



Parallax

INC.

U.S. Army Corps of Engineers
Omaha District
ATTN: CENWO-PM-HA (Tom Zink)
215 North 17th Street
Omaha, NE 68102-4978

ATL-00-162

August 2, 2000

Reference: Contract No. DACA45-99-D-0015
Delivery Order No. 003

Subject: Long Term Monitoring of Landfills 3, 4, & 25
Cannon Air Force Base, New Mexico

Dear Mr. Zink,

Attached are the final work plans with comments and responses on the above referenced project. The comments have also been transmitted to you via electronic mail, and a computer disk is enclosed. Please contact me at 770-955-2008 if you have any questions or require further information.

Sincerely,
Parallax, Inc.

David Keefer
Program Manager

cc: Sanford Hutsell, - 27 CES/CEV, 8 copies
Margret Patterson, - HQ ACC/CEVR-W, 2 copies
Quality Assurance Branch Lab,
Debbie Molinary - Parallax w/o attachment
File

An Engineering and Environmental Management Company

320 Interstate North Parkway, Suite 230 • Atlanta, GA 30339 • Phone: (770) 955-2008 • FAX: (770) 955-2331

6
FINAL

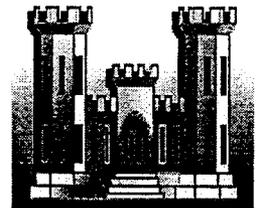
**WORK PLAN
LONG TERM MONITORING ACTIVITIES
FOR LANDFILLS 3, 4, AND 25
CANNON AIR FORCE BASE
CLOVIS, NEW MEXICO**

August 2, 2000

**Submitted to:
U. S. Army Corps of Engineers
Omaha District**



**Submitted by:
Parallax, Inc.
320 Interstate North Prkwy
Suite 320
Atlanta, GA 30339**



**Contract No.
DACA45-99-D-0015
Delivery Order No. 003**



**Quality Assurance Project Plan Addendum
Long Term Monitoring Activities (Groundwater)
for Landfills 3, 4, and 25**

**Cannon Air Force Base
Clovis, New Mexico**

1.0 INTRODUCTION

Parallax, Inc. (Parallax) has been tasked by the U.S. Army Corps of Engineers (USACE), Omaha District, to collect groundwater samples from existing monitoring wells located down-gradient of landfills 3 (MW-O), 4 (MW-N), and 25 (MW-R). The identified groundwater wells have existing dedicated pumps; however, due to the corrosivity of water present in well R (landfill 25), that pump must be pulled and inspected for required maintenance prior to each sampling event. The existing long term monitoring schedule specifies monitoring wells-N and -O to be sampled annually, typically in December. MW-R will be sampled semi-annually, in June and December. All groundwater investigations will be performed in accordance with existing Cannon Air Force Base (AFB) field sampling plan requirements. This Quality Assurance Project Plan Addendum is tiered below the existing Cannon Air Force Base Field Sampling Plan and is intended to meet the requirements of a sampling and analysis plan for this project.

For each monitoring event, one groundwater sample will be collected from the specified MWs and submitted for chemical analyses. To ensure that acceptable data are obtained through compliance with proper quality assurance/quality control (QA/QC) protocols, one field duplicate will be submitted to the laboratory for analysis. In addition, split samples will be provided to the USACE, as directed.

1.1 Purpose and Scope

This quality assurance project plan (QAPjP) addendum addresses activities specific to groundwater sample collection and laboratory analysis to obtain analytical results of sufficient quality to satisfy data quality objectives for legally defensible data. The U.S. Environmental Protection Agency (USEPA) requires preparation of a QAPjP for all environmental measurements that will be used for regulatory compliance. The purpose of this QAPjP addendum is to identify pertinent aspects of sampling, identification, preservation and holding times, shipping and custodial documentation, and analytical procedures that are subject to proper QA/QC requirements.

1.2 Regulatory Guidance Criteria

A QAPjP is required for all investigation activities subject to the Resource Conservation and Recovery Act (RCRA) guidelines in accordance with requirements promulgated in 40 Code of Federal Regulation (CFR) 264.97. In addition, all groundwater LTM activities will be performed according to New Mexico Solid Waste Management

Regulations 20 New Mexico Administrative Code (NMAC) 9.1, Subpart VII (effective November 1995), and New Mexico Hazardous Waste Management Regulations 20 NMAC 4.1.

1.3 Project Organization

Parallax will provide a Project Manager (PM) to manage all aspects of the groundwater sampling activities. The PM will also serve as site safety and health officer. An environmental technician will assist in well purging, containerization of purge waters, collecting samples, and sample preparation. All Parallax team members will have HAZWOPER 40-hour training (29 CFR 1910) and be current in their annual updates.

2.0 SAMPLING PROCEDURES

Each of the three monitoring wells addressed by the Cannon AFB long term monitoring (LTM) program are equipped with dedicated pumps. After the respective caps are removed, the casing ambient atmospheres will be monitored for elevated levels of volatile organic compounds (VOC) as a precautionary measure (see site specific safety and health plan for hazard analysis), and the water level will be determined in each well. These depths to water will allow calculation of the required volume of groundwater to be purged for each well. A total of three well volumes will be purged. During water extraction, various physical parameters will be monitored to ensure water stabilization prior to sample collection. The samples will then be labeled, listed on custodial documentation, and shipped to the laboratory for requisite analyses.

2.1 Well Access and Determination of Water Levels

Each well will initially be monitored to detect the presence of elevated levels of volatile organic vapors. After the protective outer casing is opened, the well casing cap will be removed. The tip of a photoionization detector (PID) will be placed into the well casing to measure volatile organic compound (VOC) levels. If the ambient VOC concentration is not elevated, sampling will proceed. If an elevated volatile concentration is detected, personnel will move upwind until the atmosphere clears. If elevated organic vapors persist, engineering controls or respiratory protection will be implemented in accordance with the site specific safety and health plan.

The depth to top of water inside each well casing will be determined using a transducer suspended on the end of a conductive, graduated measuring wire. When the transducer contacts the top of the water table, an audible indicator will sound. The transducer will also be used to determine the presence of non-aqueous phase liquids (NAPLs) at either the top (LNAPLs) or bottom (DNAPLs) of the water column. If NAPLs are detected, sampling will be suspended and the USACE Technical Representative will be contacted for further instructions. The depth to the top of water will be subtracted from the established elevation of the top of casing. The total depth of each well is known from initial installation records; therefore, the difference in the two elevations is the height of

the water column, in feet and tenths of feet. The height of the water column will then be multiplied by an appropriate conversion factor to determine the well volume in gallons.

2.2 Well Purging and Measurement of Physical Parameters

A total of three well volumes will be purged prior to sampling, unless the well is slow to recharge. If the well does not recharge rapidly enough to permit extraction of the three volumes, the well will be pumped dry and sampled as soon as sufficient recharge has occurred.

Physical parameters (i.e., temperature, pH, specific conductivity, and turbidity) will be measured at the start of purging and twice per casing volume removed. Purging will continue until all three well volumes have been removed. Purging will continue beyond the three casing volumes until the physical parameters have stabilized (i.e., within 0.2 pH units or a 10 percent variance for the other parameters among four consecutive readings). Purging activities and physical parameter readings will be recorded on the *Well Purge Data Sheet*. All aspects of the sampling event will be recorded on the *Daily Quality Control Report*.

2.3 Sample Collection

After the proper volume of water has been purged and the physical parameters have stabilized, each well will be sampled. The actual sample quantities will be drawn with a bailer or taken at the point of discharge to prevent unnecessary agitation of the sample along with loss of entrained volatiles. During sample collection, two 40-milliliter (-mL) VOC vials will be collected first followed by semi-volatiles and then the remaining suite of analytes. Each day that VOC samples are shipped, two trip blanks (i.e., 40-mL vials filled with deionized water supplied by the laboratory) will also be sent to the laboratory. Appropriate preservatives will be included in the sample containers (e.g., hydrochloric acid for VOCs, nitric acid for metals).

The analytical laboratory will furnish all sample containers and supplies, as required. For the Cannon LTM, the contracted laboratory will be Paragon Analytics, Inc., Golden, Colorado. Because each laboratory has specific quantity requirements due to combinations of extractions from common containers, a matrix showing specific bottle requirements will not be included in the QAPjP addendum. These requirements will be furnished by Paragon at the start of sample collection.

2.4 Sample Identification

A unique identification number will be assigned to each water sample that identifies the base, date collected, monitoring well, and if the sample is a field duplicate or split sample. The same numbering system used during previous Cannon LTM sampling events will be used by Parallax.

Each identifier will consist of at least three segments:

- Date of the sampling event - consisting of month and year (e.g., 0601 will denote June 2001);
- Monitoring well number - MWR will represent monitoring well R (landfill 25);
- QC field duplicates - identified with an X (i.e., MWX); and
- Split samples - divided with the USACE will be assigned an "S" after the MW designation (MWR-S).

Therefore, an example of a sample identification number is: CAFB0601MWR, representing a groundwater sample from monitoring well R, Cannon AFB, collected during June, 2001.

2.5 Custody Documentation

To ensure that there is no inadvertent cross-contamination or tampering with sample containers after collection, a custody seal will be applied across the lid of each cooler such that the lid cannot be opened without tearing the security device. Each seal will be signed and dated by the person collecting the sample. The containers/coolers will not be out of the control of authorized field personnel until they are released for shipment. An exception to the "constant possession rule" would be placing the coolers in a secured location (e.g., locked vehicle, location on-Base capable of being locked).

Prior to sample shipment, each container will be included on a chain of custody (COC) form listing such pertinent information as feature(s) sampled, number and types of containers, date and time collected, preservatives, collection personnel, and required analyses. COCs are project QC documents that will be included in the respective coolers during transport. A COC will track sample possession and physical conditions through the various stages of collection, shipment, and analysis. The analytical laboratory will generally furnish both custody seals and COCs.

2.6 Sample Packing and Shipping

Water samples will be packed in such a manner that they will not sustain breakage of the glass containers during transit, and be maintained at 4°C, ± 2°C until received by the analytical laboratory. Each glass container will be enclosed in "plastic bubble-type wrap" and placed in plastic zip-top "baggies." Individually packaging the glass containers will reduce the possibility of surface cross-contamination by liquids in the event of breakage during shipment. Sufficient ice, protected in double thicknesses of zip-top "baggies," will be placed in the coolers to attain the 4°C shipping requirement. Any voids will be filled with Styrofoam "peanuts" or similar inert material.

After each cooler is filled, the COC representing the samples for that respective container will be placed in a plastic zip-top "baggie" that will be taped to the inside lid of the sample cooler prior to closing the cooler lid. The cooler lid will be secured with packaging tape on each end. A minimum of three custody seals will be affixed to the outside of the cooler in such a manner that each seal extends from the lid to the body of the container. This will ensure that the cooler cannot be opened without destroying the

seal integrity. The coolers will be shipped via an overnight express carrier that guarantees next morning delivery.

3.0 ANALYTICAL PROCEDURES

Paragon will be responsible for employing proper analytical protocols (USEPA SW-846) to produce accurate data that can be validated according to accepted methodologies and that will be reproducible and legally defensible. At least one field split will be submitted during each sampling event to the CQAB Lab, 420 S. 18th Street, Omaha, NE 68102. POC is Laura Percifield, 402-444-4314. The assigned LIMS number for this project is 6052. This number shall be used on the sample labels and all correspondence to the USACE QA lab. Also, the contract laboratory will be expected to continually monitor its analyte recovery efficiency, instrumentation calibrations, and internal QC checks and balances [e.g., matrix spikes/matrix spike duplicates (MS/MSDs), spike surrogates].

3.1 Analytical Parameters and Methods

Groundwater samples collected during the Cannon LTM events will be analyzed for the following parameters using the following USEPA methods.

METHOD	PARAMETER(S)
8260B	VOCs
8270C	Semi-VOCs (including Petroleum Aromatic Hydrocarbons)
6010B	TAL Metals
7470A	Mercury
8151	Herbicides
8081A	Organochlorinated Pesticides
8082	Polychlorinated Biphenyls
8140	Organophosphate Pesticides
300.0 (Methods for Chemical Analysis of Water and Wastes)	Water Quality Parameters: Sulfate, Nitrate, and Chloride
8270C (Methods for Chemical Analysis of Water and Wastes)	Water Quality Parameters: Phenol

All methods will be taken from SW-846, Third Edition, Update III, unless otherwise stated. Practical quantitation limits are attached per Paragon, Laboratory Quality Assurance Program tables.

3.2 Data Validation

Data review and validation will be performed by applying the QC limits defined in the various analytical methodologies. Data validation will consist of examination of holding times, method blanks, field duplicates, surrogate spikes, MS/MSDs, and review of case narratives addressing sample receipt forms and COCs. USEPA validation guidelines from *the National Functional Guidelines for Organic Data Review* and *the National*

Functional Guidelines for Inorganic Data Review will be used as reference resources to define these validation criteria. Accepted validation qualifiers denoting various exceptions, estimations, and non-usability of data will be assigned.

4.0 CORRECTIVE ACTIONS

Various aspects of sampling quality will be monitored in accordance with the Parallax QA Program. If a problem is identified, it will be rectified at that point, if possible. Any problems will be noted in the field log and reported, as appropriate. Problems arising from QC issues with laboratory analyses or data quality will be discussed with laboratory personnel, and reported to the USACE representatives, if necessary.

Comment / Response Form



Comments made by: Paula Peters

Company: USACE

No	Section	Comments	Response
1		Please number the pages.	Pages have been numbered.
2	1.1	Reference the QAPP that this QAPP Addendum is an addendum for.	QAPP reference added.
3	1.3	Having one individual serve as the Project Manager, site geologist and site safety and health officer may be okay, but it should be considered whether or not this person can manage all of these jobs at the same time.	Due to the small size and simple tasks of this project, we determined one person would be able to safely handle these responsibilities. In addition, reference to site geologist was deleted. The PM will be a civil engineer.
4	2.1	Correct the typo in "substracted".	Typo corrected in "subtracted".
5	2.3	Paragon Laboratory located in Norcross, Georgia is not currently a USACE validated laboratory. A USACE validated laboratory was scoped to be used for this work effort. Parallax must chose another laboratory that is currently USACE validated or this lab must undergo USACE lab validation. The USACE lab validation process currently takes approximately 4 months. If Parallax wishes to choose another laboratory, please contact the USACE Project Chemist, Paula Peters, at 402-221-7699 to determine if the proposed laboratory is USACE validated.	Paragon Lab was USACE approved in April 2000 (see attached). However, if using Paragon is not acceptable, Parallax has GPL as a backup and will use this lab.
6	2.5	It is not necessary to apply a custody seals across the cap of each sample container. Custody seals are only needed on the lid of the sample cooler.	Plan revised to reflect application of custody seals to each cooler.
7	2.6	State also that the complete COC, once placed in the plastic ziptop baggie, will be taped to the inside lid of the sample cooler.	Stated that COC will be placed in zip-top bag and then taped to

			inside cooler lid.
--	--	--	--------------------

No	Section	Comments	Response
8	3.0	In the introduction, it states that a split sample will be taken and provided to USACE. However, section 3.0 does not discuss the split sample that will be taken. Include the lab name, address, phone number and point of contact (CQAB lab, 420 S. 18 th Street, Omaha, NE 68102, 402-444-4314, Laura Percifield). Also, LIMS# has been assigned to the correspondence sent to the USACE QA lab. The QA lab will be notified at least one day prior to sample shipment to the QA lab.	Included lab name, address, phone number and POC.
9	3.1	Include a list of the TAL metals that will be analyzed. Not all of the TAL metals will be analyzed by Method 6010B. Arsenic, chromium, selenium and thallium should be analyzed by graphite furnace methods. Include those method numbers in this section.	All TAL metals can be analyzed using Trace ICP 6010B method, and will be for this project.
10	3.1	3.1, last paragraph. It is not acceptable to reference the NMAC citation for practical quantitation limits. Tables showing practical quantitation limits for all the analytes must be included in the QAPP Addendum.	Reference to NMAC deleted and Practical Quantitation Limits tables were included.
11	General	It appears that Parallax has simply reiterated the USACE scope of services, rather than generating their own, original QAPP Addendum. Parallax should have written pertinent sections of the QAPP Addendum and described them in detail rather than just including text from the USACE Scope of Services.	Parallax has attempted to adhere to the USACE Omaha District requirements for content and format as provided in the model scope of services. Project specific requirements have been included where applicable.

20:11 00. 20/80



DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS

HTRW CENTER OF EXPERTISE

12565 WEST CENTER ROAD

OMAHA, NEBRASKA 68144-3869

REPLY TO
ATTENTION OF:

April 10, 2000

Hazardous, Toxic and Radioactive Waste
Center of Expertise

Paragon Analytics, Inc.
225 Commerce Drive
Fort Collins, CO 80524

Gentlemen:

This correspondence addresses the recent evaluation of Paragon Analytics, Inc. of Fort Collins, CO by the U.S. Army Corps of Engineers (USACE) for chemical analysis in support of the USACE Hazardous, Toxic and Radioactive Waste Program.

Your laboratory is now validated for the parameters listed below:

METHOD	PARAMETERS	MATRIX ⁽¹⁾
300 series	Anions ⁽⁴⁾	Water ⁽²⁾
8021B	Aromatic Volatile Organics	Water ⁽²⁾
8021B	Aromatic Volatile Organics	Solids
9010B/9012A	Cyanide	Water ⁽²⁾
9013	Cyanide	Solids
8330	Explosives	Water ⁽²⁾
8330	Explosives	Solids ⁽²⁾
8151A	Herbicides	Water ⁽²⁾
8151A	Herbicides	Solids
413.1	Oil & Grease	Water ⁽²⁾
9071	Oil & Grease	Solids
413.2	Oil & Grease	Water ⁽²⁾
9071/413.2	Oil & Grease	Solids
8081A	Organochlorine Pesticides	Water ⁽²⁾
8081A	Organochlorine Pesticides	Solids
8082	Polychlorinated Biphenyls	Water ⁽²⁾
8082	Polychlorinated Biphenyls	Solids ⁽²⁾
8310	Polynuclear Aromatic Hydrocarbons	Water ⁽²⁾
8310	Polynuclear Aromatic Hydrocarbons	Solids
8270C	Semivolatile Organics	Water ⁽²⁾
8270C	Semivolatile Organics	Solids ⁽²⁾
SW-846	TAL Metals ⁽³⁾	Water ⁽²⁾
SW-846	TAL Metals ⁽³⁾	Solids ⁽²⁾
9060	Total Organic Carbon	Water ⁽²⁾
9060	Total Organic Carbon	Solids ⁽⁵⁾

- 2 -

Mod 8015	TPH - DRO ⁽⁵⁾	Water
Mod 8015	TPH - GRO ⁽⁵⁾	Solids
418.1	TRPH ⁽⁵⁾	Water
9071/418.1	TRPH ⁽⁵⁾	Solids
8260B	Volatile Organics	Water ⁽²⁾
8260B	Volatile Organics	Solids

- Remarks:
- 1) 'Solids' includes soils, sediments, and solid waste.
 - 2) The laboratory has successfully analyzed a performance evaluation sample for this method/matrix.
 - 3) TAL Metals: Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.
 - 4) Anions: Chloride, fluoride, sulfate, nitrate, nitrite, and ortho-phosphate.
 - 5) Approval for this parameter is based on review of SOPs only.

Enclosed for your information is a copy of the Laboratory Inspection and Evaluation Report. Your laboratory has responded to the deficiencies as noted in the report. No further responses are necessary.

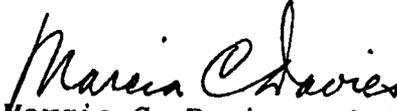
Based on the successful analysis of the performance evaluation samples and the results of the laboratory inspection, your laboratory will be validated for sample analysis by the methods listed above. The period of validation is 24 months and expires on March 14, 2002.

The USACE reserves the right to conduct additional laboratory inspections or to suspend validation status for any or all of the listed parameters if deemed necessary. It should be noted that your laboratory may not subcontract USACE analytical work to any other laboratory location without the approval of this office. This laboratory validation does not guarantee the delivery of any analytical samples from a USACE Contracting Officer Representative.

- 3 -

Any questions or comments can be directed to Richard Kissinger at (402) 697-2569. General questions regarding laboratory validation may be directed to the Laboratory Validation Coordinator at (402) 697-2574.

Sincerely,


Marcia C. Davies, Ph.D.
Director, USACE Hazardous,
Toxic and Radioactive Waste
Center of Expertise

Enclosure

CENWO-HX-C (200)

10 April 2000

MEMORANDUM THRU

CENWO-HX-C *KC*

CENWO-HX *MOP*

FOR FILES (CENWO-HX-C)

SUBJECT: Laboratory Inspection and Evaluation - Paragon Analytics, Inc. of Fort Collins, CO, 16 - 18 February 2000

1. General:

a. Date of Inspection: 16 - 18 February 2000.

b. Contracts for which the laboratory will be used:

(1) Fort Carson, DACW45-94-D-0001

(2) Black Hill Army Deport, OT 23K Removal Action, Contract No. DACA45-98-D-0003, Task Order 5.

(3) TERC I Contract for Fort Carson, CO; Pueblo Deport, CO; KI Sawyer AFB, MI and Ellsworth AFB, SD.

c. Description of Contract: Analysis of an undetermined number of environmental samples for a variety of parameters.

d. General information of laboratory inspected:

Business Name:	Paragon Analytics, Inc.
Address:	225 Commerce Drive
City and State:	Fort Collins, CO 80524
Phone:	970-490-1511
Fax:	970-490-1522
How Long in Business:	10 years
Number Employed:	80 including 60 technical staff
Services Offered:	Chemical analysis of environmental samples.

Additional Information: Paragon Analytics, Inc. is a medium size-testing laboratory. The laboratory occupies 25,000 sq. ft. with office space occupying an additional 3,500 sq. ft. The laboratory has fourteen GCs, six GC/MSSs, four HPLCs, four ICP, two Ion Chromatographs, one GFAA, two infrared spectrophotometers, two UV/Visible spectrophotometers and one mercury analyzer. The laboratory maintains certification in the states of Arizona, California, Colorado, Connecticut, Idaho,

CENWO-HX-C

SUBJECT: Laboratory Inspection and Evaluation - Paragon Analytics, Inc. of Fort Collins, CO, 16 - 18 February 2000

Kansas, Maryland, Nevada, North Dakota, Oklahoma, Tennessee, Utah and Washington.

2. Summary of Inspection/Evaluation Results:

a. Paragon Analytics, Inc. has passed the performance evaluation (PE) samples noted in Section 4 of this report.

b. Paragon Analytics, Inc.' QA/QC policy is generally consistent with USACE and EPA policy and guidance.

c. Based on the PE sample results and the information gathered during the on-site inspection, Paragon Analytics, Inc. is considered qualified to perform analyses for the parameters and matrices which have either a GOOD or PASS status as noted in Section 4 of this report.

d. Paragon Analytics, Inc. was inspected by Rhonda Carter and Patricia Trotman of New Technologies, on behalf of the US Army Corps of Engineers CENWO-HX-C. Detailed inspection results are addressed in the enclosed Findings. A preliminary questionnaire is available upon request.

3. Interviews:

a. The following persons were present during the Entrance Interview:

Rhonda Carter	Chemist, NTEC
Patricia Trotman	Chemist, NTEC
Marty Brown	Organic Manager, Paragon Analytics, Inc.
Debra Scheib	QA Specialist, Paragon Analytics, Inc.
Steve Workman	Inorganics Manager, Paragon Analytics, Inc.
Peter Gintautas	Organics Manager, Paragon Analytics, Inc.
Darryl Patrick	Inorganics Supervisor, Paragon Analytics, Inc.
Debra Henderer	QA Manager, Paragon Analytics, Inc.
Donald F. Gipple	Lab Manager, Paragon Analytics, Inc.
Lori Pacheco	Operations Manager, Paragon Analytics, Inc.

CENWO-HX-C

SUBJECT: Laboratory Inspection and Evaluation - Paragon
Analytics, Inc. of Fort Collins, CO, 16 - 18 February 2000

The general topics discussed during the entrance interview were:
(1) the USACE QA program, (2) projects that the laboratory was
requested for, (3) onsite inspection procedures, (4) Project
Specific requirements and (5) PE sample results.

b. At the conclusion of the inspection, an Exit Interview
was held with the following persons:

Rhonda Carter	Chemist, NTEC
Patricia Trotman	Chemist, NTEC
Marty Brown	Organic Manager, Paragon Analytics, Inc.
Debra Scheib	QA Specialist, Paragon Analytics, Inc.
Steve Workman	Inorganics Manager, Paragon Analytics, Inc.
Peter Gintautas	Organics Manager, Paragon Analytics, Inc.
Darryl Patrick	Inorganics Supervisor, Paragon Analytics, Inc.
Debra Henderer	QA Manager, Paragon Analytics, Inc.
Donald F. Gipple	Lab Manager, Paragon Analytics, Inc.
Lori Pacheco	Operations Manager, Paragon Analytics, Inc.
Ken Campbell	Project Manager, Paragon Analytics, Inc.

Deficiencies noted during the inspection, recommendations and
required corrective actions to be taken were discussed.

4. Conclusions: PE Sample Results - The results of the PE
sample analysis are as follows:

PARAMETERS	MATRIX	METHOD	STATUS ¹
Volatile Organics	Water	8260B	Good
Aromatic Volatile Organics	Water	8021B	Pass
BNA (Semivolatile Organics)	Water	8270C	Good
BNA (Semivolatile Organics)	Sediment	8270C	Good
PAH	Water	8310	Good
Explosives	Water	8330	Good
Explosives	Sediment	8330	Good
PCBs	Water	8082	Good

CENWO-HX-C
 SUBJECT: Laboratory Inspection and Evaluation - Paragon
 Analytics, Inc. of Fort Collins, CO, 16 - 18 February 2000

PCBs	Sediment	8082	Good
Organochlorine Pesticides Herbicides	Water	8081A	Good
	Water	8151A	Good
TAL Metals ²	Water	SW-846	Good
TAL Metals ²	Sediment	SW-846	Good
TOC Cyanide	Water	9060	Good
	Water	9010B/9012A	Good
Anions	Water	300series	Good
Oil & Grease	Water	413.1	Good
Oil & Grease	Water	413.2	Good

Item ¹ - 'Good' means that the laboratory passed the PE sample on its first attempt, 'Pass' means that the laboratory passed with data corrections or analysis of additional PE samples, and 'Fail' means that the laboratory did not pass. 'NR' means that the laboratory did not report any results.

Item ² - TAL metals are: Aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium and zinc.

5. Deficiencies (D), Recommendation (R) and Other Findings (OF):
 See the attached Findings for the findings that would adversely affect the laboratory's ability to conduct the required chemical analyses, noted along with recommendations and other findings.

6. Action Items for the Laboratory:

a. The laboratory has responded satisfactorily to the deficiencies noted in the enclosed Findings. The items of interest are stated below.

b. Reference Findings Section 5, the laboratory preference is to use Trace ICP instead of analyzing low-level metals by graphite furnace.

08/02 00:11:07

CENWO-HX-C

SUBJECT: Laboratory Inspection and Evaluation - Paragon
Analytics, Inc. of Fort Collins, CO, 16 - 18 February 2000

Richard Kissinger
for

Rhonda Carter
Chemist

New Technologies Environmental
Consulting, Inc.

Enclosure

Q:\LABS\CO\Paragon Analytics -- Fort Collins\99September.validation\INS-01.doc

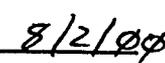
SITE SPECIFIC SAFETY AND HEALTH PLAN

**CANNON AIR FORCE BASE
LANDFILLS 3, 4, AND 25
CLOVIS, NEW MEXICO**

**U.S. ARMY CORPS OF ENGINEERS
CONTRACT No: DACA45-99-D-0015**

**C. N. Carter
Parallax, Inc.
Corporate Safety and Health Officer**

**David Keefer
Parallax, Inc.
Program Manager**



**Phillip Cummings
Parallax, Inc.
Project Manager/SSHR**

**Site Specific
Safety and Health Plan
for
Cannon Air Force Base
Landfills 3, 4, and 25
Clovis, New Mexico**

Revision 1

August 1, 2000

**Prepared by
Parallax, Inc.
320 Interstate North Parkway
Suite 230
Atlanta, Georgia 30339**

**Prepared for
U. S. Army Corps of Engineers
Omaha District
Contract DACA 45-99-D-0015
DO 003**

CONTENTS

ACRONYMS	vi
1. INTRODUCTION	1
2. ES&H REQUIREMENTS	1
3. ZERO ACCIDENT PERFORMANCE	2
4. INTEGRATED SAFETY MANAGEMENT SYSTEM	2
5. KEY PERSONNEL/IDENTIFICATION OF SAFETY AND HEALTH PERSONNEL	3
6. ORGANIZATIONAL RESPONSIBILITIES	3
6.1 PROJECT MANAGER	3
6.2 SITE SUPERINTENDENT	4
6.3 ENVIRONMENTAL SAFETY & HEALTH REPRESENTATIVE	4
6.4 RADIOLOGICAL CONTROL TECHNICIAN	5
6.5 FIELD PERSONNEL	5
7. SITE HISTORY AND DESCRIPTION	6
8. PERSONNEL TRAINING REQUIREMENTS	7
9. TRAINING AND HAZARD COMMUNICATION	7
9.1 FACILITY/SITE FEATURES	9
9.2 FACILITY/SITE HISTORY	9
9.3 CONTAMINANTS OF CONCERN	9
9.4 EMERGENCY ASSEMBLY POINTS	9
9.5 HAZCOM	9
10. ACTIVITY HAZARD ANALYSIS	10
10.1 SPECIFIC TASKS	10
10.2 HAZARD IDENTIFICATION	11
10.3 HAZARD CONTROL MEASURES	11
11. SAFETY AND HEALTH MONITORING	11
12. MEDICAL SURVEILLANCE PROGRAM	12
13. RESPIRATORY PROTECTION	14
13.1 LEVEL B CERTIFICATION	15

14. CONDUCT OF OPERATIONS	15
14.1 SITE ACCESS	16
14.2 MEDICAL SERVICES	16
14.3 DAILY "TOOLBOX"/WEEKLY SAFETY MEETINGS	16
14.4 ACCIDENT/INJURY REPORTS	17
14.5 EMPLOYEE RIGHT-TO-KNOW	17
14.6 FIRST AID	17
14.7 POTABLE AND NONPOTABLE WATER	17
14.8 HEARING PROTECTION	17
14.9 FIRE PREVENTION AND PROTECTION	18
14.10 EQUIPMENT STAGING AREA	18
14.11 VENTILATION	18
14.12 ILLUMINATION	18
14.13 LOCKOUT/TAGOUT	18
14.14 VEHICLE OPERATIONS	18
15. EMERGENCY RESPONSE	19
15.1 EVACUATION	20
15.2 EMERGENCY RESPONSE ASSISTANCE	20
15.3 NATIONAL OR REGIONAL SOURCES OF ASSISTANCE	21
16. HEAT STRESS	21
16.1 HEAT STRESS	22
16.2 PREVENTIVE MEASURES	23
16.3 HEAT STRESS MONITORING	23
17. COLD STRESS	24
17.1 PREVENTIVE MEASURES	25
17.2 COLD STRESS MONITORING	25
18. HOUSEKEEPING	25
19. PERSONAL PROTECTIVE EQUIPMENT	26
19.1 LEVEL D MODIFIED PPE	27
19.2 LEVEL C PPE	27
19.3 LEVEL B PPE	28
20. OCCURRENCE REPORTING	28
21. WORK SMART STANDARDS	28

APPENDICES

APPENDIX A – Task Specific Health and Safety Plan

APPENDIX B – Medical Surveillance and OSHA HAZEOPER Training

APPENDIX C – Activity Hazard Analysis

APPENDIX D – USACE Accident Reporting Form

APPENDIX E – Site Safety Meetings

APPENDIX F – Personnel Site Activity Log

APPENDIX G – Hazardous Material Inventory

ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AHA	Activity Hazard Assessment
AIHA	American Industrial Hygiene Association
ALARA	as low as reasonable achievable
ANSI	American National Standards Institute
CFR	<i>Code of Federal Regulations</i>
CPR	cardiopulmonary resuscitation
CWA	Clean Water Act
DOT	U.S. Department of Transportation
ECP	Environmental Compliance Plan
EPA	Environmental Protection Agency
ES&H	environmental safety and health
ES&HR	Environmental Safety and Health Representative
GET	General Employee Training
HASP	Health and Safety Plan
HSP	Health and Safety Plan
HAZCOM	hazard communication
HSWA	Hazardous and Solid Waste Amendments
IDLH	immediately dangerous to life or health
ISMS	Integrated Safety Management System
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PLHCP	physician or other licensed health care professional
PPE	personal protective equipment
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
SWMU	solid waste management unit
TLV	Threshold Limit Values
USACE	U. S. Corps of Engineers

1. INTRODUCTION

Parallax, Inc. has developed this Health and Safety Plan (HASP) for the Long Term Monitoring of Landfill Nos. 3 (MW-O), 4 (MW-N), and 25 (MW-R) under U. S. Army Corps of Engineers Contract No., DACA 45-99-D-0015, DO 003. This HASP addresses potential on-site contaminants and hazards inherent to routine sampling of water from Well N located in Landfill #4, Well O located in Landfill #3 and Well R located in Landfill #25.

This HASP is designed to accommodate anticipated contingencies. Should unexpected conditions be encountered, the HASP will be modified to provide adequate health and safety awareness and training to all personnel, subcontractors, and other persons conducting field activities. If conditions are identified that make a revision necessary, the revisions will be made to the HASP by the Parallax Environmental Safety and Health Representative (ES&HR) and approved by the U. S. Corps of Engineers, Omaha District. This HASP provides the following:

- general descriptions of work tasks, contaminants, and concentrations
- primary and contingency personal protection equipment (PPE)
- personnel monitoring equipment and action levels
- personnel and equipment decontamination requirements
- project emergency contacts.

A task specific Safety and Health Plan is included as Appendix A.

2. ES&H REQUIREMENTS

Parallax is committed to having safety as the first priority during any task performed under the Long Term Monitoring contract. As part of this commitment, Parallax will implement an Integrated Safety Management System (ISMS) and is committed to Zero Accident Performance and Safety Excellence. Parallax is dedicated to fulfilling all of the U. S. Army Corps of Engineers expectations for Environmental Safety and Health (ES&H) performance. This system will be completed by implementing the following plans:

- Environment, Safety, and Health (ES&H) Plan
- Activity Hazards Analysis (AHA) (attachment to ES&H Plan)
- Respiratory Protection Program (incorporated into ES&H Plan)
- Hazard Communication (HAZCOM) Program (incorporated into ES&H Plan)
- Emergency Response Plan (incorporated into ES&H Plan)

All sub-tier subcontractors will perform work in accordance with this ES&H documentation prepared and supplied by Parallax. The requirements contained within these documents will be included in all subcontracts, as appropriate, and will be discussed during readiness reviews conducted by Parallax to ensure that sub-tier subcontractors have a clear and complete

understanding of each work assignment and its associated requirements prior to initiation of work.

All ES&H documents and records generated from the requirements of the Long Term Monitoring contract will be maintained at the job site and made immediately available for inspection by U. S. Corps of Engineer personnel.

3. ZERO ACCIDENT PERFORMANCE

Parallax is committed to “Zero Accident Performance” and will strive for this goal through continuous improvement of work practices. Parallax’s policy incorporates the guiding principles and core functions of the ISMS. The “Zero Accident Performance” policy adopted by Parallax addresses, at a minimum, the following principles:

- The safety and health of employees, site visitors, and the public and the protection of the environment are first priority.
- All accidents are preventable.
- Line management is directly responsible for protection of the public, workers, and the environment.
- No unsafe act is tolerated or accepted.
- Clear and unambiguous lines of authority and responsibility for ensuring safety are established at all organizational levels.
- ES&H controls are tailored for the work being performed, while maintaining strict compliance with requirements established in the RA/D&D contract.
- Managers and supervisors proactively implement ES&H policies and programs in the field.
- Work to be performed is clearly defined and understood by all personnel involved.
- ES&H, pollution prevention, and waste minimization considerations are planned into all activities before work begins.
- Employees are trained and qualified commensurate with their responsibilities.
- Accidents and incidents are immediately reported, investigated, and followed by timely corrective actions.

4. INTEGRATED SAFETY MANAGEMENT SYSTEM

Parallax is committed to the implementation of the ISMS core values and principles. Parallax will strive to meet the objectives of ISMS, which are to systematically integrate ES&H protection into management and work practices at all levels so that workers, the public, and the environment are protected while project goals are still attained. Parallax realizes that the term “safety” as specified in Parallax ES&H procedures and policies encompasses ES&H including pollution prevention and waste minimization. The term “employee” as specified in Parallax

ES&H procedures and policies includes Parallax's and all sub-tier subcontractor employees.

It is understood that it may not be possible to determine actual working conditions in advance of actual work. Therefore, the plan must allow the opportunity to provide a range of protection based upon actual work conditions.

All site workers who have the potential for exposure must read this document, or have it read to them carefully, and sign the Site Safety and Health Acceptance Form (Appendix B) to indicate their understanding. Visitors to the site shall be briefed by the Site Safety and Health Representative (SS&HR) and must sign as visitors on the Site Safety and Health Acceptance Form to indicate their understanding.

5. KEY PERSONNEL/IDENTIFICATION OF SAFETY AND HEALTH PERSONNEL

The following personnel, or their designees as appropriate, are designated to carry out the stated job functions on site. One person may carry out more than one job function.

POSITION	NAME
To be filled as task orders become available	
A. Project Manager	Phillip Cummings
B. SS&HR Alternate(s)	Maurice Rowan
C. Site Superintendent	Phillip Cummings
D. First Aid Attendant(s)	Maurice Rowan

6. ORGANIZATIONAL RESPONSIBILITIES

6.1 PROJECT MANAGER

The Project Manager is ultimately responsible for administration, implementation, project status and providing technical information for the project. He is the primary contact for changes in scope of work and coordination efforts between Parallax and The U. S. Army Corps of Engineers, Omaha District. He ensures that the plan includes an ES&H Plan and responds to the requirements of the client. The Project Manager will have overall responsibility for operations and reporting on this project. He will ensure that project reports and any incident reporting requirements are met and will maintain ongoing dialog with the U. S. Corps of Engineers (USACE), as needed. The Project Manager will also maintain contact with the Site Superintendent and will consult with him regarding all field operations. He will review and

concur with all revisions to Project Plans and procedures.

6.2 SITE SUPERINTENDENT

The Site Superintendent reports to the Project Manager and is responsible for the day-to-day operations for this project. He will ensure that all personnel have appropriate training and adhere to the ES&H guidelines and requirements in *29 Code of Federal Regulations (CFR) 1910*. He is responsible for personnel and providing material and equipment to the site. He will maintain communications with the USACE as needed. Additionally, the Site Superintendent will:

- Assure that appropriate safety material is available, maintained, and properly used by all Parallax and Parallax subcontractor personnel.
- Advise personnel of Parallax safety policies and their application to potential hazards associated with specific site operations.
- Instruct personnel in safe work practices and procedures for dealing with emergencies.
- Correct work practices or conditions that may result in injury or exposure to toxic substances.
- Supervise and monitor personnel safety performances to ensure required work practices are employed.
- Notify the Environmental Safety and Health Representative of any job-related illness or injury.
- Coordinate emergency response activities for on-site personnel and with emergency support groups in the community.
- Maintain the daily log and the visitor's log.

6.3 SITE SAFETY & HEALTH REPRESENTATIVE

Parallax will assign an SS&HR for the duration of the project. The SS&HR will be Parallax's on-site ES&H lead and will be responsible for implementation and routine evaluation of the effectiveness of the ES&H Plan. The ES&HR will be on site any time hands-on work is being performed by Parallax or sub-tier subcontractors. The SS&HR will report to the Site Manager on a day-to-day basis. Parallax will designate an alternate SS&HR to carry out requirements whenever the primary SS&HR is absent from the site. The SS&HR and designated alternate will be trained and qualified to fulfill all responsibilities in accordance with this ES&H Plan.

The SS&HR will, at a minimum, have the following responsibilities and perform the following activities:

- Conduct and document daily ES&H inspections of work activities.
- Ensure that a daily pre-work briefing and weekly toolbox safety meeting are conducted for Parallax and sub-tier subcontractor personnel.
- Provide project-specific training for new employees and visitors.
- Establish and implement applicable ES&H procedures.

- Maintain and post emergency response telephone numbers for the site near all telephones.
- Ensure that the posted site map includes safety information such as fire extinguisher and eye wash station locations, and ensure that first-aid kits are kept current.
- Ensure that proper chemical and safety postings are in place and legible.
- Ensure that all operations are conducted so as to mitigate adverse environmental impacts.
- Post and keep current all employee right-to-know information.
- Establish and maintain the HAZCOM Program [including Material Safety Data Sheets (MSDSs), training, etc.].
- Evaluate site for any hazards not identified in the AHA, initiate safety measures required to protect personnel, and revise ES&H documents accordingly.
- Ensure that all wastes generated are managed in compliance with applicable state and federal laws and contract requirements.
- Establish and maintain programs required to mitigate hazards identified in the AHA.
- Maintain first-aid and Occupational Safety and Health Administration (OSHA) 200 logs, report accidents and injuries through appropriate channels, and conduct accident/incident investigations as required (including completion of appropriate forms).
- Coordinate with off-site emergency responders and medical service organizations to establish provided services and verify that telephone numbers, addresses, and contacts are current and accurate.

6.4 FIELD PERSONNEL

Project personnel involved in the on-site activities are responsible for:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees; being alert to potentially harmful situations.
- Performing only those task that they believe they can do safely and immediately reporting any accidents and/or unsafe conditions to the SS&HR and/or the Site Superintendent.
- Notifying the SS&HR of any special medical conditions (i.e., allergies, contact lenses, pregnancy, diabetes) and if necessary, ensuring that all on-site personnel are aware of the condition.
- Preventing spillage to the extent possible. In the event of spillage, contain the spill and clean up immediately using safe clean measures as directed by the SS&HR. Do not engage in spill containment or clean up if conditions are not safe.
- Avoiding splashing materials to the extent possible.
- Practicing good housekeeping by keeping the work area neat, clean and orderly to the extent possible.
- Reporting all injuries at once to the SS&HR.
- Meeting the requirements of this HASP and recommendations made by the SS&HR and other ES&H disciplines.

7. SITE HISTORY AND DESCRIPTION

SITE BACKGROUND: LANDFILL NO. 3 (SWMU NO. 105), LANDFILL NO. 4 (SWMU NO. 104), LANDFILL NO 25 (SWMU 97)

SWMU 105 (Landfill No. 3)

Landfill No. 3 is located in the east-central portion of CAFB. It is approximately 1,960 feet by 300 feet (13.5 acres) and rectangular in shape. Currently, the site is an open field covered with native vegetation. The landfill was in operation between 1959 and 1967. During this time, domestic solid wastes, waste oils, solvents, paints, paint thinners, pesticide containers, and empty drums were burned in trenches. As trenches filled, new trenches were excavated in adjacent areas and subsequently filled. In the past, borings have been drilled at the site. Soil samples from the borings were analyzed for volatile organic compounds (VOCs), metals, oils, and grease. In January 1995, one monitoring well, MW-O, located downgradient of Landfill 3, was sampled and found to contain detectable concentrations of carbon tetrachloride, 1.6 micrograms per liter ($\mu\text{g/L}$), and toluene, 6.8 $\mu\text{g/L}$. Gasoline-range organic (GRO) compounds were detected at a concentration of 16 $\mu\text{g/L}$. Metal analytes detected include arsenic, 0.022 milligrams per liter (mg/L); barium, 0.064 mg/L; selenium, 0.0025 mg/L; and vanadium, 0.018 mg/L.

SWMU 104 (Landfill No. 4)

Landfill 4 is located near Landfill 3 in the east-central portion of the base. It is rectangular in shape and has the approximate dimensions of 573 feet by 479 feet (6.3 acres). Landfill 4 was active between 1967 and 1968. During this time, domestic solid wastes, waste oils, solvents, paints, paint thinners, pesticide containers, and empty drums were burned in trenches. As trenches filled, new trenches were excavated in adjacent areas and subsequently filled. Soil samples have been collected from previous investigation of the landfill. Laboratory analysis was performed for VOCs, metals, oil, and grease. One monitoring well, MW-N, was installed and developed downgradient of the site. The well was initially sampled in January 1995. Results of the sample analyses indicated that toluene was present at a concentration of 5.7 $\mu\text{g/L}$. A duplicate sample taken from the well contained toluene at 6.4 $\mu\text{g/L}$. GRO compounds were also detected in the sample and duplicate sample collected from the well. GRO concentrations of 17 $\mu\text{g/L}$ and 14 $\mu\text{g/L}$ were reported for the sample and duplicate, respectively. Metals concentrations detected in samples from this well were as follows: arsenic, 0.0033 mg/L; barium, 0.047 mg/L; copper, 0.0059 mg/L; selenium, 0.0068 mg/L; tin, 0.32 mg/L; vanadium, 0.019 mg/L; and zinc, 0.013 mg/L.

SWMU 97 (Landfill No. 25)

Landfill 25 is located in the east-central portion of the base not far from Landfills 3 and 4. It has a rectangular shape, approximately 650 feet by 1,950 feet (28.8 acres). The site is bounded by the road leading to the ordnance area to the north, the road leading to the north side of the playa lake to the south, the ordnance area to the east, and Perimeter Road to the west (Figure A-1). At present, the site consists of piles of rubble covered with weeds, shrubs, and trees. The height of the rubble piles over most of the site are about 3 to 4 feet above natural grade and reach a maximum of about 14 to 15 feet above natural grade at the northern end.

Waste disposal in Landfill 25 began about 1945. The date disposal stopped is unknown. After World War II, temporary buildings and runways were demolished and disposed of at the landfill. The rubble includes large pieces of concrete and wood, exterior asbestos tiles, metal and asbestos/cement pipe, and asphalt mixed with soil.

8. PERSONNEL TRAINING REQUIREMENTS

Parallax will ensure that no employee is given a role or responsibility for which that employee is not trained and qualified. The SS&HR will have training and/or experience commensurate with the responsibilities of the position. The individual will be able to recognize, evaluate, and control ES&H hazards associated with work activities and environmental compliance issues associated with the tasks involved. At least two persons who have current certification in administering first aid and cardiopulmonary resuscitation (CPR) will remain on site at all times during regular work hours and while work is being performed.

All Parallax or sub-tier subcontractor personnel will possess the experience, knowledge, skills, and abilities necessary to fulfill their duties. The Parallax Site Superintendent and/or the SS&HR will see that all workers, supervisors, and non-worker/visitors are trained properly before starting work or visiting the work site (Appendix B). Parallax will ensure that any individual working on or visiting the site has read and abides by the ES&H Plan.

All personnel working on the site or visiting the site will have completed site-specific medical surveillance to comply with Parallax medical surveillance requirements. The Parallax Site Superintendent and/or SS&HR will see that all personnel or visitors have met these requirements before starting work or visiting the site. Any special medical requirement such as respirator fit test and vehicle operator requirements will be included as part of the medical surveillance requirements for individuals who perform or may perform specific tasks. Parallax will provide these requirements to its team members and sub-tier subcontractors and will see that all employees working for, subcontracted to, or teamed with Parallax adhere to these requirements. Any individual who is determined not to be in compliance with applicable requirements will be immediately removed from the site, and any expense resulting from this action will be borne by Parallax.

9. TRAINING AND HAZARD COMMUNICATION

Parallax will ensure that all employees, sub-tier subcontractors, and/or team members meet all training requirements as specified in the ES&H Plan. Parallax will provide USACE with certification that all employees and sub-tier subcontractor employees are current in their training requirements. All training will be documented on an Employee Certification Documentation Form, and documentation will be available for verification.

Parallax will be responsible for providing the appropriate ES&H training for its employees and maintaining the appropriate records. Parallax will also ensure that its sub-tier subcontractors comply with these requirements and will provide, upon request, copies of any and/or all training documents or certifications.

Parallax and sub-tier subcontractor employees who will be required to work in areas that are within the scope of 29 CFR 1910.120 will meet the applicable training requirements. Parallax will certify that personnel who will work on site have previous education, training, experience, and/or attendance at training courses sufficient to meet the requirements of 29 CFR 1910.120(e). The certifications will be submitted to the USACE on request. For personnel added after commencement of work, the certification shall be submitted before site-specific training is provided. Personnel will receive up to 8 hours of site-specific training, provided by Parallax, before beginning work on site.

When Parallax is required to provide respirators, training, and fit-testing, Parallax will quantitatively fit-test and train each employee who wears a tightly fitting respirator in accordance with a written Respiratory Protection Program to be included within the ES&H Plan. The procedures for quantitative fit-testing and training outlined in the Respiratory Protection Program will be at least as stringent as those outlined in American National Standards Institute (ANSI) Z88.2-1992 and governing OSHA (e.g., 29 CFR 1910.134) standards. Respirator training shall instruct individuals when to leave the work area if they experience respirator failure and when they should remove a respirator to avoid a life-threatening situation.

Parallax employees and sub-tier subcontractor employees will receive appropriate hearing conservation training, as specified in 29 CFR 1910.95, and applicable annual updates. Training will include, at a minimum, a description of the effects of noise on hearing and the purposes, advantages, disadvantages, and attenuation of various types of hearing protection devices (HPDs). Instructions will also include selection, fitting, use, and care of HPDs. Finally, training will address the purpose of audiometric testing and an explanation of the test procedures.

Parallax will have employees capable of working in areas with energy sources, regardless of the type of work, who are trained in Lockout/Tagout. As required by OSHA 29 CFR 1926.650, Parallax will have employees designated as competent persons, where applicable, to determine the safety and stability of excavations. In addition, special training and/or experience that qualifies each individual as a competent person shall be documented.

All personnel will be trained in basic site emergency notification and response procedures. Parallax personnel, including sub-tier subcontractors, will participate in emergency response and emergency drills, as required by USACE, and will be trained in the requirements of the Parallax Emergency Response Plan included within the ES&H Plan. In addition, Parallax personnel will also complete any other training that may be required by OSHA substance-specific standards or applicable Work Smart Standards before initiating work.

All applicable work performed under the Long Term Monitoring contract will be conducted in strict accordance with the requirements of 29 CFR 1901.120. As part of this requirement,

HAZCOM training will be provided to all personnel working in hazardous or potentially hazardous environments identifying the potential safety and health hazards associated with the work in accordance with 29 CFR 1926.59. Parallax will prepare a written HAZCOM Program that will be included within the ES&H Plan and will conduct training for all personnel that will be exposed to hazardous materials. This training will include use of materials, PPE required, and emergency procedures associated with the materials. Parallax will provide in the ES&H Plan a description of the facility/site that will provide sufficient information to identify potential ES&H concerns. Site descriptions will include, at a minimum, the following:

9.1 FACILITY/SITE FEATURES

Locations, Type Of Terrain And Significant Feature, Structure and their condition, energized utilities, hazardous materials/processes, adjacent facilities and operations that could affect ES&H or site accessibility, and adjacent areas (residential, commercial, other) that could be impacted by facility/site activities. The ES&H Plan will also provide figures depicting the location and layout of the site.

9.2 FACILITY/SITE HISTORY

Historical information items that relate to facility/site conditions, including previous use, spills or releases of hazardous substances, and previous cleanup operations and will be included in the addendum to this plan.

9.3 CONTAMINANTS OF CONCERN

Information regarding identified contaminants will be specified in tabular form; the table will include name of contaminant, affected media, concentrations of contaminants, and locations where samples were taken. If contaminants or hazardous materials are present as discrete sources (e.g., lead, asbestos, etc.), information regarding the sources will be provided. If there is a potential for encountering contamination or sources of hazardous materials other than those identified, information regarding those sources, including identity, possible location(s) and effected media, form or concentration, will also be provided. This site-specific information will be included in an addendum to this plan.

9.4 EMERGENCY ASSEMBLY POINTS

Locations where personnel at the work site are to assemble in the event of emergencies will be identified and included in the addendum to this plan.

9.5 HAZCOM

Parallax has established a HAZCOM Program to inform all Parallax employees about the presence of chemical or hazardous materials located within Parallax work spaces. The full extent of this program is defined in the Parallax Corporate Health and Safety Program.

Site-specific elements of this HAZCOM Program, including the following items:

- site-specific requirements for labeling hazardous substances,
- site-specific locations for storage of hazardous substances, and
- location(s) of MSDSs.

Parallax will submit to the USACE a copy of the MSDS for each hazardous chemical as defined in the OSHA Hazard Communication Standard at least 5 working days before the chemical is brought onto the site. MSDS submittals shall be accompanied by a description of the intended use of the substance, container size, and number of containers transported on site, including at the initiation of the project and during the entire contract duration. Secondary containers will be labeled in accordance with Parallax's Hazard Communication Program with minimum labeling requirements of 29 CFR 1926.59.

Parallax will develop and maintain an inventory for all hazardous materials used in its operations and will submit a monthly Hazardous Materials Information System (HMIS) inventory **Appendix G**, containing the following minimum data: quantity purchased/brought on site, quantity on hand, sizes of containers, and maximum quantity on site during the month.

Parallax will be responsible for adherence to all the rules and regulations, especially as they pertain to the storage, labeling, and placarding of chemical products as written in, but not limited to, the National Fire Protection Association (NFPA) and the CFR.

10. ACTIVITY HAZARD ANALYSIS

As part of the ES&H Plan, Parallax will prepare and submit AHAs, **Appendix C**, for work to be performed at a site. The AHAs will address the specific tasks and work processes Parallax intends to employ under the contract and will be included as an attachment to the ES&H Plan. An AHA will contain basic descriptions of the different phases of work and will contain appropriate approval signatures. Additional AHAs may be prepared during the course of the project, but work addressed by a specific AHA will not be authorized until the AHA is approved by USACE. The AHA will be considered a living document, and Parallax will update and revise the AHA as required to reflect current site and work conditions. Parallax's AHAs will include the following components:

10.1 SPECIFIC TASKS

Parallax will provide descriptions of the specific tasks and work processes associated with the scope of work covered by the AHA. The description will clearly delineate the activities covered by the AHA from other site activities.

10.2 HAZARD IDENTIFICATION

Parallax will identify all potential hazards associated with the identified tasks and work processes to be employed.

10.3 HAZARD CONTROL MEASURES

Parallax will identify and establish what measures shall be implemented to eliminate or mitigate each hazard identified in the AHA. AHAs will be developed to be compatible with the project schedule and shall be organized and prepared as an outline of activities of work arranged according to the project activity/task schedule sequence. Mobilization and demobilization activities will be included even if they are not activities listed on the schedule. Additionally, Parallax's plan to service, maintain, and repair on-site equipment under Parallax and sub-tier subcontractor control will be included in the AHAs. AHAs are not mutually exclusive of each other and when developed will consider other activities/tasks that are taking place at the same time and how one AHA affects another.

The relevant portions of the AHAs and applicable permits will be reviewed with the work crew before the start of work for each shift. AHA meetings will be conducted by the Parallax ES&HR, and workers and supervisors directly participating in the activity will attend the meeting. Following the review, the supervisor and workers who attended the briefing will sign and date the document, thereby indicating that they have participated in the review and understand and will comply with the requirements. Parallax will post copies of AHAs for the current shift at access control or near the entry point where work is being performed.

11. SAFETY AND HEALTH MONITORING

Where feasible, engineering controls will be used to maintain personnel exposures to hazardous chemicals below the threshold limit values. Depending on the chemical or contaminants associated with the scope of work, Parallax may be required to conduct both real-time and integrated personal exposure sampling. Parallax will establish a set of exposure action levels in its ES&H Plan for the compounds/contaminants to which its employees may be exposed while working on site. These action levels shall be developed based on regulatory drivers, industry standards, and sound industrial hygiene practice. The upgrading/downgrading of PPE and implementation of engineering controls will be based on these action levels, which are the results of data generated by the appropriate real-time instrumentation.

If work area real-time monitoring indicates a significant airborne level (above the action levels established in Parallax's ES&H Plan) of contaminants during any site activity, either project boundary or perimeter monitoring will be initiated by the ES&HR. The goal of such monitoring will be to determine whether any airborne contaminants are dispersing off the designated work area and to obtain data that would identify the need for corrective action in the work area. The significant contaminants of concern include organic vapors and fugitive dust. If

work area monitoring shows a continuous concentration of vapors or particulates that exceed the action level (not an individual peak), monitoring will be initiated at the site boundary downwind from the work activity. If the action level is exceeded at the downwind perimeter point, the level upwind of the work area will be measured immediately.

As each new task with a potential for exposure is identified, personal samples will be collected on a minimum of 25 percent or two employees, whichever is greater, to document exposure and evaluate the effectiveness of PPE that has been selected. Samples will be collected in the employee's breathing zone using personal sampling pumps and the appropriate collection media. After a baseline is established for each task with exposure potential, monitoring to confirm conditions will be done periodically, but in no case less than monthly. A baseline will consist of not fewer than 10 discrete samples for each individual monitored for each task. For tasks with the potential for exposure to significantly elevated chemical concentration, it is expected that the sampling frequency will increase.

If direct reading instruments indicate levels of vapors or particulates that exceed the action level for over 15 minutes in the work area, personal sampling will be initiated immediately. Sampling will be conducted, at a minimum, on the worker with the highest expected exposure. Monitoring will continue until levels recorded by direct reading instruments return below the action level. Once initiated, sampling will always continue for a period long enough to collect a volume of air sufficient to allow the laboratory to achieve an analytical detection limit no greater than one-half the PEL. The samples will be collected in accordance with the approved National Institute of Occupational Safety and Health (NIOSH) or OSHA methodology and analyzed for the appropriate contaminant(s) of concern. All personal exposure samples shall be analyzed by a laboratory accredited by AIHA in accordance with the appropriate NIOSH or OSHA methodology.

Parallax will review monitoring results with employees and will notify and supply employees with the results of any exposure monitoring in accordance with any OSHA standard requiring such written notification.

12. MEDICAL SURVEILLANCE PROGRAM

Parallax will specify site-specific medical surveillance requirements, **Appendix B**, for workers and visitors. At a minimum, Parallax's medical surveillance program will meet the requirements set forth in OSHA's 29 CFR medical surveillance requirements and the minimums established in relevant Work Smart Standards.

Parallax's medical surveillance program will specify site-specific bioassay requirements to identify and quantify exposure to nonradiological hazardous chemicals and define which types of bioassay are required (other than radiological bioassays) for specific tasks or site conditions and shall include:

- requirements for baseline bioassays,
- provisions for adherence to bioassay requirements stipulated by radiological protection personnel,
- frequency of routine bioassays,
- special bioassay requirements, and
- closeout bioassays.

Parallax will furnish to USACE certifications that all personnel working on sites for which Parallax is responsible are current in their medical qualifications. This certification should be in a format similar to the Medical Surveillance Certification Report. Copies of medical qualification requirements, including physician's statements, will be made available for review by USACE and its consulting physician, if requested, and will be maintained on site by the SSHR. Individuals who are determined not to be in compliance with applicable requirements will be immediately removed from the site.

Any Parallax personnel wearing respirators during the course of work will participate in a medical surveillance program that meets the requirements of OSHA 29 CFR 1910.134, "Respiratory Protection." This regulation requires an evaluation by a physician or other licensed health care professional (PLHCP) to determine what physiological and psychological conditions are pertinent to wearing respirators and whether an individual is medically suited to be assigned to a task requiring a respirator. This determination can be made by: (a) review of responses to a medical questionnaire in accordance with Appendix C of the OSHA 29 CFR 1910.134 standard and (b) a physical examination when deemed necessary by PLHCP. A written opinion signed by PLHCP will state whether the individual evaluated is medically qualified to wear respiratory protection. The opinion shall also include a description of any recommended work limitations placed on the individual as a result of medical conditions detected from the evaluation. Evaluations shall be provided more frequently under the following circumstances;

- if determined necessary by PLHCP;
- if an employee is injured or becomes ill or develops signs or symptoms possibly due to an overexposure;
- if an individual develops a condition that may affect his/her ability to wear a respirator, such as respiratory or cardiovascular disease, diabetes, fear of tight or enclosed spaces, ruptured eardrum, defective vision, etc.; and
- as soon as possible following an emergency incident.

13. RESPIRATORY PROTECTION

Parallax will provide a written Respiratory Protection Program as part of this ES&H Plan and will perform all work in full compliance with 29 CFR 1910.134, "Respiratory Protection"; 29 CFR 1926.103, "Respiratory Protection"; and ANSI Z88.2-1992, "Standard Practices for Respiratory Protection." Parallax will supply all training records and medical surveillance for personnel performing work under the Long Term Monitoring contract for review and acceptance as required.

If work conditions require respirators to be worn by workers, Parallax will provide respirators, respirator canister, and respirator fit-testing for all Parallax and sub-tier subcontractor personnel. Only full-face respirators will be worn if respirators are required during any work activity. A current occupational medical physician's certification form will be required for each individual who must wear a respirator.

Parallax will require personnel to wear respirators based on the AHA for the work being conducted. Quantitative respirator fit-testing will be performed for all Parallax and sub-tier subcontractor personnel required to wear such equipment. All personnel required to wear respirators shall inspect their respirators before and after each use. Routine inspection, cleaning, and storage of respirators are the responsibility of Parallax and will be conducted in accordance with OSHA 29 CFR 1910.134. Responsibility for issuance and quantitative fit testing of respirators shall be included in the Parallax ES&H Plan. Parallax will ensure that adequate corrective actions are implemented to abate any deficiencies discovered during routine inspection and maintenance of respiratory protection equipment.

Respirators will be considered an acceptable method of protecting the health of workers only under the following circumstances:

- when it has been determined that there are no feasible engineering or work practice controls, that can be used to adequately control the hazard,
- during interim periods when engineering controls are being designed or installed,
- during emergencies,
- as part of a safety procedure where a potentially hazardous condition has been defined, and
- when operating in atmospheres with unknown elements present.

Air purifying respirators may not be worn in atmospheres where:

- The concentration of contamination is not known, or it is immediately dangerous to life or health (IDLH).
- Atmosphere contain less than 19.5 percent or more than 23.5 percent oxygen by volume.
- Contaminant levels exceed the limitations of the facepiece or cartridge.

The standards governing the development of a respiratory protection plan include, but are not limited to the following:

- OSHA Respiratory Protection Regulation, 29 CFR 1910.134.
- ANSI Practices for Respiratory Protection, Z88.2-1992.
- Parallax, Inc., Respiratory Protection Program.

13.1 LEVEL B CERTIFICATION

Parallax personnel who will be required to work in areas that are within the scope of 29 CFR 1910.120 or 29 CFR 1926.65 shall participate in the Parallax medical surveillance program. Certification under this requirement will mean that Parallax personnel have been examined by a licensed physician within the past year and are deemed medically and physically fit for work up through level B on a hazardous waste site. The physician's statement shall be based on a medical examination, which, at a minimum, meets the criteria specified by Parallax's ES&H Plan and OSHA 29 CFR 1926.65(f).

The information and certifications required above will be provided on the Training/Medical Surveillance Certification Report; one certification form must be submitted for each employee. Each form will be reviewed by Parallax's ESHR and signed by a Corporate Officer with commitment authority for Parallax; each must also be notarized. Parallax will be responsible for maintaining the actual documentation that supports this certification (i.e., training certificates, physician's statements, etc.) as part of its site files.

14. CONDUCT OF OPERATIONS

Parallax and sub-tier subcontractors will be solely responsible for providing a safe workplace for their personnel who will be exposed to various hazards related to work performed under the Long Term Monitoring contract. OSHA regulations, and applicable USACE Orders will be strictly adhered to.

Where the provisions of the individual subparts of OSHA 29 CFR 1910 or 1926 require a "competent person," Parallax will provide a qualified competent person meeting the specific requirements indicated for a "competent person."

Prior to beginning work at any site, a list of personnel (Parallax employees and sub-tier subcontractors) who will be working on site, their work classification, social security number, home address and required certifications will be provided to USACE. For personnel added after work begins, certifications will be submitted prior to site-specific training.

14.1 SITE ACCESS

Parallax will comply with USACE requirements for controlling access to project facilities and work sites. Parallax will establish work site controls so that only the following are allowed entry:

- personnel (including visitors) who meet the established entry requirements;
- material and supplies that have prior authorization.

14.2 MEDICAL SERVICES

Parallax will be responsible for all medical services, with the exception of emergency medical care. Before work can begin, Parallax will have on site at least one person trained in first aid and CPR with valid and current First Aid/CPR card and Bloodborne Pathogens Training such as those presented by the American Red Cross or United States Bureau of Mines.

14.3 DAILY "TOOLBOX"/WEEKLY SAFETY MEETINGS

During work procedures, Parallax will hold daily, informal "tool box" safety meetings, and at least weekly formal safety meetings to discuss specific topics from the ES&H Plan and review any AHAs that may be applicable to that day's work procedures. These meetings will be organized, conducted and documented on **Appendix E** by the Parallax SS&HR. All personnel working on the site, including lower-tier subcontractors will attend the daily safety meetings. Parallax will also comply with the following specific safety and health requirements:

- Eating, drinking, chewing gum or tobacco, applying cosmetics, or smoking will be permitted only in designated area.
- Parallax personnel may be required to take a medical examination should monitoring reveal any over-exposure to hazardous chemicals.
- All equipment and tools will be used only for their designated purpose.
- All motorized and manual equipment will be inspected daily. .
- A Lockout/Tagout Permit will be obtained prior to performing any work that may expose personnel to hazardous energy sources or where operation of equipment could jeopardize personnel working on associated equipment.
- All electrical cords and equipment will have ground fault circuit interrupters (GFCI) for additional worker protection and power tools will be equipped with constant pressure switches.
- All fuel will be stored in containers that meet NFPA 30 and OSHA 1926.152 standards.

All Parallax personnel will obey the following vehicle, radiological access, and traffic safety regulations:

- All vehicle operators and passengers will wear seat belts.
- Seat belts will be worn when operating motorized equipment equipped with factory-installed

seat belts.

- The number of persons in any vehicle will not exceed the number of seat belts.
- Riding in the bed of a pick-up truck or in the storage space of cargo van is prohibited on site.
- The use of all motor vehicles will be in accordance with the traffic laws and posted traffic signs for the state or site.
- Emergency vehicles, vehicle operators are to stop on the side of the road until the vehicle passes.
- The motor will be turned off for all vehicles left unattended.

14.4 ACCIDENT/INJURY REPORTS

Parallax and its sub-tier subcontractor(s) shall send their employees that have suffered a job-related injury or illness to the designated medical facility for medical treatment. Parallax's designated personnel who are trained and qualified in First Aid and CPR can administer minor first aid treatment.

Parallax is required to report all job-related injuries and/or illnesses immediately to the USACE. Parallax will notify USACE immediately of any injury to an employee, environmental release, accident, incident, unusual occurrence, or any other event that may be a violation of regulatory requirements or be viewed negatively by the public or the client. The appropriate medical forms and accident investigation report (Appendix D) will be completed within 24 hours after occurrence.

14.5 EMPLOYEE RIGHT-TO-KNOW

A formal notice of employee rights and obligations will be posted near the job site. Complaint forms will also be available to employees.

14.6 FIRST AID

Parallax will provide first aid supplies, approved by a consulting physician, at the work site. The first aid supplies will be inspected at least weekly and contents replaced immediately when used. All applicable requirements of CFR 1910.1030, "Bloodborne Pathogens," will be followed.

14.7 POTABLE AND NONPOTABLE WATER

Potable and nonpotable water containers and portable toilets will be provided when necessary in compliance with OSHA 29 CFR 1910.141 requirements. In addition to these requirements, single-use cup dispensers shall be provided adjacent to all portable water dispensers. Water dispensers will be clearly identified as drinking water.

14.8 HEARING PROTECTION

Any Parallax personnel who may be exposed to noise levels at or above 85 dBA 8-hour time-weighted average, without regard to hearing protection devices, are required to participate in an audiometric testing program provided by Parallax.

Hearing protection will be provided to all personnel and visitors on the work site. If noise levels reach 85dBA, hearing protection must be worn by all personnel and visitors in the area. If applicable, Parallax will provide a written Hearing Conservation Program as evidence of compliance with 29 CFR 1910.95 when required. Specifications will be made in Parallax's ES&H Plan to comply with 29 CFR 1926.52, "Occupational Noise Exposure"; 29 CFR 1926.101, "Hearing Protection"; and the section "Noise" in the American Council of Government Industrial Hygienists (ACGIH) "Threshold Limit Values (TLVs) for Chemical Substances, Physical Agents, and Biological Exposure Indices" (current edition).

14.9 FIRE PREVENTION AND PROTECTION

Parallax will provide specific measures for fire prevention and fire protection, such as housekeeping. Provisions will be made for proper storage and handling of materials, including hazardous materials like gasoline, thinners, and cleaning solvents.

14.10 EQUIPMENT STAGING AREA

When necessary Parallax will establish a staging area for the inspection of tools and equipment prior to use.

14.11 VENTILATION

When ventilation is an engineering control method, the system will be installed and operated in compliance with 29 CFR 1910.94, "Ventilation," and 29 CFR 1926.57, "Ventilation."

14.12 ILLUMINATION

When any work is performed at night or where daylight is obscured, Parallax will provide at its own expense artificial light sufficient to permit thorough inspection in accordance with OSHA Standard 29 CFR 1926.56. During such time periods, access to the place of work will also be clearly illuminated. All wiring for electric lights and power will be installed and maintained in a safe manner and will meet all applicable codes and standards.

14.13 LOCKOUT/TAGOUT

Work involving hazardous energy sources will be conducted under a Parallax-authorized lockout/tagout program. Parallax will comply with all applicable codes in the current NFPA, National Electric Codes (NEC), and OSHA Standards.

14.14 VEHICLE OPERATIONS

Parallax will ensure that all operators of motor vehicles have a current and valid state driver's license and ensure that before an operator uses equipment on site, he/she has furnished documentation validating that the operator(s) have been certified and/or qualified to operate each piece of heavy equipment. Parallax will be responsible for the safe operation of all vehicles and heavy equipment operated by Parallax and sub-tier subcontractor personnel.

15. EMERGENCY RESPONSE

Parallax will have a site-specific emergency response plan in place before work commences that will be outlined in the ES&H Plan Addendum. The plan shall be in accordance with 29 CFR 1910.134, 29 CFR 1910.65, and 29 CFR 1910.120 (1), (1), (2), and (3) and will include facility maps clearly indicating evacuation routes, the location of fire extinguishers, the location of spill response equipment, and other critical information. All emergencies will be immediately reported to Base Operations and the USACE having jurisdiction over the work area. Provisions for addressing emergency response requirements at the site will include, at a minimum, the following issues:

- the meaning of the alarm systems at the site;
- site-specific responses to emergencies;
- how to report emergencies and request help from security, fire and medical services;
- emergency assembly points;
- identification of potential emergencies or abnormal situations that could occur on site;
- responsibilities and lines of authority of site and project personnel during an emergency, including project management and the ES&HR;
- site-specific requirements for coordinating with USACE facility emergency response personnel;
- emergency prevention requirements such as site inspections, hazard recognition, fire prevention plan [in accordance with 29 CFR 1910.38(b)], and employee training;
- site-specific procedures for dealing with minor occupational injuries/illnesses;
- emergency preparedness requirements, including pre-emergency planning, emergency response equipment to be maintained on site, coordination with emergency services representatives, including facility emergency response services and the Parallax's medical provider;
- a map showing the route to the Parallax's medical provider;
- emergency telephone numbers list, including Parallax project management, and ES&H personnel;
- accident and injury investigation procedures, including record keeping requirements;
- emergency communication methods will be established (i.e., site phones, cellular phones, two-way radios, site emergency phone numbers); and
- site-specific training for Parallax management, employees, and visitors as it relates to specific emergency response duties and responsibilities.

All personnel and visitors will be required to sign in and out on the Personnel Site Activity Log, **Appendix F**, for Parallax to have an accurate personnel count in the event of an emergency. Parallax will maintain the capability to make emergency calls (cellular telephones) to designated ambulance services at all times. In the event of tornado or severe thunderstorm warnings or the threat of other severe weather conditions, Parallax will immediately perform those tasks necessary to stabilize the work site and proceed to shelter. In the event of substantial damage due to inclement weather, Parallax will be responsible for accounting for its personnel and will immediately notify Base Operations and USACE of any unaccounted for personnel.

Parallax will promptly notify the Base Operations of any emergency conditions, personal injuries, or other unusual events that result in or could have resulted in personal injury, environmental releases, or property damage.

Appropriate equipment and services will be available to respond promptly to emergency events involving personal injury or other emergency situations. The following is an inventory list describing the minimum emergency response and spill equipment to be supplied by Parallax and made available for emergency use:

- first aid kit
- appropriate fire extinguisher(s)
- CPR/first aid trained worker
- communication (radio, cellular telephone, etc.)
- evacuation/assembly plan
- emergency telephone numbers

These items will be maintained in an accessible location near the work area.

15.1 EVACUATION

The evacuation routes and assembly points will be identified during the pre-entry briefing. In the event of an evacuation, proceed to the predetermined assembly point.

15.2 EMERGENCY RESPONSE ASSISTANCE

- | | | |
|--|----------|--------------|
| • Emergency Fire, Security and Medical | On Base | 911 |
| | Off Base | 505-784-2528 |
| • Base Contact (Sanford Hutsell) | | 505-784-6378 |
| • Ambulance & Base Hospital | On Base | 911 |

- | | | |
|--|--------------|--------------|
| | Off Base | 505-784-4033 |
| • Clovis High Plains Hospital | 505-769-2141 | |
| • Environmental Safety & Health Representative | On Base | 42811 |
| | Off Base | 505-784-2811 |

15.3 NATIONAL OR REGIONAL SOURCES OF ASSISTANCE

- Parallax, Inc. 1-800-962-1335
- Environmental Protection Agency (EPA)
[Resource Conversation and Recovery
Act (RCRA) - Superfund Hotline] 1-800-424-9346
- Chemtrec (24 hours) 1-800-424-9300
- Bureau of Explosives 1-202-293-4048
- Communicable Disease Center 1-404-663-5313
- National Response Center 1-800-424-8802
- U.S. Department of Transportation (DOT),
Office of Hazardous Operations 1-202-426-0656
- U.S. Coast Guard (major incidents) 1-800-424-8802
- Pesticide Health Hotline 1-800-858-7378
- Medical Service Network 1-800-874-4676

16. HEAT STRESS

The most common types of stress that affect field personnel are from heat and cold. Heat stress and cold stress may be the most serious hazards to workers at waste sites. In light of this, it is important that all employees understand the signs and symptoms of potential injuries

associated with working in extreme temperatures.

16.1 HEAT STRESS

Heat stress occurs when the body's physiological processes fail to maintain a normal body temperature because of excessive heat. The body reacts to heat stress in a number of different ways. The reactions range from mild (such as fatigue, irritability, anxiety, and decreased concentration) to severe (such as death). Heat-related disorders are generally classified in four basic categories: heat rash, heat cramps, heat exhaustion, and heat stroke. The descriptions, symptoms, and treatments for these diseases are described in the following sections.

Heat Rash

- **Description.** Heat rash is caused by continuous exposure to heat and humid air and is generally aggravated by coarse clothing. This condition decreases the body's ability to tolerate heat but is the mildest of heat-related disorders.
- **Symptoms.** Mild red rash, which is generally more prominent in areas of the body in contact with PPE.
- **Treatment.** Decrease the amount of time in PPE. Use powder to help absorb moisture.

Heat Cramps

- **Description.** Heat cramps are caused by perspiration that is not offset by adequate fluid intake. This condition is the first sign of a situation that can lead to heat stroke.
- **Symptoms.** Acute, painful spasms of the voluntary muscles (e.g., abdomen and extremities).
- **Treatment.** **Remove victim to a cool area and loosen clothing. Have victim drink 1 to 2 cups of water immediately and every 20 minutes thereafter until the symptoms subside. Consult a physician.**

Heat Exhaustion

- **Description.** Heat exhaustion is a state of definite weakness or exhaustion caused by the loss of fluids from the body. This condition is more severe than heat cramps.
- **Symptoms.** Pale, clammy, moist skin with profuse perspiration and extreme weakness. Body temperature is generally normal, but the pulse is weak and rapid. Breathing is shallow. The victim may show signs of dizziness and may vomit.
- **Treatment.** Remove the victim to a cool, air-conditioned atmosphere. Loosen clothing and require the victim to lie in a flat position with the feet slightly elevated. Have the victim drink 1 to 2 cups of water immediately and every 20 minutes until the symptoms subside. Seek medical attention, particularly in severe situations.

Heat Stroke

- **Description.** Heat stroke is an acute, dangerous situation. It can happen in a very short

time. The victim's temperature control system shuts down completely, resulting in a rise in body core temperature to levels that can cause brain damage and can be fatal if not treated promptly and effectively.

- **Symptoms.** Red, hot, dry skin, with no perspiring. Rapid respiration, high pulse rate, and extremely high body temperature.
- **Treatment.** Cool the victim quickly by soaking in cool water. If the body temperature is not brought down quickly, permanent brain damage or death can result. Get medical attention as soon as possible.

16.2 PREVENTIVE MEASURES

A number of steps can be taken to minimize the potential for heat stress disorders.

- Acclimate employees to working conditions by slowly increasing workloads over extended periods of time. Do not begin site work activities with the most demanding physical expenditures.
- As practicable, conduct strenuous activities during cooler portions of the day, such as early morning or early evening.
- Provide employees with lots of tempered water and encourage them to drink it throughout the work shift; discourage the use of alcohol during nonworking hours. It is essential that fluids lost through perspiration be replenished. Total water consumption should equal 1 to 2 gal/day.
- During hot periods, rotate employees wearing impervious clothing.
- Provide cooling devices as appropriate. Mobile showers and/or hose-down facilities, powered air purifying respirators, and ice vests have all proven effective in helping prevent heat stress.

16.3 HEAT STRESS MONITORING

For strenuous field activities that are part of ongoing site activities in hot weather, the following procedures are used to monitor the body's physiological response to heat. These procedures will be implemented when employees are required to wear impervious clothing in temperatures exceeding 70°F.

- **Monitor Heart Rate.** Heart rate should be measured by the radial pulse for 30 seconds as early as possible in the resting period. This measurement should not exceed 110 beats per minute; if it does, the next work period should be shortened by 33 percent, with the length of the rest period remaining the same. If the heart rate still exceeds 110 beats per minute at the beginning of the next rest period, the following work cycle should likewise be shortened by 33 percent. This procedure continues until the rate is maintained below 110 beats per minute.
- **Monitor Body Temperature.** Body temperature is measured orally with a clinical thermometer as early as possible in the resting period. Body temperature should not exceed

99.6°F; if it does, the next work period should be shortened by 33 percent. If the temperature at the end of the next work period still exceeds 99.6°F, the following work cycle is shortened by another 33 percent. This procedure continues until the body temperature is maintained below 99.6°F.

The work/rest schedules below are provided as a guideline for workers in Level C or Level B PPE.

Adjusted Temperature (°F) ^a	Work schedule (min/hour)
75	50
80	40
85	30
90	20
95	10
100	0

^a Adjusted temperature is the sum of the actual temperature plus the product of 13 times the fraction of sunshine. The fraction of sunshine is an estimate of the percentage of the time that the sun is not overcast by clouds.

The guidelines set forth in the current issue of the ACGIH Threshold Limit Values and Biological Indices shall be used to determine the work/rest regimen for working in environments conducive to heat stress.

All outside work activities will stop when the Heat Index reaches 110°F as reported by Base Operations.

17. COLD STRESS

Persons working outdoors in low temperatures, especially at or below freezing, are subject to cold stress disorders. Exposure to extreme cold for even a short period of time can cause severe injury to the body surfaces and/or profound cooling, which can lead to death. Areas of the body that have high surface area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible.

Two basic types of cold disorders exist, localized (e.g., frostbite) and generalized (e.g., hypothermia). The descriptions, symptoms, and treatments for frostbite and hypothermia are provided below.

Frostbite

- **Description.** Frostbite is a condition in which the fluids around the cells of body tissues freeze, damaging the tissues. The most vulnerable parts of the body are the nose, cheeks, ears, fingers, and toes.

- **Symptoms.** Affected areas become white and firm.
- **Treatment.** Get the individual to a warm environment and rewarm the areas quickly. Keep affected areas covered and warm. Warm water can be used to thaw the areas.

Hypothermia

- **Description.** As the temperature of the body drops, the thermoregulatory system attempts to increase the body's generation of heat, blood vessels are constricted to conserve energy, and glucose is produced to increase the body's metabolic rate (i.e., glucose is used as fuel to generate heat).
- **Symptoms.** Uncontrollable shivering with the sensation of cold. Slower heartbeat and weaker pulse.
- **Treatment.** Get individual to a warm environment.

17.1 PREVENTIVE MEASURES

A number of steps can be taken to minimize the potential for cold stress.

- Individuals can achieve a certain degree of acclimation when working in cold environments as they can for warm environments. The body will undergo some changes that increase the body's comfort and reduce the risk of cold injury.
- Working in cold environments causes significant water loss through the skin and the lungs as a result of the dryness of the air. Increased fluid intake is essential to prevent dehydration, which affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, nonalcoholic drinks as well as soups should be readily available.
- The skin should not be continuously exposed to sub-zero temperatures.

17.2 COLD STRESS MONITORING

Air temperature alone is not a sufficient criterion on which to judge the potential for cold-related disorders in a particular environment. Heat loss from convection (air movement at the surface of the skin) is probably the greatest and most deceptive factor in the loss of body heat. For this reason wind speeds as well as air temperatures need to be considered in the evaluation of the potential for cold stress disorders. ACGIH TLVs and Biological Indices provide additional guidance on cold stress evaluation and the establishment of the work/rest regimen in environments conducive to cold stress.

18. HOUSEKEEPING

Work zones shall be cleaned, and wastes and debris will be removed on a daily basis. Tools, materials, or debris shall not be strewn about in a manner that may cause tripping or other hazards. Stored material shall be placed and stacked in a manner that is stable and otherwise secured against sliding or collapse. All slip, trip, and fall hazards will be eliminated.

19. PERSONAL PROTECTIVE EQUIPMENT

Parallax will supply appropriate level PPE for its employees, visitors and other personnel who are on site. PPE will comply with OSHA standards 29 CFR 1910.132–1910.138, Subpart I, “Personal Protective Equipment”; 29 CFR 1926.95–1926.107, Subpart E, “Personal Protective and Life Saving Equipment”; and any specific requirements identified in the Work Smart Standards. The Parallax SS&HR will determine applicable PPE requirements using results of personal monitoring, results from analytical sampling (if applicable), and information from the AHAs. All PPE will be commensurate with the work being performed.

For the Long Term Monitoring Contract, at a minimum, personnel performing work will be required to wear the following standard safety apparel:

- Hard hats (with the bill facing forward) meeting the requirements of ANSI Z89.1 as prescribed in 29 CFR 1910.135, “Head Protection,” for protection from falling objects. Hard hats shall be worn with the brim forward and the suspension properly installed. Hard hats shall not be damaged, painted, deformed, or marked in any way except for markings required to identify the employee, company, craft, or title (cowboy style hard hats and suspensions shall not be used).
- Eye protection shall, at a minimum, consist of safety glasses with fixed or firm clip-on affixed side shields that meet the ANSI Z 87.1 standard. Prescription glasses shall also meet the ANSI standard and be provided with fixed or firm clip-on side shields. Cover glasses used over prescription glasses will be permitted. Safety glasses shall be worn at all times in Controlled. Face shields shall not be worn in lieu of safety glasses.
- Safety-toe footwear or sturdy work boots shall be worn for this project.
- Long pants and shirts with sleeves at least 4 in. long will be required. Tank tops, cut-off pants, and tennis shoes will not be permitted.
- Cotton liners and nitrile gloves for sampling events.
- Appropriate Cloth Coverall

Parallax realizes that under certain circumstances higher level PPE may be required to fully protect workers from work-related hazards. In such circumstances, additional PPE such as respiratory protection and impermeable disposable coveralls will be supplied by Parallax.

19.1 LEVEL D MODIFIED PPE

Level D Modified PPE is utilized when the atmosphere contains no known hazards, and work functions may involve skin contact with hazardous chemicals.

The following PPE may be worn inside the Exclusion Zone as determined by the ES&HR and applicable RWP requirements:

- company-issued long sleeve clothing
- steel-toe work boots
- latex gloves
- safety glasses with side shields
- hearing protection as required
- hard hat

Additional PPE requirements may be necessary depending on changing site conditions.

19.2 LEVEL C PPE

Level C PPE is utilized at a site when the following conditions exist:

- Air contaminant concentrations require a protection factor no greater than that afforded by a full facemask (protection factor = 50).
- Harmful levels to unprotected body areas (face, neck, etc.).
- Well documented, reliable history of site and patterns of entry.
- No evidence to suspect acute or chronic toxicity to exposed personnel.
- The following PPE may be worn inside the Exclusion Zone as determined by the ES&HR and applicable RWP requirements:
 - company-issued long sleeve clothing
 - Tyvek™ long sleeve coveralls
 - steel-toe work boots
 - chemical-resistant rubber booties
 - latex gloves
 - nitrile gloves
 - respirator (filter media as appropriate to protect from identified and characterized environmental contaminants). The use of respirator protection will be governed in accordance with the corporate PARALLAX respiratory protection program.
 - safety glasses with side shields
 - hard hat

- leather or cotton work gloves
- hearing protection, as required

19.3 LEVEL B PPE

Level B PPE will be addressed when required as an addendum to this ES&H Plan.

20. OCCURRENCE REPORTING

Parallax will notify the Base Operations Officer and USACE immediately of any employee injury/illness and any accident, incident, near-miss (potential bodily injury/illness or damage to equipment or facilities), potential Price-Anderson Amendment Act noncompliance, environmental release, or any other unplanned event that may be a violation of a regulatory requirement.

21. WORK SMART STANDARDS

Parallax will complete all work under the Long Term Monitoring contract in compliance with applicable Work Smart Standards. As part of the Work Smart Standards, Parallax will comply with applicable federal, state, local USACE and Parallax safety and health regulations or requirements including reporting requirements. Applicable regulations and requirements include but are not limited to those listed below:

Federal

- 29 CFR 1904, "Recording and Reporting Occupational Injuries and Illnesses"
- 29 CFR 1910, "Occupational Safety and Health Standards"
- 29 CFR 1926, "Safety and Health Regulations for Construction"
- 49 CFR, as related to shipping and handling of hazardous waste
- 40 CFR, as related to shipping and handling of hazardous waste
- 40 CFR 260, 266, 268, 270, RCRA

Industry Standards

- ACGIH—TLVs for Chemical Substances and Physical Agents and Biological Exposure Indices.

Appendix A

Project Specific Safety & Health Plan

SITE SPECIFIC SAFETY AND HEALTH PLAN

Omaha District Corps of Engineers

August 1, 2000

Parallax, Inc.
320 Interstate North Parkway, Suite 230
Atlanta, GA 30339

PROJECT NAME Cannon AFB Long Term Monitoring Program

REQUEST FOR SERVICES NO. Delivery Order 003

JOBSITE ADDRESS Cannon AFB, Clovis, New Mexico

COST CODE FFP

PROJECT MANAGER: Phillip Cummings

SITE CONTACT: Sanford Hutsell

PHONE NO.: 770-955-2008

PHONE NO: 46378 (base) 505-784-6378 (off base)

PURPOSE OF PLAN: The purpose of the Parallax, Inc. Health and Safety Plan (HSP) and this site-specific addendum is to define the protocols and procedures to be followed during the semi-annual and annual well sampling project at Cannon Air Force Base, Clovis, New Mexico. These protocols and procedures are designed to minimize the hazards that may be presented by the project field work tasks and serve as a guide for contingency activities that may arise during the field work tasks. Sufficient copies of this site-specific HSP will be kept at the worksite for the duration of project tasks.

CHANGES TO PLAN: All changes to the procedures set forth in this approved site-specific HSP or the project Work Plans must be approved by the Parallax, Inc. Environmental Safety and Health Representative and the USACE -TM.

OBJECTIVES OF FIELD WORK: Semi-annual groundwater sampling at well R, and annual groundwater sampling at wells N and O. (See below). All field activities for this project must be performed in accordance with the protocols described in this site-specific HSP. All personnel (Parallax and any subcontractors) performing field work as well as any visitors to the site must have read and fully understood the information contained in this document, and have signed the acknowledgment form located at the last page of this document.

SITE TYPE: Check as many as applicable

- | | | |
|--|--|--|
| <input type="checkbox"/> Active | <input checked="" type="checkbox"/> Landfill | <input type="checkbox"/> Natural |
| <input checked="" type="checkbox"/> Inactive | <input type="checkbox"/> Uncontrolled | <input checked="" type="checkbox"/> Military |
| <input type="checkbox"/> Secure | <input type="checkbox"/> Industrial | <input type="checkbox"/> Other |
| <input type="checkbox"/> Unsecure | <input type="checkbox"/> Residential | specify: |
| <input type="checkbox"/> Enclosed space | <input type="checkbox"/> Well Field | |

DESCRIPTION AND FEATURES: Summarize below. Include principal operations and unusual features (containers, buildings, dykes, power lines, hills, slopes, river)

Well N: 300-ft deep, 4-in well located approximately 100 ft SE of SE corner of LF#4. 30-foot screen.

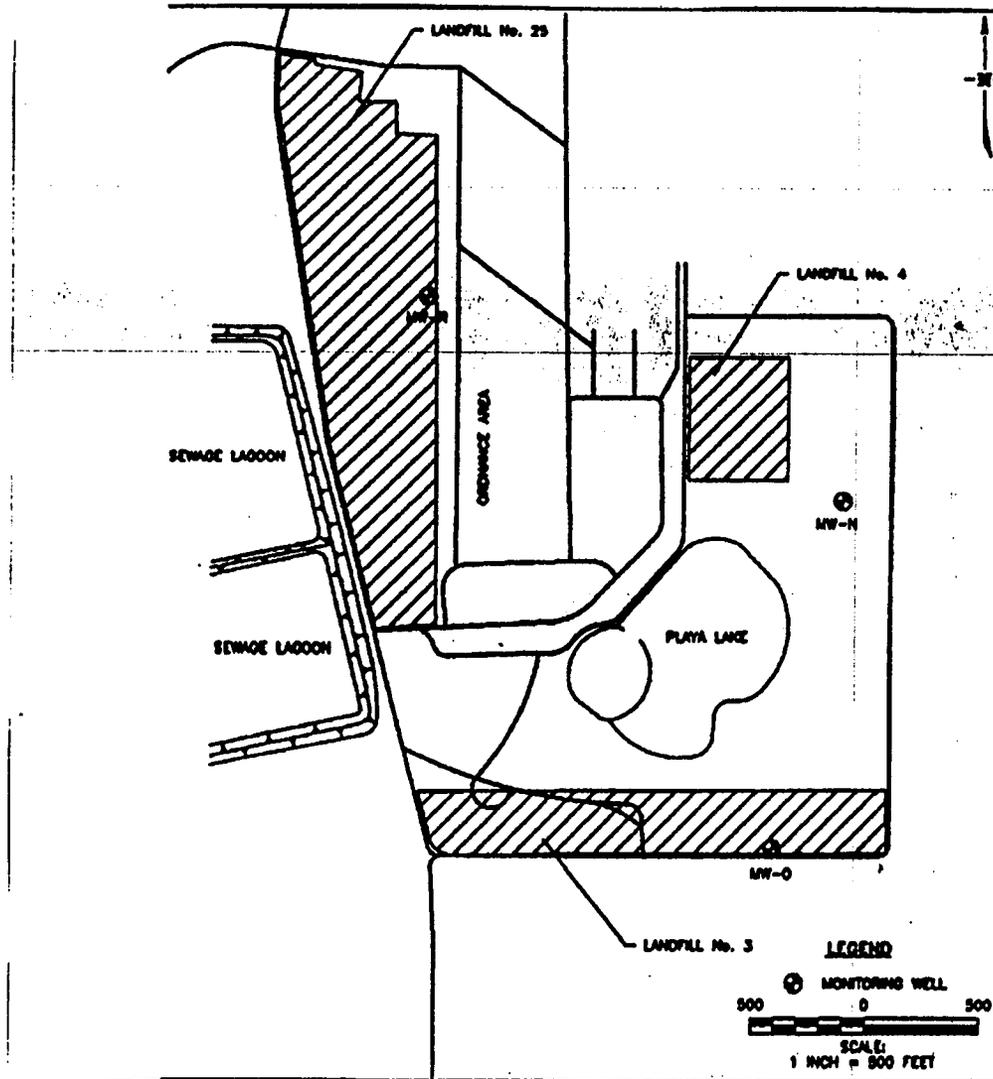
Well O: 304-ft deep, 4-in well located on south side of LF#3. 30-foot screen.

Well R: 304-ft deep, 6-in well located on the eastern boundary of LF#25. 30-foot screen.

CLIMATE: The site climate is very dry, subject to fairly high temperatures during daylight hours most of the year. However, depending on the semi-annual and annual schedule of sampling, the potential exists for sub-zero temperatures and snow cover during the winter months.

SURROUNDING POPULATION: Residential Industrial Rural Urban Commercial: Other:

SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers



SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers

HISTORY:

LF#3: Active 1959-1967. The practice was to excavate a trench, fill it with solid waste, waste oil, solvents, paints, thinners, strippers, pesticide containers, empty cans and drums, burn everything, then backfill. Twelve borings were sampled in 1985; 9 borings were sampled in 1992; MW-O was installed and sampled in 1994. Mostly pesticides and petroleum compounds were detected in some soil samples. Low concentrations of barium and vanadium were detected in groundwater samples collected during the June 1997 sampling event.

LF#4: Active 1967-68. The practice was as for LF#3. Seven borings were sampled in 1985; 10 borings were sampled in 1992; MW-N was installed and sampled in 1994. Mostly pesticides and petroleum compounds were detected in soil samples; Toluene was detected in groundwater during previous sampling events. Results from the June 1997 sampling event (the most recent event) did not indicate the presence of toluene in the groundwater. Groundwater samples from Well N did contain low concentrations of barium, lead, selenium, and vanadium.

LF #25: Active 1945-unknown. After World War II, temporary buildings and runways were demolished and disposed of at the landfill. The rubble includes large pieces of concrete and wood, exterior asbestos tiles, metal and asbestos/cement pipe, and asphalt mixed with soil. Groundwater sampled from well R in June 1998 contained chromium and nickel above background levels.

WASTE TYPES: () Liquid () Solid () Sludge () Gas () Unknown (X) Other specify: Contaminated groundwater

WASTE CHARACTERISTICS: Check as many as applicable.

- () Corrosive () Flammable () Radioactive
 (X) Toxic (X) Volatile () Reactive (X) Other specify: Metals,
 gasoline range organics
 () Inert Gas () Unknown

WORK ZONES: Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize.

Exclusion Zone: Will consist of the work area around each well. The work zone will be marked with orange cones.

CRZ: Will consist of the field decontamination (detergent rinse, DI rinse, etc.) area adjacent to each E.Z.

Support Zone: Field vehicle, equipment storage area if used.

SITE CONTROL: Site control will be the responsibility of the Site Safety and Health Officer. Non-project personnel will not be allowed in the work zone or the CRZ.

BUDDY SYSTEM: The "buddy system" or line-of-site practices will be utilized by project personnel while performing sampling tasks, i.e., no single project personnel will place him/herself out of line-of-sight of other project personnel during performance of sampling tasks.

HAZARDS OF CONCERN:

- (X) Heat Stress attach guidelines () Noise
 (X) Cold Stress attach guidelines (X) Inorganic Chemicals
 (X) Explosive/Flammable (X) Organic Chemicals () Other specify:
 see Risk Analysis
 () Oxygen Deficient () Motorized Traffic
 () Radiological () Heavy Machinery
 (X) Biological () Slips, Trips & Falls

PRINCIPAL DISPOSAL METHODS AND PRACTICES:

PPE will be placed in plastic bags.

Monitoring well purge water and any decontamination water will be contained in existing polyethylene tanks adjacent to each well, pending groundwater sample analyses. Upon receipt of the results a determination will be made regarding proper disposal.

SITE SPECIFIC SAFETY AND HEALTH PLAN

Omaha District Corps of Engineers

HAZARDOUS MATERIAL SUMMARY: Circle (shade) waste type and estimate amounts by category

CHEMICALS Amounts/Units:	SOLIDS (Groundwater) Amounts/Units:~359, 22.7, 13, 66, 15 and 21 µg/l	SLUDGES Amounts/Units:	SOLVENTS (Groundwater) Amounts/Units:~	OILS Amounts/Units:	OTHER Amounts/Units:
Acids	Flyash	Paint	Halogenated (chloro, bromo) Solvents	Oily Wastes	Laboratory
Pickling Liquors	Asbestos	Pigments	Hydrocarbons	Gasoline	Pharmaceutical
Caustics	Milling/Mine Tailings	Metal Sludges	Alcohols	Diesel Oil	Hospital
Pesticides	Ferrous Smelter	POTW Sludge	Ketones	Lubricants	Radiological
Dyes/Inks	Non-ferrous Smelter	Aluminum	Esters	PCBs	Municipal
Cyanides	Metals - nickel, chromium, lead, barium, selenium, vanadium	Distillation Bottoms	Ethers	Polynuclear Aromatics	Construction
Phenols	Other	Other	Other	Other	Munitions
Halogens	Specify:	Specify:	Specify:	Specify:	Other
Dioxins Other Specify:					Specify:

OVERALL HAZARD EVALUATION: () High () Medium (X) Low () Unknown (Where tasks have different hazards, evaluate each. Attach additional sheets if necessary)

JUSTIFICATION:

Well N: Low (Barium, lead, selenium, and vanadium in groundwater) Well O: Low (Barium and vanadium in groundwater) Well R: Low (Chromium and nickel in water)
 Low (toluene detected in the past, but not in recent sample) Low (hydrocarbons detected in the past, but not in recent sample)

FIRE/EXPLOSION POTENTIAL: () High () Medium (X) Low () Unknown

Groundwater sampling task - Since wells are installed next to landfills, there is a possibility of explosive gas buildup in the closed wells.

BACKGROUND REVIEW: () COMPLETE (X) INCOMPLETE

Soil sample data unavailable.

SITE SPECIFIC SAFETY AND HEALTH PLAN						
Omaha District Corps of Engineers						
KNOWN CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION (specify units and media)	PEL ppm or mg/m ³ (specify)	IDLH ppm or mg/m ³ (specify)	WARNING CONCENTRATION ppm in air	SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	PHOTOIONIZATION POTENTIAL
Barium	66 µg/l - GW	0.5 mg/m ³ as barium	50 mg/m ³	Not applicable	Eyes, skin, upper respiratory system irritant, skin burns	Not applicable
Chromium	22.7 µg/ - GW	0.5 mg/m ³ as chromium	25 mg/m ³ as Cr ³⁺	Not applicable	Eye irritant, sensitizer, dermatitis	Not applicable
Lead	13 µg/ - GW	0.05 mg/m ³ as lead	100 mg/m ³	Not applicable	Eye irritant, constipation, abdominal pain	Not applicable
Nickel	359 µg/ - GW	1 mg/m ³ (inorganic)	10 mg/m ³	Not applicable	Nausea, abdominal pain, vomiting, dizziness	Not applicable
Selenium	15 µg/ - GW	0.2 mg/m ³ as selenium	1 mg/m ³	Not applicable	Eyes, skin, nose, throat irritant; headache; chills; fever; metallic taste; garlic breath; eye, skin burns	Not applicable
Vanadium	21 µg/ - GW	0.5 mg/m ³ as vanadium	35 mg/m ³	Not applicable	Eye, skin, throat irritant; metallic taste, cough	Not applicable
NA=Not Available NE=None Established U=Unknown PEL=Permissible Exposure Limit IDLH=Immediately Dangerous to Life or Health S=Soil SW=Surface Water T=Tailings W=Waste TK=Tanks SD=Sediment BZ=Breathing Zone ppb=parts per billion A=Air GW=Groundwater SL=Sludge D=Drums L=Lagoon OFF=Offsite eV=electron volts Note: Information is based on the most recent groundwater sampling event for each well.						

SITE SPECIFIC SAFETY AND HEALTH PLAN	
Omaha District Corps of Engineers	

FIELD ACTIVITIES COVERED UNDER THIS PLAN				HAZARD		
TASK DESCRIPTION/SPECIFIC TECHNIQUE-STANDARD OPERATING PROCEDURES/SITE LOCATION(Attach additional sheets as necessary)	Type	Primary	Contingency	SCHEDULE		
<p>1 Purge monitoring wells, collect samples using dedicated pumps, pack samples. Use PID to monitor air over well head and in breathing zone, also over purge water.</p> <p>MSDS sheets for the acid and base preservatives to be used for the groundwater samples are included as Attachment 1 to this HSP.</p> <p>Hand signals will be used to maintain communication between project personnel. These signals will be agreed upon before the field work commences.</p>	Intrusive	A B C <u>D</u>	A B C <u>D</u>	Hi	Med	<u>Low</u>
	<u>Non-intrusive</u>	Modified	Exit Area			

STEP-BY-STEP RISK ANALYSIS :		
STEP	HAZARD	PRECAUTION
Opening the well :	<ol style="list-style-type: none"> 1. Possible pressurized gas buildup that could propel cap with appreciable force; projectile hazard. 2. Possible buildup of pressurized flammable gas within the well; fire hazard. 3. Possible buildup of toxic/hazardous gases within well; inhalation hazard. 	<ol style="list-style-type: none"> 1. Open cap slowly, vent any pressure. 2. Vent any pressure. 3. Stand upwind of well, monitor over well with PID.
Purging the well	<ol style="list-style-type: none"> 1. Contact with possibly contaminated groundwater. 2. Inhalation of volatiles offgassing from purged water. 	<ol style="list-style-type: none"> 1. Wear appropriate PPE. 2. Stand upwind of purge water effluent at all times, monitor with PID in breathing zone and over effluent.
Sampling the well	<ol style="list-style-type: none"> 1. Contact with possibly contaminated groundwater. 2. Contact with preservative acids or bases. 	<ol style="list-style-type: none"> 1. Wear appropriate PPE. 2. Wear appropriate PPE.

PERSONNEL* AND RESPONSIBILITIES (Include subcontractors) - Responsibilities for each position listed below (as applicable) will be as stated in Parallax, Inc. Safety and Health Plan.					
NAME	OFFICE SYMBOL	HEALTH CLEARANCE	FIRST AID/CPR TRAINING	RESPONSIBILITIES	ONSITE?
Phillip Cummings	Parallax	Yearly Med. Mon: 29CFR 1910.120(f)	YES	PROJECT MANAGER	Yes
Phillip Cummings	Parallax	Yearly Med. Mon: 29CFR 1910.120(f)	YES	SITE SAFETY AND HEALTH OFFICER	Yes
Tom Zink	CENWO-PM-H	Yearly Med. Mon: 29CFR 1910.120(f)	NA	USACE TECHNICAL MANAGER	No
Maurice Rowan	Parallax	Yearly Med. Mon: 29CFR 1910.120(f)	YES	FIELD TECHNICIAN/SAMPLER	Yes

SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers

PROTECTIVE EQUIPMENT: Specify by task. Indicate type and/or material as necessary. Use copies of this sheet if needed.

BLOCK A TASKS: Well Sampling (X) Primary
LEVEL: A - B - C - D - Modified () Contingency

BLOCK B TASKS: Exit Area () Primary
LEVEL: A - B - C - D - Modified (X) Contingency

Respiratory: (X) Not Needed
() SCBA, Airline:
() APR:
() Cartridge:
() Escape Mask:
() Other:

Prot. Clothing: () Not Needed
() Encapsulated Suit:
() Splash Suit:
() Apron
() Tyvek Coverall: Saran-coated (yellow)
() Saranex Coverall:
(X) Cloth Coverall:
() Other:

Head and Eye: () Not Needed
(X) Safety Glasses:
() Face Shield:
() Goggles:
() Hard Hat:
() Other:

Gloves: () Not Needed
(X) Undergloves: Latex
() Gloves:
(X) Overgloves: Nitrile - 13"
() Other - specify below:

Boots: () Not Needed
(X) Boots: Leather steel-toed work boots
() Overboots:
() Rubber:

Respiratory: () Not Needed
() SCBA, Airline:
(X) APR: Full face
(X) Cartridge: Combination HEPA
dust/fumes/mist-- O.V./Acid gas
() Escape Mask:
() Other:

Prot. Clothing: () Not Needed
() Encapsulated Suit:
() Splash Suit:
() Apron
() Tyvek Coverall: Saran-coated (yellow)
() Saranex Coverall:
(X) Cloth Coverall:
() Other:

Head and Eye: (X) Not Needed
() Safety Glasses:
() Face Shield:
() Goggles:
() Hard Hat:
() Other:

Gloves: () Not Needed
(X) Undergloves: Latex
() Gloves:
(X) Overgloves: Nitrile - 13"
() Other - specify below:

Boots: () Not Needed
(X) Boots: Leather steel-toed work boots
() Overboots:
() Rubber:

SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers

MONITORING EQUIPMENT: Specify by task. Indicate type as necessary. Attach additional sheets as necessary.

INSTRUMENT	TASK	ACTION GUIDELINES	COMMENTS (Includes schedules of use)
Combustible Gas Indicator	1 2 3 4 5 6	<p><05% LEL Continue work 05-10% LEL Continue work with monitoring ≥10% LEL Stop work</p> <p>23.0% O₂ Oxygen normal <23.0% O₂ Oxygen deficient; notify SHSC <19.5% O₂ Interrupt task/evacuate</p>	Health and Safety air monitoring results must be recorded on the appropriate field form. Instrument calibration, operation, and maintenance will be performed according to the manufacturer's instructions.
Radiation Survey Meter	1 2 3 4 5 6	<p>3X Background Notify SSHO >2mR/hr Interrupt task/evacuate</p>	(X) Not Needed
Photoionization Detector Type <u>MiniRae</u> () 11.7 eV (X) 10.2 eV () 9.8 eV () ___ eV	1 2 3 4 5 6	<p>Specify: If OVA readings remain between 5 and 10 ppm in breathing zone for 30 seconds, or above 2 ppm continuously, then stop work. As toluene was present in Well N in the past, verify using Draeger tube(s) that toluene is not the cause. As long as toluene is not the cause, use 1 ppm above background in BZ for 30 seconds as action level. If toluene is the cause, don APR above 50 ppm in breathing zone. If toluene is not the cause, don APR.</p> <p>If any readings persist above 50 ppm in BZ for over 1 minute, stop work. Consider upgrade to Level B.</p>	<p>(X) Monitor gases in well column immediately after opening.</p> <p>Health and Safety air monitoring results must be recorded on the appropriate field form. Instrument calibration, operation, and maintenance will be performed according to the manufacturer's instructions.</p>
Flame Ionization Detector Type <u>OVA - Foxboro 128</u>	1 2 3 4 5 6	Specify:	Health and Safety air monitoring results must be recorded on the appropriate field form. Instrument calibration, operation, and maintenance will be performed according to the manufacturer's instructions.
Detector Tubes/Monitox Type <u>Draeger: Toluene</u>	1 2 3 4 5 6	Specify: Use tube to check for presence of toluene as airborne contaminant.	Health and Safety air monitoring results must be recorded on the appropriate field form. Instrument calibration, operation, and maintenance will be performed according to the manufacturer's instructions.
Respirable Dust Monitor Type _____ Type _____	1 2 3 4 5 6	Specify:	(X) Not Needed. The presence of visible airborne dust will be considered an action level that will necessitate donning of APRs with HEPA dust cartridge (see Risk analysis "General" section).

SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers

DECONTAMINATION PROCEDURES

Personalized Decontamination

Summarize below and/or attach diagram; discuss use of work zones.
In cont. reduction zone:

1. Remove nitrile gloves.
2. Remove cloth coveralls.
3. Remove latex gloves.
4. Wash hands with soap and water.
5. Wash face with soap and water.

Procedure must be performed whenever personnel are preparing to leave work site.

() Not Needed

Sampling Equipment Decontamination

Summarize below and/or attach diagram; discuss use of work zones.

Since wells will be sampled using existing dedicated pumps, only water quality instrumentation will need to be decontaminated. Equipment will be decontaminated after use at each well, using a deionized water rinse, and wiped with a paper towel.

() Not Needed

Heavy Equipment Decontamination

Summarize below and/or attach diagram; discuss use of work zones.

(X) Not Needed

Containment and Disposal Method

A determination will be visually made in the field for PPE disposal. If visual contamination is not present, the PPE will be placed in plastic bags, which will be closed using twist-ties, and disposed of in a municipal landfill. Visually contaminated PPE will be placed in plastic bags and be properly disposed of by Base personnel following characterization analysis.

Containment and Disposal Method

Monitoring well purge water and any decon water will be contained in existing polyethylene tanks adjacent to each well, pending groundwater sample analyses. Upon receipt of the results a determination will be made regarding proper disposal.

Containment and Disposal Method

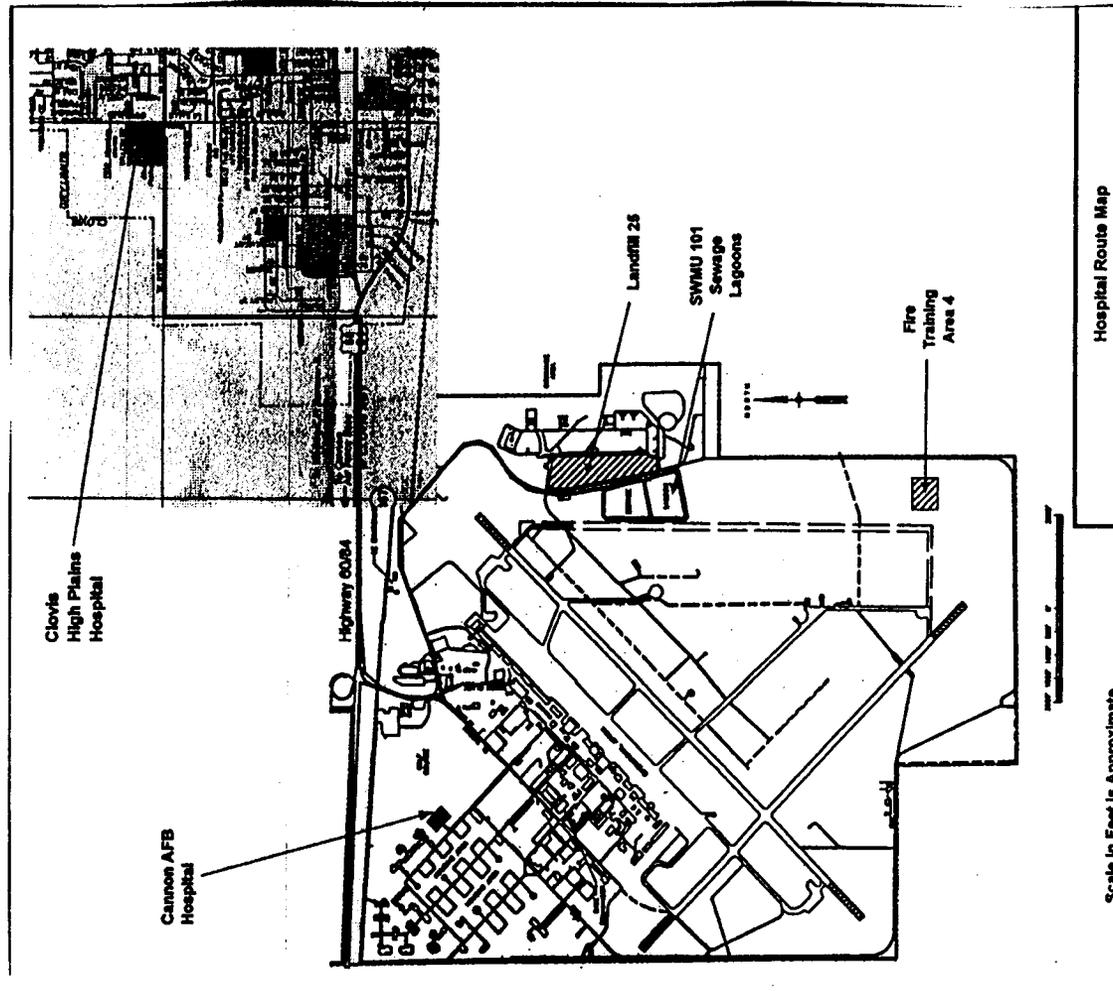
NA

SITE SPECIFIC SAFETY AND HEALTH PLAN Omaha District Corps of Engineers					
EMERGENCY CONTACTS			EMERGENCY CONTACTS	NAME	PHONE
Water Supply	NA		Technical Manager	David Keefer	770-955-2008
Site Telephone	Cell. (303) 748-5093		Safety and Health Manager	Nick Carter	319-753-7029
EPA Release Report No.	800-424-8802		Industrial Hygienist	Nick Carter	319-753-7029
Environmental Agency	NM Env. Dept.	505-827-2932	Other (specify)		
Other (specify)			State Spill Number	UST Division	505-827-0188
CONTINGENCY PLANS Summarize below: <u>Worker Injury:</u> Administer first aid as needed, transport victim to hospital if necessary, or, call 911 for ambulance. First Aid kit and cellular phone will be kept at the work site at all times during performance of project tasks, primarily in the work vehicle. <u>Fire or Explosion:</u> Move personnel to a safe location. Account for all personnel. Use fire extinguisher if applicable. Call 911. First Aid kit, cellular phone, and fire extinguisher (ABC type) will be kept at the work site at all times during performance of project tasks, primarily in the work vehicle. <u>DOCUMENTATION REQUIREMENTS:</u> Any injuries, accidents, or illnesses that occur during performance of the project field tasks must be thoroughly documented using the appropriate OSHA incident report form. Parallax, Inc. Corporate Safety and Health Program outlines these requirements.			Fire Department	Clovis FD	911
			Police Department	Clovis PD	911 or 763-5531
			State Police	Clovis State Police Dept.	505-763-3426
			Health Department	Clovis DOH	505-763-5583
			Poison Control Center	Poison Control	1-800-332-3073
			Occupational Health Unit		402-221-3645
HEALTH AND SAFETY PLAN APPROVALS (See cover sheet)					
Prepared by:	Date:	MEDICAL EMERGENCY			
			Hospital Name: Plains Regional Medical Center		Phone: 769-2154
Reviewed by	Date:	Hospital Address: 2100 N. Thomas Street			
		Name of Contact at Hospital:			
		Name of 24-Hour Ambulance:			Phone:
CEMRO-SO Signature:	Date:	Route to Hospital (Attach map with route to hospital) Exit AFB at main entrance, take US 84 east for 5 miles to Clovis. Stay on US 84 (7th Street) while entering city limits. One-third mile inside city limits, turn left (north) on North Thomas Street. Hospital is one-third mile north on left.			

SITE SPECIFIC SAFETY AND HEALTH PLAN

Omaha District Corps of Engineers

THIS PAGE RESERVED FOR HOSPITAL ROUTE MAP



Hospital Route Map

Scale in Feet is Approximate

SITE SPECIFIC SAFETY AND HEALTH PLAN
Omaha District Corps of Engineers

The following personnel have read and fully understand the contents of this Site Health and Safety Plan and further agree to all requirements contained herein.

Name

Affiliation

Date

Signature

Attachment 1

**Material Safety Data Sheets
(MSDS)**



Material Safety Data Sheet

ISOBUTYLENE

Page: 1
Rev. Date
07/13/89

Airco, Division of The BOC Group, Inc.
575 Mountain Avenue
Murray Hill, NJ 07974

Telephone: (201)464-8100

Emergency Contact: CHEMTREC
Emergency Phone Number: (800)424-9300

SECTION #1 - IDENTIFICATION

Product: ISOBUTYLENE

CAS Number: 115-11-7
Product Code: MSDS CODE G-53
Chemical Family: Aliphatic hydrocarbon
Chemical Formula: C₄H₈
Molecular Weight: 56.00

Synonyms: 2-METHYLPROPENE
G-53
ISOBUTENE

Hazard Rating - Health: 1 Slight
- Fire: 4 Extreme
- Reactivity: 0 Negligible

SECTION #2 - CHEMICAL COMPONENTS

Component: ISOBUTYLENE
CAS Number: 115-11-7 Percent of Mixture: 99.0000 to 99.8000
Asphyxiant - maintain oxygen levels
above 19.5 percent

SECTION #3 - PHYSICAL DATA

Boiling Point: 19.5°F -6.9°C
Melting Point: -220.6°F -140.3°C
Vapor Pressure: 39 psia @ 70°F
Vapor Density (Air=1): 1.98 @ STP
Solubility (H₂O): Insoluble, Insoluble
Percent Volatiles: 100

SECTION #3 - PHYSICAL DATA Continued...Appearance

A colorless gas.

Odor

Unpleasant odor similar to that of burning coal.

SECTION #4 - FIRE FIGHTING & EXPLOSION DATA

Flash Point: -105°F -76°C Closed Cup
Autoignition: 869°F 465°C

Flammability Class: 1

Lower Explosive Limit (%): 1.8
Upper Explosive Limit (%): 9.6

Fire and Explosion Hazards

Isobutylene is heavier than air and may travel a considerable distance to an ignition source. Isobutylene is a flammable gas! Keep away from open flame and other sources of ignition. Do not allow smoking in storage areas or when handling.

Extinguishing Media

Water, carbon dioxide, dry chemical.

Special Fire Fighting Instructions

If possible, stop the flow of gas with a remote valve. Use water spray to cool fire exposed containers. If fire is extinguished and flow of gas is continued, increase ventilation to prevent a build up of a flammable/explosive atmosphere. Extinguish sources of ignition.

SECTION #5 - EXPOSURE and EFFECTS - INHALATIONRoutes of Exposure - Inhalation

In moderate concentrations, product may exclude an adequate oxygen supply and may cause dizziness, drowsiness and eventual unconsciousness. Product may also act as an anesthetic on the central nervous system, causing a slight anesthetic effect. Symptoms may include dizziness, euphoria and headache in higher concentrations. Asphyxiation due to exclusion of oxygen is possible. Maintain oxygen levels above 19.5% at sea level.

ISOBUTYLENE

SECTION #5 - EXPOSURE and EFFECTS - INHALATION Continued...Routes of Exposure - InhalationFirst Aid - Inhalation

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO PRODUCT. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS.

Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted (artificial) respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

SECTION #5 - EXPOSURE and EFFECTS - SKINRoutes of Exposure - Skin

Contact with liquefied product may cause frostbite or cryogenic "burns" upon evaporation. Frostbite effects are a change in color of the skin to gray or white, possibly followed by blistering. Skin may become inflamed and painful.

First Aid - Skin

Remove contaminated clothing and flush affected area with cold water and soap. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the skin or deep tissue freezing or if frostbite has occurred. Treat the "burn" in a similar manner as a thermal burn.

SECTION #5 - EXPOSURE and EFFECTS - EYESRoutes of Exposure - Eyes

Contact with evaporating liquid may cause frostbite or cryogenic "burns". Irritation may also occur.

First Aid - Eyes

Never introduce oil or ointment into the eyes without medical advice! In case of freezing or cryogenic "burns" by rapidly evaporating liquid, DO NOT WASH THE EYES WITH HOT OR EVEN TEPID WATER! Remove victim from the source of contamination. Open eyelids wide to allow liquid to evaporate. If pain is present, refer the victim to an ophthalmologist for further treatment and follow up. If the victim cannot tolerate light, protect eyes with a light

ISOBUTYLENE

SECTION #5 - EXPOSURE and EFFECTS - EYES Continued...

First Aid - Eyes

bandage or handkerchief.

SECTION #5 - EXPOSURE and EFFECTS - INGESTION

Routes of Exposure - Ingestion

Ingestion is unlikely. The effects of ingestion are unknown, however minimal health effects are anticipated. Consult a physician for treatment or contact the local poison control center.

First Aid - Ingestion

Keep victim calm and warm. Notify physician and inform of nature of material, the state of the victim and any observed signs or symptoms.

SECTION #5 - MISCELLANEOUS TOXICOLOGICAL INFORMATION

Carcinogenicity -- NTP: No IARC: No NTP: No

SECTION #6 - REACTIVITY & POLYMERIZATION

Stability: Stable

Conditions to Avoid (Stability)

None.

Incompatible Materials

Oxidizers.

Hazardous Decomposition Products

Carbon monoxide.

SECTION #7 - SPILL, LEAK, & DISPOSAL PROCEDURES

Steps to be Taken in The Event of Spills, Leaks, or Release

Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact CHEMTREC for emergency assistance or your closest Airco

ISOBUTYLENE

SECTION #7 - SPILL, LEAK, & DISPOSAL PROCEDURES Continued...**Steps to be Taken in The Event of Spills, Leaks, or Release**

location. Increase ventilation to prevent build up of a flammable/explosive atmosphere. Extinguish all sources of ignition!

Waste Disposal Methods

Do not attempt to dispose of residual or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Airco for proper disposal.

SARA Hazard Classes: Acute Health Hazard
Fire Hazard
Sudden Release of Pressure Hazard

SECTION #8 - SPECIAL PROTECTIVE MEASURES**Ventilation**

Use local exhaust to prevent accumulation. Use general ventilation to prevent build up of flammable concentrations. May use hood with forced ventilation when handling small quantities.

If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

Eye Protection

Safety goggles or glasses.

Skin Protection

Protective Gloves made of plastic or rubber.

Respiratory Protection

Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use. A chemical cartridge respirator with organic vapor cartridges may be used for low concentrations when adequate oxygen is present, however product does not have adequate warning properties.

Other Protection

Safety shoes, safety shower, eyewash.

ISOBUTYLENE**SECTION #9 - SPECIAL PRECAUTIONS - STORAGE & HANDLING****Storage & Handling Conditions**

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure regulator when connecting cylinder to lower pressure (<250 psig) piping or systems. Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130°F. Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. For additional recommendations consult Compressed Gas Association Pamphlet P-1. Post "No Smoking" signs in storage or use areas.

Never carry a compressed gas cylinder or a container of a gas in cryogenic liquid form in an enclosed space such as a car trunk, van or station wagon. A leak can result in a fire, explosion, asphyxiation or a toxic exposure.

SECTION #10 - SHIPPING INFORMATION

Proper Shipping Name: Liquefied petroleum gas

Hazard Class: Flammable Gas
DOT Identification Number: UN1075
DOT Shipping Label: Flammable Gas

SECTION #11 - MISC COMMENTS & REFERENCE DOCUMENTATION

Earth bond and ground all lines and equipment associated with the product system. Electrical equipment should be non-sparking and explosion proof.

Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipments of a compressed gas cylinder, which has not been filled by the owner or with his (written) consent, is in violation of Federal Law (49CFR).

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

6.1 M02 NITRIC ACID, 2N VOLUMETRIC SOLUTION PAGE: 1
EFFECTIVE: 03/09/92 ISSUED: 03/28/92

T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

=====

SECTION I - PRODUCT IDENTIFICATION

=====

PRODUCT NAME: NITRIC ACID, 2N VOLUMETRIC SOLUTION
COMMON SYNONYMS: N/A
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: HNO3 IN H2O
FORMULA WT.: 63.01
CAS NO.: 7697-37-2
OSHA/RTECS NO.: QU5775000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 5639

=====

PRECAUTIONARY LABELING

=====

MSDS SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

USES BURNS. HARMFUL IF INHALED. MAY BE FATAL IF SWALLOWED. OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE.

DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME AND PLACE IN DRY CONTAINER.

INTERNATIONAL LABELING

AVOID CONTACT WITH EYES. AFTER CONTACT WITH SKIN, WASH IMMEDIATELY WITH ABUNDANT AMOUNTS OF WATER. KEEP CONTAINER TIGHTLY CLOSED.

MSDS SAF-T-DATA* STORAGE COLOR CODE: WHITE (CORROSIVE)

CONTINUED ON PAGE: 2

669 M02
EFFECTIVE: 03/09/92

NITRIC ACID, 2N VOLUMETRIC SOLUTION

PAGE: 3
ISSUED: 03/28/92

=====
SECTION IV - FIRE AND EXPLOSION HAZARD DATA (CONTINUED)
=====

USUAL FIRE & EXPLOSION HAZARDS

MODERATE OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR.

TOXIC GASES PRODUCED
OXIDES OF NITROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

=====
SECTION V - HEALTH HAZARD DATA
=====

PERMITTED EXPOSURE LIMIT VALUE (TLV/TWA): 5 MG/M3 (2 PPM)

THIS IS FOR NITRIC ACID.

SHORT-TERM EXPOSURE LIMIT (STEL): 10 MG/M3 (4 PPM)

THIS IS FOR NITRIC ACID.

PERMISSIBLE EXPOSURE LIMIT (PEL): 5 MG/M3 (2 PPM)

THIS IS FOR NITRIC ACID.

TOXICITY OF COMPONENTS

INHALATION-1HR RAT LC50 FOR NITRIC ACID

2500 PPM

INTRAPERITONEAL MOUSE LD50 FOR WATER

190 G/KG

INTRAVENOUS MOUSE LD50 FOR WATER

25 G/KG

MUTAGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

MUTAGENICITY

NONE IDENTIFIED.

CONTINUED ON PAGE: 4

3009 M02
EFFECTIVE: 03/09/92

NITRIC ACID, 2N VOLUMETRIC SOLUTION

PAGE: 4
ISSUED: 03/28/92

=====

SECTION V - HEALTH HAZARD DATA (CONTINUED)

=====

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: HEADACHE, NAUSEA, VOMITING, DIZZINESS, SEVERE IRRITATION
OF RESPIRATORY SYSTEM

SKIN CONTACT: SEVERE IRRITATION OR BURNS

EYE CONTACT: SEVERE IRRITATION OR BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: SEVERE BURNS TO MOUTH, THROAT, AND STOMACH, KIDNEY
DISFUNCTION

CHRONIC EFFECTS: NONE IDENTIFIED

TARGET ORGANS

RESPIRATORY SYSTEM, EYES, SKIN, TEETH

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
DAMAGED SKIN, EYE DISORDERS, CARDIO-PULMONARY DISEASE

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, SKIN CONTACT, EYE CONTACT

EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF
CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE
ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE
OXYGEN.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF
WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED
CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

CONTINUED ON PAGE: 5

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC † (800) 424-9300 -- NATIONAL RESPONSE CENTER † (800) 424-8802

UN 19 M02
EFFECTIVE: 03/09/92

NITRIC ACID, 2N VOLUMETRIC SOLUTION

PAGE: 7
ISSUED: 03/28/92

=====
SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION (CONTINUED)
=====

HAZARD (I.C.A.O.)

PROPER SHIPPING NAME: NITRIC ACID, SOLUTION

HAZARD CLASS: 8

UN: UN2031

PACKAGING GROUP: II

HAZARD LABELS: CORROSIVE

REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3 AND EMPLOYEE TRAINING 49CFR 173.1.

U.S. CUSTOMS HARMONIZATION NUMBER: 2808000000

=====
/A = NOT APPLICABLE OR NOT AVAILABLE

/E = NOT ESTABLISHED

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY A PERSON TRAINED IN, OR SUPERVISED BY A PERSON TRAINED IN, CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES.

EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, BAKER CANNOT WARN OF ALL OF THE POTENTIAL DANGERS OF USE OR REACTION WITH OTHER CHEMICALS OR MATERIALS. BAKER WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL.

CONTINUED ON PAGE: 8

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC † (800) 424-9300 -- NATIONAL RESPONSE CENTER † (800) 424-8802

5807 M02
EFFECTIVE: 03/09/92

NITRIC ACID, 2N VOLUMETRIC SOLUTION

PAGE: 8
ISSUED: 03/28/92

=====

BAKER DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR PURPOSE.

THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY AND EVEN DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, BAKER WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET.

NOTE: CHEMTREC, CANUTEC, AND NATIONAL RESPONSE CENTER EMERGENCY TELEPHONE NUMBERS ARE TO BE USED ONLY IN THE EVENT OF CHEMICAL EMERGENCIES INVOLVING SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT INVOLVING CHEMICALS. ALL NON-EMERGENCY QUESTIONS SHOULD BE DIRECTED TO CUSTOMER SERVICE (1-800-JTBAKER) FOR ASSISTANCE.

COPYRIGHT 1992 J.T.BAKER INC.
TRADEMARKS OF J.T.BAKER INC.

APPROVED BY QUALITY ASSURANCE DEPARTMENT.

-- LAST PAGE --
ISSUED BY VWR 12/14/92

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

43880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 1
ISSUED: 07/02/92

J.T.BAKER INC., 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865

=====

SECTION I - PRODUCT IDENTIFICATION

=====

PRODUCT NAME: HYDROCHLORIC ACID
COMMON SYNONYMS: MURIATIC ACID; CHLOROHYDRIC ACID; HYDROGEN CHLORIDE,
AQUEOUS
CHEMICAL FAMILY: INORGANIC ACIDS
FORMULA: HCL
FORMULA WT.: 36.46
CAS NO.: 7647-01-0
NIOSH/RTECS NO.: MW4025000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9538,9535,4800,9542,9534,9549,9529,9547,9546,690,9536,9540
9539,9548,5367,9544,5800,5214,9543,9530,9537,553,5814,5575

=====

PRECAUTIONARY LABELING

=====

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	0	NONE
REACTIVITY	-	2	MODERATE
CONTACT	-	3	SEVERE (CORROSIVE)

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES

U.S. PRECAUTIONARY LABELING

POISON DANGER

CAUSES SEVERE BURNS. MAY BE FATAL IF SWALLOWED OR INHALED.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING. DO NOT BREATHE VAPOR. CAUSES DAMAGE
TO RESPIRATORY SYSTEM (LUNGS), EYES AND SKIN. KEEP IN TIGHTLY CLOSED
CONTAINER. LOOSEN CLOSURE CAUTIOUSLY. USE WITH ADEQUATE VENTILATION. WASH
THOROUGHLY AFTER HANDLING. IN CASE OF SPILL NEUTRALIZE WITH SODA ASH OR LIME
AND PLACE IN DRY CONTAINER.

CONTINUED ON PAGE: 2

H3880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 3
ISSUED: 07/02/92

=====
SECTION IV - FIRE AND EXPLOSION HAZARD DATA
=====

FLASH POINT (CLOSED CUP): N/A NFPA 704M RATING: 3-0-0

AUTOIGNITION TEMPERATURE: N/A

FLAMMABLE LIMITS: UPPER - N/A LOWER - N/A

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL. DO NOT GET WATER INSIDE CONTAINERS.

1. USUAL FIRE & EXPLOSION HAZARDS
MAY EMIT HYDROGEN GAS UPON CONTACT WITH METAL.

TOXIC GASES PRODUCED
HYDROGEN CHLORIDE, HYDROGEN

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
NONE IDENTIFIED.

=====
SECTION V - HEALTH HAZARD DATA
=====

THRESHOLD LIMIT VALUE (TLV/TWA): 7 MG/M3 (5 PPM)

TLV (CEILING) IS FOR HYDROGEN CHLORIDE.

SHORT-TERM EXPOSURE LIMIT (STEL): NOT ESTABLISHED

F. MISSIBLE EXPOSURE LIMIT (PEL): 7 MG/M3 (5 PPM)

PFL (CEILING) IS FOR HYDROGEN CHLORIDE.

CONTINUED ON PAGE: 4

13880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 4
ISSUED: 07/02/92

=====
SECTION V - HEALTH HAZARD DATA (CONTINUED)
=====

TOXICITY OF COMPONENTS

INTRAPERITONEAL MOUSE LD50 FOR HYDROCHLORIC ACID	40	MG/KG
ORAL RABBIT LD50 FOR HYDROCHLORIC ACID	960	MG/KG
INHALATION-1HR RAT LC50 FOR HYDROCHLORIC ACID	3124	PPM
INTRAPERITONEAL MOUSE LD50 FOR WATER	150	G/KG
INTRAVENOUS MOUSE LD50 FOR WATER	25	G/KG
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO		

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: PULMONARY EDEMA, CIRCULATORY FAILURE, RESPIRATORY SYSTEM
DAMAGE, COLLAPSE, COUGHING, DIFFICULT BREATHING

SKIN CONTACT: SEVERE BURNS

EYE CONTACT: SEVERE BURNS

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IS HARMFUL AND MAY BE FATAL. SEVERE BURNS TO MOUTH,
THROAT, AND STOMACH, NAUSEA, VOMITING

CHRONIC EFFECTS: MAY CAUSE TEETH DAMAGE

TARGET ORGANS
RESPIRATORY SYSTEM, EYES, SKIN

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

PRIMARY ROUTES OF ENTRY
INGESTION, INHALATION, SKIN CONTACT, EYE CONTACT

CONTINUED ON PAGE: 5

H3880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 5
ISSUED: 07/02/92

=====
SECTION V - HEALTH HAZARD DATA (CONTINUED)
=====

EMERGENCY AND FIRST AID PROCEDURES

- INGESTION: CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING. IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.
- INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
- SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.
- EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: NO PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: YES CONTAINS HYDROGEN CHLORIDE (RQ = 1 LB, TPQ = 500 LBS)

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS HYDROCHLORIC ACID (RQ = 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS HYDROCHLORIC ACID

GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91

TSCA INVENTORY: YES

=====
SECTION VI - REACTIVITY DATA
=====

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, MOISTURE

INCOMPATIBLES: MOST COMMON METALS, WATER, AMINES, METAL OXIDES, ACETIC ANHYDRIDE, PROPIOLACTONE, VINYL ACETATE, MERCURIC SULFATE, CALCIUM PHOSPHIDE, FORMALDEHYDE, ALKALIES, CARBONATES, STRONG BASES, SULFURIC ACID, CHLOROSULFONIC ACID

DISPOSITION PRODUCTS: HYDROGEN CHLORIDE, HYDROGEN, CHLORINE

CONTINUED ON PAGE: 6

H3880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 6
ISSUED: 07/02/92

=====

SECTION VII - SPILL & DISPOSAL PROCEDURES

=====

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE
SPILL WITH SODA ASH OR LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL
INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA
WITH WATER.

J. T. BAKER NEUTRASORB(R) OR TEAM(R) 'LOW NA+' ACID NEUTRALIZERS ARE
FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL
ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (CORROSIVE WASTE)

=====

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

=====

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV
REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE
CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO
100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID
CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A
SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE
SUIT, NEOPRENE GLOVES ARE RECOMMENDED.

=====

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

=====

HAZ-T-DATA* STORAGE COLOR CODE: WHITE (CORROSIVE)

STORAGE REQUIREMENTS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. ISOLATE
FROM INCOMPATIBLE MATERIALS. DO NOT STORE NEAR OXIDIZING MATERIALS.

CONTINUED ON PAGE: 7

J.T.BAKER INC. 222 RED SCHOOL LANE, PHILLIPSBURG, NJ 08865
M A T E R I A L S A F E T Y D A T A S H E E T
24-HOUR EMERGENCY TELEPHONE -- (908) 859-2151
CHEMTREC # (800) 424-9300 -- NATIONAL RESPONSE CENTER # (800) 424-8802

880 -04
EFFECTIVE: 03/30/92

HYDROCHLORIC ACID

PAGE: 7
ISSUED: 07/02/92

=====
SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION
=====

DOMESTIC (D.O.T.)

OPER SHIPPING NAME: HYDROCHLORIC ACID, SOLUTION
HARDWARE CLASS: 8
UN: UN1789 REPORTABLE QUANTITY: 5000 LBS. PACKAGING GROUP: II
HAZARD: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101

INTERNATIONAL (I.M.O.)

OPER SHIPPING NAME: HYDROCHLORIC ACID, SOLUTION
HARDWARE CLASS: 8 I.M.O. PAGE: 8183
UN: UN1789 MARINE POLLUTANTS: NO PACKAGING GROUP: II
HAZARD: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.102; PART 176; IMO

INTERNATIONAL (I.C.A.O.)

OPER SHIPPING NAME: HYDROCHLORIC ACID, SOLUTION
HARDWARE CLASS: 8
UN: UN1789 PACKAGING GROUP: II
HAZARD: CORROSIVE
REGULATORY REFERENCES: 49CFR 172.101; 173.6; PART 175; ICAO/IATA=== WE BELIEVE THE TRANSPORTATION DATA AND REFERENCES CONTAINED HEREIN TO BE FACTUAL AND THE OPINION OF QUALIFIED EXPERTS. THE DATA IS MEANT AS A GUIDE TO THE OVERALL CLASSIFICATION OF THE PRODUCT AND IS NOT PACKAGE SIZE SPECIFIC, NOR SHOULD IT BE TAKEN AS A WARRANTY OR REPRESENTATION FOR WHICH THE COMPANY ASSUMES LEGAL RESPONSIBILITY.=== THE INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION. ANY USE OF THE INFORMATION MUST BE DETERMINED BY THE USER TO BE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS. SEE SHIPPER REQUIREMENTS 49CFR 172.3 AND EMPLOYEE TRAINING 49CFR 173.1.

S. CUSTOMS HARMONIZATION NUMBER: 28061000000

=====
CONTINUED ON PAGE: 8

Acute Effects of Overexposure:

Eye: May cause slight irritation to the eyes.

Skin: May cause slight irritation to the skin.

Inhalation: May cause headache, nausea, weakness, sedation, and unconsciousness.

Ingestion: May cause irritation to intestines. May be aspirated into the lungs if swallowed, which may result in pulmonary edema and chemical pneumonitis.

Subchronic and Chronic Effects of Overexposure:

Unleaded gasoline has produced cancer in laboratory animals. No comparable health hazard for cancer is known to occur in humans.

Other Health Effects:

Unleaded gasoline has produced kidney damage in male rats only. No comparable health hazard for kidney disease is known to occur in humans.

Gasolines containing lead anti-knock compounds should be handled in such a way to minimize contact with the body. Lead can accumulate in the body with overexposure and cause illness due to effects on the blood, nerves, kidneys and the reproductive system.

Gasolines generally contain Benzene which has been designated a carcinogen by NTP, IARC, and OSHA. Benzene may produce blood changes which include reduced platelets, reduced red blood cells, reduced white blood cells, aplastic anemia, and acute nonlymphocytic leukemia. Benzene has produced fetal death in laboratory animals and caused chromosome changes in humans and mutation changes in cells of other organisms. Health effects attributable to Benzene are not known to occur in humans exposed to gasolines.

Health Hazard Categories:

	Animal	Human		Animal	Human
Known Carcinogen	___	___	Toxic	___	___
Suspect Carcinogen	<u>X</u>	___	Corrosive	___	___
Mutagen	___	___	Irritant	___	___
Teratogen	___	___	Target Organ Toxin	<u>X</u>	<u>X</u>
Allergic Sensitizer	___	___	Specify - Lung-Aspiration Hazard		
Highly Toxic	___	___			

First Aid and Emergency Procedures:

- Eye:** Flush eyes with running water for at least fifteen minutes. If irritation develops, seek medical attention.
- Skin:** Wash with soap and water. If irritation develops, seek medical attention.
- Inhalation:** Remove from exposure. If breathing ceases, administer artificial respiration followed by oxygen. Seek medical attention.
- Ingestion:** Do not induce vomiting. Seek immediate medical assistance.
- Note to Physician:** Gastric lavage using a cuffed endotracheal tube may be performed at your discretion.

G. Physical Data

Appearance: Red-orange Liquid
Odor: Pungent
Boiling Point: 80-430F (27-221C)
Vapor Pressure: 350-800 mmHg at 20C (68F)
Vapor Density (Air = 1): 3-4
Solubility in Water: Negligible
Specific Gravity (H₂O = 1): 0.8 at 60/60F (15.6/15.6C)
Percent Volatile by Volume: 100
Evaporation Rate (Butyl Acetate = 1): > 1
Viscosity: Not Established

H. Fire and Explosion Data

Flash Point (Method Used): <-35F (-37C) (Estimated)
Flammable Limits (% by Volume in Air): LEL - 1.5
UEL - 7.6

Fire Extinguishing Media: Dry chemical, foam or carbon dioxide (CO₂)

Special Fire Fighting Procedures: Evacuate area of all unnecessary personnel. Wear appropriate safety equipment for fire conditions including NIOSH/MSHA self-contained breathing apparatus (SCBA). Shut off source, if possible. Water fog or spray may be used to cool exposed containers and equipment. Do not spray water directly on fire - product will float and could be reignited on surface of water.

Fire and Explosion Hazards: Carbon oxides and various hydrocarbons formed when burned. Gasolines containing Tetraethyl Lead will form lead fumes when burning. Highly flammable vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. Flashback along vapor trail may occur.

N. Additional Comments

This product contains the following chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. (See Hazardous Components Section B).

Benzene
Toluene
Ethyl Benzene
p-Xylene
o-Xylene
m-Xylene
Methyl-tert-Butyl Ether
1,2,4-Trimethyl Benzene

A Toxicity Study Summary is available upon request for Regular Gasoline.

Phillips Petroleum Company (references to Phillips Petroleum Company or Phillips include it's divisions, affiliates and subsidiaries) believes that the information contained herein (including data and statements) is accurate as of the date hereof. **NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE AS CONCERNS THE INFORMATION HEREIN PROVIDED.** The information provided herein relates only to the specific product designated and may not be valid where such product is used in combination with any other material or in any process. Further, since the conditions and methods of use of the product and information referred to herein are beyond the control of Phillips, Phillips expressly disclaims any and all liability as to any results obtained or arising from any use of the product or such information. No statement made herein shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents.

Appendix B

Medical Surveillance and OSHA HAZWOPER Training

Onsite personnel will have copies of the following certifications available onsite:

- OSHA 40 hour HAZWOPER training
- Current OSHA 8 hour HAZWOPER Update
- First Aid and CPR training
- OSHA HAZWOPER Supervisor training (at least one person per team)

Appendix C

Activity Hazard Analysis (AHA)

ACTIVITY HAZARD ANALYSIS

WELL PURGING AND WATER SAMPLING OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
General Site Set-Up	Head Injuries	Hard hats will be worn at all times, set-up and where designated by signs.
	Eye Injury	Protective eyewear with sideshields will be worn at all times in the field if not in a respirator. Eyewear will meet the ANSI Z-87 standard for safety glasses.
	Hearing Protection	Hearing protection will be worn at all times when noise exceeds 85 dBA.
	Foot Injury	Employees will wear leather, steel-toed boots as required for their job.
	Hand Injuries	Leather gloves will be required when handling equipment.

ACTIVITY HAZARD ANALYSIS

WELL PURGING AND WATER SAMPLING OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
	Back Injuries	<p>Employees will be taught proper lifting techniques to prevent back injuries</p> <ul style="list-style-type: none">- Bend at the knees and grip objects with the whole hand.- Keep back as straight and vertical as possible.- Center body weight over feet.- Arms and elbows should be kept close to the body.- Heavy or large objects shall be carried by two or more people.- Ensure pathways are clear.
	Slip/Trip Hazards	<p>Good housekeeping requirements will be applied to all operations. Equipment will be stored unless in use.</p>
	Site Visitors	<p>All work areas will be flagged off and warning signs posted. All visitors will report to the SSHO or Field Team Leader prior to visiting the work area</p>

ACTIVITY HAZARD ANALYSIS

WELL PURGING AND WATER SAMPLING OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
	Contamination Transfer	Company issued clothing will be required for all personnel entering the exclusion zone (EZ) for water sampling. Additionally Tyveck™ coveralls and latex gloves will be required to prevent contamination transfer due to water splashing during sampling operations.
	Electrical Shock	Ground-Fault Circuit Interrupters (GFCIs) will be required for all electrical equipment in use.
	Inhalation Hazards	All personnel working in the EZ will be qualified to wear a Respirator as defined in 29 CFR 1910. All personnel, working in the EZ will have a respirator available should it be requires.
		Water samples will be monitored with the OVM as soon as each sample is taken

ACTIVITY HAZARD ANALYSIS

WELL PUMP REMOVAL AND REINSTALLATION OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
General Site Set-Up	Head Injuries	Hard hats will be worn at all times, set-up and where designated by signs.
	Eye Injury	Protective eyewear with sideshields will be worn at all times in the field if not in a respirator. Eyewear will meet the ANSI Z-87 standard for safety glasses.
	Hearing Protection	Hearing protection will be worn at all times when noise exceeds 85 dBA.
	Foot Injury	Employees will wear leather, steel-toed boots as required for their job.
	Hand Injuries	Leather gloves will be required when handling equipment.

ACTIVITY HAZARD ANALYSIS

WELL PUMP REMOVAL AND REINSTALLATION OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
	Back Injuries	Employees will be taught proper lifting techniques to prevent back injuries <ul style="list-style-type: none">- Bend at the knees and grip objects with the whole hand.- Keep back as straight and vertical as possible.- Center body weight over feet.- Arms and elbows should be kept close to the body.- Heavy or large objects shall be carried by two or more people.- Ensure pathways are clear.
	Slip/Trip Hazards	Good housekeeping requirements will be applied to all operations. Equipment will be stored unless in use.
	Site Visitors	All work areas will be flagged off and warning signs posted. All visitors will report to the SSHO or Field Team Leader prior to visiting the work area

ACTIVITY HAZARD ANALYSIS

WELL PUMP REMOVAL AND REINSTALLATION OPERATIONS

Activity	Potential Hazard(s)	Required Actions or Controls
	Contamination Transfer	Company issued clothing will be required for all personnel entering the exclusion zone (EZ) for well removal and reinstallation. Additionally Tyveck™ coveralls and latex gloves will be required for well removal and reinstallation to prevent the possibility of personal contamination.
	Monitoring of well	Monitoring of well will be conducted with an OVM as soon as the well has cleared the hole.

Appendix D

USACE Accident Reporting Form

(For Safety Staff only)		REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT <i>(For Use of this Form See Attached Instructions and USACE Suppl to AR 385-40)</i>			REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)
1 ACCIDENT CLASSIFICATION							
PERSONNEL CLASSIFICATION		INJURY/ILLNESS/FATAL		PROPERTY DAMAGE		MOTOR VEHICLE INVOLVED	DIVING
<input type="checkbox"/> GOVERNMENT <input type="checkbox"/> CIVILIAN <input type="checkbox"/> MILITARY		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> CONTRACTOR		<input type="checkbox"/>		<input type="checkbox"/> FIRE INVOLVED <input type="checkbox"/> OTHER		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> PUBLIC		<input type="checkbox"/> FATAL <input type="checkbox"/> OTHER		PROPERTY DAMAGE		<input type="checkbox"/>	DIVING
2 PERSONAL DATA							
b. NAME (Last, First, MI)		b. AGE	c. SEX <input type="checkbox"/> MALE <input type="checkbox"/> FEMALE		d. SOCIAL SECURITY NUMBER		e. GRADE
f. JOB SERIES/TITLE		g. DUTY STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ON DUTY <input type="checkbox"/> TDY <input type="checkbox"/> OFF DUTY		h. EMPLOYMENT STATUS AT TIME OF ACCIDENT <input type="checkbox"/> ARMY ACTIVE <input type="checkbox"/> ARMY RESERVE <input type="checkbox"/> VOLUNTEER <input type="checkbox"/> PERMANENT <input type="checkbox"/> FOREIGN NATIONAL <input type="checkbox"/> SEASONAL <input type="checkbox"/> TEMPORARY <input type="checkbox"/> STUDENT <input type="checkbox"/> OTHER (Specify)			
3 GENERAL INFORMATION							
a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time)	c. EXACT LOCATION OF ACCIDENT				d. CONTRACTOR'S NAME	
		e. CONTRACT NUMBER <input type="checkbox"/> CIVIL WORKS <input type="checkbox"/> MILITARY <input type="checkbox"/> OTHER (Specify)		f. TYPE OF CONTRACT <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> SERVICE <input type="checkbox"/> A/E <input type="checkbox"/> DREDGE <input type="checkbox"/> OTHER (Specify)		g. HAZARDOUS/TOXIC WASTE ACTIVITY <input type="checkbox"/> SUPERFUND <input type="checkbox"/> DERP <input type="checkbox"/> IRP <input type="checkbox"/> OTHER (Specify)	
4 CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see instructions)							
a. CONSTRUCTION ACTIVITY (CODE)				b. TYPE OF CONSTRUCTION EQUIPMENT (CODE)			
5 INJURY / ILLNESS INFORMATION (Include name on line and corresponding code number in box for items a, f & g - see instructions)							
e. SEVERITY OF ILLNESS / INJURY (CODE)				b. ESTIMATED DAYS LOST	c. ESTIMATED DAYS HOSPITALIZED	d. ESTIMATED DAYS RESTRICTED DUTY	
f. BODY PART AFFECTED (CODE)				g. TYPE AND SOURCE OF INJURY/ILLNESS			
PRIMARY				TYPE			
SECONDARY				SOURCE			
6 PUBLIC FATALITY (Fill in line and corresponding code number in box - see instructions)							
a. ACTIVITY AT TIME OF ACCIDENT (CODE)				b. PERSONAL FLOATION DEVICE USED? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A			
7 MOTOR VEHICLE ACCIDENT							
a. TYPE OF VEHICLE <input type="checkbox"/> PICKUP/VAN <input type="checkbox"/> AUTOMOBILE <input type="checkbox"/> TRUCK <input type="checkbox"/> OTHER (Specify)		b. TYPE OF COLLISION <input type="checkbox"/> SIDE SWIPE <input type="checkbox"/> HEAD ON <input type="checkbox"/> REAR END <input type="checkbox"/> BROADSIDE <input type="checkbox"/> ROLL OVER <input type="checkbox"/> BACKING <input type="checkbox"/> OTHER (Specify)			c. SEAT BELTS USED NOT USED NOT AVAILABLE		
					(1) FRONT SEAT		
					(2) REAR SEAT		
8 PROPERTY/MATERIAL INVOLVED							
b. NAME OF ITEM			b. OWNERSHIP			c. \$ AMOUNT OF DAMAGE	
(1)							
(2)							
(3)							
9 VESSEL / FLOATING PLANT ACCIDENT (Fill in line and corresponding code number in box from list - see instructions)							
a. TYPE OF VESSEL/FLOATING PLANT (CODE)				b. TYPE OF COLLISION/MISHAP (CODE)			
10 ACCIDENT DESCRIPTION (Use additional paper, if necessary)							

11. CAUSAL FACTOR(S) (Read Instruction Before Completing)					
a. (Explain YES answers in Item 13) DESIGN: Was design of facility, workplace or equipment a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO INSPECTION/MAINTENANCE: Were inspection & maintenance procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO OPERATING PROCEDURES: Were operating procedures a factor? <input type="checkbox"/> YES <input type="checkbox"/> NO JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred? <input type="checkbox"/> YES <input type="checkbox"/> NO HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO			a. (CONTINUED) CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident? <input type="checkbox"/> YES <input type="checkbox"/> NO OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task? <input type="checkbox"/> YES <input type="checkbox"/> NO PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident? <input type="checkbox"/> YES <input type="checkbox"/> NO b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT? <input type="checkbox"/> YES (If yes, attach a copy.) <input type="checkbox"/> NO		
12. TRAINING					
a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK? <input type="checkbox"/> YES <input type="checkbox"/> NO		b. TYPE OF TRAINING. <input type="checkbox"/> CLASSROOM <input type="checkbox"/> ON JOB		c. DATE OF MOST RECENT FORMAL TRAINING. (Month) / (Day) / (Year)	
13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES (See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)					
a. DIRECT CAUSE					
b. INDIRECT CAUSE(S)					
14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).					
DESCRIBE FULLY:					
15. DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.					
a. BEGINNING (Month/Day/Year) / /			b. ANTICIPATED COMPLETION (Month/Day/Year) / /		
c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT		d. DATE (Mo/Da/Yr)	e. ORGANIZATION IDENTIFIER (Div. Br, Sect)	f. OFFICE SYMBOL	
CORPS _____		____ / ____ / ____	_____	_____	
CONTRACTOR _____		____ / ____ / ____	_____	_____	
16. MANAGEMENT REVIEW (1st)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE _____		TITLE _____		DATE _____	
17. MANAGEMENT REVIEW (2nd - Chief Operations, Construction, Engineering, etc.)					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. COMMENTS					
SIGNATURE _____		TITLE _____		DATE _____	
18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW					
a. <input type="checkbox"/> CONCUR b. <input type="checkbox"/> NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS:					
SIGNATURE _____		TITLE _____		DATE _____	
19. COMMAND APPROVAL					
COMMENTS					
COMMANDER SIGNATURE _____				DATE _____	

GENERAL. Complete a separate report for each person who was injured, caused, or contributed to the accident (excluding uninjured personnel and witnesses). Use of this form for reporting USACE employee first-aid type injuries not submitted to the Office of Workers' Compensation Programs (OWCP) shall be at the discretion of the FOA commander. Please type or print legibly. Appropriate items shall be marked with an "X" in box(es). If additional space is needed, provide the information on a separate sheet and attach to the completed form. Ensure that these instructions are forwarded with the completed report to the designated management reviewers indicated in sections 16 and 17.

INSTRUCTIONS FOR SECTION 1— ACCIDENT CLASSIFICATION. (Mark All Boxes That Are Applicable.)

- a. **GOVERNMENT.** Mark "CIVILIAN" box if accident involved government civilian employee; mark "MILITARY" box if accident involved U.S. military personnel.
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any government civilian employee injury, illness, or fatality that requires the submission of OWCP Forms CA-1 (injury), CA-2 (illness), or CA-6 (fatality) to OWCP; mark if accident resulted in military personnel lost-time or fatal injury or illness.
 - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to government property (including motor vehicles).
 - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) **DIVING ACTIVITY**—Mark if the accident involved an in-house USACE diving activity.
- b. **CONTRACTOR.**
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in any contractor lost-time injury/illness or fatality.
 - (2) **PROPERTY DAMAGE**—Mark the appropriate box if accident resulted in any damage of \$1000 or more to contractor property (including motor vehicles).
 - (3) **VEHICLE INVOLVED**—Mark if accident involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" or "PROPERTY DAMAGE" are marked.
 - (4) **DIVING ACTIVITY**—Mark if the accident involved a USACE Contractor diving activity.
- c. **PUBLIC.**
 - (1) **INJURY/ILLNESS/FATALITY**—Mark if accident resulted in public fatality or permanent total disability. (The "OTHER" box will be marked when requested by the FOA to report an unusual non-fatal public accident that could result in claims against the government or as otherwise directed by the FOA Commander).
 - (2) **VOID SPACE**—Make no entry.
 - (3) **VEHICLE INVOLVED**—Mark if accident resulted in a fatality to a member of the public and involved a motor vehicle, regardless of whether "INJURY/ILLNESS/FATALITY" is marked.
 - (4) **VOID SPACE**—Make no entry.

INSTRUCTIONS FOR SECTION 2— PERSONAL DATA

- a. **NAME**—(MANDATORY FOR GOVERNMENT ACCIDENTS. OPTIONAL AT THE DISCRETION OF THE FOA COMMANDER FOR CONTRACTOR AND PUBLIC ACCIDENTS). Enter last name, first name, middle initial of person involved.
- b. **AGE**—Enter age.
- c. **SEX**—Mark appropriate box.
- d. **SOCIAL SECURITY NUMBER**—(FOR GOVERNMENT PERSONNEL ONLY) Enter the social security number (or other personal identification number if no social security number issued).
- e. **GRADE**—(FOR GOVERNMENT PERSONNEL ONLY) Enter pay grade. Example: O-6; E-7; WG-8; WS-12; GS-11; etc.

- f. **JOB SERIES/TITLE**—For government civilian employees enter the pay plan, full series number, and job title. e.g. GS-0810/Civil Engineer. For military personnel enter the primary military occupational specialty (PMOS), e.g., 15A30 or 11G50. For contractor employees enter the job title assigned to the injured person, e.g. carpenter, laborer, surveyor, etc..
- g. **DUTY STATUS**—Mark the appropriate box.
 - (1) **ON DUTY**—Person was at duty station during duty hours or person was away from duty station during duty hours but on official business at time of the accident.
 - (2) **TDY**—Person was on official business, away from the duty station and with travel orders at time of accident. Line-of-duty investigation required.
 - (3) **OFF DUTY**—Person was not on official business at time of accident.
- h. **EMPLOYMENT STATUS**—(FOR GOVERNMENT PERSONNEL ONLY) Mark the most appropriate box. If "OTHER" is marked, specify the employment status of the person.

INSTRUCTION FOR SECTION 3— GENERAL INFORMATION

- a. **DATE OF ACCIDENT**—Enter the month, day, and year of accident.
- b. **TIME OF ACCIDENT**—Enter the local time of accident in military time. Example: 1430 hrs (not 2:30 p.m.).
- c. **EXACT LOCATION OF ACCIDENT**—Enter facts needed to locate the accident scene: (installation/project name, building number, street, direction and distance from closest landmark, etc.,).
- d. **CONTRACTOR NAME**
 - (1) **PRIME**—Enter the exact name (title of firm) of the prime contractor.
 - (2) **SUBCONTRACTOR**—Enter the name of any subcontractor involved in the accident.
- e. **CONTRACT NUMBER**—Mark the appropriate box to identify if contract is civil works, military, or other; if "OTHER" is marked, specify contract appropriation on line provided. Enter complete contract number of prime contract, e.g., DACW 09-85-C-0100.
- f. **TYPE OF CONTRACT**—Mark appropriate box. A/E means architect/engineer. If "OTHER" is marked, specify type of contract on line provided.
- g. **HAZARDOUS/TOXIC WASTE ACTIVITY (HTW)**—Mark the box to identify the HTW activity being performed at the time of the accident. For Superfund, DERP, and Installation Restoration Program (IRP) HTW activities include accidents that occurred during inventory, pre-design, design, and construction. For the purpose of accident reporting, DERP Formerly Used DoD Site (FUDS) activities and IRP activities will be treated separately. For Civil Works O&M HTW activities mark the "OTHER" box.

INSTRUCTIONS FOR SECTION 4— CONSTRUCTION ACTIVITIES

- a. **CONSTRUCTION ACTIVITY**—Select the most appropriate construction activity being performed at time of accident from the list below. Enter the activity name and place the corresponding code number identified in the box.

CONSTRUCTION ACTIVITY LIST

- | | |
|-------------------------|----------------------------|
| 1. MOBILIZATION | 14. ELECTRICAL |
| 2. SITE PREPARATION | 15. SCAFFOLDING/ACCESS |
| 3. EXCAVATION/TRENCHING | 16. MECHANICAL |
| 4. GRADING (EARTHWORK) | 17. PAINTING |
| 5. PIPING/UTILITIES | 18. EQUIPMENT/MAINTENANCE |
| 6. FOUNDATION | 19. TUNNELING |
| 7. FORMING | 20. WAREHOUSING/STORAGE |
| 8. CONCRETE PLACEMENT | 21. PAVING |
| 9. STEEL ERECTION | 22. FENCING |
| 10. ROOFING | 23. SIGNING |
| 11. FRAMING | 24. LANDSCAPING/IRRIGATION |
| 12. MASONRY | 25. INSULATION |
| 13. CARPENTRY | 26. DEMOLITION |

d. TYPE OF CONSTRUCTION EQUIPMENT - Select the equipment involved in the accident from the list below. Enter the name and place the corresponding code number identified in the box. If equipment is not included below, use code 24, "OTHER", and write in specific type of equipment.

CONSTRUCTION EQUIPMENT

- | | |
|------------------------------------|--------------------------------|
| 1. GRADER | 13. DUMP TRUCK (OFF HIGHWAY) |
| 2. DRAGLINE | 14. TRUCK (OTHER) |
| 3. CRANE (ON VESSEL/BARGE) | 15. FORKLIFT |
| 4. CRANE (TRACKED) | 16. BACKHOE |
| 5. CRANE (RUBBER TIRE) | 17. FRONT-END LOADER |
| 6. CRANE (VEHICLE MOUNTED) | 18. PILE DRIVER |
| 7. CRANE (TOWER) | 19. TRACTOR (UTILITY) |
| 8. SHOVEL | 20. MANLIFT |
| 9. SCRAPER | 21. DOZER |
| 10. PUMP TRUCK (CONCRETE) | 22. DRILL RIG |
| 11. TRUCK (CONCRETE/TRANSIT MIXER) | 23. COMPACTOR/VIBRATORY ROLLER |
| 12. DUMP TRUCK (HIGHWAY) | 24. OTHER |

INSTRUCTIONS FOR SECTION 5 - INJURY/ILLNESS INFORMATION

a. SEVERITY OF INJURY / ILLNESS - Reference para 2-10 of USACE Suppl 1 to AR 385-40 and enter code and description from list below..

- | | |
|-----|---|
| NOI | NO INJURY |
| FAT | FATALITY |
| PTL | PERMANENT TOTAL DISABILITY |
| PPR | PERMANENT PARTIAL DISABILITY |
| LWD | LOST WORKDAY CASE INVOLVING DAYS AWAY FROM WORK |
| NLW | RECORDABLE CASE WITHOUT LOST WORKDAYS |
| RFA | RECORDABLE FIRST AID CASE |
| NRI | NON-RECORDABLE INJURY |

b. ESTIMATED DAYS LOST - Enter the estimated number of workdays the person will lose from work.

c. ESTIMATED DAYS HOSPITALIZED - Enter the estimated number of workdays the person will be hospitalized.

d. ESTIMATED DAYS RESTRICTED DUTY - Enter the estimated number of workdays the person, as a result of the accident, will not be able to perform all of their regular duties.

e. BODY PART AFFECTED - Select the most appropriate primary and when applicable, secondary body part affected from the list below. Enter body part name on line and place the corresponding code letters identifying that body part in the box.

GENERAL BODY AREA	CODE	BODY PART NAME
ARM/WRIST	AB	ARM AND WRIST
	AS	ARM OR WRIST
TRUNK, EXTERNAL MUSCULATURE	B1	SINGLE BREAST
	B2	BOTH BREASTS
	B3	SINGLE TESTICLE
	B4	BOTH TESTICLES
	BA	ABDOMEN
	BC	CHEST
	BL	LOWER BACK
	BP	PENIS
	BS	SIDE
	BU	UPPER BACK
	BW	WAIST
	BZ	TRUNK OTHER
HEAD, INTERNAL	C1	SINGLE EAR INTERNAL
	C2	BOTH EARS INTERNAL
	C3	SINGLE EYE INTERNAL
	C4	BOTH EYES INTERNAL
	CB	BRAIN
	CC	CRANIAL BONES
	CD	TEETH
	CJ	JAW
	CL	THROAT, LARYNX
	CM	MOUTH

	CN	NOSE	
	CR	THROAT, OTHER	
	CT	TONGUE	
	CZ	HEAD OTHER INTERNAL	
ELBOW	EB	BOTH ELBOWS	
	ES	SINGLE ELBOW	
FINGER	F1	FIRST FINGER	
	F2	BOTH FIRST FINGERS	
	F3	SECOND FINGER	
	F4	BOTH SECOND FINGERS	
	F5	THIRD FINGER	
	F6	BOTH THIRD FINGERS	
	F7	FOURTH FINGER	
	F8	BOTH FOURTH FINGERS	
TOE	G1	GREAT TOE	
	G2	BOTH GREAT TOES	
	G3	TOE OTHER	
	G4	TOES OTHER	
HEAD, EXTERNAL	H1	EYE EXTERNAL	
	H2	BOTH EYES EXTERNAL	
	H3	EAR EXTERNAL	
	H4	BOTH EARS EXTERNAL	
	HC	CHIN	
	HF	FACE	
	HK	NECK/THROAT	
	HM	MOUTH/LIPS	
	HN	NOSE	
	HS	SCALP	
KNEE	KB	BOTH KNEES	
	KS	KNEE	
LEG, HIP, ANKLE, BUTTOCK	LB	BOTH LEGS/HIPS/ ANKLES/BUTTOCKS	
	LS	SINGLE LEG/HIP ANKLE/BUTTOCK	
HAND	MB	BOTH HANDS	
	MS	SINGLE HAND	
FOOT	PB	BOTH FEET	
	PS	SINGLE FOOT	
TRUNK, BONES	R1	SINGLE COLLAR BONE	
	R2	BOTH COLLAR BONES	
	R3	SHOULDER BLADE	
	R4	BOTH SHOULDER BLADES	
	RB	RIB	
	RS	STERNUM (BREAST BONE)	
	RV	VERTEBRAE (SPINE; DISC)	
	RZ	TRUNK BONES OTHER	
	SHOULDER	SB	BOTH SHOULDERS
		SS	SINGLE SHOULDER
THUMB	TB	BOTH THUMBS	
	TS	SINGLE THUMB	
TRUNK, INTERNAL ORGANS	V1	LUNG, SINGLE	
	V2	LUNGS, BOTH	
	V3	KIDNEY, SINGLE	
	V4	KIDNEYS, BOTH	
	VH	HEART	
	VL	LIVER	
	VR	REPRODUCTIVE ORGANS	
	VS	STOMACH	
	VV	INTESTINES	
	VZ	TRUNK, INTERNAL; OTHER	

f. NATURE OF INJURY/ILLNESS - Select the most appropriate nature of injury / illness from the list below. This nature of injury / illness shall correspond to the primary body part selected in 5e, above. Enter the nature of injury / illness name on the line and place the corresponding CODE letters in the box provided.

* The injury or condition selected below must be caused by a specific incident or event which occurred during a single work day or shift.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
SKIN DISEASE OR CONDITION	SB	BIOLOGICAL
	SC	CHEMICAL
	SS	DERMATITIS, UNCLASSIFIED

g. TYPE AND SOURCE OF INJURY/ILLNESS (CAUSE) - Type and Source Codes are used to describe what caused the incident. The Type Code stands for an ACTION and the Source Code for an OBJECT or SUBSTANCE. Together, they form a brief description of how the incident occurred. Where there are two different sources, code the initiating source of the incident (see example 1, below). Examples:

- (1) An employee tripped on carpet and struck his head on a desk.
TYPE: 210 (fell on same level) SOURCE: 0110 (walking/working surface)
- NOTE: This example would NOT be coded T20 (struck against) and 0140 (furniture).
- (2) A Park Ranger contracted dermatitis from contact with poison ivy/oak.
TYPE: 510 (contact) SOURCE: 0920 (plant)
- (3) A lock and dam mechanic punctured his finger with a metal silver while grinding a turbine blade.
TYPE: 410 (punctured by) SOURCE: 0830 (metal)
- (4) An employee was driving a government vehicle when it was struck by another vehicle.
TYPE: 800 (traveling in) SOURCE: 0421 (government-owned vehicle, as driver)

NOTE: The Type Code 800, "Traveling In" is different from the other type codes in that its function is not to identify factors contributing to the injury or fatality, but rather to collect data on the type of vehicle the employee was operating or traveling in at the time of the incident.

Select the most appropriate TYPE and SOURCE identifier from the list below and enter the name on the line and the corresponding code in the appropriate box.

CODE	TYPE OF INJURY NAME
	STRUCK
0110	STRUCK BY
0111	STRUCK BY FALLING OBJECT
0120	STRUCK AGAINST
	FELL, SLIPPED, TRIPPED
0210	FELL ON SAME LEVEL
0220	FELL ON DIFFERENT LEVEL
0230	SLIPPED, TRIPPED (NO FALL)
	CAUGHT
0310	CAUGHT ON
0320	CAUGHT IN
0330	CAUGHT BETWEEN
	PUNCTURED, LACERATED
0410	PUNCTURED BY
0420	CUT BY
0430	STUNG BY
0440	BITTEN BY
	CONTACTED
0610	CONTACTED WITH (INJURED PERSON MOVING)
0620	CONTACTED BY (OBJECT WAS MOVING)
	EXERTED
0810	LIFTED, STRAINED BY (SINGLE ACTION)
0820	STRESSED BY (REPEATED ACTION)
	EXPOSED
0710	INHALED
0720	INGESTED
0730	ABSORBED
0740	EXPOSED TO
0800	TRAVELING IN
	SOURCE OF INJURY NAME
0100	BUILDING OR WORKING AREA
0110	WALKING/WORKING SURFACE (FLOOR, STREET, SIDEWALKS, ETC)
0120	STAIRS, STEPS
0130	LADDER
0140	FURNITURE, FURNISHINGS, OFFICE EQUIPMENT
0160	BOILER, PRESSURE VESSEL
0160	EQUIPMENT LAYOUT (ERGONOMIC)
0170	WINDOWS, DOORS
0180	ELECTRICITY

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
TRAUMATIC INJURY OR DISABILITY	TA	AMPUTATION
	TB	BACK STRAIN
	TC	CONTUSION; BRUISE; ABRASION
	TD	DISLOCATION
	TF	FRACTURE
	TH	HERNIA
	TK	CONCUSSION
	TL	LACERATION, CUT
	TP	PUNCTURE
	TS	STRAIN, MULTIPLE
	TU	BURN, SCALD, SUNBURN
	TI	TRAUMATIC SKIN DISEASES/ CONDITIONS INCLUDING DERMATITIS
	TR	TRAUMATIC RESPIRATORY DISEASE
	TO	TRAUMATIC FOOD POISONING
TW	TRAUMATIC TUBERCULOSIS	
TX	TRAUMATIC VIROLOGICAL/ INFECTIVE/PARASITIC DISEASE	
T1	TRAUMATIC CEREBRAL VASCULAR CONDITION/STROKE	
T2	TRAUMATIC HEARING LOSS	
T3	TRAUMATIC HEART CONDITION	
T4	TRAUMATIC MENTAL DISORDER; STRESS; NERVOUS CONDITION	
T8	TRAUMATIC INJURY - OTHER (EXCEPT DISEASE, ILLNESS)	

**A nontraumatic physiological harm or loss of capacity produced by systemic infection; continued or repeated stress or strain; exposure to toxins, poisons, fumes, etc.; or other continued and repeated exposures to conditions of the work environment over a long period of time. For practical purposes, an occupational illness/disease or disability is any reported condition which does not meet the definition of traumatic injury or disability as described above.

GENERAL NATURE CATEGORY	CODE	NATURE OF INJURY NAME
**NON-TRAUMATIC ILLNESS/DISEASE OR DISABILITY		
RESPIRATORY DISEASE	RA	ASBESTOSIS
	RB	BRONCHITIS
	RE	EMPHYSEMA
	RP	PNEUMOCONIOSIS
	RS	SILICOSIS
	RB	RESPIRATORY DISEASE, OTHER
VIROLOGICAL, INFECTIVE & PARASITIC DISEASES	VB	BRUCELLOSIS
	VC	COCCIDIOMYCOSIS
	VF	FOOD POISONING
	VH	HEPATITIS
	VM	MALARIA
	VS	STAPHYLOCOCCUS
	VT	TUBERCULOSIS
	VB	VIROLOGICAL/INFECTIVE/ PARASITIC - OTHER
DISABILITY, OCCUPATIONAL	DA	ARTHRITIS, BURSITIS
	DB	BACK STRAIN, BACK SPRAIN
	DC	CEREBRAL VASCULAR CONDITION; STROKE
	DD	ENDEMIC DISEASE (OTHER THAN CODE TYPES RA-S)
	DE	EFFECT OF ENVIRONMENTAL CONDITION
	DH	HEARING LOSS
	DK	HEART CONDITION
	DM	MENTAL DISORDER, EMOTIONAL STRESS NERVOUS CONDITION
	DR	RADIATION
	DS	STRAIN, MULTIPLE
	DU	ULCER
	DV	OTHER VASCULAR CONDITIONS
	DS	DISABILITY, OTHER

CODE	SOURCE OF INJURY NAME
0200	ENVIRONMENTAL CONDITION
0210	TEMPERATURE EXTREME (INDOOR)
0220	WEATHER (ICE, RAIN, HEAT, ETC.)
0230	FIRE, FLAME, SMOKE (NOT TOBACCO)
0240	NOISE
0250	RADIATION
0280	LIGHT
0270	VENTILATION
0271	TOBACCO SMOKE
0280	STRESS (EMOTIONAL)
0290	CONFINED SPACE
0300	MACHINE OR TOOL
0310	HAND TOOL (POWERED: SAW, GRINDER, ETC.)
0320	HAND TOOL (NONPOWERED)
0330	MECHANICAL POWER TRANSMISSION APPARATUS
0340	GUARD, SHIELD (FIXED, MOVEABLE, INTERLOCK)
0350	VIDEO DISPLAY TERMINAL
0360	PUMP, COMPRESSOR, AIR PRESSURE TOOL
0370	HEATING EQUIPMENT
0380	WELDING EQUIPMENT
0400	VEHICLE
0411	AS DRIVER OF PRIVATELY OWNED/RENTAL VEHICLE
0412	AS PASSENGER OF PRIVATELY OWNED/RENTAL VEHICLE
0421	DRIVER OF GOVERNMENT VEHICLE
0422	PASSENGER OF GOVERNMENT VEHICLE
0430	COMMON CARRIER (AIRLINE, BUS, ETC.)
0440	AIRCRAFT (NOT COMMERCIAL)
0450	BOAT, SHIP, BARGE
0500	MATERIAL HANDLING EQUIPMENT
0510	EARTHMOVER (TRACTOR, BACKHOE, ETC.)
0520	CONVEYOR (FOR MATERIAL AND EQUIPMENT)
0530	ELEVATOR, ESCALATOR, PERSONNEL HOIST
0540	HOIST, SLING CHAIN, JACK
0550	CRANE
0551	FORKLIFT
0560	HANDTRUCK, DOLLY
0600	DUST, VAPOR, ETC.
0610	DUST (SILICA, COAL, ETC.)
0620	FIBERS
0621	ASBESTOS
0630	GASES
0631	CARBON MONOXIDE
0640	MIST, STEAM, VAPOR, FUME
0641	WELDING FUMES
0650	PARTICLES (UNIDENTIFIED)
0700	CHEMICAL, PLASTIC, ETC.
0711	DRY CHEMICAL—CORROSIVE
0712	DRY CHEMICAL—TOXIC
0713	DRY CHEMICAL—EXPLOSIVE
0714	DRY CHEMICAL—FLAMMABLE
0721	LIQUID CHEMICAL—CORROSIVE
0722	LIQUID CHEMICAL—TOXIC
0723	LIQUID CHEMICAL—EXPLOSIVE
0724	LIQUID CHEMICAL—FLAMMABLE
0730	PLASTIC
0740	WATER
0750	MEDICINE
0800	INANIMATE OBJECT
0810	BOX, BARREL, ETC.
0820	PAPER
0830	METAL ITEM, MINERAL
0831	NEEDLE
0840	GLASS
0850	SCRAP, TRASH
0860	WOOD
0870	FOOD
0880	CLOTHING, APPAREL, SHOES
0900	ANIMATE OBJECT
0911	DOG
0912	OTHER ANIMAL
0920	PLANT
0930	INSECT
0940	HUMAN (VIOLENCE)
0950	HUMAN (COMMUNICABLE DISEASE)
0960	BACTERIA, VIRUS (NOT HUMAN CONTACT)

CODE	SOURCE OF INJURY NAME
1000	PERSONAL PROTECTIVE EQUIPMENT
1010	PROTECTIVE CLOTHING, SHOES, GLASSES, GOGGLES
1020	RESPIRATOR, MASK
1021	DIVING EQUIPMENT
1030	SAFETY BELT, HARNESS
1040	PARACHUTE

INSTRUCTIONS FOR SECTION 6 — PUBLIC FATALITY

- a. **ACTIVITY AT TIME OF ACCIDENT**—Select the activity being performed at the time of the accident from the list below. Enter the activity name on the line and the corresponding number in the box. If the activity performed is not identified on the list, select from the most appropriate primary activity area (water related, non-water related or other activity), the code number for "Other", and write in the activity being performed at the time of the accident.

WATER RELATED RECREATION

- | | |
|-----------------------------------|--|
| 1. Sailing | 9. Swimming/designated area |
| 2. Boating—powered | 10. Swimming/other area |
| 3. Boating—unpowered | 11. Underwater activities (skin diving, scuba, etc.) |
| 4. Water skiing | 12. Wading |
| 5. Fishing from boat | 13. Attempted rescue |
| 6. Fishing from bank dock or pier | 14. Hunting from boat |
| 7. Fishing while wading | 15. Other |
| 8. Swimming/supervised area | |

NON-WATER RELATED RECREATION

- | | |
|--|---|
| 16. Hiking and walking | 23. Sports/summer (baseball, football, etc.) |
| 17. Climbing (general) | 24. Sports/winter (skiing, sledding, snowmobiling etc.) |
| 18. Camping/picnicking authorized area | 25. Cycling (bicycle, motorcycle, scooter) |
| 19. Camping/picnicking unauthorized area | 26. Gliding |
| 20. Guided tours | 27. Parachuting |
| 21. Hunting | 28. Other non-water related |
| 22. Playground equipment | |

OTHER ACTIVITIES

- | | |
|--|----------------------------------|
| 29. Unlawful acts (fights, riots, vandalism, etc.) | 33. Sleeping |
| 30. Food preparation/serving | 34. Pedestrian struck by vehicle |
| 31. Food consumption | 35. Pedestrian other acts |
| 32. Housekeeping | 36. Suicide |
| | 37. "Other" activities |

- b. **PERSONAL FLOTATION DEVICE USED**—If fatality was water-related was the victim wearing a personal flotation device? Mark the appropriate box.

INSTRUCTIONS FOR SECTION 7 — MOTOR VEHICLE ACCIDENT

- a. **TYPE OF VEHICLE**—Mark appropriate box for each vehicle involved. If more than one vehicle of the same type is involved, mark both halves of the appropriate box. USACE vehicle(s) involved shall be marked in left half of appropriate box.
- b. **TYPE OF COLLISION**—Mark appropriate box.
- c. **SEAT BELT**—Mark appropriate box.

INSTRUCTIONS FOR SECTION 8 — PROPERTY/ MATERIAL INVOLVED

- a. **NAME OF ITEM**—Describe all property involved in accident. Property/material involved means material which is damaged or whose use or misuse contributed to the accident. Include the name, type, model; also include the National Stock Number (NSN) whenever applicable.
- b. **OWNERSHIP**—Enter ownership for each item listed. (Enter one of the following: USACE; OTHER GOVERNMENT; CONTRACTOR; PRIVATE)
- c. **\$ AMOUNT OF DAMAGE**—Enter the total estimated dollar amount of damage (parts and labor), if any.

INSTRUCTIONS FOR SECTION 9—VESSEL/ FLOATING PLANT ACCIDENT

- a. **TYPE OF VESSEL/FLOATING PLANT**—Select the most appropriate vessel/floating plant from list below. Enter name and place corresponding number in box. If item is not listed below, enter item number for "OTHER" and write in specific type of vessel/floating plant.

VESSEL/FLOATING PLANTS

- | | |
|------------------------|-----------------------------|
| 1. ROW BOAT | 7. DREDGE/DIPPER |
| 2. SAIL BOAT | 8. DREDGE/CLAMSHELL, BUCKET |
| 3. MOTOR BOAT | 9. DREDGE/PIPE LINE |
| 4. BARGE | 10. DREDGE/DUST PAN |
| 5. DREDGE/HOPPER | 11. TUG BOAT |
| 6. DREDGE/SIDE CASTING | 12. OTHER |

- b. **COLLISION/MISHAP**—Select from the list below the object(s) that contributed to the accident or were damaged in the accident.

COLLISION/MISHAP

- | | |
|-----------------------------|-----------------------|
| 1. COLLISION W/OTHER VESSEL | 7. HAULAGE UNIT |
| 2. UPPER GUIDE WALL | 8. BREAKING TOW |
| 3. UPPER LOCK GATES | 9. TOW BREAKING UP |
| 4. LOCK WALL | 10. SWEEP DOWN ON DAM |
| 5. LOWER LOCK GATES | 11. BUOY/DOLPHIN/CELL |
| 6. LOWER GUIDE WALL | 12. WHARF OR DOCK |
| | 13. OTHER |

INSTRUCTIONS FOR SECTION 10—ACCIDENT DESCRIPTION

DESCRIBE ACCIDENT—Fully describe the accident. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Continue on blank sheets if necessary and attach to this report.

INSTRUCTIONS FOR SECTION 11—CAUSAL FACTORS

- a. Review thoroughly. Answer each question by marking the appropriate block. If any answer is yes, explain in item 13 below. Consider, as a minimum, the following:

- (1) **DESIGN**—Did inadequacies associated with the building or work site play a role? Would an improved design or layout of the equipment or facilities reduce the likelihood of similar accidents? Were the tools or other equipment designed and intended for the task at hand?
- (2) **INSPECTION/MAINTENANCE**—Did inadequately or improperly maintained equipment, tools, workpiece, etc. create or worsen any hazards that contributed to the accident? Would better equipment, facility, work site or work activity inspections have helped avoid the accident?
- (3) **PERSON'S PHYSICAL CONDITION**—Do you feel that the accident would probably not have occurred if the employee was in "good" physical condition? If the person involved in the accident had been in better physical condition, would the accident have been less severe or avoided altogether? Was over exertion a factor?
- (4) **OPERATING PROCEDURES**—Did a lack of or inadequacy within established operating procedures contribute to the accident? Did any aspect of the procedures introduce any hazard to, or increase the risk associated with the work process? Would establishment or improvement of operating procedures reduce the likelihood of similar accidents?
- (5) **JOB PRACTICES**—Were any of the provisions of the Safety and Health Requirements Manual (EM 385-1-1) violated? Was the task being accomplished in a manner which was not in compliance with an established job hazard analysis or activity hazard analysis? Did any established job practice (including EM 385-1-1) fail to adequately address the task or work process? Would better job practices improve the safety of the task?

- (6) **HUMAN FACTORS**—Was the person under undue stress (either internal or external to the job)? Did the task tend toward overloading the capabilities of the person; i.e., did the job require tracking and reacting to many external inputs such as displays, alarms, or signals? Did the arrangement of the workplace tend to interfere with efficient task performance? Did the task require reach, strength, endurance, agility, etc., at or beyond the capabilities of the employee? Was the work environment ill-adapted to the person? Did the person need more training, experience, or practice in doing the task? Was the person inadequately rested to perform safely?
 - (7) **ENVIRONMENTAL FACTORS**—Did any factors such as moisture, humidity, rain, snow, sleet, hail, ice, fog, cold, heat, sun, temperature changes, wind, tides, floods, currents, dust, mud, glare, pressure changes, lightning, etc., play a part in the accident?
 - (8) **CHEMICAL AND PHYSICAL AGENT FACTORS**—Did exposure to chemical agents (either single shift exposure or long-term exposure) such as dusts, fibers (asbestos, etc.), silica, gases (carbon monoxide, chlorine, etc.), mists, steam, vapors, fumes, smoke, other particulates, liquid or dry chemicals that are corrosive, toxic, explosive or flammable, by-products of combustion or physical agents such as noise, ionizing radiation, non-ionizing radiation (UV radiation created during welding, etc.) contribute to the accident/incident?
 - (9) **OFFICE FACTORS**—Did the fact that the accident occurred in an office setting or to an office worker have a bearing on its cause? For example, office workers tend to have less experience and training in performing tasks such as lifting office furniture. Did physical hazards within the office environment contribute to the hazard?
 - (10) **SUPPORT FACTORS**—Was the person using an improper tool for the job? Was inadequate time available or utilized to safely accomplish the task? Were less than adequate personnel resources (in terms of employee skills, number of workers, and adequate supervision) available to get the job done properly? Was funding available, utilized, and adequate to provide proper tools, equipment, personnel, site preparation, etc.?
 - (11) **PERSONAL PROTECTIVE EQUIPMENT**—Did the person fail to use appropriate personal protective equipment (gloves, eye protection, hard-toed shoes, respirator, etc.) for the task or environment? Did protective equipment provided or worn fail to provide adequate protection from the hazard(s)? Did lack of or inadequate maintenance of protective gear contribute to the accident?
 - (12) **DRUGS/ALCOHOL**—Is there any reason to believe the person's mental or physical capabilities, judgement, etc., were impaired or altered by the use of drugs or alcohol? Consider the effects of prescription medicine and over the counter medications as well as illicit drug use. Consider the effect of drug or alcohol induced "hangovers".
- b. **WRITTEN JOB/ACTIVITY HAZARD ANALYSIS**—Was a written Job/Activity Hazard Analysis completed for the task being performed at the time of the accident? Mark the appropriate box. If one was performed, attach a copy of the analysis to the report.

INSTRUCTIONS FOR SECTION 12—TRAINING

- a. **WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?**—For the purpose of this section "trained" means the person has been provided the necessary information (either formal and/or on-the-job (OJT) training) to competently perform the activity/task in a safe and healthful manner.
- b. **TYPE OF TRAINING**—Mark the appropriate box that best indicates the type of training; (classroom or on-the-job) that the injured person received before the accident happened.
- c. **DATE OF MOST RECENT TRAINING**—Enter the month, day, and year of the last formal training completed that covered the activity/task being performed at the time of the accident.

INSTRUCTIONS FOR SECTION 13 - CAUSES

- a. **DIRECT CAUSES** - The direct cause is that single factor which most directly lead to the accident. See examples below.
- b. **INDIRECT CAUSES** - Indirect causes are those factors which contributed to but did not directly initiate the occurrence of the accident.

Examples for section 13:

- a. Employee was dismantling scaffold and fell 12 feet from unguarded opening.
Direct cause: failure to provide fall protection at elevation.
Indirect causes: failure to enforce USACE safety requirements; improper training/motivation of employee (possibility that employee was not knowledgeable of USACE fall protection requirements or was lax in his attitude towards safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.
- b. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by USACE vehicle. (note USACE vehicle was in proper/safe working condition).
Direct cause: failure of USACE driver to maintain control of and stop USACE vehicle within safe distance.
Indirect cause: Failure of employee to pay attention to driving (defensive driving).

INSTRUCTIONS FOR SECTION 14 - ACTION TO ELIMINATE CAUSE(S)

DESCRIPTION - Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent recurrence of similar accidents/illnesses. Continue on blank sheets of paper if necessary to fully explain and attach to the completed report form.

INSTRUCTIONS FOR SECTION 15 - DATES FOR ACTION

- a. **BEGIN DATE** - Enter the date when the corrective action(s) identified in Section 14 will begin.
- b. **COMPLETE DATE** - Enter the date when the corrective action(s) identified in Section 14 will be completed.
- c. **TITLE AND SIGNATURE** - Enter the title and signature of supervisor completing the accident report. For a GOVERNMENT employee accident/illness the immediate supervisor will complete and sign the report. For PUBLIC accidents the USACE Project Manager/Area Engineer responsible for the USACE property where the accident happened shall complete and sign the report. For CONTRACTOR accidents the Contractor's project manager shall complete and sign the report and provide to the USACE supervisor responsible for oversight of that contractor activity. This USACE Supervisor shall also sign the report. Upon entering the information required in 15.d, 15.e and 15.f below, the responsible USACE supervisor shall forward the report for management review as indicated in Section 16.
- d. **DATE SIGNED** - Enter the month, day, and year that the report was signed by the responsible supervisor.
- e. **ORGANIZATION NAME** - For GOVERNMENT employee accidents enter the USACE organization name (Division, Branch, Section, etc.) of the injured employee. For PUBLIC accidents enter the USACE organization name for the person identified in block 15.c. For CONTRACTOR accidents enter the USACE organization name for the USACE office responsible for providing contract administration oversight.

- f. **OFFICE SYMBOL** - Enter the latest complete USACE Office Symbol for the USACE organization identified in block 15.a.

INSTRUCTIONS FOR SECTION 16 - MANAGEMENT REVIEW (1st)

1ST REVIEW - Each USACE FOA shall determine who will provide 1st management review. The responsible USACE supervisor in section 15.c shall forward the completed report to the USACE office designated as the 1st Reviewer by the FOA. Upon receipt, the Chief of the Office shall review the completed report, mark the appropriate box, provide substantive comments, sign, date, and forward to the FOA Staff Chief (2nd review) for review and comment.

INSTRUCTIONS FOR SECTION 17 - MANAGEMENT REVIEW (2nd)

2ND REVIEW - The FOA Staff Chief (i.e., FOA Chief of Construction, Operations, Engineering, Planning, etc.) shall mark the appropriate box, review the completed report, provide substantive comments, sign, date, and return to the FOA Safety and Occupational Health Office.

INSTRUCTIONS FOR SECTION 18 - SAFETY AND OCCUPATIONAL HEALTH REVIEW

3RD REVIEW - The FOA Safety and Occupational Health Office shall review the completed report, mark the appropriate box, ensure that any inadequacies, discrepancies, etc. are rectified by the responsible supervisor and management reviewers, provide substantive comments, sign, date and forward to the FOA Commander for review, comment, and signature.

INSTRUCTION FOR SECTION 19 - COMMAND APPROVAL

4TH REVIEW - The FOA Commander shall (to include the person designated Acting Commander in his absence) review the completed report, comment if required, sign, date, and forward the report to the FOA Safety and Occupational Health Office. Signature authority shall not be delegated.

Appendix E

Site Safety Meetings

Appendix F

Personnel Site Activity Log

Appendix G

Hazardous Material Inventory

HARZARDOUS MATERIAL INVENTORY SHEET

- Gasoline – less than 5 gallons
- Nitric Acid – less than 200 ml
- Hydrochloric Acid – less than 200 ml
- Isobutylene – approximately 1 liter



Comment / Response Form

Comments made by: Judy Strawhecker
Company: USACE

No	Section	Comments	Response
1	General Comment	Every SSHP must be a stand-alone document, following USACE's General Health and Safety Scope of Services. Only Base Wide SSHPs and a specific site's previous SSHP can be added, if the hazards and tasks are identical.	Pages have been numbered
2	1.0	Section 1.0, page 1, first paragraph: Chemical hazards must be identified specifically. They are not mentioned in the Base Wide SSHP.	QAPP reference added
3	1.0	Section 1.0, page 1, -second paragraph: The Base Wide SSHP was written by another company and I am aware you do not have a copy. You must address all requirements.	Due to the small size and simple tasks of this project, we determined one person would be able to safely handle these responsibilities. In addition, reference to site geologist was deleted. The PM will be a civil engineer.
4	3.0	Section 3.0, page 1: This section must address Physical, Chemical, and Biological Hazards. Specifically the chemicals of concern must be tabled also listed relevant TWA information. This will dictate the air monitoring and PPE requirements to be discussed later on.	A full site specific Safety and Health Plan for Landfills 3, 4, and 25 has been developed per direction from USACE.
5	3.1	Section 3.1, page 1: Justify the use of PID 11.2 eV lamp. Is it specific for the chemicals and their ionization potentials identified in for the LTM? Please elaborate.	No VOC hazard is anticipated for job activity. However, a PID meter will be used per Parallax SOP for well sampling.
6	3.1	Section 3.1, page 2, first paragraph: The USACE project IH can be mentioned in a general sense, do list my name specifically.	Comment noted.

No.	Section	Comments	Response
7		General comment: There needs to be a specific Air Monitoring Section, as well as a Personal Protection Equipment (PPE) Section.	See response to Comment 4. Appendix A of revised SSHP addresses this comment.
8		Section 4.6, page 5: The directions to the Hospital need to indicate the mileage and time it takes to reach the facility.	Hospital route map has been included in lieu of driving directions.
9		Section.1, page 5, seventh bullet: The specific chemicals brought on site should be discussed and their corresponding MSDSs should be included in an appendix in this document.	MSDS sheets included
10		SSHP Approval signature Page: A CIH must approve this plan prior to sending to USACE for review—also the USACE IH does not have a signature space.	Signature page has been included.

Comment / Response Form



Comments made by: Marc Anderson
Company: USACE

No	Section	Comments	Response
1	General	<p>In general, addending a SSHP from another site for current investigation activities is unacceptable because regulatory requirements, scope and objectives, corporate safety policy, site-specific conditions, and other factors vary. Addending a previous SSHP for Landfills 2, 4, and 5 for this LTM would be acceptable, as would addending the Basewide SSHP. Ensure that the health and safety requirements for HTRW work at Landfills 2, 4, and 5 identified in the scope of services are satisfied. Please contact the project industrial hygienist at Omaha District USACE or myself if needed.</p>	<p>Pages have been numbered.</p>
2	General	<p>This document does not satisfy the requirements for a health and safety plan as described in EM 385-1-1. Please correct deficiencies by adding the following information (I assume the base SSHP will satisfy general health and safety requirements such as medical surveillance, health and safety inspections, training, organizational responsibilities, etc.):</p> <ul style="list-style-type: none"> a) Contact number; b) Names of supervisory personnel (USACE contracting officer, project manager, project health and safety manager, site safety and health officer, etc.); c) On-site medical support and off-site medical arrangements, including point of contact for and directions to the off-site medical facility; d) Chemical hazards identification and description such as action levels, symptoms of exposure, historical detections, etc.; e) Physical and biological hazards identification and description, including OE, weather, and terrain; f) Work zones (draw on a map or describe in text); g) Emergency and accident notification procedures; 	<p>The Safety and Health Plan has be rewritten and these comments addressed in revised plan.</p>

		<ul style="list-style-type: none"> h) Approval signatures from the plan preparer, plan approver (a CIH), and plan concurrence reviewer; and i) User understanding and agreement signature page. 	
3		<p>Table 1: Please review for usability and sensibility and revise. For example,</p> <ul style="list-style-type: none"> a) Remove "K1." From the well sampling principal step. b) Under "Equipment To Be Used," be more specific than "groundwater sampling equipment." Identify specific items, such as gasoline pumps and hand tools and chemical preservatives, and their associated hazards c) Define when Drager tube monitoring would be necessary. d) Steel toe safety boots provide no protection against vapors from well casing. e) Define "standard Tyvek" 	<p>Due to the small size and simple tasks of this project, we determined one person would be able to safely handle these responsibilities. In addition, reference to site geologist was deleted. The PM will be a civil engineer.</p>