ	UJ	UJ	UJ	UJ
Aroclor 1242	UJ	UJ	UJ	UJ	UJ
Aroclor 1248	UJ	UJ	UJ	UJ	UJ
Aroclor 1254	UJ	UJ	UJ	UJ	UJ
Aroclor 1260	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4971

Client Sample ID:	36-FS02-WC-WB02	36-FS03-WC-F01	36-FS03-WC-F0	36-FS03-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0/5.0*	1.0/5.0*	1.0	1.0/5.0*
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ
Methylene Chloride	42 J	50 J	UJ	28 J
Acetone	938 J	413 J	255 J	2360 J*
Carbon Disulfide	1367 J*	348 J*	278 J	348 J
1,1-Dichloroethene	UJ	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ
2-Butanone	42 UJ	UJ	33 UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	42 UJ
Dibromochloromethane	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	50 UJ	UJ	UJ
2-Hexanone	UJ	50 UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	42 UJ
Toluene	UJ	UJ	UJ	33 J
Chlorobenzene	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	42 UJ
Styrene	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	58 J
Chloromethane	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B4971

Client Sample ID:	36-FS03-SM-F01	36-FS01-WC-F01	36-FS02-WC-F01	36-FS02-WC-WB01
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0/5.0*	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	28 J	48 UJ	35 J
Acetone	UJ	312 J	198 J	1794 J
Carbon Disulfide	579 J	875 J*	456 J	402 J
1,1-Dichloroethene	UJ	UJ	UJ	UJ
1,1-Dichloroethane	40 UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ
2-Butanone	40 UJ	UJ	48 UJ	48 UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ
Toluene	40 UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	48 UJ
Styrene	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ	UJ

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MANAGERS DESIGNERS/CONSULTANTS

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA4971

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-22-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA4971

CASE SUMMARY

This data validation review consists of twelve (12) soil samples received on 04-25-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

FS01WC	FS02W2	FS02WC	FS03LG	FS03SM	FS03WC
FS02LM	FS02WB	FS03F1	FS03LM	FS03WB	FS03WM

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

*	•	Holding Time
*	•	Calibration
	•	Contract Required Detection Limit Samples
	•	Blank Samples
	•	Interference Check Samples
	•	Matrix Spike
	•	Duplicate Digestion Samples
*	•	Laboratory Control Sample
*	•	Serial Dilution Sample
	•	Graphite Furnace Analysis
*	•	Quarterly Verification of Instrument Parameters
*	•	Sample Result Verification
*	•	Preparation Logs
*	•	Run Logs
	•	Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (129.7%) in ICP analysis and As (125%), Pb (183.3/123.3%), and Se (130/130%) in graphite furnace analysis were above the upper data validation requirement limits of 120%. The positive results greater than the IDL but less than 3X the CRDL should be qualified estimated due to the uncertainty near the detection limits.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	3.57	18
As	0.18	0.9
Cd	0.021	0.1
Cu	0.243	1.2
Na	237	1185
Tl	0.07	0.35

* Action level = 5X the blank concentration.

The results for all these elements are qualified "U" in the data summary due to the blank concentration.

The calibration and preparation blanks had lead at levels above the CRDL. The reported sample results are rejected in the samples.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recovery for Hg (51.5%) and Se (51.5%) were below the requirement limit of 75%. The reported positive sample result is qualified estimated. The reported sample data are biased low.

LABORATORYDUPLICATE SAMPLES

The RPD for all analytes were within the analysis and the data validation requirement limits. The field duplicate was not identified for this batch of samples.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the 85-115%.

SAMPLE ID	ANALYTE	% RECOVERY
FS03SM	As/Cd/Pb/Tl	73.5/130*/66.5/77.5
FS01WC	As/Pb/Se/Tl	70.51/400.5**/50/81
FS02WC	As/Pb/Se/Tl	74.5/65/64/82
FS02WB	As/Pb/Se	53.5/79.5/55
FS02W2	As/Pb/Se	56/76.5/47
FS03WC	As/Se/Tl	70.5/65/83
FS03F1	As/Pb/Se	80.5/77.5/76
FS03WB	As/Se	65/42
FS02LM	As/Pb/Se/Tl	73/73.5/42/80.5
FS03LM	As/Pb/Tl	84/77.5/78
FS03WM	As/Se/Tl	79.5/71/79.5
FS03LG	As/Cd/Se	69/116.5*/42

* Only the positive results are qualified estimated.

** The positive result should be rejected due to the extremely high analytical spike recovery.

The results and non-detected values are qualified estimated. However, the additional qualifier codes are not applied if the sample results are qualified based on the blank contamination.

The linearity did not meet the requirement of "r≥0.995"in standard calibration analyzed for cadmium on 06-15-94 at 12:00. The affected sample results (all samples with the exception of sample FS03SM) are considered estimated. Cadmium results have already been flagged with "U" and the results are considered as the non-detected values due to the blank contaminations. The additional qualifier code was not applied.

DATA PACKAGE COMPLETENESS

Sample FS03WC was not listed on the Form XIV for selenium analysis. The analytical spike recoveries for selenium in samples FS02W2 and FS03WB were 47% and 42%, respectively. The data for these two samples should be flagged "W" by the laboratory.

SUMMARY

The data package completeness is fair. The sample results for Pb are rejected due to the blank contamination. The minor issues have been discussed. The reported sample data are considered representative with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4971

Client Sample ID:			FS03SM	FS01WC -F01	FS02WC -F01	FS02W[illegible]C-WB01	FS02W[illegible]C-WB02	FS03WC
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			25.2	18.1	20.7	25.5	24.2	20.2
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)						
Aluminium	P	20	21.6 U	31.0 U	23.6 U	68.6 U	33.7 U	23.6 U
Antimony	P	46						
Arsenic	F	2.0	1.3 U	2.0 U	1.8	1.8 U	1.7 U	1.6 U
Barium	P	1.0	1.2	1.0	1.0 U	1.3	1.2	0.86
Beryllium	P	1.0						
Cadmium	F	1.0	0.12 U	0.12 U	0.13 U	0.11 U	0.15 U	0.12 U
Calcium	P	1700	1570			8070	23100	1090
Chromium	P	7.0	3				3.6	
Cobalt	P	11						
Copper	P	2.0	4 U	3.8 U	3.9 U	4.2 U	4.7 U	4.2 U
Iron	P	13	41.7	52.0	45.0	106	96.5	39.8
Lead	F	1.0	UJ		UJ	0.43 R	0.41 R	
Magnesium	P	13	994	1250	1310	1100	1270	1220
Manganese	P	2.0	0.86	2.5	2.1	9.6	10.3	2.3
Mercury	AV	0.1	UJ	0.33 J	UJ	UJ	UJ	UJ
Nickel	P	11						
Potassium	P	2440	14000	18900	16000	10400	12100	17600
Selenium	F	1.4	UJ	0.99 J	UJ	0.63 J	1.0 J	UJ
Silver	P	3.0				2.1		3.3
Sodium	P	2370	2270 U	4010 U	2990 U	3220 U	4050 U	3500 U
Thallium	F	0.6	0.32 U	0.94 U	0.39 U	0.39 U	0.33 U	0.40 U
Vanadium	P	5.0						
Zinc	P	11	28.8	58.3	34.9	62.1	56.5	35.2

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA4971

Client Sample ID:			FS03[illegible] wt-F02	FS03W[illegible] t-w1301	FS02LMB-F01	FS03LMB-F01	FS03WM-F01	FS03LG-F01
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			17.4	29.8	21.5	19.6	29.2	25.1
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS								
		IDL (ug/L)						
Aluminium	P	20	22.5 U	30.8 U	22.1 U	21.7 U	18.6 U	22.3 U
Antimony	P	46						
Arsenic	F	2.0	1.5 U	1.2 U	1.7 U	1.8 U	0.96 U	2.0 U
Barium	P	1.0	0.79	0.94	0.60	0.65	0.62	0.52
Beryllium	P	1.0						
Cadmium	F	1.0	0.14 U	0.13 U	0.11 U	0.20 U	0.08 U	0.22 U
Calcium	P	1700	1590	9100	6750	1440	7060	678
Chromium	P	7.0		2.5	4.0			
Cobalt	P	11						
Copper	P	2.0	3.8 U	3.2 U	3.2 U	3.9 U	2.5 U	2.3 U
Iron	P	13	53.6	80.3	43.3	40.2	34.6	28.0
Lead	F	1.0	0.63 R		UJ	UJ	0.51 R	0.56 R
Magnesium	P	13	1380	983	1400	1470	981	1210
Manganese	P	2.0	1.8	5.8	1.3		2.0	1.7
Mercury	AV	0.1	UJ	UJ	1.2 J	1.3 J	UJ	0.29 J
Nickel	P	11						
Potassium	P	2440	17900	9480	15000	20200	11800	12100
Selenium	F	1.4	UJ	0.91 J	UJ	5.8 J	UJ	0.60 J
Silver	P	3.0	2.2	1.0				1.3
Sodium	P	2370	3910 U	2790 U	4820 U	3440 U	2510 U	2530 U
Thallium	F	0.6	0.34 U		0.37 U	0.41 U	0.38 U	0.28 U
Vanadium	P	5.0						
Zinc	P	11	39.0	51.4	26.8	22.9	33.1	18.2

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B5057

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-10-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-16-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B5057

INTRODUCTION

This quality assurance review is based upon a review of all data generated from nineteen soil samples collected on 05-04,06,08,10,11,13,14,15,16-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Volatiles

Sample 35-SS04-000 RE was inadvertently listed as 35-DD04-000 RE throughout the data package. The laboratory should correct and resubmit all of the affected forms.

The complete sample IDs were not listed for this fraction; however, the full IDs are reported in the validation report.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (14 days from collection to analysis), has been exceeded for the re-analyses of HC-SD02-612 RE and HC-SD04-612 RE. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. However, these analyses are not reported as the representative results.

GC/MS TUNING

Volatiles

Several percent relative abundance results reported on Form V, pages 0068 and 0071 differ slightly from the results reported on the mass spectra/mass list. In either case, the precise percent relative abundance results are within the QC criteria. The laboratory should clarify this discrepancy. Also, the re-analyses were inadvertently listed on the Form V, page 0071. The laboratory should correct this form.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-13-94	HP3.i	Acetone	36.8
		2-Butanone	33.6
		4-Methyl-2-Butanone	33.1
		2-Hexanone	29.1
CC 05-20-94	HP3.i	Chloromethane	27.8
		Bromoform	32.4
		Acetone	53.4
		Carbon Disulfide	25.2
		2-Butanone	44.0
		4-Methyl-2-Pentanone	36.0
		2-Hexanone	33.4
CC 05-23-94 (10:59)	HP3.i	Bromomethane	25.8
		Acetone	39.3
		2-Butanone	39.1
		Vinyl Acetate	25.5
		4-Methyl-2-Pentanone	26.9
		2-Hexanone	28.0
CC 05-23-94 (16:10)	HP3.i	Acetone	40.1
		1,1-Dichloroethane	43.4
		2-Butanone	38.6
		4-Methyl-2-pentanone	39.3
		2-Hexanone	35.7
CC 06-03-94	HP1.i	4-Chloroaniline	68.8
		3-Nitroaniline	37.5
		4-Nitroaniline	25.5
		3,3-Dichlorobenzidine	33.1
		2,6-Dinitrotoluene	28.8
		2,4-Dinitrophenol	26.3
		4-Nitrophenol	40.9
		Bis(2-ethylhexylphthalate)	35.0
CC 06-07-94	HP1.i	4-Chloroaniline	64.4
		3-Nitroaniline	28.3
		4-Nitroaniline	35.9
		3,3-Dichlorobenzidine	29.6
		2,6-Dinitrotoluene	31.7
		4-Nitrophenol	29.9
		Bis(2-ethylhexylphthalate)	32.5

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 06-08-94	HP1.i	4-Chloroaniline	48.5
		3-Nitroaniline	49.4
		Bis(2-chloroethyl)ether	35.9
		Isophorane	27.5
		2,6-Dinitrotoluene	31.8
		2,4-Dinitrophenol	49.7
		Carbazole	31.2

Pesticide/PCBs

The %RSD for decachlorobiphenyl (22.6) exceeded the 20% QC in the initial calibration analyzed on the DB1701 column. Since the %RSDs for the pesticide compounds were within criteria, no qualification is applied on this basis.

The percent resolution for endosulfan sulfate (55.2) for RESCB1 was below the 60% QC limit. Since this compound was not detected in the samples, no action is taken on this basis.

The endrin percent breakdown (46.8) exceeded 20% in the analysis of PEMA3 on the SPB-608 column. Also, the retention time for alpha-BHC was outside the retention time window. Since these performance evaluation mixes were analyzed at the end of the analytical sequence, no qualification is applied on this basis.

The %RPD for endrin ketone in INBMA2 (SPB-608) and INDBMA3 (SPB-608) exceeded the 25% QC limit and the retention times for alpha-BHC in INDAMB2 (DB1701) and INDAMB3 (DB1701) were outside the established windows. Neither of these compounds were detected in the samples; therefore, no qualification is applied on this basis.

BLANKS

Semivolatiles

The following method blank contained a common laboratory contaminant at a level below the CRQL. This compound was not detected in the samples; therefore, no action is required.

BLANK	COMPOUND	LEVEL
SBLKA	Bis(2-ethylhexyl)phthalate	298 ug/kg

Pesticide/PCBs

The following method blank contained target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLK)	Delta-BHC	0.70 ug/kg
	Methoxychlor	1.2 ug/kg
	4,4-DDT	0.81 ug/kg

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were above the QC limits:

SAMPLE	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35-MW36B-03	1,2-Dichloroethane-d_4	123	70-121
HC-SD02-612	1,2-Dichloroethane-d_4	155	70-121
HC-SD01-06	1,2-Dichloroethane-d_4	122	70-121
35-MW34B-03	4-Bromofluorobenzene	116	59-113
35-SS04-00	1,2-Dichloroethane-d_4	123	70-121
35-SS04-00D	Toluene-d_8	143	84-138
35-MW37BS-03	1,2-Dichloroethane-d_4	124	70-121
HC-SD02-612RE	1,2-Dichloroethane-d_4	225	70-121
35-SS04-00RE	1,2-Dichloroethane-d_4	129	70-121
	Toluene-d_8	148	59-113
35-SS04-00DRE	1,2-Dichloroethane-d_4	271	70-121
	Toluene-d_8	149	59-113

Several of the samples listed above were reanalyzed and similar results were obtained for HC-SD02-612RE, 35-SS04-00RE, and 35-SS04-00DRE; therefore, the original analysis can be used as the representative results. All samples with surrogate outliers have positive results qualified estimated due to exceeded surrogate recovery.

Semivolatiles

The following surrogate recoveries were outside the QC limits. Also, one of the 2-chlorophenol-d4 recoveries was outside the limits; however, since this surrogate is advisory; this outlier is not used to qualify the data.

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
SBLKA	Nitrobenzene-d_5	15	23-120
	2-Fluorobiphenyl	26	30-115
	Phenol-d_5	10	24-113
	2-Fluorophenol	6	25-121
	2,4,6-Tribromophenol	11	19-122
SBLKB	2-Fluorophenol	14	25-121

As for the blanks, since the surrogate recovery criteria were met in the samples, these outliers are believed to be isolated incidents. The sample data are accepted without qualification.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
HC-SD02-06	6/0	TCX	Advisory Criteria 60-150%
	238/256	DCB	Advisory Criteria 60-150%
HC-SD02-612	9/7	TCX	Advisory Criteria 60-150%
	239/252	DCB	Advisory Criteria 60-150%
HC-SD04-06	47/38	TCX	Advisory Criteria 60-150%
	250/258	DCB	Advisory Criteria 60-150%
HC-SD04-612	13/11	TCX	Advisory Criteria 60-150%
	238/243	DCB	Advisory Criteria 60-150%
HC-SD01-06	166/152	TCX	Advisory Criteria 60-150%
	224/241	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
HC-SD01-612	205/397	DCB	Advisory Criteria 60-150%
PBLK	250/282	DCB	Advisory Criteria 60-150%
PLCS	155/- 270/274	TCX DCB	Advisory Criteria 60-150% Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Per the laboratory's case narrative, MS/MSD analysis results are not included in this data package, since no sample had been specified on the chain-of-custody for this SDG. No qualification is required due to the lack of MS/MSD analyses.

LABORATORYCONTROL SAMPLE

Volatiles

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

Semivolatiles

An LCS analysis was not performed with this batch of samples. No qualification is required due to the lack of this QC analysis.

Pesticide/PCBs

All LCS recoveries were above the QC limits. No specific qualification is required due to LCS outliers; therefore, no qualification has been applied to the sample data on this basis.

INTERNAL STANDARD

Volatiles

The following internal standard areas were outside the control limits:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
HC-SD02-612	BCM	86523	91690-366758
	CBZ	239916	271046-1084182
HC-SD02-612RE	BCM	63009	142652-570610
	DFB	334258	381616-1526466
	CBZ	252755	406259-1625036
HC-SD04-612	CBZ	250601	271046-1084182
HC-SD04-612RE	BCM	140496	142652-570610
	DFB	345284	381616-1526466
	CBZ	290687	406259-1625036
HC-SD01-612	CBZ	243159	271046-1084182
35-SS04-00	DFB	287819	293316-1173266
	CBZ	198797	271046-1084182
35-SS04-00RE	BCM	53896	142652-570610
	DFB	173467	381616-1526466
	CBZ	98536	406259-1625036
35-SS04-00D	BCM	89166	91690-366758
	DFB	244457	293316-1173266
	CBZ	139950	271046-1084182
35-SS04-00DRE	BCM	28723	142692-570610
	DFB	149794	381616-1526466
	CBZ	88136	406259-1625036

BCM = Bromochloromethane
DFB = 1,4-Difluorobenzene
CBZ = Chlorobenzene-d_5

All of these samples were re-analyzed and similar internal standard outliers were obtained. These samples are exhibiting matrix effects. Sample analyses HC-SD02-612, HC-SD04-612, HC-SD01-612, 35-SS04-00, and 35-SS04-00D are reported as the representative results; however, all positive results and non-detects quantified in reference to these internal standard outliers are qualified estimated.

Semivolatiles

The following internal standard areas were outside the control limits in the analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKA	Perylene-d_{12}	739030	816468-3265870
SBLKC	Perylene-d_{12}	917663	986700-3946802

All sample internal standard areas were within the control limits; therefore, only the blank results quantified in reference to perylene are considered estimated.

FIELD DUPLICATE RESULTS

One set of field duplicate analyses was provided with this batch of samples (SS04-00/SS04-00D). The sample result reproducibility was satisfactory.

COMPOUND QUANTITATION

Volatiles

The following sample results were inadvertently reported on the Form I's. These compounds were not reported on the quantitation reports and library search spectra were not provided; therefore, these results are reported as the CRQLs on the data validation summary.

SAMPLE	COMPOUND
35-MW34B-03	2-Butanone
35-SS04-00	2-Butanone 4-Methyl-2-pentanone 2-Hexanone
35-MW30BS-04	Dibromochloromethane

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5057

Client Sample ID:	35-MW36B-3	HC-SD02-06	HC-SD02-612	HC-SD04-06	HC-SD04-612	HC-SD01-06	HC-SD01-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND							
Bromomethane			UJ				
Vinyl Chloride			UJ				
Chloroethane			UJ				
Methylene Chloride			UJ				
Acetone	119 J	UJ	UJ	UJ	UJ	70 J	U
Carbon Disulfide		14	19 J				
1,1-Dichloroethene			UJ				
1,1-Dichloroethane			UJ				
1,2-Dichloroethene (TOTAL)			UJ				
Chloroform			UJ				
1,2-Dichloroethane			UJ				
2-Butanone	UJ	UJ	UJ	UJ	UJ	7 J	U
1,1,1-Trichloroethane							
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
cis-1,3-Dichloropropene							
Trichloroethene							
Dibromochloromethane							
1,1,2-Trichloroethane							
Benzene							
Trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	U
2-Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	U
Tetrachloroethene			UJ		UJ		U
1,1,2,2-Tetrachloroethane			UJ		UJ		U
Toluene			UJ		UJ		U
Chlorobenzene			UJ		UJ		U
Ethylbenzene			UJ		UJ		U
Styrene			UJ		UJ		U
Xylene (total)			UJ		UJ		U
Chloromethane			UJ		UJ		U

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5057

Client Sample ID:		35-MW34B-03	35-SS04-00	35-SS04-00D	35-MW30B-01	35-MW35B-01	35-MW29B-01
Matrix:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:		1.0	1.0	1.0	1.0	1.0	1.0
Units:		UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND							
Bromomethane				UJ			
Vinyl Chloride				UJ			
Chloroethane				UJ			
Methylene Chloride				UJ			
Acetone	J	144 J	311 J	358 J	UJ	UJ	UJ
Carbon Disulfide				UJ			
1,1-Dichloroethene				UJ			
1,1-Dichloroethane				UJ			
1,2-Dichloroethene (TOTAL)				UJ			
Chloroform				UJ			
1,2-Dichloroethane				UJ			
2-Butanone	J	13 UJ	43 U	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane			UJ	UJ			
Carbon Tetrachloride			UJ	UJ			
Bromodichloromethane			UJ	UJ			
1,2-Dichloropropane			UJ	UJ			
cis-1,3-Dichloropropene			UJ	UJ			
Trichloroethene			UJ	UJ			
Dibromochloromethane			UJ	UJ			
1,1,2-Trichloroethane			UJ	UJ			
Benzene			UJ	UJ			
Trans-1,3-Dichloropropene			UJ	UJ			
Bromoform			UJ	UJ			
4-Methyl-2-Pentanone	J	UJ	43 UJ	UJ	UJ	UJ	UJ
2-Hexanone	J	UJ	43 UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	J		UJ	UJ			
1,1,2,2-Tetrachloroethane	J		UJ	UJ			
Toluene	J		UJ	UJ			
Chlorobenzene	J		UJ	UJ			
Ethylbenzene	J		UJ	UJ			
Styrene	J		UJ	UJ			
Xylene (total)	J		UJ	UJ			
Chloromethane	J		UJ	UJ			

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5057

Client Sample ID:	35-MW30BS-04	35-MW33BS-05	35-MW26BS-04	35-MW32BS-03	35-MW38BS-03	35-MW37BS-03
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride						
Chloroethane						
Methylene Chloride	7 J	7			7 J	7 J
Acetone	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	UJ	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethene						
1,1-Dichloroethane						
1,2-Dichloroethene (TOTAL)						
Chloroform						
1,2-Dichloroethane						
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane						
Carbon Tetrachloride						
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene						
Dibromochloromethane	12 U					
1,1,2-Trichloroethane						
Benzene						
Trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	60	8		10		23 J
1,1,2,2-Tetrachloroethane						
Toluene						
Chlorobenzene						
Ethylbenzene						
Styrene						
Xylene (total)						
Chloromethane	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5057

Client Sample ID:	HC–SD02–06	HC–SD02–612	HC–SD04–06	HC–SD04–612	HC–SD01–612	35–SS04–00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND						
Phenol						
bis(2–Chloroethyl)ether			UJ	UJ	UJ	UJ
2–Chlorophenol						
1,3–Dichlorobenzene						
1,4–Dichlorobenzene						
1,2–Dichlorobenzene						
2–Methylphenol						
2,2'–oxybis(1–Chloropropane)						
4–Methylphenol						
N–Nitroso–di–n–propylamine						
Hexachloroethane						
Nitrobenzene						
Isophorone			UJ	UJ	UJ	UJ
2–Nitrophenol						
2,4–Dimethylphenol						
bis(2–Chloroethoxy)methane						
2,4–Dichlorophenol						
1,2,4–Trichlorobenzene						
Naphthalene						
4–Chloroaniline	UJ	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene						
4–Chloro–3–methylphenol						
2–Methylnaphthalene						
Hexachlorocyclopentadiene						
2,4,6–Trichlorophenol						
2,4,5–Trichlorophenol						
2–Chloronaphthalene						
2–Nitroaniline						
Dimethylphthalate						
Acenaphthylene						
2,6–Dinitrotoluene	UJ	UJ	UJ	UJ	UJ	UJ
3–Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ
Acenaphthene						

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5057

Client Sample ID:	HC–SD02–06	HC–SD02–612	HC–SD04–06	HC–SD04–612	HC–SD01–612	35–SS04–00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND						
2,4–Dinitrophenol			UJ	UJ	UJ	UJ
Dibenzofuran						
4–Nitrophenol	UJ	UJ				
2,4–Dinitrotoluene						
Diethylphthalate						
Fluorene						
4–Chlorophenyl–phenylether						
4–Nitroaniline	UJ	UJ				
4,6–Dinitro–2–methylphenol						
N–Nitrosodiphenylamine						
4–Bromophenyl–phenylether						
Hexachlorobenzene						
Pentachlorophenol						
Phenanthrene						
Anthracene						
Carbazole			UJ	UJ	UJ	UJ
Di–n–butylphthalate						
Fluoranthene						
Pyrene						
Butylbenzylphthalate						
Benzo(a)anthracene						
3,3–Dichlorobenzidine	UJ	UJ				
Chrysene						
bis(2–Ethylhexyl)phthalate	UJ	UJ				
Di–n–octylphthalate						
Benzo(b)fluoranthene						
Benzo(k)fluoranthene						
Benzo(a)pyrene						
Indeno(1,2,3–cd)pyrene						
Dibenz(a,h)anthracene						
Benzo(g,h,i)perylene						

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5057

Client Sample ID:	35-SS04-00D	35-MW30B-01	35-MW29B-01
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg
COMPOUND			
Phenol			
bis(2-Chloroethyl)ether	UJ	UJ	UJ
2-Chlorophenol			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
1,2-Dichlorobenzene			
2-Methylphenol			
2,2'-oxybis(1-Chloropropane)			
4-Methylphenol			
N-Nitroso-di-n-propylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone	UJ	UJ	UJ
2-Nitrophenol			
2,4-Dimethylphenol			
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			
1,2,4-Trichlorobenzene			
Naphthalene			
4-Chloroaniline	UJ	UJ	UJ
Hexachlorobutadiene			
4-Chloro-3-methylphenol			
2-Methylnaphthalene			
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			
2,4,5-Trichlorophenol			
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate			
Acenaphthylene			
2,6-Dinitrotoluene	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ
Acenaphthene			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5057

Client Sample ID:	35–SS04–00D	35–MW30B–01	35–MW29B–01
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg
COMPOUND			
2,4–Dinitrophenol	UJ	UJ	UJ
Dibenzofuran			
4–Nitrophenol			
2,4–Dinitrotoluene			
Diethylphthalate			
Fluorene			
4–Chlorophenyl–phenylether			
4–Nitroaniline			
4,6–Dinitro–2–methylphenol			
N–Nitrosodiphenylamine			
4–Bromophenyl–phenylether			
Hexachlorobenzene			
Pentachlorophenol			
Phenanthrene			
Anthracene			
Carbazole	UJ	UJ	UJ
Di–n–butylphthalate			
Fluoranthene			
Pyrene			
Butylbenzylphthalate			
Benzo(a)anthracene			
3,3–Dichlorobenzidine			
Chrysene			
bis(2–Ethylhexyl)phthalate			
Di–n–octylphthalate			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Indeno(1,2,3–cd)pyrene			
Dibenz(a,h)anthracene			
Benzo(g,h,i)perylene			

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5057

Client Sample ID:	HC-SD02-06	HC-SD02-612	HC-SD04-06	HC-SD04-612	HC-SD01-06	HC-SD01-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
COMPOUND						
alpha-BHC						
beta-BHC				1.7 J		
delta-BHC	4.2 U	2.8 U	2.3 U		2.4 U	
gamma-BHC(Lindane)						
Heptachlor				2 J	0.48 J	
Aldrin						
Heptachlor Epoxide						
Endosulfan I						
Dieldrin						
4,4'-DDE						
Endrin						
Endosulfan II						
4,4'-DDD	1.5 J					
Endosulfan Sulfate						
4,4'-DDT						
Methoxychlor	42 U		0.94 J		24 U	
Endrin Ketone						
Endrin Aldehyde	7.1 J	0.77 J			0.59 J	
alpha-Chlordane						
gamma-Chlordane						
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5057

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-10-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA5057

CASE SUMMARY

This data validation review consists of eleven (11) soil samples received on 05-07,10,11-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35MW29	35SS04	HCSD01	SD0612
35MW30	35SS4D	HCSD02	SD4612
35MW35	HCS612	HCSD04	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

	• Holding Time
	• Calibration
	• Contract Required Detection Limit Samples
	• Blank Samples
	• Interference Check Samples
	• Matrix Spike
	• Duplicate Digestion Samples
*	• Laboratory Control Sample
*	• Serial Dilution Sample
	• Graphite Furnace Analysis
*	• Quarterly Verification of Instrument Parameters
*	• Sample Result Verification
*	• Preparation Logs
*	• Run Logs
	• Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIMES

The preparation/analysis holding time exceeded the requirement limits (28 days from collection) in mercury analysis; therefore, the reported results and non-detected values are qualified estimated. Affected samples: 35MW29, 35MW30, 35MW35, 35SS04D, and 35SS04.

CALIBRATION

The percent recoveries for mercury (120.4%) in the initial calibration were above the 120% requirement limit. The reported sample results are not qualified based on this outlier since the deviation is marginal.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for lead (143.3% & 136.7%), Sb (121%), Be (130%), Se (130%), and Zn (126%) were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code was not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	9	45
Fe	5.4	27
Mg	8.5	42.5
Zn	1.8	9

* Action level = 5X the blank concentration.

The reported sample results for Al and Fe were above the action levels. The results for Mg and Zn up to the action levels are qualified "U" for these analytes due to the laboratory blank contamination.

The preparation and initial calibration blanks had lead (0.34 mg/kg) and mercury (0.2 & 0.4 ug/L) at levels above the CRDL, respectively. The results up to 10X the blank contaminations are rejected in the samples. The results above the 10X the blank level are considered as true values and are accepted unqualified.

Affected samples: mercury in all samples
lead in samples HCS612, HCSD01, HCSD02, HCSD04, BD0612, and SD4612

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits. Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The spike recoveries for Sb (68.6%), As (70.4%), and Se (74.4%) were below the lower control limit of 75%. The reported sample results and non-detected values are qualified estimated (J and UJ) due to the possible matrix interferences.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in the laboratory duplicate sample analysis were within the control limits, with the exception of zinc. However, the limit was within the (±2 x CRDL) data validation requirement limit. Therefore, the data are not qualified based on this outlier. One set of field duplicates (35SS04/4D) was analyzed for this batch. The RPDs were within the control limits for the analytes detected at levels above the corresponding CRDLs.

SERIAL DILUTION SAMPLE ANALYSIS

The %Difference for Al (19.1%) and Ba (207%) were above the analysis and data validation requirement limits. The reported sample results are considered biased and are qualified estimated due to the possible matrix and/or the physical interferences.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
35MW29	As/Se	78.5/76
35MW30	As/Se	73.5/73
35MW35	As/Se	75.5/80
35SS04	Se	70
HCS612	Se	60
HCSD01	Se	68.8
HCSD02	As/Se	77.5/70
HCSD04	As	83.5
SD0612	Se	77

The reported data are qualified estimated.

Arsenic in samples 35SS04 and 35SS4D were analyzed by the Method of Standard Addition (MSA). The linearity did not meet the control limit of "r≥0.995"in the original and re-analysis of sample 35SS04. The reported result is rejected in the sample.

The linearity did not meet the requirement limit of "r≥0.995"in the cadmium standard curve analysis performed by graphite furnace. The reported data are considered estimated.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, and thallium were analyzed by graphite furnace. Other elements were analyzed by ICP. Mercury was analyzed by automated cold vapor AA.

DATA PACKAGE COMPLETENESS

The case number was not identified for this batch. The sample analyses were classified under an SDG number.

The ICP interelement correction factor (Form XI, Part II) was not included in this data package.

SUMMARY

The quality of the data was fair. The % recovery for one element exceeded the requirement limit in calibration curve analysis. The initial and continuing calibration blanks had mercury at a level above the CRDL. The calcium analysis was not performed with the ICP elements in the ICP interference check sample. The holding time exceeded the requirement limit for mercury analysis. The CRDL recoveries exceeded the upper control limit of 120% for some elements. The matrix spike recovery for three elements were below the lower control limit of 75%.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5057

Client Sample ID:			35MW29	35MW30	35MW35	35SS04	35SS4D	HCS612	HCSD01
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			88.6	87.8	88.4	23.3	23.2	61.8	70
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	20	2860 J	3510 J	1870 J	9550 J	12700 J	10100 J	2940 J
Antimony	P	46	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Arsenic	F	1.2	0.68 J	0.82 J	0.4 J	9.8 J	9.3 J	1.9 J	0.46 J
Barium	P	1.0	8.6 J	12.5 J	5.4 J	34.8 J	38.8 J	8.7 J	16.3 J
Beryllium	P	1.0				1.3 J		0.32 J	0.14 J
Cadmium	F	0.2	0.07 J	0.09 J	0.04 J	0.43 J	0.42 J	0.04 J	0.03 J
Calcium	P	1700	1990 J	2420 J	361 J	6900 J	6500 J	1610 J	3620 J
Chromium	P	7.0	3.6	4	3.4	18.5	22.4	6	2.3
Cobalt	P	11							
Copper	P	2.0	2.9	8.5	1.2	13.3	12.1	0.81	1
Iron	P	13	1390	1850	1170	6220	6490	4630	648
Lead	F	0.6	144	11	10	82.8	74.6	7.1 R	0.77 R
Magnesium	P	13	188	200	58.3 U	2680	2660	1040	87.7
Manganese	P	2	7.1	7.5	3.2	15	15.5	4.9	6.9
Mercury	CV	0.1	0.16 R	0.14 R	0.14 R	0.69 R	0.73 R	0.24 R	0.19 R
Nickel	P	11			1.2	5.6	5.2	1.8	
Potassium	P	2440							
Selenium	F	1.4	0.17 J	0.28 J	UJ	0.86 R	UJ	0.47 J	0.27 J
Silver	P	0.2							
Sodium	P	2370				2200	2140	1630	
Thallium	F	0.5		0.15		0.52	0.43	0.28	0.14
Vanadium	P	11	5.5	5.5	4.4	26.2	27.2	7	2.6
Zinc	P		16.3	10.8 U	6.3 U	46.4	62.9	6.6 U	4.9 U

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5057

Client Sample ID:			HCSD02	HCSD04	SD0612	SD4612
Matrix:			SOIL	SOIL	SOIL	SOIL
% Solids:			40.3	75.3	61.6	68.8
Units:			MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS						
		IDL (ug/L)				
Aluminium	P	20	7820 J	780 J	1880 J	1260 J
Antimony	P	46	UJ	UJ	UJ	UJ
Arsenic	F	1.2	1.1 J	0.45 J	0.28 J	0.26 J
Barium	P	1.0	9.2 J	4.1 J	14.6 J	5.5 J
Beryllium	P	1.0	0.25 J			
Cadmium	F	0.2	0.1 J	0.03 J	0.03 J	UJ
Calcium	P	1700	2030 J	1030 J	3330 J	2150 J
Chromium	P	7.0	6	2	3.2	1.3
Cobalt	P	11				
Copper	P	2.0	1.5	0.66	1.1	0.73
Iron	P	13	3660	382	586	583
Lead	F	0.6	1.1 R	1 R	0.88 R	1.1 R
Magnesium	P	13	1450	48.2 U	77.1	62.5 U
Manganese	P	2	6.5	3.7	6.5	3.5
Mercury	CV	0.1	0.42 R	0.11 R	0.13 R	0.08 R
Nickel	P	11				
Potassium	P	2440	623			
Selenium	F	1.4	0.6 J	0.21 J	0.34 J	UJ
Silver	P	0.2				
Sodium	P	2370	2750			
Thallium	F	0.5	0.42		0.16	
Vanadium	P	11	8.4	1.5	2.8	1.9
Zinc	P		9.7 U	4.5 U	4.5 U	8.3 U

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B5167

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 08-02-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: Kelly Muir Spittler for 08-02-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: B5167

INTRODUCTION

This quality assurance review is based upon a review of all data generated from ten water samples, three trip blanks and four rinsate blanks collected on 05-06,07,08,09,10-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 60/602 for Benzene, Toluene, Ethylbenzene and Xylene by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The chain-of-custody for the soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

Volatiles

The raw data was missing for the analysis of 35-RB18. The laboratory should provide this documentation.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (7 days from collection to analysis), has been exceeded for samples HC-SW03, HC-SW03D, HC-SW02, HM-SW02, HM-SW03, WC-SW02, WC-SW03, 35-SW12, 35-RB13, 35-TB26. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-15-94	HP4.i	Chloromethane	34.1
		Bromoform	48.1
		Tetrachloroethene	40.0
CC 05-16-94	HP1.i	2,2'-oxybis(1-chloropropane)	55.4
		N-Nitroso-di-n-propylamine	27.3
		Hexachlorobutadiene	28.6
		Hexachlorocyclopentadiene	28.2
		Dimethylphthalate	91.3
		4-Nitrophenol	53.3
		Butylbenzylphthalate	28.5
		Bis(2-ethylhexyl)phthalate	26.9
		Di-n-octylphthalate	41.1
		3,3-Dichlorobenzidine	50.8
CC 05-17-94	HP1.i	2,2'-oxybis(1-chloropropane)	99.7
		N-Nitroso-di-n-propylamine	31.8
		2,4-Dinitrophenol	26.6
		4-Nitrophenol	36.9
		Bis(2-ethylhexyl)phthalate	30.3
		3-Nitroaniline	35.5
		4-Nitroaniline	42.7
		3,3-Dichlorobenzidine	26.1
CC 05-18-94	HP1.i	N-Nitroso-di-propylamine	37.0
		4-Nitrophenol	36.1
		Bis(2-ethylhexyl)phthalate	25.1
		3-Nitroaniline	38.2
		4-Nitroaniline	39.7
		3,3-Dichlorobenzidine	30.7

Volatiles (601/602)

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

BLANKS

Volatiles

The following trip blank contained a common laboratory contaminant at a level above the CRQL. Since this compound was not detected in the other water samples, no action is required.

BLANK	COMPOUND	LEVEL
35-TB28	Methylene Chloride	32 ug/L

Pesticide/PCBs

The following method blanks contained target compound methoxychlor at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLKA)	Delta-BHC	0.12 ug/L
	Methoxychlor	0.045 ug/L
Method Blank (PBLKB)	Delta-BHC	0.011 ug/L

SURROGATE RECOVERIES

Semivolatiles

The following surrogate recoveries were outside the QC limits. Also, several of the 2-chlorophenol-d4 recoveries were outside the limits; however, since this surrogate is advisory; the outliers are not used to qualify the data.

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
SBLKB	Phenol-d5	9	30-110
	2-Fluorophenol	9	30-120
	2,4,6-Tribromophenol	9	25-135
HC-SW02	2-Fluorophenol	27	30-120

Since only one surrogate recovery was outside the QC limits in sample analysis HC-SW02, no qualification is required due to this surrogate outlier. As for the blank, since the surrogate recovery criteria were met in the samples, these outliers are believed to be an isolated incident. The sample data are accepted without qualification.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
HC-SW03	59/-	DCB	Advisory Criteria 60-150%
HC-SW03D	54/-	DCB	Advisory Criteria 60-150%
HC-SW02	57/-	DCB	Advisory Criteria 60-150%
HM-SW02	46/-	DCB	Advisory Criteria 60-150%
HM-SW03	58/-	DCB	Advisory Criteria 60-150%
WC-SW02	48/-	DCB	Advisory Criteria 60-150%
WC-SW03	41/-	DCB	Advisory Criteria 60-150%
HC-SW01MS	15/14	TCX/TCX	Advisory Criteria 60-150%
	58/-	DCB	Advisory Criteria 60-150%
35-RB14	55/-	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Pesticide/PCBs

The following MS/MSD recoveries were outside the QC limits in the analyses of HC-SW01 MS/MSD.

SAMPLE	COMPOUND	RECOVERY	LIMIT
MS/MSD	Gamma-BHC	41/42	56-123
MSD	Heptachlor	35	40-131

Since these compounds were not detected in the unspiked sample, and no qualification is required based on MS outliers, the sample data are accepted unqualified.

Volatiles (601/602)

Most of the spike recoveries were within the 60-140% QC range, with the exception of those listed below. Since these compounds were not detected in the samples, no action is required.

SAMPLE	SPIKE COMPOUND	RECOVERY
MSD	Bromodichloromethane	147
MS	1,2-Dichlorobenzene	168
MSD	1,2-Dichlorobenzene	183
LCS	1,2-Dichlorobenzene	169

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
HM-SW02	Perylene-d_{12}	7154	364798-1459192

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKB	Perylene-d_{12}	296248	307352-1229406
SBLKC	Perylene-d_{12}	151031	327343-1309372

Sample HM-SW02 was not re-extracted/reanalyzed; therefore, the non-detects quantified in reference to perylene in the original analyses are qualified estimated since positive results were not detected. The blank results quantified in reference to perylene are also considered estimated.

FIELD DUPLICATE RESULTS

One set of field duplicate analyses was provided with this batch of samples (HC-SW03/HC-SW03D). The sample result reproducibility was satisfactory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5167

Client Sample ID:	HC-SW03	HC-SW03D	HC-SW02	HM-SW02	HM-SW03	WC-SW02	WC-SW03	35-RB12
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND								
Chloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromomethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methylene Chloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acetone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Toluene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Styrene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5167

Client Sample ID:	35-RB13	35-TB26	HC-SW04	HC-SW01	HM-SW01	35-RB14	35-TB27	35-RB18
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND								
Chloromethane	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromomethane	UJ	UJ						
Vinyl Chloride	UJ	UJ						
Chloroethane	UJ	UJ						
Methylene Chloride	UJ	UJ						
Acetone	UJ	UJ						
Carbon Disulfide	UJ	UJ						
1,1-Dichloroethene	UJ	UJ						
1,1-Dichloroethane	UJ	UJ						
1,2-Dichloroethene (TOTAL)	UJ	UJ						
Chloroform	UJ	UJ						
1,2-Dichloroethane	UJ	UJ						
2-Butanone	UJ	UJ						
1,1,1-Trichloroethane	UJ	UJ						
Carbon Tetrachloride	UJ	UJ						
Bromodichloromethane	UJ	UJ						
1,2-Dichloropropane	UJ	UJ						
cis-1,3-Dichloropropene	UJ	UJ						
Trichloroethene	UJ	UJ						
Dibromochloromethane	UJ	UJ						
1,1,2-Trichloroethane	UJ	UJ						
Benzene	UJ	UJ						
Trans-1,3-Dichloropropene	UJ	UJ						
Bromoform	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ						
2-Hexanone	UJ	UJ						
Tetrachloroethene	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ						
Toluene	UJ	UJ						
Chlorobenzene	UJ	UJ						
Ethylbenzene	UJ	UJ						
Styrene	UJ	UJ						
Xylene (total)	UJ	UJ						
	UJ	UJ						

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5167

Client Sample ID:	35-TB28
Matrix:	WATER
Dilution Factor:	1.0
Units:	ug/L

COMPOUND	
Chloromethane	UJ
Bromomethane	
Vinyl Chloride	
Chloroethane	
Methylene Chloride	
Acetone	32
Carbon Disulfide	
1,1-Dichloroethene	
1,1-Dichloroethane	
1,2-Dichloroethene (TOTAL)	
Chloroform	
1,2-Dichloroethane	
2-Butanone	
1,1,1-Trichloroethane	
Carbon Tetrachloride	
Bromodichloromethane	
1,2-Dichloropropane	
cis-1,3-Dichloropropene	
Trichloroethene	
Dibromochloromethane	
1,1,2-Trichloroethane	
Benzene	
Trans-1,3-Dichloropropene	
Bromoform	UJ
4-Methyl-2-Pentanone	
2-Hexanone	
Tetrachloroethene	UJ
1,1,2,2-Tetrachloroethane	
Toluene	
Chlorobenzene	
Ethylbenzene	
Styrene	
Xylene (total)	

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5167

Client Sample ID:	35–RB18
Matrix:	WATER
Dilution Factor:	1
Units:	ug/L

METHOD: EPA 601

Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
Dibromochloromethane	
1,2–Dichlorobenzene	
1,3–Dichlorobenzene	
1,4–Dichlorobenzene	
Dichlorodifluoromethane	
1,1–Dichloroethene	
1,2–Dichloroethane	
1,1–Dichloroethane	
Cis–1,2–Dichloroethene	
Trans–1,2–Dichloroethene	
1,2–Dichloropropane	
Cis–1,3–Dichloropropene	
Trans–1,3–Dichloropropene	
Methylene Chloride	
1,1,2,2–Tetrachloroethane	
Tetrachloroethene	
1,1,1–Trichloroethane	
1,1,2–Trichloroethane	
Trichloroethene	
Trichlorofluoromethane	
Vinyl Chloride	

METHOD: EPA 602

Benzene	
Chlorobenzene	
1,2–Dichlorobenzene	
1,3–Dichlorobenzene	
1,4–Dichlorobenzene	
Ethylbenzene	**0.6**
Toluene	**0.4**
Xylenes	**1.6**

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	35-RB12	35-RB13	HC-SW04	HC-SW01	HM-SW01	35-RB14	35-RB18
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol							
bis(2-Chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)							
4-Methylphenol							
N-Nitroso-di-n-propylamine	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene							
4-Chloro-3-methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene							
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate							
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acenaphthene							

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	35-RB12	35-RB13	HC-SW04	HC-SW01	HM-SW01	35-RB14	35-RB18
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol							
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chlorophenyl-phenylether							
Fluorene							
4-Nitroaniline	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine							
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole							
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate							
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzo(a)anthracene							
Chrysene							
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Di-n-octylphthalate							
Benzo(b)fluoranthene							
Benzo(k)fluoranthene							
Benzo(a)pyrene							
Indeno(1,2,3-cd)pyrene							
Dibenz(a,h)anthracene							
Benzo(g,h,i)perylene							

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	HC-SW03	HC-SW03D	HC-SW02	HM-SW02	HM-SW03	WC-SW02	WC-SW03
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol							
bis(2-Chloroethyl)ether							
2-Chlorophenol							
1,3-Dichlorobenzene							
1,4-Dichlorobenzene							
1,2-Dichlorobenzene							
2-Methylphenol							
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Methylphenol							
N-Nitroso-di-n-propylamine			UJ				
Hexachloroethane							
Nitrobenzene							
Isophorone							
2-Nitrophenol							
2,4-Dimethylphenol							
bis(2-Chloroethoxy)methane							
2,4-Dichlorophenol							
1,2,4-Trichlorobenzene							
Naphthalene							
4-Chloroaniline							
Hexachlorobutadiene	UJ	UJ		UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol							
2-Methylnaphthalene							
Hexachlorocyclopentadiene	UJ	UJ		UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol							
2,4,5-Trichlorophenol							
2-Chloronaphthalene							
2-Nitroaniline							
Dimethylphthalate	UJ	UJ		UJ	UJ	UJ	UJ
Acenaphthylene							
2,6-Dinitrotoluene							
3-Nitroaniline			UJ				
Acenaphthene							

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	HC-SW03	HC-SW03D	HC-SW02	HM-SW02	HM-SW03	WC-SW02	WC-SW03
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol			UJ				
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Dibenzofuran							
2,4-Dinitrotoluene							
Diethylphthalate							
4-Chlorophenyl-phenylether							
Fluorene							
4-Nitroaniline			UJ				
4,6-Dinitro-2-methylphenol							
N-Nitrosodiphenylamine							
4-Bromophenyl-phenylether							
Hexachlorobenzene							
Pentachlorophenol							
Phenanthrene							
Anthracene							
Carbazole							
Di-n-butylphthalate							
Fluoranthene							
Pyrene							
Butylbenzylphthalate	UJ	UJ		UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Benzo(a)anthracene							
Chrysene							
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Di-n-octylphthalate	UJ	UJ		UJ	UJ	UJ	UJ
Benzo(b)fluoranthene				UJ			
Benzo(k)fluoranthene				UJ			
Benzo(a)pyrene				UJ			
Indeno(1,2,3-cd)pyrene				UJ			
Dibenz(a,h)anthracene				UJ			
Benzo(g,h,i)perylene				UJ			

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	HC-SW03	HC-SW03D	HC-SW02	HM-SW02	HM-SW03	WC-SW02	WC-SW03
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND							
alpha-BHC							
beta-BHC							
delta-BHC	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U		0.05 U
gamma-BHC(Lindane)							
Heptachlor							
Aldrin						0.035 J	
Heptachlor Epoxide							
Endosulfan I							
Dieldrin							
4,4'-DDE							
Endrin							
Endosulfan II							
4,4'-DDD							
Endosulfan Sulfate							
4,4'-DDT							
Methoxychlor							
Endrin Ketone							
Endrin Aldehyde							
alpha-Chlordane							
gamma-Chlordane							
Toxaphene							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5167

Client Sample ID:	35-RB12	35-RB13	HC-SW04	HC-SW01	HM-SW01	35-RB14
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND						
alpha-BHC						
beta-BHC						
delta-BHC						
gamma-BHC(Lindane)						
Heptachlor						
Aldrin						
Heptachlor Epoxide						
Endosulfan I						
Dieldrin						
4,4'-DDE						
Endrin						
Endosulfan II						
4,4'-DDD						
Endosulfan Sulfate						
4,4'-DDT						
Methoxychlor						
Endrin Ketone						
Endrin Aldehyde						
alpha-Chlordane						
gamma-Chlordane						
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA5167

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: _____ 8-2-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG: BA5167

CASE SUMMARY

This data validation review consists of fourteen (14) water samples including 4 rinsate blanks collected on 5-6,7,8,10-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35RB12	35RB18	HCSW03	HMSW01	WCSW02
35RB13	HCSW01	HCSW04	HMSW02	WCSW03
35RB14	HCSW02	HCSW3D	HMSW03	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

- Holding Time
- Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- Interference Check Samples
- * Matrix Spike
- * Duplicate Digestion Samples
- Laboratory Control Sample
- * Serial Dilution Sample
- Graphite Furnace Analysis
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIMES

The preparation/analysis holding time exceeded the requirement limits (28 days from collection) in mercury analysis; therefore, the reported results and non-detected values are qualified estimated.

CALIBRATION

The percent recoveries for Na, Ca, and K in the continuing calibrations were above the 110% requirement limit. The reported sample results are qualified estimated and non-detected values are accepted unqualified.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for lead (126.7) and cadmium (121.6/125.6%) in graphite furnace and all ICP analytes were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code was not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Al	95	475
As	2.7	13.5
Cr	5.0	25
Cu	4.0	20
Fe	41	205
Pb	1.2	6
Mg	97	485

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Ag	6.0	30
Zn	-5.0	**

* Action level = 5X the blank concentration.

** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL. However, this analyte was detected in the continuing calibration blanks (CCBs) at levels above the CRDL. The reported sample results are rejected and the non-detected values are accepted unqualified.

The reported sample results and the field QC blanks up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits, with the exception of Cr (124.2/130.4) and Mn (76.6%). The positive sample results are qualified estimated.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

LABORATORY CONTROL SAMPLE ANALYSIS

The percent recovery for Be (122%) exceeded the upper control limit of 120%. The reported positive sample results should be qualified estimated, however, this analyte was not detected in the samples; therefore, the data are accepted unqualified.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in the laboratory duplicate sample analysis were within the control limits. One set of field duplicates was analyzed for this batch. The RPDs were within the control limits for the analytes detected at levels above the corresponding CRDLs.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
35RB12	As/Se	75.5/77
35RB13	Se/Tl	81/64
35RB14	As	80.5
HCSW01	Tl	67.5
HCSW02	As/Pb/Se/Tl	79/72/165*/39.5*
HCSW03	Pb/Se/Tl	59.2/133*/36.5**
HCSW04	Se/Tl	78/76.5
HCSW3D	As/Cd/Pb/Se/Tl	82.5/116.2*/33.4**/67/56
HMSW01	Se/Tl	71/75
HMSW02	As/Pb/Se/Tl	69/69/156*/27.5**
HMSW03	As/Pb/Se/Tl	117.5*/35.5**/32**/65
WCSW02	Pb/Se/Tl	71.5/228*/44
WCSW03	As/Pb/Se/Tl	83.7/55/43/69.5

* Only the positive results are qualified estimated.

** The reported results are qualified estimated and non-detected values are rejected due to the extremely low analytical spike recovery.

The reported data are qualified estimated.

The linearity did not meet the requirement limit of "r≥0.995" in the cadmium analysis performed by graphite furnace. The reported data are considered estimated.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, and thallium were analyzed by graphite furnace. Other elements were analyzed by ICP. Mercury was analyzed by automated cold vapor AA.

DATA PACKAGE COMPLETENESS

The case number was not identified for this batch. The sample analyses were classified under an SDG number.

The ICP interelement correction factor (Form XI, Part II) was not included in this data package.

The percent recoveries for chromium were above the 120% QC limit in the ICP interference check sample. This outlier was not reported on the case narrative.

SUMMARY

The quality of the data was fair. The % recovery for some elements exceeded the requirement limit in calibration analysis. The continuing calibration blank had zinc at a level above the CRDL. The calcium analysis was not performed with the ICP elements in the ICP interference check sample. The results for mercury are qualified estimated since the holding time exceeded the requirement limit. The CRDL recoveries exceeded the upper control limit of 120% for all ICP elements, including lead and selenium. The laboratory control sample recovery for beryllium exceeded the upper control limits.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES -- DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5167

Client Sample ID:			35RB12	35RB13	35RB14	35RB18	HCSW01	HCSW02	HCSW03
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units:			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	72					356 U	303 U	301 U
Antimony	P	39							
Arsenic	F	1.0	1 U		UJ	1.6 U		UJ	20
Barium	P	2.0		7 J		2 J	19 J	20 J	26 J
Beryllium	P	5.0							
Cadmium	F	1.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Calcium	P	308		15900			27000	36600	86600
Chromium	P	5.0	9 U	10 U	5 U	7 U	9 U	19 U	130 J
Cobalt	P	9.0							
Copper	P	2.0	6 U	15 U	8 U	5 U	9 U	9 U	21 U
Iron	P	18		66 U			746	528	339
Lead	F	1.0		1.2 U			1.1 U	UJ	5.5 U
Magnesium	P	26	71	1920			1450	44600	633000
Manganese	P	2.0					6 U	8 U	17 U
Mercury	CV	0.1	UJ	1.8 J	UJ	UJ	UJ	UJ	UJ
Nickel	P	10							
Potassium	P	1674						14500	203000
Selenium	F	1.0	UJ	UJ					6 J
Silver	P	2.0	10 U	11 U		7 U	11 U	10 U	28 U
Sodium	P	339	2210	59000	1330	1420	6900	383000	2090000
Thallium	F	1.0		UJ			UJ	R	R
Vanadium	P	4.0							
Zinc	P	2.0	4 R	4 R		7 R		2 R	5 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5167

Client Sample ID:			HCSW04	HCSW3D	HMSW01	HMSW02	HMSW03	WCSW02	WCSW03
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units:			ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	72	692	187 U	259 U	535 J	288 U	251 U	220 U
Antimony	P	39							
Arsenic	F	1.0	1 U	UJ	1.4 U	1.2 U		1.2 U	UJ
Barium	P	2.0	9 J	24 J	49 J	38 J	20 J	29 J	27 J
Beryllium	P	5.0							
Cadmium	F	1.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Calcium	P	308	11600	107000	14100	40200	302000	46900	40500
Chromium	P	5.0	9 U	125 J	10 U	36 J	158 J	15 U	97 J
Cobalt	P	9.0							
Copper	P	2.0	20 U	19 U	9 U	18 U	17 U	14 U	22 U
Iron	P	18	556	291	425	559	320	660	321
Lead	F	1.0	1.3 U	5.4 U		2.5 U	58.1	1.9 U	4.2 U
Magnesium	P	26	954	613000	2830	109000	754000	29000	44800
Manganese	P	2.0	4 U	16 U	14 U	20 U	10 U	33 U	21 U
Mercury	CV	0.1	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Nickel	P	10							
Potassium	P	1674		202000		41100	288000	10900	136000
Selenium	F	1.0	UJ	UJ	1.5 J		41 J		UJ
Silver	P	2.0	10 U	26 U	10 U	17 U	37 J	7 U	25 U
Sodium	P	339	6090	2560000	16500	739000	6750000	202000	895000
Thallium	F	1.0	UJ	UJ	UJ	R	UJ	UJ	UJ
Vanadium	P	4.0							
Zinc	P	2.0	14 R		3 R	9 R			6 R

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5243

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 08-24-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 8-24-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5243

INTRODUCTION

This quality assurance review is based upon a review of all data generated from fourteen soil samples collected on 05-06,07,08-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 60/602 for Benzene, Toluene, Ethylbenzene and Xylene by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Pesticide/PCBs

The LCS Form III was not provided with this batch of samples. The laboratory should supply this missing document.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (14 days from collection to analysis), has been exceeded for samples HM-SD03-06RE, HM-SD03-612RE, HC-SD03-612RE, WC-SD03-612RE, HM-SD01-06DRE, and HM-SD01-612RE. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, since these analyses are not reported as the representative results, no qualification is applied to the reported original results.

GC/MS TUNING

Volatiles

The incorrect Form V was provided for the initial calibration on page 051. The laboratory should submit the correct form.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC05-16-94	HP3.i	Acetone	43.3
		2-Butanone	49.2
		4-Methyl-2-pentanone	34.4
		2-Hexanone	30.5

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-24-94	HP3.i	Chloromethane	26.2
		Acetone	37.8
		2-Butanone	47.5
		Carbon Tetrachloride	27.9
		4-Methyl-2-pentanone	46.2
		2-Hexanone	49.1
CC 06-06-94	HP1.i	4-Chloroaniline	66.7
		3-Nitroaniline	35.3
		2,6-Dinitrotoluene	30.9
		2,4-Dinitrophenol	28.1
		4-Nitrophenol	30.0
CC 06-07-94	HP1.i	4-Chloroaniline	64.4
		3-Nitroaniline	28.3
		4-Nitroaniline	35.9
		3,3-Dichlorobenzidine	29.6
		2,6-Dinitrotoluene	31.7
		4-Nitrophenol	29.9
		Bis(2-ethylhexyl)phthalate	32.5
CC 06-09-94	HP1.i	4-Chloroaniline	76.4
		3-Nitroaniline	33.1
		4-Nitroaniline	44.6
		Bis(2-chloroethyl)ether	35.5
		Isophorone	38.0
		2,6-Dinitrotoluene	28.6
		4-Nitrophenol	28.7
		Bis(2-ethylhexyl)phthalate	26.5
CC 07-07-94	HP1.i	4-Chloroaniline	37.3
		4-Nitroaniline	57.9
		Phenol	39.6
		2-Methylphenol	32.4
		2,2-Oxybis(1-chloropropane)	89.8
		Hexachloroethane	40.2
		Carbazole	34.1

Pesticide/PCBs

The %RPD for endosulfan sulfate (26%) exceeded the 25% QC limit in the analysis of INDBMA2. Since this compound was not detected in the samples, no action is required.

SURROGATE

Volatiles

The following system monitoring compound recoveries were above the QC limits. Since these recoveries were above the QC limits, only the positive results should be qualified estimated; however, target compounds were not detected in the original representative analyses.

SAMPLE	SURROGATE	RECOVERY	QC LIMITS
HM-SD02-612	1,2-Dichloroethane-d_4	126	70-121
HM-SD03-06	1,2-Dichloroethane-d_4	131	70-121
HM-SD03-612	1,2-Dichloroethane-d_4	122	70-121
HC-SD03-06D	1,2-Dichloroethane-d_4	124	70-121
HC-SD03-612	1,2-Dichloroethane-d_4	125	70-121
WC-SD02-06	1,2-Dichloroethane-d_4	238	70-121
WC-SD02-612	1,2-Dichloroethane-d_4	127	70-121
HM-SD01-06	1,2-Dichloroethane-d_4	126	70-121
HM-SD01-06MS	1,2-Dichloroethane-d_4	124	70-121
HM-SD01-06MSD	1,2-Dichloroethane-d_4	122	70-121
HM-SD01-06D	1,2-Dichloroethane-d_4	132	70-121
HM-SD01-612	1,2-Dichloroethane-d_4	130	70-121
HM-SD03-06RE	1,2-Dichloroethane-d_4	397	70-121
	Toluene-d_8	369	84-138
	4-Bromofluorobenzene	302	59-113
HM-SD03-612RE	1,2-Dichloroethane-d_4	0	70-121
	Toluene-d_8	286	84-138
	4-Bromofluorobenzene	220	59-113
HC-SD03-612RE	1,2-Dichloroethane-d_4	427	70-121
	Toluene-d_8	415	84-138
	4-Bromofluorobenzene	280	59-113
WC-SD03-612RE	1,2-Dichloroethane-d_4	160	70-121
	Toluene-d_8	351	84-138
	4-Bromofluorobenzene	261	59-113
HM-SD01-06DRE	1,2-Dichloroethane-d_4	135	70-121

SAMPLE	SURROGATE	RECOVERY	QC LIMITS
HM-SD01-612RE	1,2-Dichloroethane-d_4	145	70-121
	4-Bromofluorobenzene	138	59-113

BLANKS

Pesticide/PCBs

The following method blank contained target compound methoxychlor at a level below the CRQL. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLKA)	Methoxychlor	2.1 ug/kg

SURROGATE RECOVERIES

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLKA	280/314	TCX	Advisory Criteria 60-150%
	288/421	DCB	Advisory Criteria 60-150%
PLCS	176/229	DCB	Advisory Criteria 60-150%
HM-SD01-06	-/194	DCB	Advisory Criteria 60-150%
HM-SD01-06D	-/192	DCB	Advisory Criteria 60-150%
HM-SD02-06	-/190	DCB	Advisory Criteria 60-150%
HM-SD02-612	-/187	DCB	Advisory Criteria 60-150%
HM-SD03-06	0/0	TCX	Advisory Criteria 60-150%
	9/61	DCB	Advisory Criteria 60-150%
HM-SD03-612	-/178	DCB	Advisory Criteria 60-150%
HC-SD03-06	-/152	TCX	Advisory Criteria 60-150%
	165/208	DCB	Advisory Criteria 60-150%
HC-SD03-06D	184/210	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
HC-SD03-612	161/244	DCB	Advisory Criteria 60-150%
WC-SD03-06	174/252	DCB	Advisory Criteria 60-150%
WC-SD03-612	165/208	DCB	Advisory Criteria 60-150%
WC-SD02-06	-/55	TCX	Advisory Criteria 60-150%
WC-SD02-612	30/23	TCX	Advisory Criteria 60-150%
	-/49	DCB	Advisory Criteria 60-150%
HM-SD01-06	-/240	DCB	Advisory Criteria 60-150%
PBLKB	162/309	DCB	Advisory Criteria 60-150%
HM-SD01-06	216/242	TCX	Advisory Criteria 60-150%
	284/328	DCB	Advisory Criteria 60-150%
HM-SD01-612	274/286	TCX	Advisory Criteria 60-150%
	366/451	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Pesticide/PCBs

The spike recoveries were not detected in the analyses of HM-SD01-06 MS/MSD. As per the laboratory narrative, these compounds were not spiked in the QC sample; no action is required on this basis.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Volatiles

The following internal standard areas were below the laboratory's control limits. Most of these samples are exhibiting matrix effects; therefore, all reported results in the original analyses (representative) quantified in reference to the internal standard outliers are qualified estimated.

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
HM-SD03-06	CBZ	343590	357658-1430632
HM-SD03-612	CBZ	344892	357658-1430632
HC-SD03-612	CBZ	355867	357658-1430632
WC-SD03-612	CBZ	308322	357658-1430632
WC-SD02-06	BCM	79926	108770-435082
HM-SD01-06D	CBZ	325450	357658-1430632
HM-SD01-612	BCM	100845	108770-435082
	DFB	266836	322266-1289062
	CBZ	273497	357658-1430632
HM-SD03-06RE	CBZ	547495	548440-2193760
HM-SD03-612RE	BCM	0	178452-713810
	DFB	353459	577468-2309870
	CBZ	287325	548440-2193760
HC-SD03-612RE	BCM	152909	178452-713810
	DFB	421040	577468-2309870
	CBZ	373507	548440-2193760
WC-SD03-612RE	BCM	107522	178452-713810
	DFB	263256	577468-2309870
	CBZ	233109	548440-2193760
HM-SD01-06DRE	BCM	172053	178452-713810
	DFB	397663	577468-2309870
	CBZ	358239	548440-2193760
HM-SD01-612RE	DFB	547564	577468-2309870

Semivolatiles

The following internal standard area was outside the control limits in the analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKB	Perylene-d_{12}	961678	994647-3978588

Since all sample internal standard areas were within control limits; this outlier does not affect the sample data.

FIELD DUPLICATE RESULTS

Two sets of field duplicate analyses were provided with this batch of samples (HC-SD03-06/HC-SD03-06D) and (HM-SD01-06/HM-SD01-06D). The sample result reproducibility was satisfactory, except for the following.

Pesticide/PCBs

In reference to positive results >CRQL, beta-BHC was detected in the duplicate analysis of HM-SD01-06D. This compound was not detected in sample HM-SD01-06; therefore, the positive result and non-detect are qualified estimated in these analyses.

COMPOUND QUANTITATION

Volatiles

The quantitation report did not identify carbon disulfide, dibromochloromethane, and 1,1,2-trichloroethane in sample WC-SD03-612-RE, and library search spectra were not provided. Since reanalysis is not reported as the representative results, no action is taken on this basis.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5243

Client Sample ID:	HM–SD02–06	HM–SD02–612	HM–SD03–06	HM–SD03–612	HC–SD03–06	HC–SD03–06D	HC–SD03–612	WC–SD03–06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND								
Bromomethane								
Vinyl Chloride								
Chloroethane								
Methylene Chloride								
Acetone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide								
1,1–Dichloroethene								
1,1–Dichloroethane								
1,2–Dichloroethene (TOTAL)								
Chloroform								
1,2–Dichloroethane								
2–Butanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1–Trichloroethane								
Carbon Tetrachloride								
Bromodichloromethane								
1,2–Dichloropropane								
cis–1,3–Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1,1,2–Trichloroethane								
Benzene								
Trans–1,3–Dichloropropene								
Bromoform								
4–Methyl–2–Pentanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2–Hexanone	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene			UJ	UJ			UJ	
1,1,2,2–Tetrachloroethane			UJ	UJ			UJ	
Toluene			UJ	UJ			UJ	
Chlorobenzene			UJ	UJ			UJ	
Ethylbenzene			UJ	UJ			UJ	
Styrene			UJ	UJ			UJ	
Xylene (total)			UJ	UJ			UJ	
Chloromethane			UJ	UJ			UJ	

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5243

Client Sample ID:	WC-SD03-612	WC-SD02-06	WC-SD02-612	HM-SD01-06	HM-SD01-06D	HM-SD01-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
Bromomethane		UJ				UJ
Vinyl Chloride		UJ				UJ
Chloroethane		UJ				UJ
Methylene Chloride		UJ				UJ
Acetone	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide		UJ				UJ
1,1-Dichloroethene		UJ				UJ
1,1-Dichloroethane		UJ				UJ
1,2-Dichloroethene (TOTAL)		UJ				UJ
Chloroform		UJ				UJ
1,2-Dichloroethane		UJ				UJ
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane						UJ
Carbon Tetrachloride						UJ
Bromodichloromethane						UJ
1,2-Dichloropropane						UJ
cis-1,3-Dichloropropene						UJ
Trichloroethene						UJ
Dibromochloromethane						UJ
1,1,2-Trichloroethane						UJ
Benzene						UJ
Trans-1,3-Dichloropropene						UJ
Bromoform						UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	UJ				UJ	UJ
1,1,2,2-Tetrachloroethane	UJ				UJ	UJ
Toluene	UJ				UJ	UJ
Chlorobenzene	UJ				UJ	UJ
Ethylbenzene	UJ				UJ	UJ
Styrene	UJ				UJ	UJ
Xylene (total)	UJ				UJ	UJ
Chloromethane	UJ				UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612	HC-SD03-06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
Phenol					
bis(2-Chloroethyl)ether					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol					
N-Nitroso-di-n-propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	HM–SD02–06	HM–SD02–612	HM–SD03–06	HM–SD03–612	HC–SD03–06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
2,4–Dinitrophenol	UJ	UJ	UJ	UJ	UJ
Dibenzofuran					
4–Nitrophenol	UJ	UJ	UJ	UJ	UJ
2,4–Dinitrotoluene					
Diethylphthalate					
Fluorene					
4–Chlorophenyl–phenylether					
4–Nitroaniline					
4,6–Dinitro–2–methylphenol					
N–Nitrosodiphenylamine					
4–Bromophenyl–phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di–n–butylphthalate	614 J	619 J		534 J	
Fluoranthene					
Pyrene					
Butylbenzylphthalate					
Benzo(a)anthracene					
3,3–Dichlorobenzidine					
Chrysene					
bis(2–Ethylhexyl)phthalate				454 J	
Di–n–octylphthalate					
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(a)pyrene					
Indeno(1,2,3–cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	HC–SD03–06D	HC–SD03–612	WC–SD03–06	WC–SD03–612	WC–SD02–06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
Phenol		UJ			
bis(2–Chloroethyl)ether					
2–Chlorophenol					
1,3–Dichlorobenzene					
1,4–Dichlorobenzene					
1,2–Dichlorobenzene					
2–Methylphenol		UJ			
2,2'–oxybis(1–Chloropropane)		UJ			
4–Methylphenol					
N–Nitroso–di–n–propylamine					
Hexachloroethane		UJ			
Nitrobenzene					
Isophorone					
2–Nitrophenol					
2,4–Dimethylphenol					
bis(2–Chloroethoxy)methane					
2,4–Dichlorophenol					
1,2,4–Trichlorobenzene					
Naphthalene					
4–Chloroaniline	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene					
4–Chloro–3–methylphenol					
2–Methylnaphthalene					
Hexachlorocyclopentadiene					
2,4,6–Trichlorophenol					
2,4,5–Trichlorophenol					
2–Chloronaphthalene					
2–Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6–Dinitrotoluene	UJ		UJ	UJ	UJ
3–Nitroaniline	UJ		UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	HC-SD03-06D	HC-SD03-612	WC-SD03-06	WC-SD03-612	WC-SD02-06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
2,4-Dinitrophenol	UJ				
Dibenzofuran					
4-Nitrophenol	UJ		UJ	UJ	UJ
2,4-Dinitrotoluene					
Diethylphthalate					
Fluorene					
4-Chlorophenyl-phenylether					
4-Nitroaniline		UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol					
N-Nitrosodiphenylamine					
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole		UJ			
Di-n-butylphthalate					
Fluoranthene					
Pyrene					
Butylbenzylphthalate					
Benzo(a)anthracene					
3,3-Dichlorobenzidine			UJ	UJ	UJ
Chrysene					
bis(2-Ethylhexyl)phthalate			UJ	UJ	UJ
Di-n-octylphthalate					
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(a)pyrene				544 J	
Indeno(1,2,3-cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	WC–SD02–612	SD01–06	HM–SD01–06D	HM–SD01–612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				
bis(2–Chloroethyl)ether				
2–Chlorophenol				
1,3–Dichlorobenzene				
1,4–Dichlorobenzene				
1,2–Dichlorobenzene				
2–Methylphenol				
2,2'–oxybis(1–Chloropropane)				
4–Methylphenol				
N–Nitroso–di–n–propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2–Nitrophenol				
2,4–Dimethylphenol				
bis(2–Chloroethoxy)methane				
2,4–Dichlorophenol				
1,2,4–Trichlorobenzene				
Naphthalene				
4–Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				
4–Chloro–3–methylphenol				
2–Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6–Trichlorophenol				
2,4,5–Trichlorophenol				
2–Chloronaphthalene				
2–Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6–Dinitrotoluene	UJ	UJ	UJ	UJ
3–Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	WC–SD02–612	SD01–06	HM–SD01–06D	HM–SD01–612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4–Dinitrophenol				
Dibenzofuran				
4–Nitrophenol	UJ	UJ	UJ	UJ
2,4–Dinitrotoluene				
Diethylphthalate				
Fluorene				
4–Chlorophenyl–phenylether				
4–Nitroaniline	UJ	UJ	UJ	UJ
4,6–Dinitro–2–methylphenol				
N–Nitrosodiphenylamine				
4–Bromophenyl–phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di–n–butylphthalate				
Fluoranthene				
Pyrene				
Butylbenzylphthalate				
Benzo(a)anthracene				
3,3–Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene				
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di–n–octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3–cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	HM-SD02-06	HM-SD02-612	HM-SD03-06	HM-SD03-612	HC-SD03-06	HC-SD03-06D	HC-SD03-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND							
alpha-BHC							
beta-BHC							
delta-BHC							
gamma-BHC(Lindane)							
Heptachlor							
Aldrin							
Heptachlor Epoxide							
Endosulfan I							
Dieldrin							
4,4'-DDE							
Endrin							
Endosulfan II							
4,4'-DDD			2.5 J	1.1 J		2.0 J	4.0 J
Endosulfan Sulfate							
4,4'-DDT						1.2 J	
Methoxychlor			60 U		58 U	49 U	
Endrin Ketone							
Endrin Aldehyde							
alpha-Chlordane							
gamma-Chlordane							
Toxaphene							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5243

Client Sample ID:	WC-SD03-06	WC-SD03-612	WC-SD02-06	WC-SD02-612	HM-SD01-06	HM-SD01-06D	HM-SD01-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND							
alpha-BHC							
beta-BHC					UJ	7.3 J	3.8
delta-BHC				0.79 J			
gamma-BHC(Lindane)							
Heptachlor							
Aldrin			1.2 J			0.56 J	0.72 J
Heptachlor Epoxide							
Endosulfan I							
Dieldrin			3.7 J			0.58 J	1.5 J
4,4'-DDE			16			1.0 J	4.3
Endrin							
Endosulfan II							
4,4'-DDD			12			0.87 J	3.1
Endosulfan Sulfate							
4,4'-DDT	0.76 J		2.6 J	1.1 J			1.7 J
Methoxychlor	37 U	54 U	52 U	39 U		21 U	22 U
Endrin Ketone							
Endrin Aldehyde							
alpha-Chlordane							1.3 J
gamma-Chlordane							3.0
Toxaphene							
Aroclor 1016							
Aroclor 1221							
Aroclor 1232							
Aroclor 1242							
Aroclor 1248							
Aroclor 1254							
Aroclor 1260							

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MANAGERS DESIGNERS/CONSULTANTS

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5243

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: Zohreh Hamid 8-22-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5243

CASE SUMMARY

This data validation review consists of fourteen (14) soil samples received on 05-09,10-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

HC0306	HM0106	HM0306	HM3612	WC2612
HC036D	HM016D	HM1612	WC0206	WC3612
HC3612	HM0206	HM2612	WC0306	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

* ● Holding Time
* ● Calibration
● Contract Required Detection Limit Samples
● Blank Samples
● Interference Check Samples
● Matrix Spike
● Duplicate Digestion Samples
* ● Laboratory Control Sample
* ● Serial Dilution Sample
● Graphite Furnace Analysis
* ● Quarterly Verification of Instrument Parameters
* ● Sample Result Verification
* ● Preparation Logs
* ● Run Logs
● Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for arsenic (125% & 151%) in two different analysis runs, lead (126.7%) in graphite furnace and Sb (171.9/150.4%) and Be (125.5%) in ICP were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code is not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	6.284	31
As	1.4	7
Ba	0.17	0.85
Be	0.231	1.6
Cu	1.046	5.0
Fe	6.046	30
Mg	2.475	12

* Action level = 5X the blank concentration.

The results for Al, Fe, and Mg were above the action levels. The reported sample results for other analytes up to the action limits are qualified "U", due to the laboratory blank contamination.

Sodium was detected in the preparation blank at a level above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

Antinomy and beryllium were detected in the initial and continuing calibration blanks, respectively, at levels above the CRDL. The reported sample results are rejected.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

The calcium recovery (0.0%) in ICSA solution was below the 80% requirement limit. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recovery for Sb (72%) in the matrix spike sample was below the requirement limit of 75%. The reported positive sample results and non-detected values should be qualified estimated. The reported sample data are biased low. However, the positive results are rejected due to the laboratory blank contaminations. Therefore, the non-detected values are qualified estimated.

LABORATORYDUPLICATE SAMPLES

The RPDs for Al (42.8%) and Fe (27.4%) were above the analysis requirement limits. The reported positive results for Al are qualified estimated. The results for iron are accepted unqualified since the RPD was within the data validation requirement limit.

Two sets of field duplicate analyses were analyzed with this batch of samples. The RPD for Al in field duplicates HC0306/306D was above the 50% requirement. The results for Al are qualified estimated. The RPDs for all analytes were within the control limits in field duplicates HM0106/106D.

SERIAL DILUTION ANALYSIS

The %Ds for Al (216.1%) and Fe (77.6%) were above the validation requirements. The reported positive sample results are qualified estimated in the samples.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
HC0306	Se	80
HC036D	Se	78
HC3612	Se	61
HM0106	As/Pb	118*/75
HM016D	As/Pb	119*/75
HM0206	Se	53
HM0306	Se	62
HM1612	Se	72
HM2612	Se	80
HM3612	Se	49
WC0206	As/Se	116.5*/60
WC0306	Se	73
WC3612	Se	45

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

The analytical spike recovery for Se in sample WC2612 was 107%. The result was inadvertently flagged with "W" by the laboratory.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, silver and thallium were analyzed by graphite furnace.

The results for As in sample HM0206 and Pb in samples HC0301, HC036D, HC3612, HM1612, WC0306, and WC3612 were obtained by Method of Standard Addition. The linearity met the requirements for all samples with the exception of lead analysis in sample HC3612. The reported sample result for lead in this sample is rejected due to the matrix interferences and/or the analytical problems.

SUMMARY

The data package completeness was satisfactory. The quality of the analyses was fair. The results for Sb, Be, and Na are rejected due to the high level of contaminations in the laboratory blanks. Other minor problems have been discussed. The reported sample data are accepted with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5243

Client Sample ID:			HC0306	HC036D	HC3612	HM0106	HM016D	HM0206	HM0306
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			29.4	34.4	27.2	82.2	80.2	35	28.2
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	20	3210 J	7310 J	14000 J	457 J	337 J	13600 J	8760 J
Antimony	P	46	15.9 R	14 R	UJ	6.4 R	7.7 R	13 R	UJ
Arsenic	F	1.2	7.5 U	6.5 U	7.9 U	1.3 U		16.8 U	9.5 U
Barium	P	1.0	3.9 U	10.2	17.2	3.4 U	2.1 U	18.7	11
Beryllium	P	1.0	0.95 R	0.92 R	1.3 R	0.29 R	0.12 R	1.2 R	1.2 R
Cadmium	F	0.2	0.66	0.08		0.03	0.11	0.08	0.05
Calcium	P	1700	3380 J	3350 J	3310 J	282 J	508 J	4250 J	2920 J
Chromium	P	7.0	16.1	18.8	41.6	1.6	1.1	38.4	30.7
Cobalt	P	11		4.5	5			4.4	
Copper	P	2.0	4.9 U	4.3 U	3.5 U	0.89 U	1.2 U	5.4 U	4.9 U
Iron	P	13	7280 J	11100 J	17700 J	262 J	225 J	15800 J	16900 J
Lead	F	0.6	5.3	3.7	8.6 R	0.62 J	0.74 J	6	9.2
Magnesium	P	13	4420	4130	6540	35.5	26.7	4940	5700
Manganese	P	2	17.1	35.1	64.7	1.9	1.3	67.2	50.2
Mercury	AV	0.1	0.34	0.25	0.42	0.09	0.16	0.27	0.35
Nickel	P	11	9.9	5.5	12.1			11.2	14.2
Potassium	P	2440	1420	1250	1840			1510	1720
Selenium	F	1.4	UJ	UJ	UJ			0.4 J	UJ
Silver	F	0.2				0.49			
Sodium	P	2370	14100 R	9860 R	6620 R	R	R	3750 R	15100 R
Thallium	F	0.5		0.29	0.44			0.37	
Vanadium	P	11	20.5	18.4	36.9	0.84		27.1	28.4
Zinc	P		20.8	34.3	40	9.7	6.7	43.1	34.1

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5243

Client Sample ID:			HM1612	HM2612	HM3612	WC0206	WC0306	WC2612	WC3612
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			77	31.2	37.6	33	46.2	48	31.6
Units:			MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS									
		IDL (ug/L)							
Aluminium	P	20	505 J	9850 J	9760 J	14800 J	11500 J	8200	14600 J
Antimony	P	46	UJ	UJ	UJ	22.4 R	18.4 R	UJ	15.3 R
Arsenic	F	1.2	0.77 U	9.6 U	24.1 U	2.8 U	2.9 U	2.2 U	3.7 U
Barium	P	1.0	3.9 U	13.7	12.9	28.2	14.6	13.3	19.2
Beryllium	P	1.0	0.13 R	1 R	1 R	1.1 R	0.88 R	0.61 R	1.2 R
Cadmium	F	0.2	0.03	0.06	0.03	0.26	0.06	0.12	0.07
Calcium	P	1700	2850 J	7860 J	2000 J	4060 J	2190 J	3260 J	3380 J
Chromium	P	7.0	1.5	28.1	36	18.1	30.3	8.7	42.6
Cobalt	P	11			4	3.5			3.9
Copper	P	2.0	1.4 U	3.7 U	4.1 U	8.7 U	3.6 U	4.4 R	4 U
Iron	P	13	350 J	32400 J	19900 J	14600 J	12500 J	8120	20700 J
Lead	F	0.6	1	7.2	5.7	16.9	5.1	11.9	5.5
Magnesium	P	13	34.4	3000	4300	1690	4420	618	6060
Manganese	P	2	1.6	55.5	61.3	40.2	43	26	47.8
Mercury	AV	0.1	0.18	0.32	0.27	0.4	0.23	0.36	0.26
Nickel	P	11		9.6	10.3	5.7	8.1	3.8	11.4
Potassium	P	2440		1600	1760		1410		1590
Selenium	F	1.4	0.25 J	UJ	UJ	UJ	UJ		UJ
Silver	F	0.2							
Sodium	P	2370		985 R	8980 R	1540 R	4800 R	585 R	12200 R
Thallium	F	0.5	0.13	0.32			0.24	11.9	
Vanadium	P	11	0.66	30	29.5	21	21.4	27.8	31
Zinc	P		8.3	33.2	29.9	52	28.3		27.2

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5296

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 8-23-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-24-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5296

INTRODUCTION

This quality assurance review is based upon a review of all data generated from sixteen water samples, two trip blanks and one rinsate blank collected on 05-10,11,12,13-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 601/602 for specific Volatile compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The chain-of-custody for the soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (7 days from collection to analysis), has been exceeded for both samples. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The RRFs, for the semivolatile 20 ng standard in the initial calibration, were reported incorrectly. However, the RRFs were calculated versus the actual 20 ng standard values and are correct. The laboratory should resubmit the Form VI.

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-21-94	HP4.i	Chloroethane	32.0
		Acetone	37.4
		2-Butanone	30.3

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-16-94	HP1.i	3,3-Dichlorobenzidine	50.8
		2,2'-oxybis(1-chloropropane)	55.4
		N-Nitroso-di-n-propylamine	27.3
		Hexachlorobutadiene	28.6
		Hexachlorocyclopentadiene	28.2
		Dimethylphthalate	91.3
		4-Nitrophenol	53.3
		Butylbenzylphthalate	28.5
		Bis(2-ethylhexyl)phthalate	26.9
		Di-n-octylphthalate	41.1
CC 05-20-94	HP1.i	4-Chloroaniline	29.7
		3-Nitroaniline	40.8
		3,3-Dichlorobenzidine	34.6
		2,4-Dinitrophenol	32.8
		4-Nitrophenol	35.3
		Bis(2-ethylhexyl)phthalate	27.6
CC 05-21-94	HP1.i	3-Nitroaniline	41.9
		4-Nitroaniline	34.8
		3,3-Dichlorobenzidine	29.9
		4-Nitrophenol	42.9
		Bis(2-ethylhexyl)phthalate	27.8
CC 05-23-94	HP1.i	3-Nitroaniline	36.9
		4-Nitroaniline	29.4
		4-Nitrophenol	34.2
CC 05-24-94	HP1.i	3-Nitroaniline	32.3
		4-Nitroaniline	39.1
		4-Nitrophenol	44.8
		Butylbenzylphthalate	27.8
		bis(2-ethylhexyl)phthalate	40.0

Volatiles (601/602)

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

BLANKS

Semivolatile

The following method blank contained a common contaminant at a level below the CRQL. Since this compound was not detected in the associated samples, no action is required on this basis.

BLANK	COMPOUND	LEVEL
SBLKA	Diethylphthalate	5 ug/L

Pesticide/PCBs

The following method blank contained several target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLKA)	Delta-BHC	0.12 ug/L
	Methoxychlor	0.016 ug/L

SURROGATE RECOVERIES

Semivolatiles

The following surrogate recovery was outside the QC limits.

SAMPLE NO.	SURROGATE COMPOUND	RECOVERY	QC LIMITS
35-MW21S-02	2-Fluorobiphenyl	27	43-116

Since only one surrogate recovery was outside the QC limits in this sample analysis no qualification is required due to this surrogate outlier.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE COMPOUND	REASON
35-MW-29A-01	52/- 21/58	TCX DCB	Advisory Criteria 60-150%
35-MW29BW-01	43/-	DCB	Advisory Criteria 60-150%
35-MW21S-02	55/-	DCB	Advisory Criteria 60-150%
35-MW21D-02	48/-	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

Volatiles (601/602)

The bromofluorobenzene surrogate recovery (72%) was below the 75-125% QC limits in the analysis of sample 35-MB29BW-01. Since no action is required based on this outlier, no qualification has been applied. All other recoveries were within the QC limits.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles and Pesticide/PCBs

MS/MSD analyses were not performed with these samples, since the QC sample was not identified on the chain-of-custody. No qualification is required due to the lack of these QC samples.

Semivolatile

The MS/MSD recoveries for 4-nitrophenol (85/88%) were outside the QC limits of 10-80% in the analyses of 35-MW09S-02 MS/MSD. Since this compound was not detected in the unspiked sample, no action is required on this basis.

Volatiles (601/602)

Most of the spike recoveries were within the 60-140% QC range, with the exception of those listed below. Since these compounds were not detected in the samples, no action is required.

SAMPLE	SPIKE COMPOUND	RECOVERY
MSD	Bromodichloromethane	147
MS	1,2-Dichlorobenzene	168
MSD	1,2-Dichlorobenzene	183
LCS	1,2-Dichlorobenzene	169
MS	Chlorobenzene	148
MSD	Chlorobenzene	150
MS/MSD/LCS	1,2-Dichlorobenzene	155/150/160

LABORATORYCONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Semivolatiles

Sample 35-MW09S-02 was not listed on the Form VIII, page 161. The laboratory should correct and resubmit this page.

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-MW09D-02	Perylene-d_{12}	339476	416089-1664356
35-MW09S-02	Perylene-d_{12}	51467	416089-1664356

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-MW19S-02	Perylene-d_{12}	341625	416089-1664356
35-MW09S-02RE	Perylene-d_{12}	21185	441788-1767154
35-MW09D-02RE	Perylene-d_{12}	268488	441788-1767154
35-MW19S-02RE	Perylene-d_{12}	330658	441788-1767154

These samples are exhibiting matrix effects; therefore the non-detects quantified in reference to perylene in the original analyses are qualified estimated since positive results were not detected.

FIELD DUPLICATE RESULTS

Semivolatile

Two sets of field duplicate analyses were provided with this batch of samples (35-10D-02/35-10D-02D) and (35-19S-02/35-19S-02D). The sample result reproducibility was satisfactory.

Volatiles/Pesticide/PCBs

A set of field duplicate analyses was not provided with this batch of samples, no action is required due to the lack of the field QC sample.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35–TB30	35–TB31
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
COMPOUND		
Chloromethane	UJ	UJ
Bromomethane	UJ	UJ
Vinyl Chloride	UJ	UJ
Chloroethane	UJ	UJ
Methylene Chloride	UJ	UJ
Acetone	UJ	UJ
Carbon Disulfide	UJ	UJ
1,1–Dichloroethene	UJ	UJ
1,1–Dichloroethane	UJ	UJ
1,2–Dichloroethene (TOTAL)	UJ	UJ
Chloroform	UJ	UJ
1,2–Dichloroethane	UJ	UJ
2–Butanone	UJ	UJ
1,1,1–Trichloroethane	UJ	UJ
Carbon Tetrachloride	UJ	UJ
Bromodichloromethane	UJ	UJ
1,2–Dichloropropane	UJ	UJ
cis–1,3–Dichloropropene	UJ	UJ
Trichloroethene	UJ	UJ
Dibromochloromethane	UJ	UJ
1,1,2–Trichloroethane	UJ	UJ
Benzene	UJ	UJ
Trans–1,3–Dichloropropene	UJ	UJ
Bromoform	UJ	UJ
4–Methyl–2–Pentanone	UJ	UJ
2–Hexanone	UJ	UJ
Tetrachloroethene	UJ	UJ
1,1,2,2–Tetrachloroethane	UJ	UJ
Toluene	UJ	UJ
Chlorobenzene	UJ	UJ
Ethylbenzene	UJ	UJ
Styrene	UJ	UJ
Xylene (total)	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW29A-01	35-MW29BW-01	35-MW09S-02	35-MW09D-02	35-MW10D-02D
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol					
bis(2-Chloroethyl)ether					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol	17	UJ			
2,2'-oxybis(1-Chloropropane)	UJ				
4-Methylphenol					
N-Nitroso-di-n-propylamine	UJ	UJ			
Hexachloroethane					
Nitrobenzene					
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol	74				
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene	71				
4-Chloroaniline			UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ			
4-Chloro-3-methylphenol					
2-Methylnaphthalene	81 J				
Hexachlorocyclopentadiene	UJ	UJ			
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6-Dinitrotoluene					
3-Nitroaniline			UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW29A-01	35-MW29BW-01	35-MW09S-02	35-MW09D-02	35-MW10D-02D
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol			UJ	UJ	UJ
Dibenzofuran					
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene					
Diethylphthalate	UJ	UJ			
Fluorene					
4-Chlorophenyl-phenylether					
4-Nitroaniline					
4,6-Dinitro-2-methylphenol					
N-Nitrosodiphenylamine					
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di-n-butylphthalate					
Fluoranthene					
Pyrene					
Butylbenzylphthalate	UJ	UJ			
Benzo(a)anthracene					
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ
Chrysene					
bis(2-Ethylhexyl)phthalate	UJ	UJ			
Di-n-octylphthalate	UJ	UJ	UJ	UJ	
Benzo(b)fluoranthene			UJ	UJ	
Benzo(k)fluoranthene			UJ	UJ	
Benzo(a)pyrene			UJ	UJ	
Indeno(1,2,3-cd)pyrene			UJ	UJ	
Dibenz(a,h)anthracene			UJ	UJ	
Benzo(g,h,i)perylene			UJ	UJ	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW10D-02	35-MW14S-02	35-MW14D-02	35-MW16D-02	35-MW10S-02
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol					
bis(2-Chloroethyl)ether					
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol					
N-Nitroso-di-n-propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone					
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6-Dinitrotoluene					
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW10D-02	35-MW14S-02	35-MW14D-02	35-MW16D-02	35-MW10S-02
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
2,4-Dinitrophenol	UJ	UJ	UJ	UJ	UJ
Dibenzofuran					
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene					
Diethylphthalate					
Fluorene					
4-Chlorophenyl-phenylether					
4-Nitroaniline					
4,6-Dinitro-2-methylphenol					
N-Nitrosodiphenylamine					
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di-n-butylphthalate					
Fluoranthene					
Pyrene					
Butylbenzylphthalate					
Benzo(a)anthracene					
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ
Chrysene					
bis(2-Ethylhexyl)phthalate					
Di-n-octylphthalate					
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(a)pyrene					
Indeno(1,2,3-cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35–RB20	35–MW16S–02	35–MW19S–02	35–MW19S–02D	35–MW19D–02
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
Phenol		11			
bis(2–Chloroethyl)ether					
2–Chlorophenol					
1,3–Dichlorobenzene					
1,4–Dichlorobenzene					
1,2–Dichlorobenzene					
2–Methylphenol					
2,2'–oxybis(1–Chloropropane)					
4–Methylphenol		6 J			
N–Nitroso–di–n–propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone					
2–Nitrophenol					
2,4–Dimethylphenol					
bis(2–Chloroethoxy)methane					
2,4–Dichlorophenol					
1,2,4–Trichlorobenzene					
Naphthalene		75			
4–Chloroaniline	UJ	UJ	UJ	UJ	
Hexachlorobutadiene					
4–Chloro–3–methylphenol					
2–Methylnaphthalene		70			
Hexachlorocyclopentadiene					
2,4,6–Trichlorophenol					
2,4,5–Trichlorophenol					
2–Chloronaphthalene					
2–Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6–Dinitrotoluene					
3–Nitroaniline	UJ	UJ	UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35–RB20	35–MW16S–02	35–MW19S–02	35–MW19S–02D	35–MW19D–02
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
2,4–Dinitrophenol	UJ	UJ	UJ	UJ	
Dibenzofuran					
4–Nitrophenol	UJ	UJ	UJ	UJ	UJ
2,4–Dinitrotoluene					
Diethylphthalate					
Fluorene					
4–Chlorophenyl–phenylether					
4–Nitroaniline					UJ
4,6–Dinitro–2–methylphenol					
N–Nitrosodiphenylamine					
4–Bromophenyl–phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di–n–butylphthalate					
Fluoranthene					
Pyrene					
Butylbenzylphthalate					
Benzo(a)anthracene					
3,3–Dichlorobenzidine	UJ	UJ	UJ	UJ	UJ
Chrysene					
bis(2–Ethylhexyl)phthalate	56				UJ
Di–n–octylphthalate			UJ		
Benzo(b)fluoranthene			UJ		
Benzo(k)fluoranthene			UJ		
Benzo(a)pyrene			UJ		
Indeno(1,2,3–cd)pyrene			UJ		
Dibenz(a,h)anthracene			UJ		
Benzo(g,h,i)perylene			UJ		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW21S-02	35-MW21D-02
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
Phenol		
bis(2-Chloroethyl)ether		
2-Chlorophenol		
1,3-Dichlorobenzene		
1,4-Dichlorobenzene		
1,2-Dichlorobenzene		
2-Methylphenol		
2,2'-oxybis(1-Chloropropane)		
4-Methylphenol		
N-Nitroso-di-n-propylamine		
Hexachloroethane		
Nitrobenzene		
Isophorone		
2-Nitrophenol		
2,4-Dimethylphenol		
bis(2-Chloroethoxy)methane		
2,4-Dichlorophenol		
1,2,4-Trichlorobenzene		
Naphthalene	499	
4-Chloroaniline		
Hexachlorobutadiene		
4-Chloro-3-methylphenol		
2-Methylnaphthalene	668	
Hexachlorocyclopentadiene		
2,4,6-Trichlorophenol		
2,4,5-Trichlorophenol		
2-Chloronaphthalene		
2-Nitroaniline		
Dimethylphthalate		
Acenaphthylene		
2,6-Dinitrotoluene		
3-Nitroaniline	UJ	UJ
Acenaphthene		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5296

Client Sample ID:	35-MW21S-02	35-MW21D-02
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
2,4-Dinitrophenol		
Dibenzofuran		
4-Nitrophenol	UJ	UJ
2,4-Dinitrotoluene		
Diethylphthalate		
Fluorene	22	
4-Chlorophenyl-phenylether		
4-Nitroaniline	UJ	UJ
4,6-Dinitro-2-methylphenol		
N-Nitrosodiphenylamine		
4-Bromophenyl-phenylether		
Hexachlorobenzene		
Pentachlorophenol		
Phenanthrene	52	
Anthracene	7 J	
Carbazole	12	
Di-n-butylphthalate		
Fluoranthene		
Pyrene		
Butylbenzylphthalate		
Benzo(a)anthracene		
3,3-Dichlorobenzidine	UJ	UJ
Chrysene		
bis(2-Ethylhexyl)phthalate	UJ	UJ
Di-n-octylphthalate		
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(a)pyrene		
Indeno(1,2,3-cd)pyrene		
Dibenz(a,h)anthracene		
Benzo(g,h,i)perylene		

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B5296

Client Sample ID:	35-MW29A-01	35-MW29BW-01	35-MW21S-02	35-MW21D-02
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
alpha-BHC				
beta-BHC	0.022 J		0.023 J	
delta-BHC		0.05 J		
gamma-BHC(Lindane)				
Heptachlor	0.011 J			
Aldrin	0.017 J		0.013 J	
Heptachlor Epoxide				
Endosulfan I				
Dieldrin				
4,4'-DDE				
Endrin				
Endosulfan II				
4,4'-DDD		0.21 J		
Endosulfan Sulfate				
4,4'-DDT				
Methoxychlor	0.5 U			
Endrin Ketone				
Endrin Aldehyde				
alpha-Chlordane				
gamma-Chlordane				
Toxaphene				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-MW29A-01	35-MW29BW-01	35-MW09S-02	35-MW09D-02	35-MW10D-02D	35-MW10D-02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	10	1	1	50	50
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene		53		3.3	894	973
Trans-1,2-Dichloroethene		6			100	102
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene		255		6.1	591	649
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA		NA			
Bromoform	NA		NA			
Bromomethane	NA		NA			
Carbon Tetrachloride	NA		NA			
Chlorobenzene	NA		NA			
Chloroethane	NA		NA			
Chloroform	NA		NA			
Chloromethane	NA		NA			
Dibromochloromethane	NA		NA			
1,2-Dichlorobenzene	NA		NA			
1,3-Dichlorobenzene	NA		NA			

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-MW29A-01	35-MW29BW-01	35-MW09S-02	35-MW09D-02	35-MW10D-02D	35-MW10D-02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	10	1	1	50	50
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene	NA		NA			
Dichlorodifluoromethane	NA		NA			
1,1-Dichloroethene	NA		NA			
1,2-Dichloroethane	NA		NA			
1,1-Dichloroethane	NA		NA			
Cis-1,2-Dichloroethene	NA	70	NA	3.8	1530	1140
Trans-1,2-Dichloroethene	NA	3	NA		174	228
1,2-Dichloropropane	NA		NA			
Cis-1,3-Dichloropropene	NA		NA			
Trans-1,3-Dichloropropene	NA		NA			
Methylene Chloride	NA		NA			
1,1,2,2-Tetrachloroethane	NA		NA			
Tetrachloroethene	NA		NA			
1,1,1-Trichloroethane	NA		NA			
1,1,2-Trichloroethane	NA		NA			
Trichloroethene	NA	468	NA	10.9	1420	855
Trichlorofluoromethane	NA		NA			
Vinyl Chloride	NA		NA			
METHOD: EPA 602/1						
Benzene	4.1	2.5		1.2		
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	2.4	0.9	0.7	1.6	85	36
Toluene	2.2	1.6	0.3	1.2	41	59
Xylenes	6.6	1.9	2.0	3.3	99	135
Methyl Tertiary Butyl Ether		22.3			250	241
METHOD: EPA 602/2						
Benzene	3.6	2.8		1.5		
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	1.3		0.4	0.5	12	28
Toluene	1.4	1.3	0.3	0.6	17	31
Xylenes	2.9	1.5	1.2	1.0	40	91

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-TB29	35-MW14S-02	35-MW14D-02	35-MW16D-02	35-MW10S-02	35-RB20
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	25	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						3.1
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene		682	185		32.0	
Trans-1,2-Dichloroethene		47	18		2.6	
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene		299	180		3.8	
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA			NA		
Bromoform	NA			NA		
Bromomethane	NA			NA		
Carbon Tetrachloride	NA			NA		
Chlorobenzene	NA			NA		
Chloroethane	NA			NA		
Chloroform	NA			NA		6.3
Chloromethane	NA			NA		
Dibromochloromethane	NA			NA		
1,2-Dichlorobenzene	NA			NA		
1,3-Dichlorobenzene	NA			NA		

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-TB29	35-MW14S-02	35-MW14D-02	35-MW16D-02	35-MW10S-02	35-RB20
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	25	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene	NA			NA		
Dichlorodifluoromethane	NA			NA		
1,1-Dichloroethene	NA			NA		
1,2-Dichloroethane	NA			NA		
1,1-Dichloroethane	NA			NA		
Cis-1,2-Dichloroethene	NA			NA		
Trans-1,2-Dichloroethene	NA			NA		
1,2-Dichloropropane	NA			NA		
Cis-1,3-Dichloropropene	NA	942	256	NA	35.1	
Trans-1,3-Dichloropropene	NA	49	20	NA	1.8	
Methylene Chloride	NA			NA		
1,1,2,2-Tetrachloroethane	NA			NA		
Tetrachloroethene	NA			NA		
1,1,1-Trichloroethane	NA			NA		
1,1,2-Trichloroethane	NA			NA		
Trichloroethene	NA	548	270	NA	5.9	
Trichlorofluoromethane	NA			NA		
Vinyl Chloride	NA			NA		
METHOD: EPA 602/1						
Benzene	NA			0.5	3.4	
Chlorobenzene	NA					
1,2-Dichlorobenzene	NA					
1,3-Dichlorobenzene	NA					
1,4-Dichlorobenzene	NA					
Ethylbenzene	NA	18	6	1.1	0.9	
Toluene	NA	17	12	1.0	0.6	0.6
Xylenes	NA	54	19	2.5	2.3	1.4
Methyl Tertiary Butyl Ether	NA	92.5	43.9			
METHOD: EPA 602/2						
Benzene	NA			0.6	2.9	
Chlorobenzene	NA					
1,2-Dichlorobenzene	NA					
1,3-Dichlorobenzene	NA					
1,4-Dichlorobenzene	NA					
Ethylbenzene	NA	6	2	0.2	0.3	
Toluene	NA	10	3	0.3	0.5	0.3
Xylenes	NA	23	7	0.5	1.0	0.7

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-MW16S-02	35-MW19S-02	35-MW19S-02D	35-MW19D-02	35-MW21S-02	35-MW21D-02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene		26.0	26.4	664		13.9
Trans-1,2-Dichloroethene		6.0	6.1	176		1.5
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene			0.8			
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene		26.8	26.1	900		8.3
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA				NA	
Bromoform	NA				NA	
Bromomethane	NA				NA	
Carbon Tetrachloride	NA				NA	
Chlorobenzene	NA				NA	
Chloroethane	NA				NA	
Chloroform	NA				NA	
Chloromethane	NA				NA	
Dibromochloromethane	NA				NA	
1,2-Dichlorobenzene	NA				NA	
1,3-Dichlorobenzene	NA				NA	

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5296

Client Sample ID:	35-MW16S-02	35-MW19S-02	35-MW19S-02D	35-MW19D-02	35-MW21S-02	35-MW21D-02
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene	NA				NA	
Dichlorodifluoromethane	NA				NA	
1,1-Dichloroethene	NA				NA	
1,2-Dichloroethane	NA				NA	
1,1-Dichloroethane	NA				NA	
Cis-1,2-Dichloroethene	NA	31.1	33.9	835	NA	18.2
Trans-1,2-Dichloroethene	NA	6.3	7.9	171	NA	3.1
1,2-Dichloropropane	NA				NA	
Cis-1,3-Dichloropropene	NA				NA	
Trans-1,3-Dichloropropene	NA				NA	
Methylene Chloride	NA				NA	
1,1,2,2-Tetrachloroethane	NA				NA	
Tetrachloroethene	NA		0.7		NA	
1,1,1-Trichloroethane	NA				NA	
1,1,2-Trichloroethane	NA				NA	
Trichloroethene	NA	44.1	48.3	1360	NA	13.9
Trichlorofluoromethane	NA				NA	
Vinyl Chloride	NA				NA	
METHOD: EPA 602/1						
Benzene	698				210	
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	420	0.8	0.5	29	824	0.7
Toluene	984	0.6	0.5	12	45	0.6
Xylenes	1700	1.8	1.5	50	1320	2.1
Methyl Tertiary Butyl Ether	34.1			319		
METHOD: EPA 602/2						
Benzene	550				217	
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	232	0.2	0.2	6	507	0.4
Toluene	647	0.6	0.3	7	45	0.5
Xylenes	899	0.8	0.7	18	994	2.2

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1 Weston Way
West Chester, Pennsylvania 19380-1499
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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5296

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-22-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5296

CASE SUMMARY

This data validation review consists of seventeen (17) water samples received on 05-12,13,14-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

19S02D	35RB20	MW1002	MW16D2	MW21D2	MW29BW
35MW4D	MW09D2	MW102D	MW16S2	MW21S2	W19D02
35MW4S	MW09S2	MW10S2	MW19S2	MW29A1	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

- Holding Time
- Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- Interference Check Samples
- Matrix Spike
- Duplicate Digestion Samples
- Laboratory Control Sample
- Serial Dilution Sample
- Graphite Furnace Analysis
- * Quarterly Verification of Instrument Parameters
- * Sample Result Verification
- * Preparation Logs
- * Run Logs
- Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIME

The analysis holding time for mercury in all samples and the corresponding QC samples exceeded the requirement limit. The reported sample data is qualified estimated.

CALIBRATION ANALYSIS

The percent recovery for Be (80%) in initial calibration analyzed by graphite furnace was below the requirement limit of 90%. The reported sample data for the corresponding samples are qualified estimated.

The percent recovery for Se (87.6%) was below the 90% requirement in the continuing calibration. The data are not impacted since this calibration was analyzed after the sample analysis.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for lead (143.3%/143.3%) in two different analysis runs, As (126%), Cd (62%), Se (122%) in graphite furnace and Sb (133.5/148%), Be (130%), Cr (132.5%), and Zn (123.6%) in ICP analysis were outside the data validation requirement limits of 80-120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits. The non-detected values for Cd are also qualified estimated.

In the second analysis, the CRDL recoveries for Sb (124.5%) and Pb (143.3%) analyzed by graphite furnace and all ICP elements were outside the requirement limits. The reported sample data for the affected samples (MW29A1 and MW29BW) are qualified estimated.

Note: The additional qualifier code is not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Ba	1.0	5
Cu	4	20
Pb	1.3	6.5
Mg	19	195
Ag	-6	**

* Action level = 5X the blank concentration.

** The reported sample data are not impacted when the absolute concentration of an analyte is less than 2X the IDL.

The reported sample results up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

Zinc was detected in the calibration blank at a level above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

The second blanks had Sb, As, Cr, Cu, Fe, Mg, Mn, Hg, Ni, and Ag at levels below the CRDLs. The reported affected sample results (MW29A1 and MW29BW) up to 5X the blank contamination are qualified "U".

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution in second analysis run. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

Also, the recoveries for Cr (124/133.8%) were above 120% requirement limits in the initial and final ICP check sample analyses. The reported sample data are qualified.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recoveries for Sb (0.0%), As (16.2%), and Se (52.0%) in matrix spike sample MW19S2 and the matrix spike recovery for Sb (73.3%) in matrix spike sample MW29A1 were below the requirement limit of 75%. The worse case has been applied. The reported positive sample results for Se, As, and Se are qualified estimated and the non-detected values are rejected, due to the extremely low matrix spike recovery. The reported results are biased low and the possibility of false negatives exist.

LABORATORYDUPLICATE SAMPLES

Two sets of laboratory duplicate sample analyses were performed. The RPDs for Pb were above the analysis requirement limits. The reported positive results are not qualified based on this outlier, since the RPD was within the data validation requirement limit.

One set of field duplicate analyses was analyzed with this batch of samples. The RPDs were within the requirement limits.

SERIAL DILUTION ANALYSIS

The %D for Ba (11.3%) was above the analysis requirement limits. The %D was within the data validation control limits. Therefore, the data are accepted unqualified.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
19S02D	As	42
25MW4D	As/Se	80/55
MW09D2	As/Se	72.5/31**

SAMPLE ID	ANALYTE	% RECOVERY
MW09S2	Se	18**
MW1002	Se	7.9
MW102D	As	71
MW10S2	Se/Tl	41/83.5
MW16D2	As/Se	73.5/66
MW16S2	As/Cd/Se	60.5/118.5*/46
MW19S2	As/Se	51/70
MW21D2	As/Se	74/77
MW21S2	Se	48
MW29A1	Sb/Ag	75/120*
MW29BW	Se	63
W19D02	As	60

* Only the positive results are qualified estimated.

** The positive results are qualified and the non-detected values are rejected due to the extremely low analytical spike recovery.

The reported data are qualified estimated.

The analytical spike recovery for Sb (93.5%) was within the control limits in sample MW29BW. The result was inadvertently flagged with "W" by the laboratory. Cadmium in samples MW29BW and 35MW4S and chromium in sample MW29A1 were inadvertently flagged with "W".

SAMPLE RESULTS

The result for aluminum in sample MW29A1 was not reported on the Form I.

Results for Sb, Be, Cr, and Ag in samples MW29A1 and MW29BW were obtained by graphite furnace.

Results for As in samples 35MW4S, MW09S2, MW1002, MW10S2, and MW21S2 and Cd in samples MW10S2, MW21S2, and W19D02 were obtained by Method of Standard Addition. The linearity met the requirement limits with the exception of cadmium in sample MW10S2. The data are not qualified since the deviation was marginal.

SUMMARY

The data package completeness was fair. The quality of the data was poor. The sample data are presented in the data summary with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5296

Client Sample ID:			MW1002	MW102D	MW10S2	MW16D2	MW16S2	MW19S2
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER
Units:			UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
INORGANIC ELEMENTS		IDL (ug/L)						
Aluminium	P	20	24600	21000	218000	8870	158000	101000
Antimony	P	46	R	R	R	R	R	R
Arsenic	F	1.2	20.3 J	9.5 J	165 J	R	6.0 J	6.3 J
Barium	P	1.0	271	249	2230	82.0	870	287
Beryllium	P	1.0	6.0	5.0 J	40.0	4.0	34.0	11.0
Cadmium	F	0.2	3.6 J	3.0	19.7 R	1.3 J	8.2 J	10.2 J
Calcium	P	1700	443000	430000	2050000	131000	886000	104000
Chromium	P	7.0	206	181	1120	81.0	735	301
Cobalt	P	11			60.0		33.0	168
Copper	P	2.0	25.0	23.0	140	16.0	70.0	38.0
Iron	P	13	20900	18100	111000	31300	137000	139000
Lead	F	0.6	9.7 J	9.7 J	57.6	5.3 J	29.9	64.0
Magnesium	P	13	9690	8940	42600	5390	27200	9650
Manganese	P	2	83.0	77.0	462	344	408	684
Mercury	AV	0.1	UJ	UJ	UJ	UJ	UJ	UJ
Nickel	P	11	29.0	18.0	221	30.0	127	174
Potassium	P	2440	4670	3660	12800		8300	10900
Selenium	F	1.4	R	R	R	R	R	1.4 J
Silver	F	0.2			20.0		4.0	
Sodium	P	2370	9070	8970	45400	7540	4470	14600
Thallium	F	0.6	1.1		4.8 J		2.5	2.8
Vanadium	P	5.0	90.0	73.0	537	48.0	466	228
Zinc	P	11	147 R	146 R	947	138 R	689	714

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5296

Client Sample ID:			19S02D	35MW4D	35MW4S	35RB20	MW09D2	MW09S2
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER
Units:			UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
INORGANIC ELEMENTS		IDL (ug/L)						
Aluminium	P	20	91500	5110	114000	64.0	10800	93000
Antimony	P	46	R	R	R	R	R	R
Arsenic	F	1.2	4.3 J	2.9 J	30.2 J	2.0 J	7.8 J	86.5 J
Barium	P	1.0	252	118	2210	2.0	132	706
Beryllium	P	1.0	10.0	1.0	30.0		3.0	14.0
Cadmium	F	0.2	8.1 J	1.1 J	6.8 J	UJ	1.3 J	4.4 J
Calcium	P	1700	86900	164000	896000		202000	256000
Chromium	P	7.0	263	64.0	743		96.0	451
Cobalt	P	11	129		17.0			19.0
Copper	P	2.0	36.0	12.0	78.0	8.0	15.0	41.0
Iron	P	13	118000	5530	77700	74.0	10200	55300
Lead	F	0.6	58.1	4.4 J	23.6		10.7 J	35.7
Magnesium	P	13	8840	3970	25300	144	5180	13200
Manganese	P	2	523	32.0	195		49.0	273
Mercury	AV	0.1	UJ	UJ	UJ	UJ	UJ	UJ
Nickel	P	11	120		85.0		18.0	62.0
Potassium	P	2440	9990	3090	5590			9140
Selenium	F	1.4	R	2.0 J	13.5 J	R	1.7 J	2.1 J
Silver	F	0.2			4.0			
Sodium	P	2370	13300	8450	10500		9450	68200
Thallium	F	0.6	1.9		3.3			2.3
Vanadium	P	5.0	207	26.0	302		37.0	246
Zinc	P	11	589 R	151 R	493 R		91.0 R	867

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5296

Client Sample ID:			MW21D2	MW21S2	MW29A1	MW29BW	W19D02
Matrix:			WATER	WATER	WATER	WATER	WATER
Units:			UG/L	UG/L	UG/L	UG/L	UG/L
INORGANIC ELEMENTS		IDL (ug/L)					
Aluminium	P	20	4350	119000	113822	1880	23000
Antimony	P	46	R	R	10.2 J	3.8 J	R
Arsenic	F	1.2	1.9 J	103 J	14.9 J	2.9 J	4.5 J
Barium	P	1.0	77.0	1400	3440	93.0	99.0
Beryllium	P	1.0	1.0	29.0	3.8 J	0.14 J	12.0
Cadmium	F	0.2	1.0 J	11.1	11.0	0.31	15.0
Calcium	P	1700	330000	1200000	18900	132000	210000
Chromium	P	7.0	81.0	1050	292	4.6	201
Cobalt	P	11		32.0	168 J	12.0 J	118
Copper	P	2.0	11.0	83.0	38.0 J	4.0 J	21.0
Iron	P	13	9730	255000	117000	2260	63300
Lead	F	0.6	3.2 J	31.0	4.2 J	3.9 J	13.1
Magnesium	P	13	8590	33300	10700	3210	10200
Manganese	P	2	65.0	121	662	52.0 J	1420
Mercury	AV	0.1	UJ	UJ	UJ	UJ	UJ
Nickel	P	11		138	294	28.0 J	148
Potassium	P	2440		9000	8880		
Selenium	F	1.4	R	7.0 J	R	R	R
Silver	F	0.2			1.2 U	1.1 U	
Sodium	P	2370	23100	10900	14200	8450	
Thallium	F	0.6		4.5	5.0		1.6
Vanadium	P	5.0	33.0	447	425	8.0 J	99.0
Zinc	P	11	42.0 R	622	415	42.0 J	707

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5361

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 08-23-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 8-24-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5361

INTRODUCTION

This quality assurance review is based upon a review of all data generated from eighteen water samples and two trip blanks collected on 05-13,14,15,16-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 601/602 for Specific Volatile Compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

	• Data Completeness
*	• Holding Time
*	• GC/MS Tuning
	• Calibration
	• Blanks
	• Surrogate Recoveries
	• Matrix Spike/Spike Duplicate
	• Laboratory Control Sample
*	• Internal Standard
*	• Instrument Performance
	• Field Duplicate Results
*	• Compound Identification
*	• Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Volatiles

The Form I VOA-TIC was missing for sample 35-EMW03-03. The laboratory should provide this document.

Semivolatiles

Sample 35-MW22S-02 is not listed on the Form IV, page 169. The laboratory should correct and resubmit this document.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged, "J" and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-21-94	HP4.i	Chloroethane	32.0
		Acetone	37.4
		2-Butanone	30.3
CC 05-24-94	HP1.i	4-Nitrophenol	44.8
		Butylbenzylphthalate	27.8
		Bis(2-ethylhexyl)phthalate	40.0
		3-Nitroaniline	32.3
		4-Nitroaniline	39.1

Volatiles

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

Semivolatiles

The 20 ng RRFs reported on the Form VI, page 309 are incorrect as per the raw data. The average RRFs are correct; however, the laboratory must resubmit this form.

BLANKS

Pesticide/PCBs

The method and instrument blanks contained several target compounds at levels below the CRQLs. Since target compounds were not detected in the associated samples, no action is taken on this basis.

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were outside the QC limits:

SAMPLE	SURROGATE COMPOUND	RECOVERY	QC LIMITS
VBLK	1,2-Dichloroethane-d_4	74	76-121
RWMS	1,2-Dichloroethane-d_4	73	76-114
RWMSD	1,2-Dichloroethane-d_4	74	76-114
35-EMW03-03	1,2-Dichloroethane-d_4	75	76-114

The analyses were not reanalyzed. Since the SMC recoveries were below the QC limits, both the positive results and non-detects are qualified estimated and flagged "J" and "UJ". The blank outlier does not affect the other samples which met the SMC recovery criteria. These MS/MSD analyses are from another SDG.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608	SURROGATE COMPOUND	REASON
35-GWDW5-01D	58	DCB	Advisory Criteria 60-150%
35-GWDW5-01	34	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles

The MS/MSD provided with this batch of samples were not part of this SDG; therefore, a Form III and raw data are not provided. These QC samples do not affect the sample analyses.

Semivolatile and Pesticide/PCBs

MS/MSD analyses were not provided with this batch of samples. No qualification is required due to the lack of the QC analyses.

Volatiles (601/602)

Most of the spike recoveries were within the 60-140% QC range, with the exception of those listed below. Since these compounds were not detected in the samples, no action is required.

SAMPLE	SPIKE COMPOUND	RECOVERY
MS/MSD/LCS	1,2-Dichlorobenzene	148/167/155
LCS	Ethylbenzene	142

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

FIELD DUPLICATE RESULTS

Volatiles

A set of field duplicate analyses was not provided with this batch of samples. No qualification is required due to the lack of this field QC sample.

Semivolatile and Pesticide/PCBs

One set of field duplicate analyses was provided with this batch of samples (35-6WDW5-01D). The sample result reproducibility was satisfactory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: B5361

Client Sample ID:	35-EMW05-03	35-MW22D-02	35-MW25S-02	35-EMW03-03	35-TB33	35-TB32
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND						
Bromomethane				UJ		
Vinyl Chloride				UJ		
Chloroethane	UJ	UJ	UJ	UJ	UJ	UJ
Methylene Chloride				UJ		
Acetone	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide				UJ		
1,1-Dichloroethene				UJ		
1,1-Dichloroethane				UJ		
1,2-Dichloroethene	17	20		46 J		
Chloroform				UJ		
1,2-Dichloroethane				UJ		
2-Butanone	UJ	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane				UJ		
Carbon Tetrachloride				UJ		
Bromodichloromethane				UJ		
1,2-Dichloropropane				UJ		
Cis-1,3-Dichloropropene				UJ		
Trichloroethene	8			12 J		
Dibromochloromethane				UJ		
1,1,2-Trichloroethane				UJ		
Benzene			11	UJ		
Trans-1,3-Dichloropropene				UJ		
Bromoform				UJ		
4-Methyl-2-Pentanone				UJ		
2-Hexanone				UJ		
Tetrachloroethene				UJ		
1,1,2,2-Tetrachloroethane				UJ		
Toluene			73	UJ		
Chlorobenzene				UJ		
Ethylbenzene			128	UJ		
Styrene				UJ		
Xylene (total)			270	UJ		
Chloromethane				UJ		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35–EMW05–03	35–MW22D–02	35–MW25S–02	35–EMW03–03
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
Phenol				
bis(2–Chloroethyl)ether				
2–Chlorophenol				
1,3–Dichlorobenzene				
1,4–Dichlorobenzene				
1,2–Dichlorobenzene				
2–Methylphenol				
2,2'–oxybis(1–Chloropropane)				
4–Methylphenol				
N–Nitroso–di–n–propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone				
2–Nitrophenol				
2,4–Dimethylphenol				
bis(2–Chloroethoxy)methane				
2,4–Dichlorophenol				
1,2,4–Trichlorobenzene				
Naphthalene	7 J		123	
4–Chloroaniline				
Hexachlorobutadiene				
4–Chloro–3–methylphenol				
2–Methylnaphthalene			131	
Hexachlorocyclopentadiene				
2,4,6–Trichlorophenol				
2,4,5–Trichlorophenol				
2–Chloronaphthalene				
2–Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6–Dinitrotoluene				
3–Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35–EMW05–03	35–MW22D–02	35–MW25S–02	35–EMW03–03
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
2,4–Dinitrophenol				
Dibenzofuran			8 J	
4–Nitrophenol	UJ	UJ	UJ	UJ
2,4–Dinitrotoluene				
Diethylphthalate				
Fluorene			8 J	
4–Chlorophenyl–phenylether				
4–Nitroaniline	UJ	UJ	UJ	UJ
4,6–Dinitro–2–methylphenol				
N–Nitrosodiphenylamine				
4–Bromophenyl–phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene			10 J	
Anthracene				
Carbazole				
Di–n–butylphthalate				
Fluoranthene				
Pyrene				
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene				
3,3–Dichlorobenzidine				
Chrysene				
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di–n–octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3–cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35-EMW7-03	35-6WDW5-01D	35-6WDW5-01	35-FS03-LG-F01
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
Phenol				23
bis(2-Chloroethyl)ether				
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-propylamine		6 J		
Hexachloroethane				
Nitrobenzene				
Isophorone				
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				118
4-Chloroaniline				
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				152
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene				
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35-EMW7-03	35-6WDW5-01D	35-6WDW5-01	35-FS03-LG-F01
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
2,4-Dinitrophenol				
Dibenzofuran				14
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene				
Diethylphthalate				
Fluorene				21
4-Chlorophenyl-phenylether				
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				31
Anthracene				
Carbazole				13
Di-n-butylphthalate				
Fluoranthene				
Pyrene				
Butylbenzylphthalate	UJ	UJ	UJ	UJ
Benzo(a)anthracene				
3,3-Dichlorobenzidine				
Chrysene				
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35-MW25D-02
Matrix:	WATER
Dilution Factor:	1.0
Units:	ug/L

COMPOUND	
Phenol	
bis(2-Chloroethyl)ether	
2-Chlorophenol	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
1,2-Dichlorobenzene	
2-Methylphenol	
2,2'-oxybis(1-Chloropropane)	
4-Methylphenol	
N-Nitroso-di-n-propylamine	
Hexachloroethane	
Nitrobenzene	
Isophorone	
2-Nitrophenol	
2,4-Dimethylphenol	
bis(2-Chloroethoxy)methane	
2,4-Dichlorophenol	
1,2,4-Trichlorobenzene	
Naphthalene	
4-Chloroaniline	
Hexachlorobutadiene	
4-Chloro-3-methylphenol	
2-Methylnaphthalene	
Hexachlorocyclopentadiene	
2,4,6-Trichlorophenol	
2,4,5-Trichlorophenol	
2-Chloronaphthalene	
2-Nitroaniline	
Dimethylphthalate	
Acenaphthylene	
2,6-Dinitrotoluene	
3-Nitroaniline	UJ
Acenaphthene	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35–MW25D–02
Matrix:	WATER
Dilution Factor:	1.0
Units:	ug/L

COMPOUND	
2,4–Dinitrophenol	
Dibenzofuran	
4–Nitrophenol	UJ
2,4–Dinitrotoluene	
Diethylphthalate	
Fluorene	
4–Chlorophenyl–phenylether	
4–Nitroaniline	UJ
4,6–Dinitro–2–methylphenol	
N–Nitrosodiphenylamine	
4–Bromophenyl–phenylether	
Hexachlorobenzene	
Pentachlorophenol	
Phenanthrene	
Anthracene	
Carbazole	
Di–n–butylphthalate	
Fluoranthene	
Pyrene	
Butylbenzylphthalate	UJ
Benzo(a)anthracene	
3,3–Dichlorobenzidine	
Chrysene	
bis(2–Ethylhexyl)phthalate	UJ
Di–n–octylphthalate	
Benzo(b)fluoranthene	
Benzo(k)fluoranthene	
Benzo(a)pyrene	
Indeno(1,2,3–cd)pyrene	
Dibenz(a,h)anthracene	
Benzo(g,h,i)perylene	

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5361

Client Sample ID:	35-GWDW5-01D	35-GWDW5-01
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/kg

COMPOUND		
alpha-BHC		
beta-BHC		
delta-BHC		
gamma-BHC(Lindane)		
Heptachlor		
Aldrin		
Heptachlor Epoxide		
Endosulfan I		
Dieldrin		
4,4'-DDE		
Endrin		
Endosulfan II		
4,4'-DDD		
Endosulfan Sulfate		
4,4'-DDT		
Methoxychlor		
Endrin Ketone		
Endrin Aldehyde		
alpha-Chlordane		
gamma-Chlordane		
Toxaphene		
Aroclor 1016		
Aroclor 1221		
Aroclor 1232		
Aroclor 1242		
Aroclor 1248		
Aroclor 1254		
Aroclor 1260		

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-EMW05-03	35-MW22D-02	35-MW36BW-01	35-MW25S-02	35-EMW03-03	35-GWDW1-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene			6.9			
1,2-Dichloroethane						
1,1-Dichloroethane			7.6			
Cis-1,2-Dichloroethene						
Trans-1,2-Dichloroethene						
1,2-Dichloropropane						
Cis-1,3-Dichloropropene	35.4	38.3			90.5	
Trans-1,3-Dichloropropene	3.4				6.4	
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene	13.8	0.4			23.4	
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane						NA
Bromoform						NA
Bromomethane						NA
Carbon Tetrachloride						NA
Chlorobenzene						NA
Chloroethane						NA
Chloroform						NA
Chloromethane						NA
Dibromochloromethane						NA
1,2-Dichlorobenzene						NA
1,3-Dichlorobenzene						NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-EMW05-03	35-MW22D-02	35-MW36BW-01	35-MW25S-02	35-EMW03-03	35-GWDW1-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	10	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene						NA
Dichlorodifluoromethane						NA
1,1-Dichloroethene			9.7			NA
1,2-Dichloroethane						NA
1,1-Dichloroethane			13.4			NA
Cis-1,2-Dichloroethene	36.7	44.8			96.4	NA
Trans-1,2-Dichloroethene	4				6.2	NA
1,2-Dichloropropane						NA
Cis-1,3-Dichloropropene						NA
Trans-1,3-Dichloropropene						NA
Methylene Chloride						NA
1,1,2,2-Tetrachloroethane						NA
Tetrachloroethene						NA
1,1,1-Trichloroethane						NA
1,1,2-Trichloroethane						NA
Trichloroethene	21.2	0.2			36.7	NA
Trichlorofluoromethane						NA
Vinyl Chloride						NA
METHOD: EPA 602/1						
Benzene	0.6	1.7	0.5	25	0.3	
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.7	0.5	0.6	259	0.4	0.9
Toluene	0.5	0.5	0.7	122	0.4	
Xylenes	1.9	1.4	1.9	561	1.5	2.1
Methyl Tertiary Butyl Ether					12.7	
METHOD: EPA 602/2						
Benzene	1	2.1	0.3	18	0.3	
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.4	0.4	0.3	156	0.3	0.8
Toluene	0.4	0.4	0.4	95	0.4	
Xylenes	1.1	1.3	1	375	1	2.5

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-MW34BW-01	35-MW34AW-01	35-EMW7-03	35-MW30BW-01	35-GWDW5-01D	35-GWDW5-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	25	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene	11.6		353	485		
Trans-1,2-Dichloroethene			44	115		
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene	0.6		137	217		
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane		NA			NA	NA
Bromoform		NA			NA	NA
Bromomethane		NA			NA	NA
Carbon Tetrachloride		NA			NA	NA
Chlorobenzene		NA			NA	NA
Chloroethane		NA			NA	NA
Chloroform		NA			NA	NA
Chloromethane		NA			NA	NA
Dibromochloromethane		NA			NA	NA
1,2-Dichlorobenzene		NA			NA	NA
1,3-Dichlorobenzene		NA			NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-MW34BW-01	35-MW34AW-01	35-EMW7-03	35-MW30BW-01	35-GWDW5-01D	35-GWDW5-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	25	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene		NA			NA	NA
Dichlorodifluoromethane		NA			NA	NA
1,1-Dichloroethene		NA			NA	NA
1,2-Dichloroethane		NA			NA	NA
1,1-Dichloroethane		NA			NA	NA
Cis-1,2-Dichloroethene	14.4	NA	385	584	NA	NA
Trans-1,2-Dichloroethene		NA	33	121	NA	NA
1,2-Dichloropropane		NA			NA	NA
Cis-1,3-Dichloropropene		NA			NA	NA
Trans-1,3-Dichloropropene		NA			NA	NA
Methylene Chloride		NA			NA	NA
1,1,2,2-Tetrachloroethane		NA			NA	NA
Tetrachloroethene		NA			NA	NA
1,1,1-Trichloroethane		NA			NA	NA
1,1,2-Trichloroethane		NA			NA	NA
Trichloroethene	1.0	NA	171	347	NA	NA
Trichlorofluoromethane		NA			NA	NA
Vinyl Chloride		NA			NA	NA
METHOD: EPA 602/1						
Benzene	0.4		16	16		
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.6		11	11	0.7	1
Toluene	0.4		9	15	0.9	0.8
Xylenes	1.8	1.7	40	40	2.4	1.6
Methyl Tertiary Butyl Ether			86.8	223		
METHOD: EPA 602/2						
Benzene	0.3		6	9		
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.3		9	9	0.5	0.5
Toluene	0.4		9	11	0.5	0.5
Xylenes	1.2	0.7	29	29	1.5	1.5

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-GWDW4-01	35-MW31BW-01	35-MW35BW-01	35-MW22S-02	35-MW25D-02	35-MW36AW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	25	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene			5.7			2.1
1,2-Dichloroethane						
1,1-Dichloroethane						2.5
Cis-1,2-Dichloroethene			3.2			
Trans-1,2-Dichloroethene			0.4			
1,2-Dichloropropane						
Cis-1,3-Dichloropropene		234				
Trans-1,3-Dichloropropene		26				
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene			0.6			
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA			NA	NA	
Bromoform	NA			NA	NA	
Bromomethane	NA			NA	NA	
Carbon Tetrachloride	NA			NA	NA	
Chlorobenzene	NA			NA	NA	
Chloroethane	NA			NA	NA	
Chloroform	NA			NA	NA	
Chloromethane	NA			NA	NA	
Dibromochloromethane	NA			NA	NA	
1,2-Dichlorobenzene	NA			NA	NA	
1,3-Dichlorobenzene	NA			NA	NA	

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5361

Client Sample ID:	35-GWDW4-01	35-MW31BW-01	35-MW35BW-01	35-MW22S-02	35-MW25D-02	35-MW36AW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	25	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene	NA			NA	NA	
Dichlorodifluoromethane	NA			NA	NA	
1,1-Dichloroethene	NA		5.7	NA	NA	1.3
1,2-Dichloroethane	NA			NA	NA	
1,1-Dichloroethane	NA		4	NA	NA	2.6
Cis-1,2-Dichloroethene	NA	264	3.4	NA	NA	
Trans-1,2-Dichloroethene	NA	19	0.2	NA	NA	
1,2-Dichloropropane	NA			NA	NA	
Cis-1,3-Dichloropropene	NA			NA	NA	
Trans-1,3-Dichloropropene	NA			NA	NA	
Methylene Chloride	NA			NA	NA	
1,1,2,2-Tetrachloroethane	NA			NA	NA	
Tetrachloroethene	NA			NA	NA	
1,1,1-Trichloroethane	NA			NA	NA	
1,1,2-Trichloroethane	NA			NA	NA	
Trichloroethene	NA		0.2	NA	NA	
Trichlorofluoromethane	NA			NA	NA	
Vinyl Chloride	NA			NA	NA	
METHOD: EPA 602/1						
Benzene		15		1660	0.3	1.7
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.7	21	0.8	96	0.6	0.8
Toluene	1	14	0.5	86	0.7	0.8
Xylenes	1.8	66	1.9	100	1.6	3
Methyl Tertiary Butyl Ether		76.3		13.4		
METHOD: EPA 602/2						
Benzene		10		1910	0.5	1.2
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	0.5	13	0.5	60	0.9	0.6
Toluene	0.5	16	0.6	74	0.8	0.7
Xylenes	1.5	47	1.5	98	2.5	2.1

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5361

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-18-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5361

CASE SUMMARY

This data validation review consists of nine (9) water sample received on 05-17-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

GW0501	MW0202	MW0303	MW0703	MW250D
GW051D	MW020S	MW0501	MW2502	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

*	•	Holding Time
*	•	Calibration
	•	Contract Required Detection Limit Samples
	•	Blank Samples
	•	Interference Check Samples
*	•	Matrix Spike
	•	Duplicate Digestion Samples
*	•	Laboratory Control Sample
*	•	Serial Dilution Sample
	•	Graphite Furnace Analysis
*	•	Quarterly Verification of Instrument Parameters
*	•	Sample Result Verification
*	•	Preparation Logs
*	•	Run Logs
	•	Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for antimony (133.6/137.5%) in ICP analysis and lead (143.3%), arsenic (129%), and selenium (136%) in graphite furnace analysis were above the upper data validation requirement limit of 120%. The positive results greater than the IDL but less than 3X the CRDL are qualified estimated due to the uncertainty near the detection limits.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Ba	1.1	5.5
Cd	0.1	0.5
Fe	38.5	192.5
Mg	88.6	443

* Action level = 5X the blank concentration.

The results for cadmium are qualified "U". The reported sample results for barium, iron, and magnesium are above the action levels; therefore, the data are not impacted.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

LABORATORYDUPLICATE SAMPLES

The RPD for mercury was above the analysis and the data validation requirement limits. The reported positive results are qualified estimated, due to the poor reproducibility.

Two sets of field duplicate analyses were performed. The RPDs for Hg in field duplicate samples GW0501/GW051D and Ca, Cr, Fe, Mn, and Hg in field duplicate samples MW2502/MW250D were above 50%. The data for these elements are qualified estimated in the corresponding field duplicate samples.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had analytical spike recoveries outside the 85-115% range.

SAMPLE ID	ANALYTE	% RECOVERY
GW0501	Se/Tl	84/54.5
GW051D	Se/Tl	81/58.5
MW0202	As/Pb/Se	75/541.5*/43
MW020S	Se	40
MW0303	As/Se/Tl	81/77/80.5
MW0501	Pb/Tl	557*/72
MW0703	Pb/Se	545*/63
MW2502	Se/Tl	71/76.5
MW250D	As/Se	79/47

* The positive results are rejected due to the extremely high analytical spike recovery.

The reported sample results are qualified estimated.

The result for arsenic in sample MW0205 was flagged with "W". The analytical spike recovery (109.5%) was within the limit in this sample.

The analytical spike recovery for Tl in sample MW0303 was below the 85% control limit. This sample should be flagged "W" by the laboratory.

DATA PACKAGE COMPLETENESS

Samples GW051D and MW0703 were not listed prior to the corresponding analytical spike samples on the Form XIV in the thallium analysis. The raw data showed that these samples were analyzed correctly.

The calibration curve standards in ICP analysis reported after ICV, ICB, and other required QC samples on the Form XIV. The raw data showed that the standards analyzed prior to the ICV/ICB analyses.

The CCV14 for calcium was not listed on the Form II.

The Form III for ICB and CCB in the second analysis run was not included in the data package. Also, the frequency of CCV/CCB listed on Form III does not match the Form XIV.

The Form XI (Part II) was not included in the data package.

SUMMARY

Overall, no major problems were encountered during the sample analysis. The reported data are accepted with the applied qualifier code.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5361

Client Sample ID:			GW0501	GW051D	MW0202	MW020S	MW0303	MW0501	MW0703
Matrix:			WATER	WATER	WATER	WATER	WATER	WATER	WATER
Units:			UG/L	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
INORGANIC ELEMENTS		IDL (ug/L)							
Aluminium	P	20	215	177	34100	380000	4960	43800	81000
Antimony	P	46							
Arsenic	F	1.2	2.6		2.6 J	26.2	3.5	23.4	10.7
Barium	P	1.0	20.7	20.3	300	2280	60.4 J	114	1410
Beryllium	P	1.0			11.8	63.5	1.5	2.5	16.7
Cadmium	F	0.2	0.3 U	0.23 U	6.1	340	1.6	1.8	4.7
Calcium	P	1700	49300	49500	825000	787000	215000	47400	834000
Chromium	P	7.0			268	1540	25.6	91.4	283
Cobalt	P	11			56.1	281	26		67.9
Copper	P	2.0	2.7	2.9	26.4	94.7	5	20.4	32.8
Iron	P	13	310	286	57500	239000	10400	36500	81000
Lead	F	0.6	1.6		14.9 R	6.9	2.7	35.6 R	22.3 R
Magnesium	P	13	2560	2540	16700	35400	4880	5990	20500
Manganese	P	2	13.3	14	299	497	45.7	75.8	281
Mercury	AV	0.1	0.46 J		0.84 J	0.15 J			0.17 J
Nickel	P	11			119	524	28.8	18.8	104
Potassium	P	2440	5730	5220	7150	22300		4540	7370
Selenium	F	1.4	UJ	UJ	UJ	11.5 J	UJ		UJ
Silver	F	0.2							
Sodium	P	2370	33900	34500	7960	5030	6930	12300	7750
Thallium	F	0.6	UJ	UJ		2.7	UJ	2 J	1.3
Vanadium	P	5.0			141	886	35.5	92.6	185
Zinc	P	11			424	1850	81.1	148	383

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5361

Client Sample ID:			MW2502	MW250D
Matrix:			WATER	WATER
Units:			UG/L	UG/L
INORGANIC ELEMENTS		IDL (ug/L)		
Aluminium	P	20	7810	8880
Antimony	P	46		
Arsenic	F	1.2	6.1	3.7 J
Barium	P	1.0	150	205
Beryllium	P	1.0	2.3	3.9
Cadmium	F	0.2	0.56	0.96
Calcium	P	1700	138000 J	262000 J
Chromium	P	7.0	40.1 J	74.2 J
Cobalt	P	11		
Copper	P	2.0	2	7.7
Iron	P	13	65900 J	9820 J
Lead	F	0.6	2.2	2
Magnesium	P	13	6220	4960
Manganese	P	2	735 J	55 J
Mercury	AV	0.1	0.44 J	
Nickel	P	11		13.4
Potassium	P	2440		4050
Selenium	F	1.4	UJ	UJ
Silver	F	0.2		
Sodium	P	2370	10700	7140
Thallium	F	0.6	1.5 J	
Vanadium	P	5.0	25.1	32.4
Zinc	P	11	43.6	41.9

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MANAGERS DESIGNERS/CONSULTANTS

ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5529

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 08-22-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 8-22-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5529

INTRODUCTION

This quality assurance review is based upon a review of all data generated from eleven water samples, four trip blanks and three rinsate blanks collected on 05-17,18,19-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 601/602 for specific volatile target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- GC/MS Tuning
- Calibration
- Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The chain-of-custody for the soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

Volatiles

Sample 35-RB36 was inadvertently listed as 35-RE36 throughout this package. The laboratory should correct all documents affected by the discrepancy.

Pesticide/PCBs

The raw data for PEMA3/PEMB3 were missing for both columns. The laboratory should provide this missing information.

GC/MS TUNING

The continuing calibration standard was not listed on the Form V, page 055. The laboratory should correct and resubmit this form.

Semivolatiles

The LCS analysis was not reported on a Form V. The laboratory should add this analysis and resubmit the corrected form.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (7 days from collection to analysis), has been exceeded for sample TB-TB38. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged "J" and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-21-94	HP4.i	Chloroethane	32.0
		Acetone	68.0
		1,1-Dichloroethane	25.1
		1,2-Dichloroethane	26.1
		2-Butanone	30.3
CC 05-30-94	HP4.i	Chloroethane	29.7
		Methylene Chloride	26.8
		Acetone	44.4
		1,1-Dichloroethane	25.1
		2-Butanone	25.8
CC 06-02-94	HP1.i	4-Chloroaniline	70.5
		3-Nitroaniline	40.0
		3,3-Dichlorobenzidine	25.8
		2,6-Dinitrotoluene	33.7
		2,4-Dinitrophenol	29.3
		4-Nitrophenol	34.1
		N-Nitrosodiphenylamine	33.5
		Butylbenzylphthalate	28.0
		Bis(2-ethylhexyl)phthalate	37.8
		Di-n-octylphthalate	33.9
CC 06-03-94	HP1.i	2,6-Dinitrophthalate	28.8
		2,4-Dinitrotoluene	26.3
		4-Nitrophenol	40.9
		Bis(2-ethylhexyl)phthalate	35.0

Pesticide/PCBs

The percent recovery in the florisil check for alpha-BHC (79%) was below the 80-120% QC limit; however, since this compound was not detected in the samples, no action is taken on this basis.

Volatiles (601/602)

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

BLANKS

Semivolatiles

Rinsate blank 35-RB36 contained common contaminant bis(2-ethylhexyl)phthalate at a level less than the CRQL (5 ug/L). Since this compound was not detected in the other samples, no action is required.

Pesticide/PCBs

The following method blank contained target compound methoxychlor at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLKB)	Alpha-BHC	0.013 ug/L
	4,4-DDT	0.025 ug/L
	Endrin Aldehyde	0.022 ug/L

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were below the QC limits; therefore, all positive results and non-detects in these analyses are considered estimated.

SAMPLE	SURROGATE	RECOVERY	QC LIMITS
VBLKA	1,2-Dichloroethane-d_4	74	76-114
RWMS	1,2-Dichloroethane-d_4	73	76-114
RWMSD	1,2-Dichloroethane-d_4	74	76-114

SAMPLE	SURROGATE	RECOVERY	QC LIMITS
35-TB34	1,2-Dichloroethane-d_4	75	76-114
35-TB35	1,2-Dichloroethane-d_4	75	76-114

Semivolatiles

The following surrogate recoveries were outside the QC limits. Also, several of the advisory surrogate recoveries were outside the limits; however, since this surrogate is advisory; the outliers are not used to qualify the data.

SAMPLE NO.	SURROGATE	RECOVERY	QC LIMITS
35-RB34	2-Fluorobyphenyl	154	43-116
	Terphenyl-d_{14}	168	33-141
SBLKB	All	High	Various
35-MW33AW-01	Nitrobenzene	158	35-114
	2-Fluorobiphenyl	174	43-116
	Phenol-d_5	123	30-110
	2,4,6-Tribromophenol	149	25-135
35-RB34RE	2-Fluorobiphenyl	190	43-116
	Terphenyl-d_{14}	174	33-141
	2,4,6-Tribromophenol	194	25-135

These samples were reanalyzed and a matrix effect was demonstrated in sample 35-RB34. Sample 35-MW33AW-01 was not reanalyzed. Therefore, if positive results were in this analysis they would have been qualified estimated. Sample 35-RB34 should have all base neutral positive results qualified estimated in the reanalysis; however, no target compounds were detected.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY DB608/DB1701	SURROGATE	REASON
PBLKA	15/14	TCX	Advisory Criteria 60-150%
35-MW33BW-01	59/-	DCB	Advisory Criteria 60-150%
35-MW33AW-01	49/-	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

General

MS/MSD samples were not specified on the chain-of-custody; therefore, a sample from this batch was not run as the QC samples. No qualification is applied on this basis.

Volatiles (601/602)

Most of the spike recoveries were within the 60-140% QC range, with the exception of those listed below. Since these compounds were not detected in the samples, no action is required.

SAMPLE	SPIKE COMPOUND	RECOVERY
MSD	Bromodichloromethane	143
MS	1,2-Dichlorobenzene	154
MSD	1,2-Dichlorobenzene	152
LCS	1,2-Dichlorobenzene	175

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-RB34	DCB	155071	701396-2805586
	NPT	572797	2479514-9918056
	ANT	250882	1513672-6054686
	PHN	441120	2673712-10694846
	CRY	150357	1341820-5367278
	PRY	15624	875850-35037402
35-RB32	PRY	823690	875850-35037402
SBLKB	PRY	698824	875850-35037402
35-RB34RE	ANT	944724	1144809-4579236
	CRY	762241	1133054-4532214
	PRY	44920	816468-3265870
35-MW33BW-01	PRY	736998	816468-3265870

DCB = 1,4-Dichlorobenzene-d_4
NPT = Naphthalene-d_8
ANT = Acenyphthene-d_{10}
PHN = Phenanthrene-d_{10}
CRY = Chrysene-d_{12}
PRY = Perylene-$_{12}$

Sample 35-RB34 is exhibiting a matrix effect, the reanalysis is reported. All sample results quantified in reference to the internal standard outliers in these analyses listed above are qualified estimated. The blank outlier does not affect the sample results.

FIELD DUPLICATE RESULTS

Volatiles, Semivolatiles, and Pesticide/PCBs

A set of field duplicate analyses was not provided with this batch of samples. No qualification is required due to the lack of these QC samples.

Volatiles (601/602)

One set of field duplicate analyses was performed with this batch of samples (35-MW26BW-01/35-MW26BW-01D). The sample result reproducibility was satisfactory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35–TB34	35–RB36	35–TB35	35–TB36	TB–TB38
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	UG/L	UG/L	UG/L	UG/L	UG/L
COMPOUND					
Bromomethane	UJ		UJ		UJ
Vinyl Chloride	UJ		UJ		UJ
Chloroethane	UJ	UJ	UJ	UJ	UJ
Methylene Chloride	UJ		UJ		UJ
Acetone	UJ	UJ	UJ	UJ	UJ
Carbon Disulfide	UJ		UJ		UJ
1,1–Dichloroethene	UJ		UJ		UJ
1,1–Dichloroethane	UJ	UJ	UJ	UJ	UJ
1,2–Dichloroethene (TOTAL)	UJ		UJ		UJ
Chloroform	UJ		UJ		UJ
1,2–Dichloroethane	UJ	UJ	UJ	UJ	UJ
2–Butanone	UJ	UJ	UJ		UJ
1,1,1–Trichloroethane	UJ		UJ		UJ
Carbon Tetrachloride	UJ		UJ		UJ
Bromodichloromethane	UJ		UJ		UJ
1,2–Dichloropropane	UJ		UJ		UJ
cis–1,3–Dichloropropene	UJ		UJ		UJ
Trichloroethene	UJ		UJ		UJ
Dibromochloromethane	UJ		UJ		UJ
1,1,2–Trichloroethane	UJ		UJ		UJ
Benzene	UJ		UJ		UJ
Trans–1,3–Dichloropropene	UJ		UJ		UJ
Bromoform	UJ		UJ		UJ
4–Methyl–2–Pentanone	UJ		UJ		UJ
2–Hexanone	UJ		UJ		UJ
Tetrachloroethene	UJ		UJ		UJ
1,1,2,2–Tetrachloroethane	UJ		UJ		UJ
Toluene	UJ		UJ		UJ
Chlorobenzene	UJ		UJ		UJ
Ethylbenzene	UJ		UJ		UJ
Styrene	UJ		UJ		UJ
Xylene (total)	UJ		UJ		UJ
Chloromethane	UJ		UJ		UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5529

Client Sample ID:	35–RB32	35–RB34RE	35–MW33BW–01	35–RB36	35–MW33AW–01
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND					
Phenol					
bis(2–Chloroethyl)ether					
2–Chlorophenol					
1,3–Dichlorobenzene					
1,4–Dichlorobenzene					
1,2–Dichlorobenzene					
2–Methylphenol					
2,2'–oxybis(1–Chloropropane)					
4–Methylphenol					
N–Nitroso–di–n–propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone					
2–Nitrophenol					
2,4–Dimethylphenol					
bis(2–Chloroethoxy)methane					
2,4–Dichlorophenol					
1,2,4–Trichlorobenzene					
Naphthalene					
4–Chloroaniline	UJ			UJ	UJ
Hexachlorobutadiene					
4–Chloro–3–methylphenol					
2–Methylnaphthalene					
Hexachlorocyclopentadiene		UJ			
2,4,6–Trichlorophenol		UJ			
2,4,5–Trichlorophenol		UJ			
2–Chloronaphthalene		UJ			
2–Nitroaniline		UJ			
Dimethylphthalate		UJ			
Acenaphthylene		UJ			
2,6–Dinitrotoluene	UJ	UJ	UJ	UJ	UJ
3–Nitroaniline	UJ	UJ		UJ	UJ
Acenaphthene		UJ			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5529

Client Sample ID:	35-RB32	35-RB34RE	35-MW33BW-01	35-RB36	35-MW33AW-01
Matrix:	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUND					
2,4-Dinitrophenol	UJ	UJ		UJ	UJ
Dibenzofuran		UJ			
4-Nitrophenol	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene		UJ	UJ		
Diethylphthalate		UJ			
Fluorene		UJ			
4-Chlorophenyl-phenylether		UJ			
4-Nitroaniline		UJ			
4,6-Dinitro-2-methylphenol					
N-Nitrosodiphenylamine	UJ			UJ	UJ
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol					
Phenanthrene					
Anthracene					
Carbazole					
Di-n-butylphthalate					
Fluoranthene					
Pyrene		UJ			
Butylbenzylphthalate	UJ	UJ		UJ	UJ
Benzo(a)anthracene		UJ			
3,3-Dichlorobenzidine	UJ	UJ		UJ	UJ
Chrysene		UJ			
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	5 J	UJ
Di-n-octylphthalate	UJ	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ		
Benzo(k)fluoranthene	UJ	UJ	UJ		
Benzo(a)pyrene	UJ	UJ	UJ		
Indeno(1,2,3-cd)pyrene	UJ	UJ	UJ		
Dibenz(a,h)anthracene	UJ	UJ	UJ		
Benzo(g,h,i)perylene	UJ	UJ	UJ		

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5529

Client Sample ID:	35–RB34	35–MW33BW–01	35–RB36	35–MW33AW–01
Matrix:	WATER	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/L	ug/L	ug/L	ug/L
COMPOUND				
alpha–BHC				
beta–BHC		0.022 J		
delta–BHC				
gamma–BHC(Lindane)				
Heptachlor		0.013 J		
Aldrin				
Heptachlor Epoxide				
Endosulfan I				
Dieldrin				
4,4'–DDE				
Endrin				
Endosulfan II				
4,4'–DDD				
Endosulfan Sulfate				
4,4'–DDT		0.014 J		
Methoxychlor				
Endrin Ketone				
Endrin Aldehyde		0.1 U		
alpha–Chlordane				
gamma–Chlordane				
Toxaphene				
Aroclor 1016				
Aroclor 1221				
Aroclor 1232				
Aroclor 1242				
Aroclor 1248				
Aroclor 1254				
Aroclor 1260				

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-GWDW2-01	35-GWDW3-01	35-MW35AW-01	35-MW30AW-01	35-RB32	35-RB34
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform			0.6			
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene			0.8			
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene			14.8			
Trans-1,2-Dichloroethene			3.7			
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane			64.7			
Tetrachloroethene			1.9			
1,1,1-Trichloroethane						
1,1,2-Trichloroethane			1			
Trichloroethene			79			
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA	NA		NA	NA	NA
Bromoform	NA	NA		NA	NA	NA
Bromomethane	NA	NA		NA	NA	NA
Carbon Tetrachloride	NA	NA		NA	NA	NA
Chlorobenzene	NA	NA		NA	NA	NA
Chloroethane	NA	NA		NA	NA	NA
Chloroform	NA	NA	0.8	NA	NA	NA
Chloromethane	NA	NA		NA	NA	NA
Dibromochloromethane	NA	NA		NA	NA	NA
1,2-Dichlorobenzene	NA	NA		NA	NA	NA
1,3-Dichlorobenzene	NA	NA		NA	NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-GWDW2-01	35-GWDW3-01	35-MW35AW-01	35-MW30AW-01	35-RB32	35-RB34
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	1	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene	NA	NA		NA	NA	NA
Dichlorodifluoromethane	NA	NA		NA	NA	NA
1,1-Dichloroethene	NA	NA	0.3	NA	NA	NA
1,2-Dichloroethane	NA	NA		NA	NA	NA
1,1-Dichloroethane	NA	NA		NA	NA	NA
Cis-1,2-Dichloroethene	NA	NA	17.3	NA	NA	NA
Trans-1,2-Dichloroethene	NA	NA	4.3	NA	NA	NA
1,2-Dichloropropane	NA	NA		NA	NA	NA
Cis-1,3-Dichloropropene	NA	NA		NA	NA	NA
Trans-1,3-Dichloropropene	NA	NA		NA	NA	NA
Methylene Chloride	NA	NA		NA	NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	33.3	NA	NA	NA
Tetrachloroethene	NA	NA	3	NA	NA	NA
1,1,1-Trichloroethane	NA	NA		NA	NA	NA
1,1,2-Trichloroethane	NA	NA		NA	NA	NA
Trichloroethene	NA	NA	75.2	NA	NA	NA
Trichlorofluoromethane	NA	NA		NA	NA	NA
Vinyl Chloride	NA	NA		NA	NA	NA
METHOD: EPA 602/1						
Benzene	0.7	0.7	0.4			
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	1.4	2	0.7	0.9		
Toluene	0.9	1	1.1	1.3		
Xylenes	4.5	4.7	1.7	1.7		
Methyl Tertiary Butyl Ether						
METHOD: EPA 602/2						
Benzene	0.6	0.5	0.6		NA	NA
Chlorobenzene					NA	NA
1,2-Dichlorobenzene					NA	NA
1,3-Dichlorobenzene					NA	NA
1,4-Dichlorobenzene					NA	NA
Ethylbenzene	1.2	1.2	0.7	0.4	NA	NA
Toluene	1.1	1	0.8	0.8	NA	NA
Xylenes	3.5	4	1.3	0.8	NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-MW33BW-01	35-MW26AW-02	35-MW33AW-01	35-MW32AW-01	35-MW38BW-01	35-MW26BW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	25	1	1	1	1	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene	788			96.2		260
Trans-1,2-Dichloroethene	130			39.8		
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane				20.5		
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane	574			1.9		
Trichloroethene				25.8		
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane		NA	NA		NA	
Bromoform		NA	NA		NA	
Bromomethane		NA	NA		NA	
Carbon Tetrachloride		NA	NA		NA	
Chlorobenzene		NA	NA		NA	
Chloroethane		NA	NA		NA	
Chloroform		NA	NA		NA	
Chloromethane		NA	NA		NA	
Dibromochloromethane		NA	NA		NA	
1,2-Dichlorobenzene		NA	NA		NA	
1,3-Dichlorobenzene		NA	NA		NA	

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-MW33BW-01	35-MW26AW-02	35-MW33AW-01	35-MW32AW-01	35-MW38BW-01	35-MW26BW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	25	1	1	1	1	10
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2 (continued)						
1,4-Dichlorobenzene		NA	NA		NA	
Dichlorodifluoromethane		NA	NA		NA	
1,1-Dichloroethene		NA	NA		NA	
1,2-Dichloroethane		NA	NA		NA	
1,1-Dichloroethane		NA	NA		NA	
Cis-1,2-Dichloroethene	919	NA	NA	106	NA	265
Trans-1,2-Dichloroethene	208	NA	NA	50.8	NA	
1,2-Dichloropropane		NA	NA		NA	
Cis-1,3-Dichloropropene		NA	NA		NA	
Trans-1,3-Dichloropropene		NA	NA		NA	
Methylene Chloride		NA	NA		NA	
1,1,2,2-Tetrachloroethane		NA	NA	8.3	NA	
Tetrachloroethene		NA	NA		NA	
1,1,1-Trichloroethane		NA	NA		NA	
1,1,2-Trichloroethane		NA	NA	1.1	NA	
Trichloroethene	688	NA	NA	35.9	NA	
Trichlorofluoromethane		NA	NA		NA	
Vinyl Chloride		NA	NA		NA	
METHOD: EPA 602/1						
Benzene	22	0.7		1		
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene	41	1.8	1.1	1.3		
Toluene	30	1.3	1.7	1.1		
Xylenes	95	3.7	3.9	4.2		
Methyl Tertiary Butyl Ether	265			72.9		
METHOD: EPA 602/2						
Benzene	16	0.6		0.9	NA	NA
Chlorobenzene					NA	NA
1,2-Dichlorobenzene					NA	NA
1,3-Dichlorobenzene					NA	NA
1,4-Dichlorobenzene					NA	NA
Ethylbenzene	35	1.4	1.5	1.4	NA	NA
Toluene	31	1.2	1.5	1.4	NA	NA
Xylenes	113	4.8	5.8	4.7	NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-MW26BW-01D
Matrix:	WATER
Dilution Factor:	10
Units:	ug/L

METHOD: EPA 601/1

Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
Dibromochloromethane	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Dichlorodifluoromethane	
1,1-Dichloroethene	
1,2-Dichloroethane	
1,1-Dichloroethane	
Cis-1,2-Dichloroethene	267
Trans-1,2-Dichloroethene	
1,2-Dichloropropane	
Cis-1,3-Dichloropropene	
Trans-1,3-Dichloropropene	
Methylene Chloride	
1,1,2,2-Tetrachloroethane	
Tetrachloroethene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
Trichloroethene	
Trichlorofluoromethane	
Vinyl Chloride	

METHOD: EPA 601/2

Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
Dibromochloromethane	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5529

Client Sample ID:	35-MW26BW-01D
Matrix:	WATER
Dilution Factor:	10
Units:	ug/L

METHOD: EPA 601/2 (continued)

1,4-Dichlorobenzene	
Dichlorodifluoromethane	
1,1-Dichloroethene	
1,2-Dichloroethane	
1,1-Dichloroethane	
Cis-1,2-Dichloroethene	318
Trans-1,2-Dichloroethene	
1,2-Dichloropropane	
Cis-1,3-Dichloropropene	
Trans-1,3-Dichloropropene	
Methylene Chloride	
1,1,2,2-Tetrachloroethane	
Tetrachloroethene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
Trichloroethene	
Trichlorofluoromethane	
Vinyl Chloride	

METHOD: EPA 602/1

Benzene	
Chlorobenzene	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Ethylbenzene	
Toluene	
Xylenes	
Methyl Tertiary Butyl Ether	

METHOD: EPA 602/2

Benzene	NA
Chlorobenzene	NA
1,2-Dichlorobenzene	NA
1,3-Dichlorobenzene	NA
1,4-Dichlorobenzene	NA
Ethylbenzene	NA
Toluene	NA
Xylenes	NA

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5529

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-20-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5529

CASE SUMMARY

This data validation review consists of five (5) water samples received on 05-18,19,21-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

3533AW 3533BW 35RB32 35RB34 35RB36

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

* ● Holding Time
* ● Calibration
● Contract Required Detection Limit Samples
● Blank Samples
● Interference Check Samples
● Matrix Spike
● Duplicate Digestion Samples
* ● Laboratory Control Sample
* ● Serial Dilution Sample
● Graphite Furnace Analysis
* ● Quarterly Verification of Instrument Parameters
* ● Sample Result Verification
* ● Preparation Logs
* ● Run Logs
● Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Pb (126.7%) and Se (122%) in graphite furnace and Sb (133.6/154.2%) in ICP analyses were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are qualified estimated due to the uncertainty near the detection limits.

The recovery for Cr (79.2%) was below the 80% requirement limit in final CRDL analysis. The data are not qualified based on this outlier, since the deviation is marginal.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. ug/L	ACTION LEVEL ug/L *
Al	23.5	117.5
Cu	3.5	17.5
Mg	24.5	122.5

* Action level = 5X the blank concentration.

The reported sample results up to the action levels are qualified "U" and are considered as the laboratory artifacts.

Antimony was detected in the preparation blank at a level above the CRDL. The non-detected values are accepted and the positive results are rejected in the samples.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

Sample 35RB32 was analyzed as the spike sample. This sample is considered as the reagent blank and the QC analysis should not be performed on this sample.

LABORATORYDUPLICATE SAMPLES

Sample 35RB32 was analyzed as the laboratory duplicate sample. This sample is considered as the reagent blank and should not be used as the QC sample.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
3533AW	As/Cd/Se	80/121.5*/69
3533BW	Cd/Se	126.5*/82
35RB32	As/Cd/Se/Tl	81/128.5*/75/80
35RB34	Cd	125*
35RB36	Cd	122.5*

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

Lead in sample 3533AW was analyzed by Method of Standard Addition. The linearity met the requirement limits of "r≥0.995.

The linearity did not meet the requirement of "r≥0.995" in arsenic calibration standard analyzed prior to the sample analysis. The reported data are qualified estimated.

SUMMARY

The data package completeness was fair. The Form XI (Part II) was not included. Samples 3533BW and 3533AW were analyzed for dissolved metal analysis. The data are not elevated since the data package deliverable format did not follow the CLP requirements.

The pH of the samples were not reported. The reported positive result for antimony is rejected due to the high level of the blank contamination.

The other minor issues have been discussed. The reported sample data are accepted with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

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GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5529

Client Sample ID:			3533AW	3533BW	35RB32	35RB34	35RB36
Matrix:			WATER	WATER	WATER	WATER	WATER
Units:			ug/L	ug/L	ug/L	ug/L	ug/L
INORGANIC ELEMENTS		IDL (ug/L)					
Aluminium	P	20	78200	25.3 U	52.4 U	37.9 U	134 U
Antimony	P	46	83.5 R	49 R	47.9 R		
Arsenic	F	2.0	UJ	UJ	2.6 J	UJ	UJ
Barium	P	1.0	898	43.9	7	1	2.5
Beryllium	P	1.0	3.5				
Cadmium	F	1.0	0.31 J	0.49 J	0.13 J	0.1 J	0.12 J
Calcium	P	1700	13510	92100	13500		
Chromium	P	7.0	194				
Cobalt	P	11					
Copper	P	2.0	13.4 U	7.4 U	8.8 U	4.5 U	4.3 U
Iron	P	13	70100	67.7	69.3	42.9	119
Lead	F	1.0	18.2 J	1.2 J	1 J		
Magnesium	P	13	8260	2650	1790	69 U	119 U
Manganese	P	2.0	58.8	23.3			2.6
Mercury	AV	0.1					
Nickel	P	11	34.1				
Potassium	P	2440	5690	2740	2660		
Selenium	F	1.4	1.8 J	UJ	UJ		
Silver	P	3.0					
Sodium	P	2370	8070	10800	47700		
Thallium	F	0.6	0.9		UJ		
Vanadium	P	5.0	176				
Zinc	P	11	65.8				

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5608

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-29-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: [signature] — 8-25-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5608

INTRODUCTION

This quality assurance review is based upon a review of all data generated from twenty soil samples collected on 05-17,18-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

*	•	Data Completeness
*	•	Holding Time
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
	•	Surrogate Recoveries
	•	Matrix Spike/Spike Duplicate
	•	Laboratory Control Sample
	•	Internal Standard
*	•	Instrument Performance
	•	Field Duplicate Results
*	•	Compound Identification
*	•	Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged "J and UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-26-94	HP3.i	Bromomethane	27.0
		Acetone	65.2
		2-Butanone	80.8
		Bromoform	26.6
		4-Methyl-2-pentanone	54.9
		2-Hexanone	52.2
CC 05-27-94	HP3.i	Acetone	25.2
		Carbon Disulfide	65.0
		Styrene	27.6
CC 05-30-94	HP3.i	Carbon Tetrachloride	25.4
CC 05-31-94	HP3.i	Bromomethane	28.1
		Acetone	44.0
		2-Butanone	47.6
		4-methyl-2-pentanone	39.2
		2-Hexanone	33.6
CC 06-08-94	HP1.i	Bis(2-chloroethyl)ether	35.9
		Isophorone	27.5
		2,6-Dinitrotoluene	31.8
		2,4-Dinitrophenol	49.7
		Carbazole	31.2
		4-Chloroaniline	48.5
		3-Nitroaniline	49.4
CC 06-09-94	HP1.i	Bis(2-chloroethyl)ether	35.5
		Isophorone	38.0
		2,6-Dinitrotoluene	28.6
		4-Nitrophenol	28.7
		Bis(2-ethylhexyl)phthalate	26.5
		4-Chloroaniline	76.4
		3-Nitroaniline	33.1
		4-Nitroaniline	44.6

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 06-13-94	HP1.i	Bis(2-chloroethyl)ether	28.7
		Isophorone	28.4
		2,6-Dinitrotoluene	32.7
		2,4-Dinitrophenol	50.3
		4-Nitrophenol	25.7
		Bis(2-ethylhexyl)phthalate	26.8
		4-Chloroaniline	74.8
		3-Nitroaniline	30.5
		4-Nitroaniline	29.3
		3,3-Dichlorobenzidine	34.2
CC 06-16-94	HP1.i	2,6-Dinitrotoluene	29.9
		2,4-Dinitrophenol	31.4
		4-Nitrophenol	36.5
		4-Chloroaniline	65.6
		3-Nitroaniline	30.8
		3,3-Dichlorobenzidine	29.5
CC 07-07-94	HP1.i	Phenol	39.6
		2-Methylphenol	32.4
		2,2-oxybis(1-chloropropane)	89.8
		Hexachloroethane	40.2
		Carbazole	34.1
		4-Chloroaniline	37.3
		4-Nitroaniline	57.9

Pesticide/PCBs

The percent resolution for endosulfan sulfate (58.6%) was slightly below the QC limit of 60% in the resolution check analysis. Since this compound was not detected in the samples, no action is required.

The percent breakdown for endrin exceeded the QC limits in the analysis of PEMA3. Also the retention time for B-BHC in PEMB3 was outside the window and the % RPD for Heptachlor (25.4%) for INDAMA2 exceeded 25%. All positive results for these compounds are considered estimated.

BLANKS

Volatiles

The following method blank contained a target compound at a level above the CRQL. Since this compound was detected above the CRQL, all associated results for this compound are rejected "R".

BLANK	COMPOUND	LEVEL
VBLKB	Carbon Disulfide	41 ug/kg

Pesticide/PCBs

The following method blank contained target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLK)	Aldrin	0.73 ug/kg
	4,4-DDE	0.37 ug/kg
	4,4-DDD	0.54 ug/kg
	Methoxychlor	1.3 ug/kg

SURROGATE RECOVERY

Volatiles

The following system monitoring compound recoveries were above the QC limits; therefore all positive results in these analyses are qualified estimated.

SAMPLE	SURROGATE	RECOVERY	QC LIMITS
36-SD02-06D	4-Bromofluorobenzene	120	59-113
36-SD02-612	1,2-Dichloroethane-d4	129	70-121
35-SS07-00MS	4-Bromofluorobenzene	124	59-113
36-S006-612	4-Bromofluorobenzene	148	59-113

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLKA	152/156	TCX	Advisory Criteria 60-150%
	199/234	DCB	Advisory Criteria 60-150%
PLCS	155/-	TCX	Advisory Criteria 60-150%
	201/209	DCB	Advisory Criteria 60-150%
36-SD05-06	-/159	TCX	Advisory Criteria 60-150%
	182/205	DCB	Advisory Criteria 60-150%
36-SD05-06D	-/190	TCX	Advisory Criteria 60-150%
	174/203	DCB	Advisory Criteria 60-150%
35-SD05-06	171/187	DCB	Advisory Criteria 60-150%
35-SD05-612	162/174	DCB	Advisory Criteria 60-150%
35-SD06-06	157/-	TCX	Advisory Criteria 60-150%
	260/262	DCB	Advisory Criteria 60-150%
35-SD06-612	198/199	DCB	Advisory Criteria 60-150%
36-SD01-06	161/168	DCB	Advisory Criteria 60-150%
36-SD05-06	-/167	DCB	Advisory Criteria 60-150%
36-SD06-612	176/206	DCB	Advisory Criteria 60-150%
36-SD07-06	180/206	DCB	Advisory Criteria 60-150%
36-SD07-612	208/188	TCX	Advisory Criteria 60-150%
	269/296	DCB	Advisory Criteria 60-150%
35-SD03-06	0/0	DCB	Advisory Criteria 60-150%
35-SD03-612	166/-	TCX	Advisory Criteria 60-150%
	0/0	DCB	Advisory Criteria 60-150%
36-SD02-06	196/162	TCX	Advisory Criteria 60-150%
	0/0	DCB	Advisory Criteria 60-150%
36-SD02-06	175/194	TCX	Advisory Criteria 60-150%
	0/-	DCB	Advisory Criteria 60-150%
36-SD02-612	152/-	TCX	Advisory Criteria 60-150%
	0/0	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
36-SD03-06	228/-	TCX	Advisory Criteria 60-150%
	169/0	DCB	Advisory Criteria 60-150%
36-SD03-612	176/170	TCX	Advisory Criteria 60-150%
	0/0	DCB	Advisory Criteria 60-150%
36-SD05-612	-/0	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles

Several RPD results were outside the Qc limits in the analyses of 35-SS07-00 MS/MSD. Since the MS/MSD recoveries were within the QC limits, no action is taken on this basis.

LABORATORYCONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Volatiles

The following internal standard areas were below the laboratory's control limits. All reported sample results quantified in reference to these outliers are qualified estimated.

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
36-SD03-06	CBZ	244338	252024-1008094

36-SD05-06	BCM	25114	97464-389858
	DFB	71460	223746-894982
	CBZ	106715	252024-1008094
35-SS07-00MS	DFB	242153	335456-1341822
	CBZ	330172	332068-1328570
35-SS07-00MSD	DFB	329052	335456-1341822
36-SD05-06	BCM	98854	110819-443276
	DFB	232400	281582-1126330
	CBZ	276467	324218-1296872
36-SD02-612RE	BCM	49880	110819-443276
	DFB	125444	281582-1126330
	CBZ	208238	324218-1296872
36-SD06-612	BCM	11473	110819-443276
	DFB	42157	281582-1126330
	CBZ	151754	324218-1296872

BCM = Bromochloromethane
DFB = 1,4-Difluorobenzene
CBZ = Chlorobenzene-d5

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLK	Perylene-d12	923293	986700-3946802
35-SD05-612	Phenanthrene-d10	1871807	2080474-8321898
	Perylene-d12	853623	966286-3865144
36-SD02-06D	Chrysene-d12	1177978	1219762-4879048
	Perylene-d12	803155	966286-3865144
36-SD02-612	Perylene-d12	864833	966286-3865144
36-SD05-06	Phenanthrene-d10	2494253	2634430-10537720
36-SD06-06	Acenaphthene-d10	1238212	1304470-5217880
	Phenanthrene-d10	1802715	2415966-9663866

The non-detects quantified in reference to the internal standard outlier in the original analyses are qualified estimated since positive results were not detected. The blank results quantified in reference to perylene are also considered estimated.

FIELD DUPLICATE RESULTS

Two sets of field duplicate analyses were provided with this batch of samples (36-SD02-06/36-SD02-06D) & (36-SD05-06/36-SD05-06D). The sample result reproducibility was satisfactory, except for the following:

Volatiles

Carbon Disulfide was detected in sample 36-SD05-06, but not in the duplicate analysis; therefore, these results are considered estimated.

Semivolatiles

Diethylphthalate was detected in sample 36-SD05-06, but not in the duplicate analysis; therefore, these results are considered estimated.

Pesticide/PCBs

%RPD for 4,4-DDE for 36-SD02-06/D & 4,4-DDE, 4,4-DDD, 4,4-DDT in 36-SD05-061D were outside the requirement. The results are qualified estimated.

COMPOUND QUANTITATION

Volatiles

Compounds 4-methyl-2-pertanone and 2-hexanone were not reported on the quantitative report for sample 35-SD05-612 and library search spectra were not provided. Therefore, these results are reported as the CRQLs in the sample analysis.

Also, TIC spectra were not provided for samples 35-SD06-612 and 35-SD06-06. The missing pages should be supplied from the laboratory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5608

Client Sample ID:	35-SD03-06	35-SD03-612	35-SD05-06	35-SD05-612	35-SD06-06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND					
Bromomethane	UJ		UJ	UJ	
Vinyl Chloride			UJ		
Chloroethane			UJ		
Methylene Chloride			UJ		
Acetone	UJ		UJ	UJ	
Carbon Disulfide			UJ		
1,1-Dichloroethene			UJ		
1,1-Dichloroethane			UJ		
1,2-Dichloroethene (TOTAL)			UJ		
Chloroform			UJ		
1,2-Dichloroethane			UJ		
2-Butanone	UJ		UJ	UJ	
1,1,1-Trichloroethane			UJ		
Carbon Tetrachloride			UJ		
Bromodichloromethane			UJ		
1,2-Dichloropropane			UJ		
cis-1,3-Dichloropropene			UJ		
Trichloroethene			UJ		
Dibromochloromethane			UJ		
1,1,2-Trichloroethane			UJ		
Benzene			UJ		
Trans-1,3-Dichloropropene			UJ		
Bromoform			UJ		
4-Methyl-2-Pentanone	UJ		UJ	15 UJ	
2-Hexanone	UJ		UJ	15 UJ	
Tetrachloroethene	UJ		UJ		
1,1,2,2-Tetrachloroethane	UJ		UJ		
Toluene	8 J		UJ		
Chlorobenzene	UJ		UJ		
Ethylbenzene	UJ		UJ		
Styrene	UJ		UJ		
Xylene (total)	UJ		UJ		
Chloromethane	UJ		UJ		

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5608

Client Sample ID:	36-SD06-06	36-SD06-612	36-SD07-06	36-SD07-612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND				
Bromomethane		UJ		
Vinyl Chloride		UJ		
Chloroethane		UJ		
Methylene Chloride		UJ		
Acetone	UJ	UJ		UJ
Carbon Disulfide	35 R	UJ		156 R
1,1-Dichloroethene		UJ		
1,1-Dichloroethane		UJ		
1,2-Dichloroethene (TOTAL)		UJ		
Chloroform		UJ		
1,2-Dichloroethane		UJ		
2-Butanone		UJ		
1,1,1-Trichloroethane		UJ		
Carbon Tetrachloride		UJ	UJ	
Bromodichloromethane		UJ		
1,2-Dichloropropane		UJ		
cis-1,3-Dichloropropene		UJ		
Trichloroethene		UJ		
Dibromochloromethane		UJ		
1,1,2-Trichloroethane		UJ		
Benzene		UJ		
Trans-1,3-Dichloropropene		UJ		
Bromoform		UJ		
4-Methyl-2-Pentanone		UJ		
2-Hexanone		UJ		
Tetrachloroethene		UJ		
1,1,2,2-Tetrachloroethane		UJ		
Toluene		UJ		
Chlorobenzene		UJ		
Ethylbenzene		UJ		
Styrene	UJ	UJ		UJ
Xylene (total)		UJ		
Chloromethane		UJ		

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5608

Client Sample ID:	36-SD03-06	36-SD03-612	36-SD05-6	36-SD05-06D	36-SD05-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND					
Bromomethane			UJ	UJ	
Vinyl Chloride			UJ		
Chloroethane			UJ		
Methylene Chloride			UJ		
Acetone	UJ	UJ	UJ	UJ	
Carbon Disulfide	103 R	97 R	146 R	UJ	
1,1-Dichloroethene			UJ		
1,1-Dichloroethane			UJ		
1,2-Dichloroethene (TOTAL)			UJ		
Chloroform			UJ		
1,2-Dichloroethane			UJ		
2-Butanone			UJ	UJ	
1,1,1-Trichloroethane			UJ		
Carbon Tetrachloride			UJ		UJ
Bromodichloromethane			UJ		
1,2-Dichloropropane			UJ		
cis-1,3-Dichloropropene			UJ		
Trichloroethene			UJ		
Dibromochloromethane			UJ		
1,1,2-Trichloroethane			UJ		
Benzene			UJ		
Trans-1,3-Dichloropropene			UJ		
Bromoform			UJ		
4-Methyl-2-Pentanone			UJ	UJ	
2-Hexanone			UJ	UJ	
Tetrachloroethene			UJ		
1,1,2,2-Tetrachloroethane			UJ		
Toluene			UJ		
Chlorobenzene			UJ		
Ethylbenzene			UJ		
Styrene	UJ	UJ	UJ		
Xylene (total)			UJ		
Chloromethane			UJ		

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5608

Client Sample ID:	35-SD06-612	36-SD02-06	36-SD02-06D	36-SD02-612	36-SD01-06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	5.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND					
Bromomethane					
Vinyl Chloride					
Chloroethane					
Methylene Chloride					
Acetone			UJ		UJ
Carbon Disulfide			R		67 R
1,1-Dichloroethene					
1,1-Dichloroethane					
1,2-Dichloroethene (TOTAL)					
Chloroform					
1,2-Dichloroethane					
2-Butanone					
1,1,1-Trichloroethane					
Carbon Tetrachloride					
Bromodichloromethane					
1,2-Dichloropropane					
cis-1,3-Dichloropropene					
Trichloroethene					
Dibromochloromethane					
1,1,2-Trichloroethane					
Benzene					
Trans-1,3-Dichloropropene					
Bromoform					
4-Methyl-2-Pentanone					
2-Hexanone					
Tetrachloroethene					
1,1,2,2-Tetrachloroethane					
Toluene					
Chlorobenzene					
Ethylbenzene					
Styrene			UJ		UJ
Xylene (total)					
Chloromethane					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD05-06	36-SD05-06D	36-SD05-612	36-SD06-06
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				UJ
2,4,6-Trichlorophenol				UJ
2,4,5-Trichlorophenol				UJ
2-Chloronaphthalene				UJ
2-Nitroaniline				UJ
Dimethylphthalate				UJ
Acenaphthylene				UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD05-06	36-SD05-06D	36-SD05-612	36-SD06-06
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran				UJ
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene				UJ
Diethylphthalate	2135 J	UJ		UJ
Fluorene				UJ
4-Chlorophenyl-phenylether				UJ
4-Nitroaniline	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ			UJ
N-Nitrosodiphenylamine	UJ			UJ
4-Bromophenyl-phenylether	UJ			UJ
Hexachlorobenzene	UJ			UJ
Pentachlorophenol	UJ			UJ
Phenanthrene	UJ			UJ
Anthracene	UJ			UJ
Carbazole	UJ			UJ
Di-n-butylphthalate	UJ			UJ
Fluoranthene	UJ			UJ
Pyrene				
Butylbenzylphthalate				
Benzo(a)anthracene				
3,3-Dichlorobenzidine	UJ	UJ	UJ	UJ
Chrysene				
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di-n-octylphthalate				
Benzo(b)fluoranthene				
Benzo(k)fluoranthene				
Benzo(a)pyrene				
Indeno(1,2,3-cd)pyrene				
Dibenz(a,h)anthracene				
Benzo(g,h,i)perylene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD06-612	36-SD07-06	36-SD07-612
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg
COMPOUND			
Phenol			
bis(2-Chloroethyl)ether	UJ	UJ	UJ
2-Chlorophenol			
1,3-Dichlorobenzene			
1,4-Dichlorobenzene			
1,2-Dichlorobenzene			
2-Methylphenol			
2,2'-oxybis(1-Chloropropane)			
4-Methylphenol			
N-Nitroso-di-n-propylamine			
Hexachloroethane			
Nitrobenzene			
Isophorone	UJ	UJ	UJ
2-Nitrophenol			
2,4-Dimethylphenol			
bis(2-Chloroethoxy)methane			
2,4-Dichlorophenol			
1,2,4-Trichlorobenzene			
Naphthalene			
4-Chloroaniline	UJ	UJ	UJ
Hexachlorobutadiene			
4-Chloro-3-methylphenol			
2-Methylnaphthalene			
Hexachlorocyclopentadiene			
2,4,6-Trichlorophenol			
2,4,5-Trichlorophenol			
2-Chloronaphthalene			
2-Nitroaniline			
Dimethylphthalate			
Acenaphthylene			
2,6-Dinitrotoluene	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ
Acenaphthene			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD06-612	36-SD07-06	36-SD07-612
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg
COMPOUND			
2,4-Dinitrophenol	UJ	UJ	UJ
Dibenzofuran			
4-Nitrophenol	UJ	UJ	UJ
2,4-Dinitrotoluene			
Diethylphthalate			
Fluorene			
4-Chlorophenyl-phenylether			
4-Nitroaniline	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol			
N-Nitrosodiphenylamine			
4-Bromophenyl-phenylether			
Hexachlorobenzene			
Pentachlorophenol			
Phenanthrene			
Anthracene			
Carbazole			
Di-n-butylphthalate	218 J		
Fluoranthene			
Pyrene			
Butylbenzylphthalate			
Benzo(a)anthracene			
3,3-Dichlorobenzidine	UJ	UJ	UJ
Chrysene			
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ
Di-n-octylphthalate			
Benzo(b)fluoranthene			
Benzo(k)fluoranthene			
Benzo(a)pyrene			
Indeno(1,2,3-cd)pyrene			
Dibenz(a,h)anthracene			
Benzo(g,h,i)perylene			

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	35-SD03-06	35-SD03-612	35-SD05-06	35-SD05-612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol				
Dibenzofuran				
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene				
Diethylphthalate	352 J			
Fluorene				
4-Chlorophenyl-phenylether				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				UJ
N-Nitrosodiphenylamine				UJ
4-Bromophenyl-phenylether				UJ
Hexachlorobenzene				UJ
Pentachlorophenol				UJ
Phenanthrene				UJ
Anthracene				UJ
Carbazole				UJ
Di-n-butylphthalate				UJ
Fluoranthene				UJ
Pyrene				
Butylbenzylphthalate				
Benzo(a)anthracene				
3,3-Dichlorobenzidine				
Chrysene				
bis(2-Ethylhexyl)phthalate	UJ	UJ	704 J	469 J
Di-n-octylphthalate				UJ
Benzo(b)fluoranthene				UJ
Benzo(k)fluoranthene				UJ
Benzo(a)pyrene				UJ
Indeno(1,2,3-cd)pyrene				UJ
Dibenz(a,h)anthracene				UJ
Benzo(g,h,i)perylene				UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	35-SD03-06	35-SD03-612	35-SD05-06	35-SD05-612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	35-SD06-06	35-SD06-612	36-SD02-06	36-SD02-06D
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				
bis(2-Chloroethyl)ether		UJ	UJ	UJ
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone		UJ	UJ	UJ
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	35-SD06-06	35-SD06-612	36-SD02-06	36-SD02-06D
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol	UJ			
Dibenzofuran				
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene				
Diethylphthalate		398 J	330 J	346 J
Fluorene				
4-Chlorophenyl-phenylether				
4-Nitroaniline				
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di-n-butylphthalate				
Fluoranthene				
Pyrene				UJ
Butylbenzylphthalate				UJ
Benzo(a)anthracene				UJ
3,3-Dichlorobenzidine	UJ			UJ
Chrysene				UJ
bis(2-Ethylhexyl)phthalate			242 J	432 J
Di-n-octylphthalate				UJ
Benzo(b)fluoranthene				UJ
Benzo(k)fluoranthene				UJ
Benzo(a)pyrene				UJ
Indeno(1,2,3-cd)pyrene				UJ
Dibenz(a,h)anthracene				UJ
Benzo(g,h,i)perylene				UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD02-612	36-SD01-06	36-SD03-06	36-SD03-612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
1,2-Dichlorobenzene				
2-Methylphenol				
2,2'-oxybis(1-Chloropropane)				
4-Methylphenol				
N-Nitroso-di-n-propylamine				
Hexachloroethane				
Nitrobenzene				
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol				
2,4-Dimethylphenol				
bis(2-Chloroethoxy)methane				
2,4-Dichlorophenol				
1,2,4-Trichlorobenzene				
Naphthalene				
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				
4-Chloro-3-methylphenol				
2-Methylnaphthalene				
Hexachlorocyclopentadiene				
2,4,6-Trichlorophenol				
2,4,5-Trichlorophenol				
2-Chloronaphthalene				
2-Nitroaniline				
Dimethylphthalate				
Acenaphthylene				
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD02-612	36-SD01-06	36-SD03-06	36-SD03-612
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4-Dinitrophenol			UJ	UJ
Dibenzofuran				
4-Nitrophenol	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene				
Diethylphthalate				896
Fluorene				
4-Chlorophenyl-phenylether				
4-Nitroaniline			UJ	UJ
4,6-Dinitro-2-methylphenol				
N-Nitrosodiphenylamine				
4-Bromophenyl-phenylether				
Hexachlorobenzene				
Pentachlorophenol				
Phenanthrene				
Anthracene				
Carbazole				
Di-n-butylphthalate				
Fluoranthene				
Pyrene	316 J			
Butylbenzylphthalate				
Benzo(a)anthracene				
3,3-Dichlorobenzidine			UJ	UJ
Chrysene				
bis(2-Ethylhexyl)phthalate	328 J		UJ	UJ
Di-n-octylphthalate	UJ			
Benzo(b)fluoranthene	UJ			
Benzo(k)fluoranthene	UJ			
Benzo(a)pyrene	UJ			
Indeno(1,2,3-cd)pyrene	UJ			
Dibenz(a,h)anthracene	UJ			
Benzo(g,h,i)perylene	UJ			

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD02-06	36-SD02-06D	35-SD01-06	36-SD03-06	36-SD03-612	36-SD05-06
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
alpha-BHC						
beta-BHC						
delta-BHC						
gamma-BHC(Lindane)						
Heptachlor						
Aldrin			0.93 J			
Heptachlor Epoxide						
Endosulfan I						
Dieldrin			0.80 J			
4,4'-DDE	66 J	154 J	5.3 U	169		242 J
Endrin						
Endosulfan II						
4,4'-DDD	130	184	15	606	1030	223 J
Endosulfan Sulfate						
4,4'-DDT	8.5 J			18 J	11 J	31 J
Methoxychlor						
Endrin Ketone				11 J		
Endrin Aldehyde						7.6 J
alpha-Chlordane						
gamma-Chlordane						
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	36-SD05-06D	36-SD05-612	36-SD06-06	36-SD06-612	36-SD07-06	36-SD07-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
alpha-BHC						
beta-BHC						
delta-BHC						
gamma-BHC(Lindane)						
Heptachlor						
Aldrin				24 U		
Heptachlor Epoxide						
Endosulfan I						
Dieldrin			52			14 J
4,4'-DDE	196 J	1200	249	179	51	32 J
Endrin						
Endosulfan II						
4,4'-DDD	222 J	1140	221	159	74	41
Endosulfan Sulfate						
4,4'-DDT	15 J	46 J	14 J	8.0 J		5.7 J
Methoxychlor			240 U			
Endrin Ketone						
Endrin Aldehyde	14 J					
alpha-Chlordane					13 J	6.5 J
gamma-Chlordane						
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5608

Client Sample ID:	35-SD03-06	35-SD03-612	35-SD05-06	35-SD05-612	35-SD06-06	35-SD06-612
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
alpha-BHC						
beta-BHC						
delta-BHC					1.0 J	
gamma-BHC(Lindane)						
Heptachlor	2.3 J					
Aldrin						
Heptachlor Epoxide				0.72 J		
Endosulfan I						
Dieldrin						
4,4'-DDE		24 U	80	46	115	7.7
Endrin				0.85 J	0.77 J	
Endosulfan II			1.6 J	0.84 J	2.2 J	
4,4'-DDD	23 U		43	28	39	5.9
Endosulfan Sulfate						
4,4'-DDT			3.7 J	1.3 J	1.7 J	
Methoxychlor				26 U	36 U	
Endrin Ketone			3.1 J			
Endrin Aldehyde			1.5 J	1.1 J	2.2 J	1.0 J
alpha-Chlordane			9.3	4.8		
gamma-Chlordane				5.0		
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5608

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-23-94

Zohreh Hamid, Ph.D.
Section Manager - Data Validation

Date

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5608

CASE SUMMARY

This data validation review consists of nineteen (19) soil samples received on 05-19-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

350306	350606	362612	360506	366612
353612	356612	360106	36065D	360706
350506	360206	360306	365612	367612
355612	36026D	363612	360606	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

*	●	Holding Time
	●	Calibration
	●	Contract Required Detection Limit Samples
	●	Blank Samples
	●	Interference Check Samples
	●	Matrix Spike
	●	Duplicate Digestion Samples
*	●	Laboratory Control Sample
*	●	Serial Dilution Sample
	●	Graphite Furnace Analysis
*	●	Quarterly Verification of Instrument Parameters
*	●	Sample Result Verification
*	●	Preparation Logs
*	●	Run Logs
	●	Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CALIBRATION ANALYSIS

The percent recovery for lead (114.7%) was above the 110% requirement limit. The data are not impacted since another CCV/CCB was analyzed immediately after this calibration, and the samples were analyzed under an acceptable calibration standard analysis.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for lead (136.7%, 166.7%, 156.7%, 143.3%, 136.7%) in five different analysis runs, arsenic (122%) and selenium (124%) in graphite furnace and Sb (120.8/149.6%) in ICP were above the upper data validation requirement limits of 120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes are considered qualified estimated due to the uncertainty near the detection limits.

Note: The additional qualifier code is not applied if the sample result has already been qualified "U" due to blank contamination.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Ba	0.157	0.8
Cd	0.031	0.15
Cu	0.373	1.9
Fe	5.21	26
Pb	0.18	0.9
Hg	0.06	-.3
Se	0.14	0.7

* Action level = 5X the blank concentration.

The results for Ba, Fe, and Pb were above the action levels. The reported sample results for the other analytes up to the action limits are qualified "U",due to the laboratory blank contamination.

Zinc was detected in the preparation blank at a level above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

Mercury was detected in the initial and continuing calibration blanks at levels above the CRDL. The reported sample results are rejected.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in the ICSA solution as required by CLP. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recovery for Sb (34.5%), As(-11.7%), Hg(191.1%) and Se (73%) were outside the requirement limits of 75-125%. The reported positive sample results and non-detected values are qualified estimated for Sb and Se. The reported sample data are biased low. However, the positive results for Se are qualified "U" due to the laboratory blank contamination. Therefore, the non-detected values are qualified estimated for this analyte. The positive results for mercury have already been rejected due the high level of contamination in the blank. The non-detected values are accepted unqualified.

The positive results for arsenic are qualified estimated and the non-detected values are rejected due to the extremely low matrix spike recovery. The reported results are considered biased low and the possibility of a false negatives exist.

Sample 360706 was spiked with mercury. The recovery (43%) was below the requirement limit of 75%. The data have already been rejected due to the blank contamination.

LABORATORYDUPLICATE SAMPLES

The RPDs for arsenic, lead and mercury were above the analysis requirement limits. The reported positive results for lead are qualified estimated. The results for arsenic and mercury are accepted unqualified since the RPDs were within the data validation requirement limit.

Two sets of field duplicate analyses were analyzed with this batch of samples. The RPDs for Ca, Pb, and Zn in field duplicates 360206/26D were above the 50% requirement. The results for these elements are qualified estimated. The RPDs for the analytes in field duplicates 360506/36056D could not be evaluated because the percent solids were 19% and 34% in the field sample and the field duplicate sample, respectively.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
350306	Cd	84
350506	Cd/Pb/Se	83/123/3*/65
355612	Pb/Se	126*/57
350606	Se	67
356612	As/Se	145*/64
360206	Se	80
36026D	Se	82
362612	Se/Tl	66/78.5
360306	Se	65
363612	As/Se	81/67

SAMPLE ID	ANALYTE	% RECOVERY
360506	Cd/Pb/Tl	75.5/118*/54
365612	As/Se	82.5/64
360606	Se	82
366612	Se	65
367612	Pb/Se	82/62
360706	Se	63
36056D	Se	60
360106	Se	46

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

The analytical spike recovery for Cd in samples 360506, 350506 and Se in samples 350506, 360706, 360106, and 36056D were below the control limit of 85%. The results should be qualified "W" by the laboratory.

SAMPLE RESULTS

Arsenic, cadium, lead, selenium, and thallium were analyzed by graphite furnace.

The results for As in samples 360506, 362612 and Pb in samples 356612, 36056D, 360706, 365612 were obtained by Method of Standard Addition. The linearity met the requirements for all samples with the exception of lead analysis in sample 356612 and arsenic in sample 360506. The reported sample results for lead and arsenic in the corresponding samples are rejected due to the matrix interferences and/or the analytical problems. The result for lead in sample 365612 was obtained by "MSA" analysis. The linearity did not meet the requirement in the initial analysis. This sample was not reanalyzed and the reported sample result is rejected.

SUMMARY

The data package completeness and the quality of the analyses were fair. The percent solid for some samples were below 30%. The reported results and IDLs are elevated. The results for zinc and mercury are rejected due to the high levels of contaminations in the laboratory blanks. The results for lead in two samples and arsenic in one sample are rejected due to the interference and/or analytical problem in the graphite furnace analysis. The reported non-detected values for arsenic are rejected due to the extremely low matrix spike recovery. The minor problems have been discussed. The reported sample data are summarized with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5608

Client Sample ID:			365612	360606	366612	360706	367612
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			20.2	77.7	80.3	12.5	22.3
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)					
Aluminium	P	20	17200	2150	1560	31500	10800
Antimony	P	46	UJ	UJ	UJ	UJ	UJ
Arsenic	F	2.0	2.8 J	0.67 J	0.70 J	2.0 J	1.7 J
Barium	P	1.0	31.6	3.4	2.4	60.9	19.9
Beryllium	P	1.0				1.1	
Cadmium	F	1.0	0.20 U	0.05 U	0.04 U	0.31 U	0.49 U
Calcium	P	1700	8340 J	301 J		17500 J	8610 J
Chromium	P	7.0	14.6	3.1	2.4	28.6	10.4
Cobalt	P	11		1.4			
Copper	P	2.0	6.8	4.4	3.4	14.4	5.1
Iron	P	13	15900	1860	1090	13100	9710
Lead	F	1.0	15.9 R	15100	7.1	44.9	17.0
Magnesium	P	13	2940	305	201	3830	1830
Manganese	P	2.0	62.8	5.6	4.9	29.2	15.3
Mercury	AV	0.1	1.2 R	0.41 R	0.45 R	8.0 R	3.9 R
Nickel	P	11	7.8	2.1	2.6	10.0	7.3
Potassium	P	2440				2610	
Selenium	F	1.4	1.5 U	0.21 U	0.22 U	2.6 U	1.3 U
Silver	P	3.0					
Sodium	P	2370	1860	548	514	4320	1180
Thallium	F	0.6	0.59			0.96	0.54
Vanadium	P	5.0	19.6	4.6	3.2	28.6	12.4
Zinc	P	11	32.9 R	25.9 R	16.6 R	50.9 R	29.2 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5608

Client Sample ID:			350306	353612	350506	355612	350606	356612	360206
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			73.0	68.3	34.8	65.9	47.2	60.0	80.8
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)							
Aluminium	P	20	1160	2010	11300	2580	16000	8430	3270
Antimony	P	46	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Arsenic	F	2.0	R	0.69 R	2.3 J	0.91 J	3.7 J	R	0.99 J
Barium	P	1.0	7.8	10.9	43.7	15.8	36.7	19.2	11.0
Beryllium	P	1.0			0.40		0.59	0.27	
Cadmium	F	1.0	0.10 U	0.13 U	0.51 U	0.22 U	0.92 U	0.17 U	0.28 U
Calcium	P	1700	795 J	1360 J	6490 J	5780 J	4500 J	4100 J	1150 J
Chromium	P	7.0	2.5	3.7	16.3	4.3	20.9	9.1	7.3
Cobalt	P	11			3.2		2.9	4.0	
Copper	P	2.0	1.8 U	2.5 U	18.1	5.2	21.2	4.6	3.2
Iron	P	13	1130	2530	13400	3910	10900	8350	4120
Lead	F	1.0	5.2	77.9	92.0	54.2	82.6	19.8 R	17.9 J
Magnesium	P	13	148	334	1070	446	1140	715	151
Manganese	P	2.0	4.1	6.6	25.2	10.9	24.3	23.4	4.7
Mercury	AV	0.1	0.24 R	0.25 R	0.53 R	0.31 R	1.2 R	0.40 R	0.27 R
Nickel	P	11	2.2	2.1	5.5	2.2	6.4	2.6	
Potassium	P	2440					812		
Selenium	F	1.4	0.41 U	0.60 U	0.98 U	0.46 U	0.59 U	0.45 U	0.28 U
Silver	P	3.0							
Sodium	P	2370			729		706	712	
Thallium	F	0.6	0.15		0.63	0.20	0.47	0.35	0.19
Vanadium	P	5.0	2.1	3.0	21.2	4.7	23.9	10.9	19.0
Zinc	P	11	21.0 R	31.3 R	124 R	48.2 R	139 R	35.0 R	21.7 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5608

Client Sample ID:			36026D	362612	360106	360306	363612	360506	36056D
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			73.6	75.0	62.0	34.5	38.1	19.0	39.4
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)							
Aluminium	P	20	3990	4320	26300	6080	9510	11100	4260
Antimony	P	46	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Arsenic	F	2.0	2.1 J	2.1 J	R	2.0 J	1.4 J	9.0 R	3.0 J
Barium	P	1.0	17.5	28.5	79.1	24.3	43.8	25.7	8.4
Beryllium	P	1.0			1.3	0.81			
Cadmium	F	1.0	0.92 U	8.7	0.08 U	0.86 U	0.25 U	0.88 U	0.29 U
Calcium	P	1700	3530 J	13600 J	4150 J	3530 J	5710 J	5670 J	2010 J
Chromium	P	7.0	18.2	23.3	16.9	12.2	9.1	19.4	6.3
Cobalt	P	11			6.3				
Copper	P	2.0	8.0	17.7	5.4	45.1	9.9	24.4	11.4
Iron	P	13	4630	4040	3140	8530	3730	14900	5270
Lead	F	1.0	77.4 J	148	28.5	86.7	23.4	115	29.7
Magnesium	P	13	238	487	583	1230	1240	2750	1220
Manganese	P	2.0	7.2	12.4	8.0	35.4	47.5	36.8	14.2
Mercury	AV	0.1	0.28 R	0.35 R	0.40 R	1.1 R	1.1 R	1.4 R	0.62 R
Nickel	P	11	2.0	3.1	21.4	77.1	8.5	13.6	10.1
Potassium	P	2440			1010		839		
Selenium	F	1.4	0.24 U	0.28 U	0.50 U	0.81 U	0.52 U	UJ	0.79 U
Silver	P	3.0							
Sodium	P	2370			487	985	1130	4980	2330
Thallium	F	0.6	0.20	0.20	0.42	0.32		0.89	0.38
Vanadium	P	5.0	18.4	10.8	56.8	314	17.7	39.3	18.0
Zinc	P	11	63.3 R	140	28.0 R	142 R	53.6 R	145 R	52.2 R

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5617

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-23-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: _____ — 8-24-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5617

INTRODUCTION

This quality assurance review is based upon a review of all data generated from fourteen soil samples collected on 05-16,17,18-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

*	•	Data Completeness
*	•	Holding Time
	•	GC/MS Tuning
	•	Calibration
	•	Blanks
	•	Surrogate Recoveries
	•	Matrix Spike/Spike Duplicate
	•	Laboratory Control Sample
	•	Internal Standard
*	•	Instrument Performance
	•	Field Duplicate Results
*	•	Compound Identification
*	•	Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

GC/MS TUNING

Volatiles

The Form V for the initial calibration was incorrect since the standard file ID's did not correspond to the raw data. The laboratory should correct and resubmit this document.

Semivolatile

The raw data were missing for the tunes reported on pages 0342 and 0345. The laboratory should provide these missing documents.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-25-94	HP3.i	Chloromethane	33.7
		Bromoform	30.7
		Acetone	39.7
		2-Butanone	56.4
		4-Methyl-2-pentanone	41.5
		2-Hexanone	36.5
CC 05-26-94 (09:21)	HP3.i	Bromomethane	27.0
		Acetone	65.2
		2-Butanone	80.8
		Bromoform	26.6
		4-methyl-2-pentanone	54.9
		2-Hexanone	52.2
CC 05-27-94	HP3.i	Acetone	25.2
		Carbon Disulfide	654.9
		Styrene	27.6

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-30-94	HP3.i	Carbon Tetrachloride	25.4
CC 05-31-94	HP3.i	Bromomethane	28.1
		Acetone	44.0
		2-Butanone	47.6
		4-Methyl-2-pentanone	39.2
		2-Hexanone	33.6
CC 06-13-94	HP1.i	4-Chloroaniline	74.8
		3-Nitroaniline	30.5
		4-Nitroaniline	29.3
		3,3-Dichlorobenzidine	34.2
		Bis(2-chloroethyl)ether	28.7
		Isophorone	28.4
		2,6-Dinitrotoluene	32.7
		2,4-Dinitrophenol	50.3
		4-Nitrophenol	25.7
		Bis(2-ethylhexyl)phthalate	26.8
CC 06-14-94	HP1.i	4-Chloroaniline	65.7
		3-Nitroaniline	41.0
		4-Nitroaniline	44.4
		Bis(2-chloroethyl)ether	35.0
		Isophorone	40.8
		2,6-Dinitrotoluene	34.3
		2,4-Dinitrophenol	47.4
		Diethylphthalate	29.5
		4,6-Dinitro-2-methylphenol	26.6
		Carbazole	26.3
		Bis(2-ethylhexyl)phthalate	30.4
CC 06-15-94	HP1.i	4-Chloroaniline	38.0
		3-Nitroaniline	48.1
		3,3-Dichlorobenzidine	28.9
		Isophorone	33.3
		2,6-Dinitrotoluene	39.4
		2,4-Dinitrophenol	53.8
		2,4-Dinitrotoluene	27.5
		Diethylphthalate	28.3
		Carbazole	28.4

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 07-07-94	HP1.i	4-Chloroaniline	37.3
		4-Nitroaniline	57.9
		Phenol	39.6
		2-Methylphenol	32.4
		2,2-oxybis(1-chloropropane)	89.8
		Hexachloroethane	40.2
		Carbazole	34.1

Pesticide/PCBs

The percent resolution for endosulfan sulfate (55.2%) was below the 60% QC limit in the resolution check. Since this compound was not detected in the samples, no qualification is applied on this basis.

The percent breakdown for endrin (46.8%) and combined (53.7%) exceeded the QC limits of (20/30%) repectively; therefore, all positive results for endrin or its breakdown products are qualified estimated.

The percent RPD for endrin hetanone exceeded the 25% QC limit in the analyses of INDBMA2 and INDBMA3 on the SPB-608 column and the alpha-BHC retentions were outside the QC limits for INDAMB2, INDAMB3 on the DB 1701 column. Since these compounds were not detected in the samples, no action is required.

BLANKS

Volatiles

The following method blank contained a target compound at a level above the CRQL. Since this compound exceeded the CRQL, all results in the associated samples are considered unusable and are flagged "R".

BLANK	COMPOUND	LEVEL
VBLKC	Carbon Disulfide	41 ug/kg

Pesticide/PCBs

The following method blank contained target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts and are flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLKA)	Aldrin	0.84 ug/kg
	Heptachlor Epoxide	0.36 ug/kg
	Methoxychlor	0.40 ug/kg

Volatiles

The following system monitoring compound recoveries were above the QC limits. Since the SMC recoveries were within the QC limits for the samples, no action is applied due to these outliers.

BLANK	SURROGATE	RECOVERY	QC LIMITS
VBLKA	4-Bromofluorobenzene	120	59-113
VLCSA	4-Bromofluorobenzene	115	59-113

SURROGATE RECOVERIES

Semivolatiles

One of the 1,2-dichlorobenzene-d4 surrogate recovery was outside the limits in sample 35-GWDS2-03; however, since this surrogate is advisories; the sample data are not affected. Also, sample 35-SS09-00 was inadvertently listed twice on the Form II. The second entry should be disregarded.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLKA	160/154	TCX	Advisory Criteria 60-150%
	227/223	DCB	Advisory Criteria 60-150%
PLCSA	200/225	DCB	Advisory Criteria 60-150%
35-SS07-00MS	- /167	TCX	Advisory Criteria 60-150%
	198/0	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
35-SS07-00MSD	154/154	TCX	Advisory Criteria 60-150%
	204/86	DCB	Advisory Criteria 60-150%
35-SS07-00D	164/194	DCB	Advisory Criteria 60-150%
35-SS07-00	152/ -	TCX	Advisory Criteria 60-150%
	199/216	DCB	Advisory Criteria 60-150%
35-SS04-00	228/204	DCB	Advisory Criteria 60-150%
35-SS01-00	154/ -	TCX	Advisory Criteria 60-150%
	216/220	DCB	Advisory Criteria 60-150%
35-SS02-00	156/ -	TCX	Advisory Criteria 60-150%
	200/230	DCB	Advisory Criteria 60-150%
35-SS12-00	- /438	DCB	Advisory Criteria 60-150%
			Advisory Criteria 60-150%
35-SS11-00	174/157	TCX	Advisory Criteria 60-150%
	192/244	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

Semivolatile

The following matrix spike duplicate recovery and RPD result were outside the QC limits in analysis of sample 35-SS07-00. Since this compound was ot detected in the unspiked sample, no action is required.

MS/PRD	COMPOUND	RESULT	LIMITS
MSD	Phenol	92	26-90
RPD	Phenol	36	35

LABORATORYCONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARDS

Volatiles

The following internal standard areas were below the laboratory's control limits. All reported sample results quantified in reference to these outliers are qualified estimated.

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-GWDS4-02	BCM	133277	143742-574966
	DFB	262887	294194-1176774
35-SS01- 00	CBZ	254101	312548-1250190
35-SS04-00	BCM	94962	112316-449264
	DFB	244450	335456-1341822
	CBZ	197572	332068-1328270
35-SS11-00	DFB	211784	281582-1126330
	CBZ	266639	324218-1296872

BCM = Bromochloromethane
DFB = 1,4-Difluorobenzene
CBZ = Chlorobenzene-d5

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-GWDS4-02	Acenaphthene-d_{10}	1405305	1423134-5692538
	Phenanthrene-d_{10}	1533678	2480244-9920974

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-SS04-00	Phenanthrene-d_{10}	2360544	2480244-9920974
	Chrysene-d_{12}	872496	1502667-6010668
	Perylene-d_{12}	475919	1149502-4598008
35-SS01-00	Perylene-d_{12}	1079018	1149502-4598008
35-SS10-00	Perylene-d_{12}	1082218	1149502-4598008
35-SS13-00	Phenanthrene-d_{10}	10853931	2480244-9920974
	Chrysene-d_{12}	513317	1502667-6010668
	Perylene-d_{12}	244699	1149502-4598008

The non-detects quantified in reference to the internal standard outlier in the original analyses are qualified estimated since positive results were not detected.

FIELD DUPLICATE RESULTS

One set of field duplicate analyses was provided with this batch of samples (35-SS07-00/35-SS07-00D. The sample result reproducibility was satisfactory.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5617

Client Sample ID:	35-GWDS4-02	35-GWDS3-03	35-GWDS2-03	35-SS12-00	35-SS11-00	35-SS07-00D
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
Bromomethane	UJ	UJ	UJ		UJ	
Vinyl Chloride	UJ					
Chloroethane	UJ					
Methylene Chloride	UJ		7 J			
Acetone	67 J	UJ	UJ	UJ	UJ	
Carbon Disulfide	UJ			39 R		
1,1-Dichloroethene	UJ					
1,1-Dichloroethane	UJ					
1,2-Dichloroethene (TOTAL)	UJ					
Chloroform	UJ					
1,2-Dichloroethane	UJ					
2-Butanone	UJ	UJ	UJ		UJ	
1,1,1-Trichloroethane	UJ				UJ	
Carbon Tetrachloride	UJ				UJ	UJ
Bromodichloromethane	UJ				UJ	
1,2-Dichloropropane	UJ				UJ	
cis-1,3-Dichloropropene	UJ				UJ	
Trichloroethene	UJ				UJ	
Dibromochloromethane	UJ				UJ	
1,1,2-Trichloroethane	UJ				UJ	
Benzene	UJ				UJ	
Trans-1,3-Dichloropropene	UJ				UJ	
Bromoform	UJ	UJ			UJ	
4-Methyl-2-Pentanone	UJ	UJ	UJ		UJ	
2-Hexanone	UJ	UJ	UJ		UJ	
Tetrachloroethene					UJ	
1,1,2,2-Tetrachloroethane					UJ	
Toluene					UJ	
Chlorobenzene					UJ	
Ethylbenzene					UJ	
Styrene				UJ	UJ	
Xylene (total)					UJ	
Chloromethane			UJ		UJ	

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5617

Client Sample ID:	35-SS07-00	35-SS03-00	35-SS04-00	35-SS09-00	35-SS01-00	35-SS10-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
COMPOUND						
Bromomethane			UJ			
Vinyl Chloride			UJ			
Chloroethane			UJ			
Methylene Chloride			UJ			
Acetone	UJ	UJ	UJ	UJ		
Carbon Disulfide	33 R	36 R	UJ	37 R		
1,1-Dichloroethene			UJ			
1,1-Dichloroethane			UJ			
1,2-Dichloroethene (TOTAL)			UJ			
Chloroform			UJ			
1,2-Dichloroethane			UJ			
2-Butanone			UJ			
1,1,1-Trichloroethane			UJ			
Carbon Tetrachloride			UJ			
Bromodichloromethane			UJ			
1,2-Dichloropropane			UJ			
cis-1,3-Dichloropropene			UJ			
Trichloroethene			UJ			
Dibromochloromethane			UJ			
1,1,2-Trichloroethane			UJ			
Benzene			UJ			
Trans-1,3-Dichloropropene			UJ			
Bromoform			UJ			
4-Methyl-2-Pentanone			UJ		UJ	
2-Hexanone			UJ		UJ	
Tetrachloroethene			UJ		UJ	
1,1,2,2-Tetrachloroethane			UJ		UJ	
Toluene			UJ		UJ	
Chlorobenzene			UJ		UJ	
Ethylbenzene			UJ		UJ	
Styrene	UJ	UJ	UJ	UJ	UJ	
Xylene (total)			UJ		UJ	
Chloromethane			UJ		UJ	

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5617

Client Sample ID:	35-SS02-00	35-SS13-00
Matrix:	SOIL	SOIL
Dilution Factor:	1.0	1.0
Units:	UG/KG	UG/KG
COMPOUND		
Bromomethane		
Vinyl Chloride		
Chloroethane		
Methylene Chloride		
Acetone		
Carbon Disulfide		
1,1-Dichloroethene		
1,1-Dichloroethane		
1,2-Dichloroethene (TOTAL)		
Chloroform		
1,2-Dichloroethane		
2-Butanone		
1,1,1-Trichloroethane		
Carbon Tetrachloride		UJ
Bromodichloromethane		
1,2-Dichloropropane		
cis-1,3-Dichloropropene		
Trichloroethene		
Dibromochloromethane		
1,1,2-Trichloroethane		
Benzene		
Trans-1,3-Dichloropropene		
Bromoform		
4-Methyl-2-Pentanone		
2-Hexanone		
Tetrachloroethene		
1,1,2,2-Tetrachloroethane		
Toluene		
Chlorobenzene		
Ethylbenzene		
Styrene		
Xylene (total)		43
Chloromethane		

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-GWDS4-02	35-GWDS3-03	35-GWDS2-03	35-SS12-00	35-SS11-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
Phenol					
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ	UJ
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol					
N-Nitroso-di-n-propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone	UJ	UJ	UJ	UJ	UJ
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentadiene	UJ				
2,4,6-Trichlorophenol	UJ				
2,4,5-Trichlorophenol	UJ				
2-Chloronaphthalene	UJ				
2-Nitroaniline	UJ				
Dimethylphthalate	UJ				
Acenaphthylene	UJ				
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ
Acenaphthene	UJ				

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-GWDS4-02	35-GWDS3-03	35-GWDS2-03	35-SS12-00	35-SS11-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
2,4-Dinitrophenol	UJ	UJ	UJ	UJ	UJ
Dibenzofuran	UJ				
4-Nitrophenol	UJ				
2,4-Dinitrotoluene	UJ				
Diethylphthalate	UJ	UJ	UJ	UJ	UJ
Fluorene	UJ				
4-Chlorophenyl-phenylether	UJ				
4-Nitroaniline	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	UJ	UJ	UJ	UJ	UJ
N-Nitrosodiphenylamine	UJ				
4-Bromophenyl-phenylether	UJ				
Hexachlorobenzene	UJ				
Pentachlorophenol	UJ				
Phenanthrene	UJ				191 J
Anthracene	UJ				
Carbazole	UJ	UJ	UJ	UJ	UJ
Di-n-butylphthalate	UJ				
Fluoranthene	UJ				423
Pyrene					295 J
Butylbenzylphthalate					
Benzo(a)anthracene					
3,3-Dichlorobenzidine					
Chrysene					204 J
bis(2-Ethylhexyl)phthalate	UJ	UJ	UJ	UJ	UJ
Di-n-octylphthalate					
Benzo(b)fluoranthene					J
Benzo(k)fluoranthene					
Benzo(a)pyrene					
Indeno(1,2,3-cd)pyrene					
Dibenz(a,h)anthracene					
Benzo(g,h,i)perylene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-SS07-00D	35-SS07-00	35-SS03-00	35-SS04-00	35-SS09-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
Phenol					3071
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ	
2-Chlorophenol					
1,3-Dichlorobenzene					
1,4-Dichlorobenzene					
1,2-Dichlorobenzene					
2-Methylphenol					
2,2'-oxybis(1-Chloropropane)					
4-Methylphenol					
N-Nitroso-di-n-propylamine					
Hexachloroethane					
Nitrobenzene					
Isophorone	UJ	UJ	UJ	UJ	UJ
2-Nitrophenol					
2,4-Dimethylphenol					
bis(2-Chloroethoxy)methane					
2,4-Dichlorophenol					
1,2,4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene					
4-Chloro-3-methylphenol					
2-Methylnaphthalene					
Hexachlorocyclopentadiene					
2,4,6-Trichlorophenol					
2,4,5-Trichlorophenol					
2-Chloronaphthalene					
2-Nitroaniline					
Dimethylphthalate					
Acenaphthylene					
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ	UJ
Acenaphthene					

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35–SS07–00D	35–SS07–00	35–SS03–00	35–SS04–00	35–SS09–00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
2,4–Dinitrophenol	UJ	UJ	UJ	UJ	UJ
Dibenzofuran					
4–Nitrophenol					
2,4–Dinitrotoluene					UJ
Diethylphthalate	UJ	UJ	UJ	UJ	UJ
Fluorene					
4–Chlorophenyl–phenylether					
4–Nitroaniline	UJ	UJ	UJ	UJ	
4,6–Dinitro–2–methylphenol	UJ	UJ	UJ	UJ	
N–Nitrosodiphenylamine				UJ	
4–Bromophenyl–phenylether				UJ	
Hexachlorobenzene				UJ	
Pentachlorophenol				UJ	
Phenanthrene				UJ	
Anthracene				UJ	
Carbazole	UJ	UJ	UJ	UJ	UJ
Di–n–butylphthalate				UJ	
Fluoranthene				UJ	
Pyrene				UJ	
Butylbenzylphthalate				UJ	
Benzo(a)anthracene				UJ	
3,3–Dichlorobenzidine				UJ	UJ
Chrysene				UJ	
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ	279 J	
Di–n–octylphthalate				UJ	
Benzo(b)fluoranthene				UJ	
Benzo(k)fluoranthene				UJ	
Benzo(a)pyrene				UJ	
Indeno(1,2,3–cd)pyrene				UJ	
Dibenz(a,h)anthracene				UJ	
Benzo(g,h,i)perylene				208 J	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-SS01-00	35-SS10-00	35-SS02-00	35-SS13-00
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
Phenol				UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ	UJ
2-Chlorophenol				UJ
1,3-Dichlorobenzene				UJ
1,4-Dichlorobenzene				UJ
1,2-Dichlorobenzene				UJ
2-Methylphenol				UJ
2,2'-oxybis(1-Chloropropane)				UJ
4-Methylphenol				UJ
N-Nitroso-di-n-propylamine				UJ
Hexachloroethane				UJ
Nitrobenzene				UJ
Isophorone	UJ	UJ	UJ	UJ
2-Nitrophenol				UJ
2,4-Dimethylphenol				UJ
bis(2-Chloroethoxy)methane				UJ
2,4-Dichlorophenol				UJ
1,2,4-Trichlorobenzene				UJ
Naphthalene				UJ
4-Chloroaniline	UJ	UJ	UJ	UJ
Hexachlorobutadiene				UJ
4-Chloro-3-methylphenol				UJ
2-Methylnaphthalene				UJ
Hexachlorocyclopentadiene				UJ
2,4,6-Trichlorophenol				UJ
2,4,5-Trichlorophenol				UJ
2-Chloronaphthalene				UJ
2-Nitroaniline				UJ
Dimethylphthalate				UJ
Acenaphthylene				UJ
2,6-Dinitrotoluene	UJ	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ	UJ
Acenaphthene				UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35–SS01–00	35–SS10–00	35–SS02–00	35–SS13–00
Matrix:	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND				
2,4–Dinitrophenol	UJ	UJ	UJ	UJ
Dibenzofuran				UJ
4–Nitrophenol				UJ
2,4–Dinitrotoluene				UJ
Diethylphthalate	UJ	UJ	UJ	UJ
Fluorene				UJ
4–Chlorophenyl–phenylether				UJ
4–Nitroaniline	UJ	UJ	UJ	UJ
4,6–Dinitro–2–methylphenol	UJ	UJ	UJ	UJ
N–Nitrosodiphenylamine				UJ
4–Bromophenyl–phenylether				UJ
Hexachlorobenzene				UJ
Pentachlorophenol				UJ
Phenanthrene				UJ
Anthracene				UJ
Carbazole	UJ	UJ	UJ	UJ
Di–n–butylphthalate				UJ
Fluoranthene				UJ
Pyrene				UJ
Butylbenzylphthalate				UJ
Benzo(a)anthracene				UJ
3,3–Dichlorobenzidine				UJ
Chrysene				UJ
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ	UJ
Di–n–octylphthalate	UJ	UJ		UJ
Benzo(b)fluoranthene	UJ	UJ		UJ
Benzo(k)fluoranthene	UJ	UJ		UJ
Benzo(a)pyrene	UJ	UJ		UJ
Indeno(1,2,3–cd)pyrene	UJ	UJ		UJ
Dibenz(a,h)anthracene	UJ	UJ		UJ
Benzo(g,h,i)perylene	UJ	UJ		UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-SS12-00	35-SS11-00	35-SS07-00D	35-SS07-00	35-SS03-00	35-SS04-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	5.0	2.0	1.0	1.0	1.0	1.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND						
alpha-BHC						
beta-BHC		1.6 J				0.53 J
delta-BHC						
gamma-BHC(Lindane)						
Heptachlor						
Aldrin			1.9 U	2.3 U		1.9 U
Heptachlor Epoxide						
Endosulfan I						
Dieldrin			12	11	0.35 J	2.9 J
4,4'-DDE	127	125	13	14	20	8.7
Endrin				0.68 J		7.9
Endosulfan II				0.42 J		2.9 J
4,4'-DDD		3.5 J	2.1	2.5	0.86 J	11
Endosulfan Sulfate						
4,4'-DDT		113	2.7 J	3.2 J	8.9	48
Methoxychlor	88 U					
Endrin Ketone						1.2 J
Endrin Aldehyde						1.6 J
alpha-Chlordane		36				4.1
gamma-Chlordane		27				
Toxaphene						
Aroclor 1016						
Aroclor 1221						
Aroclor 1232						
Aroclor 1242						
Aroclor 1248						
Aroclor 1254						
Aroclor 1260						

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5617

Client Sample ID:	35-SS09-00	35-SS01-00	35-SS10-000	35-SS02-00	35-SS13-00
Matrix:	SOIL	SOIL	SOIL	SOIL	SOIL
Dilution Factor:	5.0	1.0	5.0	1.0	10.0
Units:	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
COMPOUND					
alpha-BHC					
beta-BHC					
delta-BHC					
gamma-BHC(Lindane)					
Heptachlor					
Aldrin				1.8 U	
Heptachlor Epoxide				1.8 U	
Endosulfan I					
Dieldrin					212 P
4,4'-DDE	261	12	204	1.6 J	1570
Endrin	2.0 J				
Endosulfan II					
4,4'-DDD	7.3 J	1.2 J	18	0.56 J	3240
Endosulfan Sulfate					
4,4'-DDT	262	19	76	1.6 J	154
Methoxychlor					750 U
Endrin Ketone					
Endrin Aldehyde				0.37 J	
alpha-Chlordane					
gamma-Chlordane					
Toxaphene					
Aroclor 1016					
Aroclor 1221					
Aroclor 1232					
Aroclor 1242					
Aroclor 1248					
Aroclor 1254					
Aroclor 1260					

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5617

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-22-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5617

CASE SUMMARY

This data validation review consists of fourteen (14) soil samples received on 05-19-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

GWDS23	SS0100	SS0400	SS0900	SS1200
GWDS33	SS0200	SS0700	SS1000	SS1300
GWDS42	SS0300	SS070D	SS1100	

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

- Holding Time
* • Calibration
- Contract Required Detection Limit Samples
- Blank Samples
- Interference Check Samples
- Matrix Spike
- Duplicate Digestion Samples
* • Laboratory Control Sample
* • Serial Dilution Sample
- Graphite Furnace Analysis
* • Quarterly Verification of Instrument Parameters
* • Sample Result Verification
* • Preparation Logs
* • Run Logs
- Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIME

The analysis holding time for mercury exceeded the requirement limits. The reported sample data are qualified estimated.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (133.6/150.3%) in ICP analysis and As (144 & 139%), and Pb (126.7 & 166.7%) in graphite furnace analysis were above the upper data validation requirement limits of 120%. The positive results greater than the IDL but less than 3X the CRDL should be qualified estimated due to the uncertainty near the detection limits.

The recovery for Cr (79.8%) was below the lower control limit in the CRDL standard analyzed after the sample analyses. The data are not impacted, since the deviation is marginal.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	8.85	44
Ba	0.253	1.26
Cd	0.021	0.1
Cu	1.563	7.8
Fe	9.7	48.5
Pb	0.17	0.85
Mg	7.9	39.5

* Action level = 5X the blank concentration.

The results for all these elements up to the action levels are qualified "U" in the data summary due to the blank concentration.

The calibration and preparation blanks had mercury and zinc at levels above the CRDLs. The reported sample results up to 10X the blank contamination are rejected in the samples.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by the ICP were within the control limits.

Calcium was not included in the ICSA standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recovery for Sb (34.8%), As(48.4%), Cd(145%), Pb(-21.3%) and Se (47.5%) were outside the requirement limits of 75-125%. The reported positive sample results for cadmium are qualified estimated. The reported sample results and non-detected values for Sb, As, and Se are qualified estimated and are flagged "J and UJ", respectively.

The positive results for Pb are qualified estimated and the non-detected values are rejected due to the extremely low matrix spike recovery.

LABORATORYDUPLICATE SAMPLES

The RPD for all analytes were within the analysis and the data validation requirement limits of 35% and/or ±2 CRDLs. One set of field duplicates was analyzed for this batch of samples. The RPDs for Ca, Cu and Fe were above 50%. the reported sample results are qualified estimated in the field duplicate samples.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the 85-115%.

SAMPLE ID	ANALYTE	% RECOVERY
GWDS23	As/Se	71.5/66
GWDS33	Se	75

SAMPLE ID	ANALYTE	% RECOVERY
GWDS42	Pb/Se	68/76
SS0100	Cd	121.5*
SS0300	Pb/Se/Tl	128*/81/83.9
SS0400	As/Pb/Se	81.8/123*/59
SS0700	As/Se	73/69
SS070D	Cd/Se/Tl	63.5/77/81
SS0900	Se	72
SS1000	Se	65
SS1100	As/Cd/Tl	75/77/84
SS1200	Cd/Se	73/63
SS1300	Pb	117.8*

* Only the positive results are qualified estimated.

The result for Pb in samples (GWDS33,SS1200,SS1100) were inadvertently flagged "W". Also the recovery for lead in sample SS0300 was above the 115% QC limit. The reported sample result was not flagged with a "W".

SAMPLE RESULTS

The results for calcium in samples SS1200, SS0400 and SS0100 were obtained from the 10-fold dilution.

DATA PACKAGE COMPLETENESS

Sample GWDS34 was listed on the Form XIVs for all elements. The sample data (Form I) was not included in the data package.

SUMMARY

The data package completeness is fair. The sample results for mercury and zinc are rejected due to the blank contamination. The matrix spike recovery for lead was extremely low. The minor issues have been discussed. The reported sample data are considered representative with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5617

Client Sample ID:			GWDS23	GWDS33	GWDS42	SS0100	SS0200	SS0300
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			82.6	86.5	89.9	94.2	94.4	97.4
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)						
Aluminium	P	20	6190	3070	5650	2220	2420	2390
Antimony	P	46	UJ	UJ	UJ	UJ	UJ	UJ
Arsenic	F	1.2	0.19 J	0.39 J	1.2 J	UJ	0.44 J	0.32 J
Barium	P	1.0	10.7	4.8	25.0	15.6	6.2	7.9
Beryllium	P	1.0						
Cadmium	F	0.2	0.49 J	0.13 J	0.03 J	0.04 J	0.06 J	0.14 J
Calcium	P	1700	664 J			605 J	604 J	5420 J
Chromium	P	7.0	5.9	3.1	10.0	1.9	1.9	2.9
Cobalt	P	11	1.4					1.9
Copper	P	2.0	2.7	1.9	2.3	3.9	2.0	2.6
Iron	P	13	2560	1110	4030	1250	1670	2890
Lead	F	0.6	15.4 J	4.0 J	6.5 J	7.2 J	7.3 J	10.7 J
Magnesium	P	13	149	93.3	217	71.6	58.7	212
Manganese	P	2	6.4	1.5	3.2	5.5	4.1	17.8
Mercury	AV	0.1	0.16 R	0.18 R	0.16 R	0.13 R	0.11 R	0.24 R
Nickel	P	11	1.4	1.5	2.0	1.3	1.9	1.6
Potassium	P	2440						
Selenium	F	1.4	UJ	UJ	0.23 J	UJ	UJ	UJ
Silver	F	0.2						
Sodium	P	2370						
Thallium	F	0.6	0.10		2.1	0.06	0.08	0.07 J
Vanadium	P	5.0	7.6	4.4	13.2	3.6	3.6	5.3
Zinc	P	11	4.9 R	3.2 R	5.8 R	14.8 R	12.9 R	16.7 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5617

Client Sample ID:			SS0400	SS0700	SS070D	SS0900	SS1000	SS1100
Matrix:			SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
% Solids:			91.6	89.3	88.5	93.4	94.4	94.1
Units:			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)						
Aluminium	P	20	2330	7870	5520	2570	3230	2400
Antimony	P	46	8.0 J	7.4 J	UJ	UJ	UJ	UJ
Arsenic	F	1.2	UJ	0.50 J	3.0 J	0.29 J	0.76 J	0.55 J
Barium	P	1.0	79.5	15.4	19.1	8.9	17.8	9.8
Beryllium	P	1.0		0.22	0.33			
Cadmium	F	0.2	15.0 J	0.16 J	0.38 J	0.79 J	0.18 J	0.40 J
Calcium	P	1700	27700 J	4680 J	12200 J	13500 J	49500 J	5650 J
Chromium	P	7.0	98.1	13.0	10.9	5.1	5.8	3.1
Cobalt	P	11	4.3					1.3
Copper	P	2.0	43.0	3.2 J	123 J	4.5	3.3	3.8
Iron	P	13	4400	10000 J	5770 J	2200	2010	1740
Lead	F	0.6	71.0 J	17.1 J	32.9 J	35.8 J	16.2 J	30.9 J
Magnesium	P	13	675	346	461	399	951	184
Manganese	P	2	35.6	6.6	10.7	12.5	11.1	11.3
Mercury	AV	0.1	0.23 R	0.13 R	0.13 R	0.17 R	0.14 R	0.26 R
Nickel	P	11	6.8	2.4	3.1	2.8	2.2	1.5
Potassium	P	2440						
Selenium	F	1.4	UJ	UJ	UJ	UJ	UJ	UJ
Silver	F	0.2						
Sodium	P	2370						
Thallium	F	0.6		0.20	0.15 J	0.07	0.08	0.10 J
Vanadium	P	5.0	14.2	18.8	14.4	6.1	7.1	5.1
Zinc	P	11	430	18.4 R	27.0 R	138	12.5 R	24.5 R

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5617

Client Sample ID:			SS1200	SS1300
Matrix:			SOIL	SOIL
% Solids:			96.8	22.9
Units:			mg/Kg	mg/Kg
INORGANIC ELEMENTS		IDL (ug/L)		
Aluminium	P	20	2020	5160
Antimony	P	46	UJ	UJ
Arsenic	F	1.2	0.39 J	0.79 J
Barium	P	1.0	8.7	86.0
Beryllium	P	1.0		
Cadmium	F	0.2	0.26 J	0.77 J
Calcium	P	1700	24000 J	7360 J
Chromium	P	7.0	3.6	9.7
Cobalt	P	11		
Copper	P	2.0	4.8	58.3
Iron	P	13	1720	8280
Lead	F	0.6	26.1 J	43.2 J
Magnesium	P	13	545	883
Manganese	P	2	13.9	66.7
Mercury	AV	0.1	0.18 R	0.70 R
Nickel	P	11	2.0	17.2
Potassium	P	2440		
Selenium	F	1.4	UJ	1.2 J
Silver	F	0.2		
Sodium	P	2370		
Thallium	F	0.6		0.48
Vanadium	P	5.0	4.0	20.7
Zinc	P	11	16.2 R	67.5 R

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5715

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler 08-22-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 8-22-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5715

INTRODUCTION

This quality assurance review is based upon a review of all data generated from seven water samples and one rinsate blank collected on 05-19,20-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds and SW846 Methods 601/602 for Benzene, Toluene, Ethylbenzene and Xylene by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- Blanks
- * Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- * Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

General

The sample ID on the chain-of-custody is 35-MW215-02; however, the laboratory reports the ID as TB-MW215-02. The affected documents should be corrected and resubmitted.

The chain-of-custody for soil/sediment samples were included in this data package; however, the sample analyses were not provided with this SDG.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (7 days from collection to analysis), has been exceeded for sample 35-MW215-02. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 05-30-94	HP4.i	Chloroethane	29.7
		Methylene Chloride	26.8
		Acetone	44.4
		1,1-Dichloroethane	25.1
		2-Butanone	25.8

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 06-02-94	HP1.i	4-Chloroaniline	70.5
		3-Nitroaniline	40.0
		3,3-Dichlorobenzidine	25.8
		2,6-Dinitrotoluene	33.7
		2,4-Dinitrophenol	29.3
		4-Nitrophenol	34.1
		N-Nitrosodiphenylamine	33.5
		Butylbenzylphthalate	28.0
		Bis(2-ethylhexyl)phthalate	37.8
		Di-n-octylphthalate	33.9

Pesticide/PCBs

The percent recovery for alpha-BHC (79%) was slightly below the QC limits of 80-120%. Since this compound was not detected in the samples, no action is required on this basis.

Volatiles (601/602)

The calibration data met the requirements established in the method. Also, the correlation coefficients were above 0.99 in the initial calibration.

BLANKS

Semivolatiles

The following method blank contained a common contaminant at a level less than the CRQL. This compound was not detected in the associated sample; therefore, no action is required.

BLANK	COMPOUND	LEVEL
SBLK	Bis(2-ethylhexyl)phthalate	5 ug/L

MATRIX SPIKE/SPIKE DUPLICATE

Volatiles, Semivolatiles, and Pesticide/PCBs

MS/MSD analyses were not performed with this batch of samples. No qualification is required due to the lack of these QC analyses.

Volatiles (601/602)

Most of the spike recoveries were within the 60-140% QC range with the exception of these listed below. Since these compounds were not detected in the samples, no action is required.

SAMPLE	SPIKE COMPOUND	RECOVERY
MS	Chlorobenzene	146
MSD	Chlorobenzene	141
MSD	1,2-Dichlorobenzene	144
MS	1,2-Dichlorobenzene	175
MSD	Ethylbenzene	142
	Ethylbenzene	145

LABORATORYCONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Semivolatiles

The following internal standards areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
35-RB37	Perylene-d_{12}	649889	875850-3503402
SBLK	Perylene-d_{12}	826585	875850-3503402

Sample 35-RB37 was not re-extracted/re-analyzed; therefore, the non-detects quantified in reference to perylene in the original analysis are qualified estimated since the positive results were not detected. The blank results quantified in reference to perylene are also considered estimated.

FIELD DUPLICATE RESULTS

A set of field duplicate analyses was not provided with this batch of samples; however, no qualification is required due to the lack of this field QC analysis.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5715

Client Sample ID:	35-MW215-02
Matrix:	WATER
Dilution Factor:	1.0
Units:	UG/L

COMPOUND	
Bromomethane	UJ
Vinyl Chloride	UJ
Chloroethane	UJ
Methylene Chloride	UJ
Acetone	UJ
Carbon Disulfide	UJ
1,1-Dichloroethene	UJ
1,1-Dichloroethane	UJ
1,2-Dichloroethene (TOTAL)	UJ
Chloroform	UJ
1,2-Dichloroethane	UJ
2-Butanone	UJ
1,1,1-Trichloroethane	UJ
Carbon Tetrachloride	UJ
Bromodichloromethane	UJ
1,2-Dichloropropane	UJ
cis-1,3-Dichloropropene	UJ
Trichloroethene	UJ
Dibromochloromethane	UJ
1,1,2-Trichloroethane	UJ
Benzene	UJ
Trans-1,3-Dichloropropene	UJ
Bromoform	UJ
4-Methyl-2-Pentanone	UJ
2-Hexanone	UJ
Tetrachloroethene	UJ
1,1,2,2-Tetrachloroethane	UJ
Toluene	UJ
Chlorobenzene	UJ
Ethylbenzene	UJ
Styrene	UJ
Xylene (total)	UJ
Chloromethane	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5715

Client Sample ID:	35–RB37
Matrix:	WATER
Dilution Factor:	1.0
Units:	ug/L

Phenol	
bis(2–Chloroethyl)ether	
2–Chlorophenol	
1,3–Dichlorobenzene	
1,4–Dichlorobenzene	
1,2–Dichlorobenzene	
2–Methylphenol	
2,2'–oxybis(1–Chloropropane)	
4–Methylphenol	
N–Nitroso–di–n–propylamine	
Hexachloroethane	
Nitrobenzene	
Isophorone	
2–Nitrophenol	
2,4–Dimethylphenol	
bis(2–Chloroethoxy)methane	
2,4–Dichlorophenol	
1,2,4–Trichlorobenzene	
Naphthalene	
4–Chloroaniline	UJ
Hexachlorobutadiene	
4–Chloro–3–methylphenol	
2–Methylnaphthalene	
Hexachlorocyclopentadiene	
2,4,6–Trichlorophenol	
2,4,5–Trichlorophenol	
2–Chloronaphthalene	
2–Nitroaniline	
Dimethylphthalate	
Acenaphthylene	
2,6–Dinitrotoluene	UJ
3–Nitroaniline	UJ
Acenaphthene	

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5715

Client Sample ID:	35–RB37
Matrix:	WATER
Dilution Factor:	1.0
Units:	ug/L
2,4–Dinitrophenol	UJ
4–Nitrophenol	
Dibenzofuran	UJ
2,4–Dinitrotoluene	
Diethylphthalate	
4–Chlorophenyl–phenylether	
Fluorene	
4–Nitroaniline	
4,6–Dinitro–2–methylphenol	
N–Nitrosodiphenylamine	UJ
4–Bromophenyl–phenylether	
Hexachlorobenzene	
Pentachlorophenol	
Phenanthrene	
Anthracene	
Carbazole	
Di–n–butylphthalate	
Fluoranthene	
Pyrene	
Butylbenzylphthalate	UJ
3,3–Dichlorobenzidine	
Benzo(a)anthracene	UJ
Chrysene	
bis(2–Ethylhexyl)phthalate	UJ
Di–n–octylphthalate	UJ
Benzo(b)fluoranthene	UJ
Benzo(k)fluoranthene	UJ
Benzo(a)pyrene	UJ
Indeno(1,2,3–cd)pyrene	UJ
Dibenz(a,h)anthracene	UJ
Benzo(g,h,i)perylene	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5715

Client Sample ID:	35–RB37
Matrix:	WATER
Dilution Factor:	1.0
Units:	UG/L

COMPOUND
alpha–BHC
beta–BHC
delta–BHC
gamma–BHC(Lindane)
Heptachlor
Aldrin
Heptachlor Epoxide
Endosulfan I
Dieldrin
4,4'–DDE
Endrin
Endosulfan II
4,4'–DDD
Endosulfan Sulfate
4,4'–DDT
Methoxychlor
Endrin Ketone
Endrin Aldehyde
alpha–Chlordane
gamma–Chlordane
Toxaphene
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5715

Client Sample ID:	35-RB37	35-MW31AW-01	35-MW37BW-01	35-MW32BW-01	35-MW37AW-01	35-MW38AW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/1						
Bromodichloromethane						
Bromoform						
Bromomethane						
Carbon Tetrachloride						
Chlorobenzene						
Chloroethane						
Chloroform						
Chloromethane						
Dibromochloromethane						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Dichlorodifluoromethane						
1,1-Dichloroethene						
1,2-Dichloroethane						
1,1-Dichloroethane						
Cis-1,2-Dichloroethene				594		
Trans-1,2-Dichloroethene				102		
1,2-Dichloropropane						
Cis-1,3-Dichloropropene						
Trans-1,3-Dichloropropene						
Methylene Chloride						
1,1,2,2-Tetrachloroethane						
Tetrachloroethene						
1,1,1-Trichloroethane						
1,1,2-Trichloroethane						
Trichloroethene				197		
Trichlorofluoromethane						
Vinyl Chloride						
METHOD: EPA 601/2						
Bromodichloromethane	NA	NA	NA		NA	NA
Bromoform	NA	NA	NA		NA	NA
Bromomethane	NA	NA	NA		NA	NA
Carbon Tetrachloride	NA	NA	NA		NA	NA
Chlorobenzene	NA	NA	NA		NA	NA
Chloroethane	NA	NA	NA		NA	NA
Chloroform	NA	NA	NA		NA	NA
Chloromethane	NA	NA	NA		NA	NA
Dibromochloromethane	NA	NA	NA		NA	NA
1,2-Dichlorobenzene	NA	NA	NA		NA	NA
1,3-Dichlorobenzene	NA	NA	NA		NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5715

Client Sample ID:	35-RB37	35-MW31AW-01	35-MW37BW-01	35-MW32BW-01	35-MW37AW-01	35-MW38AW-01
Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
Dilution Factor:	1	1	1	25	1	1
Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
METHOD: EPA 601/2						
1,4-Dichlorobenzene	NA	NA	NA		NA	NA
Dichlorodifluoromethane	NA	NA	NA		NA	NA
1,1-Dichloroethene	NA	NA	NA		NA	NA
1,2-Dichloroethane	NA	NA	NA		NA	NA
1,1-Dichloroethane	NA	NA	NA		NA	NA
Cis-1,2-Dichloroethene	NA	NA	NA	653	NA	NA
Trans-1,2-Dichloroethene	NA	NA	NA	101	NA	NA
1,2-Dichloropropane	NA	NA	NA		NA	NA
Cis-1,3-Dichloropropene	NA	NA	NA		NA	NA
Trans-1,3-Dichloropropene	NA	NA	NA		NA	NA
Methylene Chloride	NA	NA	NA		NA	NA
1,1,2,2-Tetrachloroethane	NA	NA	NA		NA	NA
Tetrachloroethene	NA	NA	NA		NA	NA
1,1,1-Trichloroethane	NA	NA	NA		NA	NA
1,1,2-Trichloroethane	NA	NA	NA		NA	NA
Trichloroethene	NA	NA	NA	210	NA	NA
Trichlorofluoromethane	NA	NA	NA		NA	NA
Vinyl Chloride	NA	NA	NA		NA	NA
METHOD: EPA 602/1						
Benzene			5.3			
Chlorobenzene						
1,2-Dichlorobenzene						
1,3-Dichlorobenzene						
1,4-Dichlorobenzene						
Ethylbenzene			0.3			
Toluene			2.2			
Xylenes			0.6	9		
Methyl Tertiary Butyl Ether				172		
METHOD: EPA 602/2						
Benzene	NA	NA	6		NA	NA
Chlorobenzene	NA	NA			NA	NA
1,2-Dichlorobenzene	NA	NA			NA	NA
1,3-Dichlorobenzene	NA	NA			NA	NA
1,4-Dichlorobenzene	NA	NA			NA	NA
Ethylbenzene	NA	NA	0.3		NA	NA
Toluene	NA	NA	1.7		NA	NA
Xylenes	NA	NA	0.5	9	NA	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5715

Client Sample ID:	35–MW38AW–01D
Matrix:	WATER
Dilution Factor:	1
Units:	ug/L

METHOD: EPA 601/1

Bromodichloromethane	
Bromoform	
Bromomethane	
Carbon Tetrachloride	
Chlorobenzene	
Chloroethane	
Chloroform	
Chloromethane	
Dibromochloromethane	
1,2–Dichlorobenzene	
1,3–Dichlorobenzene	
1,4–Dichlorobenzene	
Dichlorodifluoromethane	
1,1–Dichloroethene	
1,2–Dichloroethane	
1,1–Dichloroethane	
Cis–1,2–Dichloroethene	
Trans–1,2–Dichloroethene	
1,2–Dichloropropane	
Cis–1,3–Dichloropropene	
Trans–1,3–Dichloropropene	
Methylene Chloride	
1,1,2,2–Tetrachloroethane	
Tetrachloroethene	
1,1,1–Trichloroethane	
1,1,2–Trichloroethane	
Trichloroethene	
Trichlorofluoromethane	
Vinyl Chloride	

METHOD: EPA 601/2

Bromodichloromethane	NA
Bromoform	NA
Bromomethane	NA
Carbon Tetrachloride	NA
Chlorobenzene	NA
Chloroethane	NA
Chloroform	NA
Chloromethane	NA
Dibromochloromethane	NA
1,2–Dichlorobenzene	NA
1,3–Dichlorobenzene	NA

ROY F. WESTON, INC.
VOLATILE ANALYSES (METHOD 601/602) – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5715

Client Sample ID:	35-MW38AW-01D
Matrix:	WATER
Dilution Factor:	1
Units:	ug/L

METHOD: EPA 601/2

1,4-Dichlorobenzene	NA
Dichlorodifluoromethane	NA
1,1-Dichloroethene	NA
1,2-Dichloroethane	NA
1,1-Dichloroethane	NA
Cis-1,2-Dichloroethene	NA
Trans-1,2-Dichloroethene	NA
1,2-Dichloropropane	NA
Cis-1,3-Dichloropropene	NA
Trans-1,3-Dichloropropene	NA
Methylene Chloride	NA
1,1,2,2-Tetrachloroethane	NA
Tetrachloroethene	NA
1,1,1-Trichloroethane	NA
1,1,2-Trichloroethane	NA
Trichloroethene	NA
Trichlorofluoromethane	NA
Vinyl Chloride	NA

METHOD: EPA 602/1

Benzene	
Chlorobenzene	
1,2-Dichlorobenzene	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Ethylbenzene	
Toluene	
Xylenes	
Methyl Tertiary Butyl Ether	

METHOD: EPA 602/2

Benzene	NA
Chlorobenzene	NA
1,2-Dichlorobenzene	NA
1,3-Dichlorobenzene	NA
1,4-Dichlorobenzene	NA
Ethylbenzene	NA
Toluene	NA
Xylenes	NA

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5715

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-18-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5715

CASE SUMMARY

This data validation review consists of one water sample (reagent blank) received on 05-21-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following sample is contained within this report:

35RB37

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

*	•	Holding Time
*	•	Calibration
	•	Contract Required Detection Limit Samples
	•	Blank Samples
	•	Interference Check Samples
	•	Matrix Spike
	•	Duplicate Digestion Samples
*	•	Laboratory Control Sample
*	•	Serial Dilution Sample
	•	Graphite Furnace Analysis
*	•	Quarterly Verification of Instrument Parameters
*	•	Sample Result Verification
*	•	Preparation Logs
*	•	Run Logs
	•	Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Sb (120.8/126%) in ICP analysis were above the upper data validation requirement limits of 120%. The positive results greater than the IDL but less than 3X the CRDL should be qualified estimated due to the uncertainty near the detection limits. However, this analyte was not detected in the sample. Therefore, the data are not impacted.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Ba	1.333	7.0
Fe	15.657	78
Pb	1.2	6
Mg	26.3	131.5

* Action level = 5X the blank concentration.

The results for barium and lead are qualified "U". The reported sample results for iron and magnesium are above the action levels; therefore, the data are not impacted.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recovery for Hg (37%) was below the requirement limit of 75%. The reported positive sample result is qualified estimated. The reported sample data are biased low.

LABORATORYDUPLICATE SAMPLES

The RPD for mercury was above the analysis and the data validation requirement limits. The reported positive results are qualified estimated, due to the poor reproducibility.

ICP SERIAL DILUTION

The %D for Al and Zn exceeded the validation requirement limit. The data are considered estimated.

GRAPHITE FURNACE ANALYSIS

Cadium in the sample analyzed by graphite furnace had the analytical spike recovery (118%) outside the control limits of 85-115%. The reported sample result is qualified estimated.

SUMMARY

This sample is considered as a reagent blank and the QC sample analyses (MS & MD) are not required. This blank should be analyzed and reported with the corresponding field sample. The data package completeness was fair. The pH of the sample was not reported. Also, the frequency of the CCV/CCB listed on the Form II and III, does not match the Form XIV.

Overall, no major problems were encountered during the sample analysis. The reported data are accepted with the applied qualifier code.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5715

Client Sample ID:			35RB37
Matrix:			WATER
Units:			UG/L
INORGANIC ELEMENTS			
		IDL (ug/L)	
Aluminium	P	20	33.9 J
Antimony	P	46	
Arsenic	F	1.2	2.6
Barium	P	1.0	6 U
Beryllium	P	1.0	
Cadmium	F	0.2	0.23 J
Calcium	P	1700	8600 J
Chromium	P	7.0	
Cobalt	P	11	
Copper	P	2.0	8.9
Iron	P	13	110
Lead	F	0.6	2.9 U
Magnesium	P	13	1200
Manganese	P	2	3.1
Mercury	AV	0.1	0.64 J
Nickel	P	11	
Potassium	P	2440	
Selenium	F	1.4	
Silver	F	0.2	
Sodium	P	2370	29000
Thallium	F	0.5	
Vanadium	P	11	
Zinc	P		16.3 J

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B5896

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittle 08-24-94
Kelly Muir Spittler **Date**
Unit Leader - Data Validation

VERIFIED BY: 8-24-94
Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B5896

INTRODUCTION

This quality assurance review is based upon a review of all data generated from three soil samples collected on 05-09-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

- Data Completeness
- Holding Time
- * GC/MS Tuning
- Calibration
- * Blanks
- Surrogate Recoveries
- Matrix Spike/Spike Duplicate
- Laboratory Control Sample
- Internal Standard
- * Instrument Performance
- Field Duplicate Results
- * Compound Identification
- Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

DATA COMPLETENESS

Volatiles

The mass spectra and mass list for the initial calibration were not provided in the data package. The laboratory should resubmit this documentation.

HOLDING TIME

Volatiles

The technical holding time established in the Functional Guidelines (14 days from collection to analysis), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to analysis) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

Semivolatiles, and Pesticide/PCBs

The technical holding time established in the Functional Guidelines (14 days from collection to extraction), has been exceeded for all samples. The laboratory's contractual holding time (10 days from VTSR to extraction) established in the CLP SOW differs for these validation requirements; however, the validator is required by functional guidelines to qualify as estimated the positive results and non-detects in these analyses. It is the data validator's opinion that these results can be accepted with the qualifier codes.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. All associated positive results and non-detected values for the compounds listed below are qualified as estimated and flagged, "J"and "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 06-07-94	HP3.i	Acetone	57.7
		2-Butanone	51.2
		4-Methyl-2-pentanone	29.5
		2-Hexanone	27.8
CC 06-08-94	HP3.i	Chloroethane	26.6
		Acetone	52.8
		2-Butanone	31.9
		4-Methyl-2-pentanone	37.4
		2-Hexanone	35.9
CC 06-20-94	HP1.i	4-Chloroaniline	45.6
		3-Nitroaniline	38.5
		3,3-Dichlorobenzidine	37.2
		2,6-Dinitrotoluene	38.0
		2,4-Dinitrophenol	67.4
		4-Nitrophenol	29.7
		2,4-Dinitrotoluene	27.0
		Diethylphthalate	25.4
CC 06-22-94	HP1.i	4-Chloroaniline	40.3
		3-Nitroaniline	45.6
		2,2-Oxybis(1-Chloropropane)	52.8
		2,6-Dinitrotoluene	29.7
		2,4-Dinitrophenol	45.3
		4-Nitrophenol	28.8
		2,4-Dinitrotoluene	29.0
		Diethylphthalate	28.8
		Di-n-octylphthalate	28.4
CC 07-07-94	HP1.i	4-Chloroaniline	37.3
		4-Nitroaniline	57.9
		Phenol	39.6
		2-Methylphenol	32.4
		2,2-Oxybis(1-chloropropane)	89.8
		Hexachloroethane	40.2
		Carbazole	34.1

Pesticide/PCBs

The percent resolution for endosulfan sulfate (58.6) was below the QC limit of 60%. Since this compound was not detected in the samples, no action is required on this basis.

The retention time for B-BHC in PEMB3 was below the established window. Since positive results were not identified for this compound, no action is required.

SURROGATE RECOVERIES

Volatiles

The following system monitoring compound recoveries were outside the QC limits:

SAMPLE	SURROGATE COMPOUND	RECOVERY	QC LIMITS
VBLK	4-Bromofluorobenzene	116	59-113
VLCS	4-Bromofluorobenzene	116	59-113
36-FS02-BC01	4-Bromofluorobenzene	117	59-113
36-FS03-BC01	1,2-Dichloroethane-d_{14}	69	70-121
	4-Bromofluorobenzene	125	59-113
36-FS03-BC02	4-Bromofluorobenzene	125	59-113
36-FS02-BC01MS	4-Bromofluorobenzene	117	59-113
36-FS02-BC01DL	4-Bromofluorobenzene	117	59-113
36-FS03-BC01DL	4-Bromofluorobenzene	115	59-113
36-FS03-BC02DL	Toluene-$_8$	72	84-138
	4-Bromofluorobenzene	141	59-113

These samples are exhibiting matrix effects. For analyses 03-BC01 and O3BC02DL, both positive results and non-detects are qualified estimated. The remaining analyses only have positive results qualified since the recoveries exceeded the QC limits.

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
PBLKA	162/257	DCB	Advisory Criteria 60-150%
PLCSA	175/211	DCB	Advisory Criteria 60-150%
36-FS02-BC01	153/-	TCX	Advisory Criteria 60-150%
	212/235	DCB	Advisory Criteria 60-150%

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
36-FS03-BC01	169/188	DCB	Advisory Criteria 60-150%
36-FS03-BC02	-/151	DCB	Advisory Criteria 60-150%

TCX = Tetrachloro-m-xylene
DCB = Decachlorobiphenyl

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/SPIKE DUPLICATE

General

As per the laboratory's case narrative, MS/MSD analyses were not provided since a sample was not specified for QC analyses. No specific qualification is required due to the lack of these QC analyses.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements established in the NEESA guidelines.

INTERNAL STANDARD

Volatiles

The following internal standard areas were outside the laboratory's control limits:

SAMPLE	INTERNAL STANDARD	AREA/RT	CONTROL LIMITS
36-FS02-BC01	1,4-Difluorobenzene	279882	301078-1204312
36-FS03-BC02	1,4-Difluorobenzene	171970	301078-1204312
	Chlorobenzene-d_5	312892	336373-1345492

SAMPLE	INTERNAL STANDARD	AREA/RT	CONTROL LIMITS
36-FS02-BC01DL	1,4-Difluorobenzene	279882	301078-1204312
36-FS03-BC02DL	1,4-Difluorobenzene	171970	301078-1204312
	Chlorobenzene-d_5	312892	336373-1345492

All reported results quantified in reference to the internal standard outliers are qualified estimated, since all IS outliers were below the control limits. Three retention times were reported as outliers on page 0033; however, these retention times did fall within the criteria. These outliers must have been inadvertently indicated.

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
36-FS03-BC01	Perylene-d_{12}	1082431	1119620-4478480
36-FS03-BC02	Perylene-d_{12}	956237	1119620-4478480

All sample results quantified in reference to the internal standard outliers are qualified estimated. Since the areas were below the control limits.

FIELD DUPLICATE RESULTS

General

A set of field duplicate analyses was not provided with this batch of samples. No qualification is required due to the lack of this field QC sample.

COMPOUND QUANTITATION

General

Since the sample matrix consists of crab tissue, the percent moisture is high; thus resulting in elevated detection limits.

Volatiles

All samples were analyzed at 5-fold dilutions, due to the high levels of common contaminants methylene chloride and acetone. The possibility of false negatives exist; therefore, the non-detects are considered estimated.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B5896

Client Sample ID:	36-FS02-BC01	36-FS03-BC01	36-FS03-BC02
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	5.0	5.0	5.0
Units:	UG/KG	UG/KG	UG/KG
COMPOUND			
Bromomethane	UJ	UJ	UJ
Vinyl Chloride	UJ	UJ	UJ
Chloroethane	UJ	UJ	UJ
Methylene Chloride	13594 J	14205 J	47051 J
Acetone	94479 J	114247 J	602942 J
Carbon Disulfide	UJ	UJ	UJ
1,1-Dichloroethene	UJ	UJ	UJ
1,1-Dichloroethane	UJ	UJ	UJ
1,2-Dichloroethene (TOTAL)	UJ	UJ	UJ
Chloroform	UJ	UJ	UJ
1,2-Dichloroethane	UJ	UJ	UJ
2-Butanone	UJ	UJ	UJ
1,1,1-Trichloroethane	UJ	UJ	UJ
Carbon Tetrachloride	UJ	UJ	UJ
Bromodichloromethane	UJ	UJ	UJ
1,2-Dichloropropane	UJ	UJ	UJ
cis-1,3-Dichloropropene	UJ	UJ	UJ
Trichloroethene	UJ	UJ	UJ
Dibromochloromethane	UJ	UJ	UJ
1,1,2-Trichloroethane	UJ	UJ	UJ
Benzene	UJ	UJ	UJ
Trans-1,3-Dichloropropene	UJ	UJ	UJ
Bromoform	UJ	UJ	UJ
4-Methyl-2-Pentanone	UJ	UJ	UJ
2-Hexanone	UJ	UJ	UJ
Tetrachloroethene	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	UJ	UJ	UJ
Toluene	UJ	UJ	UJ
Chlorobenzene	UJ	UJ	UJ
Ethylbenzene	UJ	UJ	UJ
Styrene	UJ	UJ	UJ
Xylene (total)	UJ	UJ	UJ
Chloromethane	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5896

Client Sample ID:	35-FS02-BC01	36-FS03-BC01	36-FS03-BC02
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG
Phenol	UJ	UJ	UJ
bis(2-Chloroethyl)ether	UJ	UJ	UJ
2-Chlorophenol	UJ	UJ	UJ
1,3-Dichlorobenzene	UJ	UJ	UJ
1,4-Dichlorobenzene	UJ	UJ	UJ
1,2-Dichlorobenzene	UJ	UJ	UJ
2-Methylphenol	UJ	UJ	UJ
2,2'-oxybis(1-Chloropropane)	UJ	UJ	UJ
4-Methylphenol	UJ	UJ	UJ
N-Nitroso-di-n-propylamine	UJ	UJ	UJ
Hexachloroethane	UJ	UJ	UJ
Nitrobenzene	UJ	UJ	UJ
Isophorone	UJ	UJ	UJ
2-Nitrophenol	UJ	UJ	UJ
2,4-Dimethylphenol	UJ	UJ	UJ
bis(2-Chloroethoxy)methane	UJ	UJ	UJ
2,4-Dichlorophenol	UJ	UJ	UJ
1,2,4-Trichlorobenzene	UJ	UJ	UJ
Naphthalene	UJ	UJ	UJ
4-Chloroaniline	UJ	UJ	UJ
Hexachlorobutadiene	UJ	UJ	UJ
4-Chloro-3-methylphenol	UJ	UJ	UJ
2-Methylnaphthalene	UJ	UJ	UJ
Hexachlorocyclopentadiene	UJ	UJ	UJ
2,4,6-Trichlorophenol	UJ	UJ	UJ
2,4,5-Trichlorophenol	UJ	UJ	UJ
2-Chloronaphthalene	UJ	UJ	UJ
2-Nitroaniline	UJ	UJ	UJ
Dimethylphthalate	UJ	UJ	UJ
Acenaphthylene	UJ	UJ	UJ
2,6-Dinitrotoluene	UJ	UJ	UJ
3-Nitroaniline	UJ	UJ	UJ
Acenaphthene	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B5896

Client Sample ID:	35–FS02–BC01	36–FS03–BC01	36–FS03–BC02
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG
2,4–Dinitrophenol	UJ	UJ	UJ
Dibenzofuran	UJ	UJ	UJ
4–Nitrophenol	UJ	UJ	UJ
2,4–Dinitrotoluene	UJ	UJ	UJ
Diethylphthalate	UJ	UJ	UJ
Fluorene	UJ	UJ	UJ
4–Chlorophenyl–phenylether	UJ	UJ	UJ
4–Nitroaniline	UJ	UJ	UJ
4,6–Dinitro–2–methylphenol	UJ	UJ	UJ
N–Nitrosodiphenylamine	UJ	UJ	UJ
4–Bromophenyl–phenylether	UJ	UJ	UJ
Hexachlorobenzene	UJ	UJ	UJ
Pentachlorophenol	UJ	UJ	UJ
Phenanthrene	UJ	UJ	UJ
Anthracene	UJ	UJ	UJ
Carbazole	UJ	UJ	UJ
Di–n–butylphthalate	UJ	UJ	UJ
Fluoranthene	UJ	UJ	UJ
Pyrene	UJ	UJ	UJ
Butylbenzylphthalate	UJ	UJ	UJ
Benzo(a)anthracene	UJ	UJ	UJ
3,3–Dichlorobenzidine	UJ	UJ	UJ
Chrysene	UJ	UJ	UJ
bis(2–Ethylhexyl)phthalate	UJ	UJ	UJ
Di–n–octylphthalate	UJ	UJ	UJ
Benzo(b)fluoranthene	UJ	UJ	UJ
Benzo(k)fluoranthene	UJ	UJ	UJ
Benzo(a)pyrene	UJ	UJ	UJ
Indeno(1,2,3–cd)pyrene	UJ	UJ	UJ
Dibenz(a,h)anthracene	UJ	UJ	UJ
Benzo(g,h,i)perylene	UJ	UJ	UJ

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B5896

Client Sample ID:	36-FS02-BC01	36-FS03-BC01	36-FS03-BC02
Matrix:	SOIL	SOIL	SOIL
Dilution Factor:	1.0	1.0	1.0
Units:	UG/KG	UG/KG	UG/KG
COMPOUND			
alpha-BHC	UJ	UJ	UJ
beta-BHC	8.9 J	8.4 J	6.8 J
delta-BHC	UJ	UJ	UJ
gamma-BHC(Lindane)	3.6 J	2.1 J	UJ
Heptachlor	2.6 J	UJ	UJ
Aldrin	UJ	2.3 J	UJ
Heptachlor Epoxide	UJ	UJ	UJ
Endosulfan I	UJ	UJ	UJ
Dieldrin	9.4 J	6.0 J	8.8 J
4,4'-DDE	101 J	42 J	48 J
Endrin	UJ	UJ	UJ
Endosulfan II	UJ	UJ	UJ
4,4'-DDD	49 J	19 J	33 J
Endosulfan Sulfate	UJ	UJ	UJ
4,4'-DDT	2.5 J	UJ	UJ
Methoxychlor	UJ	UJ	UJ
Endrin Ketone	UJ	UJ	UJ
Endrin Aldehyde	UJ	UJ	UJ
alpha-Chlordane	3.7 J	3.6 J	UJ
gamma-Chlordane	UJ	UJ	UJ
Toxaphene	UJ	UJ	UJ
Aroclor 1016	UJ	UJ	UJ
Aroclor 1221	UJ	UJ	UJ
Aroclor 1232	UJ	UJ	UJ
Aroclor 1242	UJ	UJ	UJ
Aroclor 1248	UJ	UJ	UJ
Aroclor 1254	UJ	UJ	UJ
Aroclor 1260	UJ	UJ	UJ

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MANAGERS DESIGNERS/CONSULTANTS

INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA5896

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: _____ 8-22-94

Zohreh Hamid, Ph.D. **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA5896

CASE SUMMARY

This data validation review consists of three (3) soil samples received on 05-11-94. Laboratory analyses were performed by NDRC Laboratories, Inchscape Testing Services for TAL metals.

All data have been validated with regard to usability according to the quality assurance set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

FS0201 FS0301 FS0302

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria.

	• Holding Time
*	• Calibration
	• Contract Required Detection Limit Samples
	• Blank Samples
	• Interference Check Samples
	• Matrix Spike
*	• Duplicate Digestion Samples
*	• Laboratory Control Sample
	• Serial Dilution Sample
	• Graphite Furnace Analysis
*	• Quarterly Verification of Instrument Parameters
*	• Sample Result Verification
*	• Preparation Logs
*	• Run Logs
	• Data Package Completeness

* All criteria were met; therefore, a narrative section is not provided for this classification.

HOLDING TIME

The analysis holding time for mercury in all samples (FS0201, FS0301, and FS0302) and the corresponding QC samples exceeded the requirement limit. The reported sample data are qualified estimated.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recovery for Sb (133.6%/146.9%) by ICP were above the upper data validation requirement limits of 120%. All sample results are non-detected values. No qualification is required.

BLANK ANALYSES

The laboratory blanks had the following contaminations at levels above the IDLs, but below the CRDLs.

ANALYTE	CONC. MG/KG	ACTION LEVEL MG/KG *
Al	2.71	14
Sb	4.897	25
Ba	0.157	0.8
Cd	0.014	0.07
Cu	0.807	4
Fe	3.803	19
Mg	5.897	30
Ni	1.687	9

* Action level = 5X the blank concentration.

The reported sample results and the field QC blanks up to the action limits are qualified "U" for these analytes due to the laboratory blank contamination.

Mercury was detected in the initial, continuing, and preparation blanks at levels above the CRDL. The reported sample results up to 10X the blank contamination level are rejected. The reported sample results above 10X the blank levels are accepted unqualified.

INTERFERENCE CHECK SAMPLES

The percent recoveries for the TAL analytes analyzed by ICP were within the control limits.

Calcium was not included in ICS A standard solution. The ICP interference could not be evaluated; therefore, the reported sample data for Ca are qualified estimated.

MATRIX SPIKE SAMPLE ANALYSIS

The matrix spike recoveries for As (45.0%), Se (62.8%), and Tl (52.2%) were below the requirement limit of 75%. The reported positive sample results and non-detected values are qualified estimated. The reported sample data are biased low.

The matrix spike recovery for Hg (139.0%) was above the requirement limit of 125%. The reported positive sample results are qualified estimated. The reported sample data are biased high.

SERIAL DILUTION ANALYSIS

The serial dilution percent difference for Mg (298.5%) was above the requirement limit of 10%. The reported positive sample results are qualified estimated.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	% RECOVERY
FS0201	As/Pb/Se/Tl	58.5/78.5/81.0/50.5
FS0301	As/Pb/Se/Tl	48.5/77.0/61.0/59.0
FS0302	As/Pb/Tl	62.5/78.0/57.0

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

SUMMARY

The data package completeness is fair. The reported sample results for Hg were rejected due to the high level of blank contaminations. The percent solid was below the 30% for all samples. The reported detection limits are elevated. Also, the percent soil could not be verified, since the raw data are not included in the data package.

The minor issues have been discussed. The results are considered representative with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: BA5896

Client Sample ID:			FS0201	FS0301	FS0302
Matrix:			SOIL	SOIL	SOIL
% Solids:			19.2	20.1	19.2
Units:			MG/KG	MG/KG	MG/KG
INORGANIC ELEMENTS		IDL (ug/L)			
Aluminium	P	20	19.3	11.7 U	
Antimony	P	46			
Arsenic	F	1.2	UJ	1.4 J	UJ
Barium	P	1.0	0.73 U	0.71 U	
Beryllium	P	1.0			
Cadmium	F	0.2	0.80	0.16	0.07 U
Calcium	P	1700	1970 J	2170 J	1740 J
Chromium	P	7.0			
Cobalt	P	11	6.9		
Copper	P	2.0	26.3	27.5	22.3
Iron	P	13	39.9	40.2	20.4
Lead	F	0.6	0.61 J	0.58 J	0.51 J
Magnesium	P	13	1550 J	1500 J	1500 J
Manganese	P	2	1.4 U	1.6 U	1.7
Mercury	AV	0.1	1.3 R	0.90 R	0.90 R
Nickel	P	11			
Potassium	P	2440	13500	13000	14400
Selenium	F	1.4	0.80 J	0.72 J	UJ
Silver	F	0.2			
Sodium	P	2370	15300	14200	14900
Thallium	F	0.6	UJ	UJ	UJ
Vanadium	P	0.5			
Zinc	P	11	104	130	93.8

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ORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG NO.: B8035

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

PREPARED BY: Kelly Muir Spittler — 08-31-94
Kelly Muir Spittler — **Date**
Unit Leader - Data Validation

VERIFIED BY: Zohreh Hamid — 8-31-94
Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: B8035

INTRODUCTION

This quality assurance review is based upon a review of all data generated from two water samples and one trip blank collected on 07-28-94. The samples were analyzed according to criteria set forth in the contract laboratory program (CLP) for TCL Volatile, Semivolatile and Pesticide/PCB target compounds by NDRC Laboratories, Inchscape Testing Services.

This review has been performed in accordance with the confirmation method. The reported analytical results are presented as a summary of the data in Attachment II. All of the analytical data were examined to determine the usability of the analytical results and also to determine contractual compliance relative to the analytical requirements and deliverables specified in the CLP method and Sampling and Chemical Analysis Quality Assurance requirements for the Navy Installation Restoration Program (NEESA 20.2-047B). The applicable qualifier codes have been placed next to the results in the data summary to indicate the qualitative and/or quantitative reliability. The details of this evaluation review are presented in the narrative section of this report.

All data have been validated with regard to usability according to the quality assurance set forth in USEPA Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. If you have any questions or comments on this data review, please call Zohreh Hamid or Kelly Spittler at (610) 701-3745.

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a review of the following criteria:

*	•	Data Completeness
*	•	Holding Time
*	•	GC/MS Tuning
	•	Calibration
	•	Blanks
	•	Surrogate Recoveries
	•	Matrix Spike/Spike Duplicate
	•	Laboratory Control Sample
	•	Internal Standard
*	•	Instrument Performance
	•	Field Duplicate Results
*	•	Compound Identification
*	•	Compound Quantitation

* All criteria were met; therefore, a narrative section is not provided for this classification.

CALIBRATION

Volatiles and Semivolatiles

The following %D results in the continuing calibrations exceeded the 25% QC limit. These calibrations are considered acceptable since less than two (VOA) or four (BNA) check (*) compounds had %Ds outside the criteria. Positive results were not detected for these compounds; therefore, all associated non-detected values for the compounds listed below are qualified as estimated and flagged "UJ". All RRFs were above 0.05; therefore, no qualification is required on this basis.

CALIBRATION	INSTRUMENT ID	COMPOUND	%RSD/%D
CC 08-04-94	HP4.i	Chloromethane	32.9
CC 08-12-94	HP1.i	4-Nitrophenol	43.3
		3,3-Dichorobenzidine	57.3

Pesticide/PCBs

The percent resolutions for endosulfan I (45.2%) and gamma-chlordane (57.5%) were below the 60% QC limit. All associated positive results are qualified estimated.

BLANKS

Pesticide/PCBs

The following method blank contained several target compounds at levels below the CRQLs. All associated positive results less than 5X the blank levels are considered laboratory artifacts. Results <CRQL are elevated to the CRQL and are flagged "U", while results >CRQL, but less than 5X the blank are also flagged "U".

BLANK	COMPOUND	LEVEL
Method Blank (PBLK)	Beta-BHC	0.013 ug/L
	Aldrin	0.012 ug/L

SURROGATE RECOVERIES

Pesticide/PCBs

All surrogate recoveries were within the requirement limits, except for the following:

SAMPLE NO.	RECOVERY SPB608/DB1701	SURROGATE COMPOUND	REASON
35-SWPD02	36/33	DCB	Advisory Criteria 60-150%
35-SWPD01	58/-	TCX	Advisory Criteria 60-150%
	47/48	DCB	Advisory Criteria 60-150%
PLCS	-/55	DCB	Advisory Criteria 60-150%

DCB = Decachlorobiphenyl
TCX = Tetrachloro-m-xylene

Since the requirement limits are advisory and there is no qualification criteria established in Functional Guidelines or NEESA for surrogate outliers in the pesticide/PCB fraction, no action is taken.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

As per the laboratory case narrative, MS/MSD samples are not included with this batch of samples, since no sample was specified for quality control in this SDG. No qualification is applied due to the lack of these QC samples.

LABORATORY CONTROL SAMPLE

An LCS analysis was performed in order to fulfill the blank spike analysis requirements as established in the NEESA guidelines.

Semivolatiles

The percent recovery for 4-nitrophenol (112.4%) was above the QC limits of 40-80%. Since this compound was not detected in the samples, no action is required.

INTERNAL STANDARD

Semivolatiles

The following internal standard areas were outside the control limits in the sample analyses:

SAMPLE	INTERNAL STANDARD	AREA	CONTROL LIMITS
SBLKA	Perylene-d_{12}	0	314316-1256546
SLCS	Perylene-d_{12}	0	314316-1256546
RWMS	Perylene-d_{12}	6478	314316-1256546
RWMSD	Perylene-d_{12}	0	314316-1256546

Since the samples in this batch met the internal standard area criteria and the MS/MSD listed above were not from this SDG, no qualification is applied due to these outliers.

FIELD DUPLICATE RESULTS

A field duplicate analysis was not provided for this batch of samples. No qualification is required due to the lack of this QC sample.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Organic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Kelly Spittler or Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS. [Substantially is equivalent to a result less than 10 times the blank level for common contaminants (methylene chloride, acetone and 2-butanone in the VOA analyses, and common phthalates in the BNA analyses, along with tentatively identified compounds) or less than 5 times the blank level for other target compounds.]

R = UNUSABLE RESULT. THE PRESENCE OR ABSENCE OF THIS ANALYTE CANNOT BE VERIFIED. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND. THERE IS PRESUMPTIVE EVIDENCE TO MAKE A TENTATIVE IDENTIFICATION.

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE WAS POSITIVELY IDENTIFIED. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = ANALYTE WAS NOT DETECTED ABOVE THE CRQL. THE REPORTED QUANTITATION LIMIT IS QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
VOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL, INC.
SDG NO.: B8035

Client Sample ID:	35-SWPD01	35-SWPD02	35-TB-100
Matrix:	WATER	WATER	WATER
Dilution Factor:	1.0	1.0	1.0
Units:	UG/L	UG/L	UG/L
COMPOUND			
Bromomethane			
Vinyl Chloride			
Chloroethane			
Methylene Chloride			
Acetone			
Carbon Disulfide			
1,1-Dichloroethene			
1,1-Dichloroethane			
1,2-Dichloroethene (TOTAL)			
Chloroform			
1,2-Dichloroethane			
2-Butanone			
1,1,1-Trichloroethane			
Carbon Tetrachloride			
Bromodichloromethane			
1,2-Dichloropropane			
cis-1,3-Dichloropropene			
Trichloroethene			
Dibromochloromethane			
1,1,2-Trichloroethane			
Benzene			
Trans-1,3-Dichloropropene			
Bromoform			
4-Methyl-2-Pentanone			
2-Hexanone			
Tetrachloroethene			
1,1,2,2-Tetrachloroethane			
Toluene			
Chlorobenzene			
Ethylbenzene			
Styrene			
Xylene (total)			
Chloromethane	UJ	UJ	UJ

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B8035

Client Sample ID:	35SWPD01	35SWPD02
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L

Phenol
bis(2–Chloroethyl)ether
2–Chlorophenol
1,3–Dichlorobenzene
1,4–Dichlorobenzene
1,2–Dichlorobenzene
2–Methylphenol
2,2'–oxybis(1–Chloropropane)
4–Methylphenol
N–Nitroso–di–n–propylamine
Hexachloroethane
Nitrobenzene
Isophorone
2–Nitrophenol
2,4–Dimethylphenol
bis(2–Chloroethoxy)methane
2,4–Dichlorophenol
1,2,4–Trichlorobenzene
Naphthalene
4–Chloroaniline
Hexachlorobutadiene
4–Chloro–3–methylphenol
2–Methylnaphthalene
Hexachlorocyclopentadiene
2,4,6–Trichlorophenol
2,4,5–Trichlorophenol
2–Chloronaphthalene
2–Nitroaniline
Dimethylphthalate
Acenaphthylene
2,6–Dinitrotoluene
3–Nitroaniline
Acenaphthene

ROY F. WESTON, INC.
SEMIVOLATILE ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SDG NO.: B8035

Client Sample ID:	35SWPD01	35SWPD02
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	ug/L	ug/L
2,4–Dinitrophenol		
4–Nitrophenol	UJ	UJ
Dibenzofuran		
2,4–Dinitrotoluene		
Diethylphthalate		
4–Chlorophenyl–phenylether		
Fluorene		
4–Nitroaniline		
4,6–Dinitro–2–methylphenol		
N–Nitrosodiphenylamine		
4–Bromophenyl–phenylether		
Hexachlorobenzene		
Pentachlorophenol		
Phenanthrene		
Anthracene		
Carbazole		
Di–n–butylphthalate		
Fluoranthene		
Pyrene		
Butylbenzylphthalate		
Benzo(a)anthracene		
3,3–Dichlorobenzidine	UJ	UJ
Chrysene		
bis(2–Ethylhexyl)phthalate		
Di–n–octylphthalate		
Benzo(b)fluoranthene		
Benzo(k)fluoranthene		
Benzo(a)pyrene		
Indeno(1,2,3–cd)pyrene		
Dibenz(a,h)anthracene		
Benzo(g,h,i)perylene		

ROY F. WESTON, INC.
PESTICIDE/PCB ANALYSES – DATA VALIDATION SUMMARY

CLIENT:BAKER ENVIRONMENTAL
SDG NO.: B8035

Client Sample ID:	35-SWPD01	35-SWPD02
Matrix:	WATER	WATER
Dilution Factor:	1.0	1.0
Units:	UG/L	UG/L
COMPOUND		
alpha-BHC	0.012 J	0.037 J
beta-BHC		
delta-BHC		
gamma-BHC(Lindane)		
Heptachlor		
Aldrin	0.05 U	
Heptachlor Epoxide		
Endosulfan I		
Dieldrin	0.027 J	0.019 J
4,4'-DDE	0.049 J	
Endrin		
Endosulfan II		
4,4'-DDD		
Endosulfan Sulfate	0.047 J	
4,4'-DDT		
Methoxychlor	0.05 J	0.028 J
Endrin Ketone		
Endrin Aldehyde	0.08 J	
alpha-Chlordane		
gamma-Chlordane		0.068 J
Toxaphene		
Aroclor 1016		
Aroclor 1221		
Aroclor 1232		
Aroclor 1242		
Aroclor 1248		
Aroclor 1254		
Aroclor 1260		

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INORGANIC QUALITY ASSURANCE REVIEW
BAKER ENVIRONMENTAL, INC.
SITE: MCB CAMP LEJEUNE
SDG NO.: BA8035

REVIEW PERFORMED BY
THE ANALYTICS DIVISION
OF
ROY F. WESTON, INC.

VERIFIED BY: Zohreh Hamid 9-1-94

Zohreh Hamid, Ph.D. — **Date**
Section Manager - Data Validation

BAKER ENVIRONMENTAL, INC. - NAVY CLEAN
SITE: MCB CAMP LEJEUNE
SDG No.: BA8035

CASE SUMMARY

This data validation review consists of three (3) water samples received on 07-29-94. Laboratory analyses were performed by NDRC Laboratories, Inchcape Testing Services for Target Analyte List (TAL).

All data have been validated with regard to usability according to the quality assurance guidelines set forth in Inorganic Functional Guidelines and Naval Energy and Environmental Support Activity (NEESA). If you have any questions or comments on this data review, please contact Zohreh Hamid at (610) 701-3745.

The following samples are contained within this report:

35PD01 35PD02 A47CWW

QUALITY ASSURANCE REVIEW

The findings offered in this report are based upon a rigorous review of the following criteria. No major problems were encountered during the sample analyses. The minor deficiencies are summarized under each parameter:

*	•	Holding Times
*	•	Calibration
	•	Contract Required Detection Limit Samples
	•	Blank Samples
*	•	Interference Check Samples
	•	Matrix Spike
	•	Duplicate Digestion Samples
*	•	Laboratory Control Sample
*	•	Serial Dilution Sample
	•	Graphite Furnace Analysis
*	•	Quarterly Verification of Instrument Parameters
*	•	Sample Result Verification
*	•	Preparation Logs
*	•	Run Logs
	•	Data Package Completeness

* All criteria were met for this classification.

CONTRACT REQUIRED DETECTION LIMIT SAMPLE ANALYSES

The CRDL recoveries for Pb (130%), Sb (72.8%), Cr (65.4%), and Cu (127.5%) were outside the data validation requirement limits of 80-120%. The positive results greater than the IDLs but less than 3X the CRDLs for these analytes should be qualified estimated due to the uncertainty near the detection limits. The non-detected values for antimony and chromium are also qualified estimated.

The results for copper are qualified "U" due to the blank contamination. An additional qualifier code was not applied.

BLANK ANALYSES

The laboratory blank had the following contaminations at levels above the IDLs, but below the CRDLs:

ANALYTE	CONC. UG/L	ACTION LEVEL UG/L *
Aluminum	22.23	111.15
Barium	1.0	5
Cobalt	11.267	56
Copper	3.8	19
Mercury	0.1	0.5

* Action level = 5X the blank concentration

Aluminum and barium were detected in the samples at levels above the action levels and mercury was not detected in the samples. Therefore, the data are not impacted for these two analytes.

The continuing calibration blank had silver at a level above the CRDL. The data are not impacted, since this analyte was not detected in the samples.

MATRIX SPIKE

The matrix spike recovery for Se (74.5%) was outside the control limits of 75-125%. The sample results are not flagged with an "N" as required by CLP. The reported sample data for selenium are considered biased low and are qualified estimated.

DUPLICATE DIGESTION SAMPLES

The RPDs for all analytes in the laboratory duplicate sample analysis were within the control limits. The field duplicate was not identified for this batch.

SERIAL DILUTION SAMPLE

The %D for Al (10.3%) was above the analysis requirement. However, the %D was within the data validation control limit of 15%. Therefore, the data are not qualified based on this outlier.

GRAPHITE FURNACE ANALYSIS

The following samples analyzed by graphite furnace had the analytical spike recoveries outside the control limits of 85-115%:

SAMPLE ID	ANALYTE	%RECOVERY
35PD01	Cd	162*
35PD02	Cd	115.5*
A47CWW	As/Cd/Se/Tl	81/148*/44.7/152.6

* Only the positive results are qualified estimated.

The reported data are qualified estimated.

The linearity did not meet the requirement of "$r \geq 0.995$" in the calibration standard analyzed for cadmium. The affected sample (35PD02) was qualified estimated.

SUMMARY

The data package and quality of the data were satisfactory. Major problems were not encountered during the analyses. The minor issues have been discussed. The reported sample data are accepted with the applied qualifier codes.

INFORMATION REGARDING DATA

The data have been reviewed according to the USEPA National Functional Guidelines for Inorganic Data Review. All data are validated with regard to usability.

If you have any questions or comments on this data review, please call Zohreh Hamid at (215) 344-3745.

ATTACHMENTS

1. Attachment I - Glossary of Data Qualifier Codes

2. Attachment II - Sample Result Summary. This includes:

    a) A summary of all positive results for the target analytes with the qualifier codes, if applicable;

    b) All qualified and usable detection limits.

3. Attachment III - Sample data (Form I) verified by the laboratory.

ATTACHMENT I
GLOSSARY OF DATA QUALIFIER CODES

WESTON
MANAGERS DESIGNERS/CONSULTANTS

GLOSSARY OF DATA QUALIFIERS

CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

U = NOT DETECTED SUBSTANTIALLY ABOVE THE LEVEL REPORTED IN LABORATORY OR FIELD BLANKS.

R = UNRELIABLE RESULT. ANALYTE MAY OR MAY NOT BE PRESENT IN THE SAMPLE. SUPPORTING DATA NECESSARY TO CONFIRM RESULT.

N = NEGATED COMPOUND WAS CONSIDERED AS NOT PRESENT IN THE SAMPLE.

(NO CODE) = CONFIRMED IDENTIFICATION

CODES RELATING TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

J = ANALYTE PRESENT. REPORTED VALUE MAY NOT BE ACCURATE OR PRECISE.

UJ = THE REPORTED QUANTITATION LIMITS ARE QUALIFIED ESTIMATED.

OTHER CODES

Q = NO ANALYTICAL RESULT.

WESTON
MANAGERS DESIGNERS/CONSULTANTS

ATTACHMENT II
SAMPLE RESULT SUMMARY

ROY F. WESTON, INC.
INORGANIC ANALYSES – DATA VALIDATION SUMMARY

CLIENT: BAKER ENVIRONMENTAL
SITE: MCB CAMP LEJEUNE
SDG NO.: BA8035

Client Sample ID:			A47CWW	35PD01	35PD02
Matrix:			WATER	WATER	WATER
Units:			ug/L	ug/L	ug/L
INORGANIC ELEMENTS					
		IDL ug/L			
Aluminium	P	20	8010	1310	508
Antimony	F	46	UJ	UJ	UJ
Arsenic	F	1.2	3.5 J	2.3	4.6
Barium	P	1.0	593	11.3	18.5
Beryllium	P	1.0			
Cadmium	F	0.1	0.20 J	0.12	UJ
Calcium	P	1700	223000	6610	22800
Chromium	P	7	33.4 J	UJ	UJ
Cobalt	P	11	19.7 U		
Copper	P	2	19.9 U	6.6 U	5.5 U
Iron	P	13	10000	2340	14200
Lead	F	1.0	16.5	1.7 J	1.6 J
Magnesium	P	13	6130	1010	2360
Manganese	P	2.0	309	103	382
Mercury	AV	0.1			
Nickel	P	11			
Potassium	P	2440	172000		
Selenium	F	1.4	UJ	UJ	UJ
Silver	P	3.0			
Sodium	P	2370	91400		3290
Thallium	F	0.6			
Vanadium	P	5	8.7	5.4	
Zinc	P	11	135	14.5	

P = ICP
A = Flam AA
F = Furnace AA
AV = Automated Cold Vapor AA