WORK PLAN FOR THE SITE ASSESSMENT PLAN ROADWAY EXPRESS, INC. 1708 WOOD STREET OAKLAND, ALAMEDA COUNTY, CALIFORNIA

MAY 2006

BMcD Project No. 42497
YRC WORLDWIDE ENTERPRISE SERVICES, INC.

Burns & McDonnell Engineering Company, Inc.
Engineers-Architects-Consultants
Kansas City, Missouri

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

(All figures follow text of the Work Plan)

LIST OF TABLES

LIST OF ACRONYMS AND ABBREVIATIONS

AETL	American Environmental Testing Laboratory, Inc.
bgs	Below ground surface
BTEX	Benzene, toluene, ethylbenzene, xylene
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
CEG	Certified Engineering Geologist
COC	Chain of custody
DOT	Department of Transportation
DPW	Department of Public Works
DRO	Diesel range organics
EPA	Environmental Protection Agency
ESL	Environmental Screening Levels
eV	Electron volt
FPH	Free phase hydrocarbons
FSM	Field Site Manager
FSP	Field Sampling Plan
GE	Geotechnical Engineer
GRO	Gasoline range organics
IDW	Investigation derived waste
IIPP	Injury and Illness Prevention Plan
MSL	Mean sea level
PID	Photoionization detector
Plan	Site Assessment Plan
PPE	Personal protective equipment
PRG	Preliminary Remediation Goals
QAPP	Quality Assurance Project Plan
QC	Quality control
RCE	Registered Civil Engineer
RG	Registered Geologist
SFRWQCB	San Francisco Regional Water Quality Control Board
SHSP	Site Health and Safety Plan
SA	Site Assessment
Site	Roadway Express, Inc., 1708 Wood Street; Oakland, California
TPH	Total petroleum hydrocarbons
USCS	United Soil Classification System
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tanks
VOC	Volatile organic compounds

YRCWYRC Worldwide Enterprise Services

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SIGNATURE PAGE

SIGNATURES OF ENVIRONMENTAL PROFESSIONALS

This plan has been prepared under the responsible charge of the Registered Civil Engineer identified below:

Danielle Starring, R.C.E. #C68651
Registered Civil Engineer

1.0 INTRODUCTION

This Site Assessment Plan (Plan) was prepared by Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) on behalf of YRC Worldwide Enterprise Services, Inc. (YRCW). The Plan will be implemented under the responsible charge of a California Registered Geologist (RG), Certified Engineering Geologist (CEG), Registered Civil Engineer (RCE), or a Registered Geotechnical Engineer (GE). The registered professional under whose charge the work will be completed shall supervise or personally conduct work associated with the project within the purview of the professional as defined in the Professional Engineers Act or Registered Geologists Act of the California Code of Regulations.

YRCW requested that Burns & McDonnell prepare this Plan and implement the activities described herein to investigate potential environmental impacts at the Roadway Express, Inc. truck terminal located at 1708 Wood Street, Oakland, CA (Site). The Site Assessment (SA) will consist of groundwater monitoring well sampling. Samples will be collected for laboratory analysis of volatile organic compounds (VOCs), oxygenates, and total petroleum hydrocarbons (TPHs). The data obtained during the SA will be used to establish current conditions of the groundwater beneath the Site. Figure 1 shows the location of the Site.

Burns & McDonnell has prepared the following project plans:

- Quality Assurance Project Plan (QAPP, Appendix A)
- Site Health and Safety Plan (SHSP, Appendix B)
- Injury and Illness Prevention Plan (IIPP, Appendix C)

This Plan includes all of the documents listed above.

1.1 PURPOSE AND OBJECTIVES

The primary objective of the SA is to evaluate the nature and extent of petroleum related constituents in the groundwater beneath the Site in accordance with requirements of the Alameda County Health Care Services, the San Francisco Bay Regional Water Quality Control Board (RWQCB), and the State Water Resources Control Board (SWRCB). Burns & McDonnell will compare the analytical results of the proposed groundwater samples to the historical soil and groundwater data collected at the Site to

determine if additional groundwater sampling is warranted.
This objective will be met by completing the following activities:

1. Incorporate results of background review/research including past activities at and in the vicinity of the Site.

2. Conduct SA activities to collect groundwater samples from three, existing on-Site groundwater monitoring wells.

3. Complete a SA Report for the Site, which summarizes data collected during the field activities and background research; provide interpretations/conclusions of the data; and recommend additional Site work, if necessary.

1.2 WORK PLAN ORGANIZATION

The remainder of the Plan is organized as follows:

Section 2.0 Provides a brief discussion of background information on the Site.

Section 3.0 Describes the SA scope of work including the field investigation approach, sample analysis, data validation, analytical data reduction, and map preparation. Groundwater sampling procedures to be followed during the field portion of the SA are described. Procedures for field tasks such as field screening, equipment decontamination, and sample packaging and shipping are also discussed in this section.

Section 4.0 Describes the SA Report that will be completed following the implementation of this Plan.

All figures and table follow the text of the Plan. The following appendices are included with this Plan:

Appendix A The QAPP outlines the strategy for meeting data quality objectives.

Appendices B & C The SHSP and IIPP describe the procedures to be followed during field

activities to protect the health and safety of field personnel.

1.3 SCHEDULE

The work described in this Plan will be completed pending approval from the Alameda County Health Care Services. If written approval is not received within 30 days from submittal of this Plan, Burns & McDonnell shall conduct the work described herein under presumptive approval. In any case, Burns & McDonnell will provide a minimum 72-hour advance notice to the Alameda County Health Care Services prior to initiating work on Site.

Questions or comments regarding this Plan shall be directed to:

Mr. Matt Cox
Burns & McDonnell Engineering Co., Inc.
9400 Ward Parkway
Kansas City, MO 64114
816-822-3299
mcox@burnsmcd.com

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2.0 SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

Roadway Express, Inc. (Site) is located at 1708 Wood Street in Oakland, California. The Site consists of a loading dock/warehouse and office (refer to Figure 2). The Site is completely fenced and guarded.

The Site is bordered by a residential park and ball field to the northeast; other surrounding properties are industrial. The Site is located within the Coast Ranges, approximately 1 mile east of the central east portion of the San Francisco Bay (Oakland Outer Harbor) at an elevation of approximately 10 feet above mean sea level (MSL). During historical drilling and soil sampling, Site geology was documented. Subsurface materials consisted of dark gray, very soft, moist clay to a depth of approximately 15 feet below ground surface (bgs) overlying approximately 10 feet of brown, soft, wet, silty sandy clay that extends from approximately 15 to at least 25 feet bgs; approximately 4 feet of brown, wet, silty clayey sand that extends from approximately 25 to 29 feet bgs; and a gray, very soft, wet clay of unknown thickness. The closest surface-water bodies to the Site are the Oakland Outer Harbor, located approximately 1 mile west of the Site, and the Oakland Inner Harbor, located approximately 1.75 miles south of the Site. Based on historical groundwater measurements, the elevation of the groundwater surface is expected to be approximately 5 feet bgs (5 feet MSL).

2.2 PREVIOUS INVESTIGATIONS/SAMPLING ACTIVITIES

The most recent investigation work completed at the Site was described in the *Additional Soil and Groundwater Investigation* report dated January 21, 2001 as prepared by One Environment of Long Beach, California for Roadway Express, Inc. of Akron, Ohio. This report concluded the following:

- Laboratory analysis of soil samples found no detectable amount of total petroleum hydrocarbons (TPH) – gasoline and diesel; benzene, toluene, ethylbenzene and xylene (BTEX), methyl tert-butyl ether (MTBE); and oil and grease.

- Laboratory analysis of groundwater found minor amounts of diesel contamination from monitoring wells MW-3, MW-4 and MW-5. The levels consisted of 65.9 micrograms per liter (µg/l), 65.7 µg/l and 78.8 µg/l of TPH-diesel respectively. No detectable amounts of TPH-g, BTEX, MTBE and oil and grease were present in any sample.

- The investigation did not determine the lateral extent of diesel contamination in the groundwater; however, the levels present appear to be minimal.

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3.0 FIELD SAMPLING PLAN

The proposed scope of work is presented in this section. Descriptions are provided for all standard tasks including the field investigation approach, sample analysis, and data reduction.

3.1 UTILITY CLEARANCE

Intrusive work is not anticipated at this time. Therefore, utility clearance is not necessary.

3.2 GROUNDWATER MONITORING WELL SAMPLING

Groundwater samples will be collected from existing on-Site groundwater monitoring wells. These include Monitoring Wells MW-3, MW-4 and MW-5 (refer to Figure 3). Collected samples will be analyzed for TPH-diesel, TPH-gasoline, MTBE, and oil and grease and held for analysis of semivolatile organic compounds (SVOC) and halogenated volatile organic compounds (VOC). If the TPH-diesel results exceed 100 milligrams per liter (mg/l) for any sample(s), the sample(s) will be analyzed for SVOCs and halogenated VOCs. Refer to Table 1 for a summary of these analytical methods and details regarding containers, preservation methods, etc.

Prior to collecting groundwater samples, the depth to the water table will be measured from the ground surface using a decontaminated, battery-operated, water-level indicator. The water level for each boring will be recorded in the field logbook.

The collection of groundwater samples from monitoring wells using this method will be accomplished in four general steps:

1. Determine the sustainable purge flow rate for the well;
2. Obtain a stabilized water level in the well;
3. Obtain stabilized water quality parameters; and
4. Collect groundwater samples.

Stabilization parameters will be collected with the use of a multiprobe meter and a flow-through cell. This will facilitate the collection of temperature, pH, specific conductance, ORP and DO data from each monitoring well sampled using a bladder pump. Turbidity will also be measured visually or with a meter. Following parameter stabilization, ferrous iron will be determined using a HACH colorimeter. During purging and sampling of each well, field parameters and water elevations will be recorded every five

minutes on the field groundwater sampling report along with the date, time and other pertinent sampling information. All data will be recorded on both the field groundwater sampling report and in the field logbook.

Monitoring wells will be purged using a low-flow methodology. Once field parameters stabilize over at least three consecutive readings while a stabilized water elevation is maintained, the final set of field parameters are recorded, a sample is collected for field ferrous iron determination, the flow-through cell is disconnected and samples for laboratory analysis are collected at a pump rate at or below the rate where water elevation stability was obtained. The pump rate will be reduced to 100 milliliters per minute (mL/min) when collecting samples for VOC analysis. Note: preserved 40-ml vials will be used for VOCs unless a reaction is noted between the acid and the water sample (gas bubbles form), and then non-preserved vials will be used and noted as such on the Chain-of-Custody (COC) form. A final water level after completion of sampling will also be recorded on the log sheet.

Each laboratory sample container will be labeled with the sample number, date, time of collection, type of preservative, and analyses to be performed. Once collected, each laboratory sample container will immediately be placed in an ice-filled cooler.

3.3 FIELD QUALITY CONTROL SAMPLES

One field duplicate or quality control (QC) sample will be collected for field and laboratory analysis for groundwater. This field duplicate sample will be used to evaluate the precision of the field sampling and laboratory analysis. The duplicate sample will be collected as splits of the original groundwater sample as described in Section 4.2.1. The duplicate sample for analysis will be labeled with a unique sample identification number so that the laboratory receives a blind replicate. One rinsate sample will be collected and submitted to the analytical laboratory for analysis of TPH-diesel and TPH-gasoline. In addition, a trip blank will be submitted to the analytical laboratory for analysis of VOCs, MTBE and TPH-gasoline.

3.4 SAMPLE CONTAINER PACKAGING AND SHIPPING

Sample packaging and shipping procedures are based on United States Department of Transportation (DOT) regulations (49 CFR Parts 172 and 173). Samples will be packed and shipped according to requirements for low hazard level samples.

The following steps will be used to pack low hazard samples:

1. Arrange decontaminated sample containers in groups by sample number.
2. Arrange containers in front of assigned coolers.
3. Affix appropriate and completed adhesive sample tag to each container.
4. Wrap each glass sample container with protective packing material.
5. Place packing material in bottom of cooler for cushioning.
6. Add ice packaged in double sealable, plastic bags on and around the containers, and fill remaining volume of cooler with packing material.
7. Sign COC form and indicate the time and date the cooler is relinquished to overnight courier or sealed. Record the time in the field logbook.
8. Separate copies of forms. Seal original (white) forms in large sealable plastic bag and tape to inside lid of cooler. Retain copies (yellow forms) for Burns & McDonnell files.
9. Tape cooler drain shut (if drain is present).
10. Close lid and latch cooler. Tape over joint between lid and body of cooler. Tape cooler shut on both ends, making several revolutions with strapping tape.
11. Place the contracted laboratory's address label on top of cooler.
12. Affix custody seals over cooler lid openings (front right and back left corners of cooler). Cover seals with clear plastic tape.
13. Maintain copies of all air-bills or receipts received from courier for each sample shipment. This will be the responsibility of the Field Site Manager (FSM).

In the late-afternoon, a COC record will be completed and enclosed in the sample cooler for shipment overnight to the analytical laboratory for analysis using methods outlined in Table 1. If overnight shipping problems are encountered, the samples will be placed in a cooler of ice and the temperature maintained at approximately 4 degrees Celsius (ºC). The samples would then be combined with the following day's shipment and the laboratory will be notified that samples may be near holding times upon receipt.

3.5 DECONTAMINATION PROCEDURES

All tools used for drilling and subsurface soil and groundwater sampling, including direct-push sampling equipment, will be decontaminated prior to advancing each boring. The following decontamination procedure will be used for sampling equipment:

1. Identify a source of potable water.
2. Fill a washtub to a depth of about 6 inches with potable water. Add approximately one tablespoon of Liquinox for each gallon of water.
3. Using the Liquinox solution scrub all sampling equipment using a stiff, long bristled brush until it is visibly clean. Rinse with distilled water. (Note: periodically inspect wash tub and decontamination water, and refresh when necessary as the decontamination water becomes dirty.)
4. Rinse equipment with isopropyl alcohol if necessary. If free phase hydrocarbons (FPH) are encountered, it may be necessary to use hexane or stronger solvent to clean equipment. Additionally, equipment may be scrubbed with a brush or towel while rinsing with a solvent. Once equipment is clean, rinse with distilled water.
5. After rinsing, place each piece of equipment on a clean sheet of plastic and allow to dry.

Decontamination water will be handled as described in Section 3.6.

3.6 MANAGEMENT OF INVESTIGATION DERIVED WASTE (IDW)

Decontamination and purge water generated from activities on the Site will be minimal, and will be discharged to the ground surface. All other IDW generated, including all personnel protective equipment (PPE), rope, bailers, paper towels, empty water bottles, etc., will be placed in trash bags. The trash bags will then be placed in the appropriate receptacle at the Site.

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4.0 SITE ASSESSMENT REPORT

Information collected during previous environmental investigations (see Section 2.2) will be used in conjunction with the SA data to determine the nature and extent (as practical) of contamination at the Site. Additionally, this data may be used to evaluate potential source control alternatives, if needed. Following completion of all field activities, Burns & McDonnell will complete a Site Assessment Report. The report will summarize data obtained to date and will include interpretations/conclusions regarding the need for additional Site work or monitoring, if needed. Data will be compared to the United States Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRG) and the RWQCB environmental screening levels (ESL). A discussion of source control alternatives may also be provided. A color photographic log of selected, significant field activities and investigation-pertinent information may also be included in the Site Assessment Report. If warranted, the Site Assessment Report may also serve jointly as the Remedial Action/Final Closure Report.

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5.0 REFERENCES

One Environment, *Additional Soil and Groundwater Investigation Report*, January 21, 2001.

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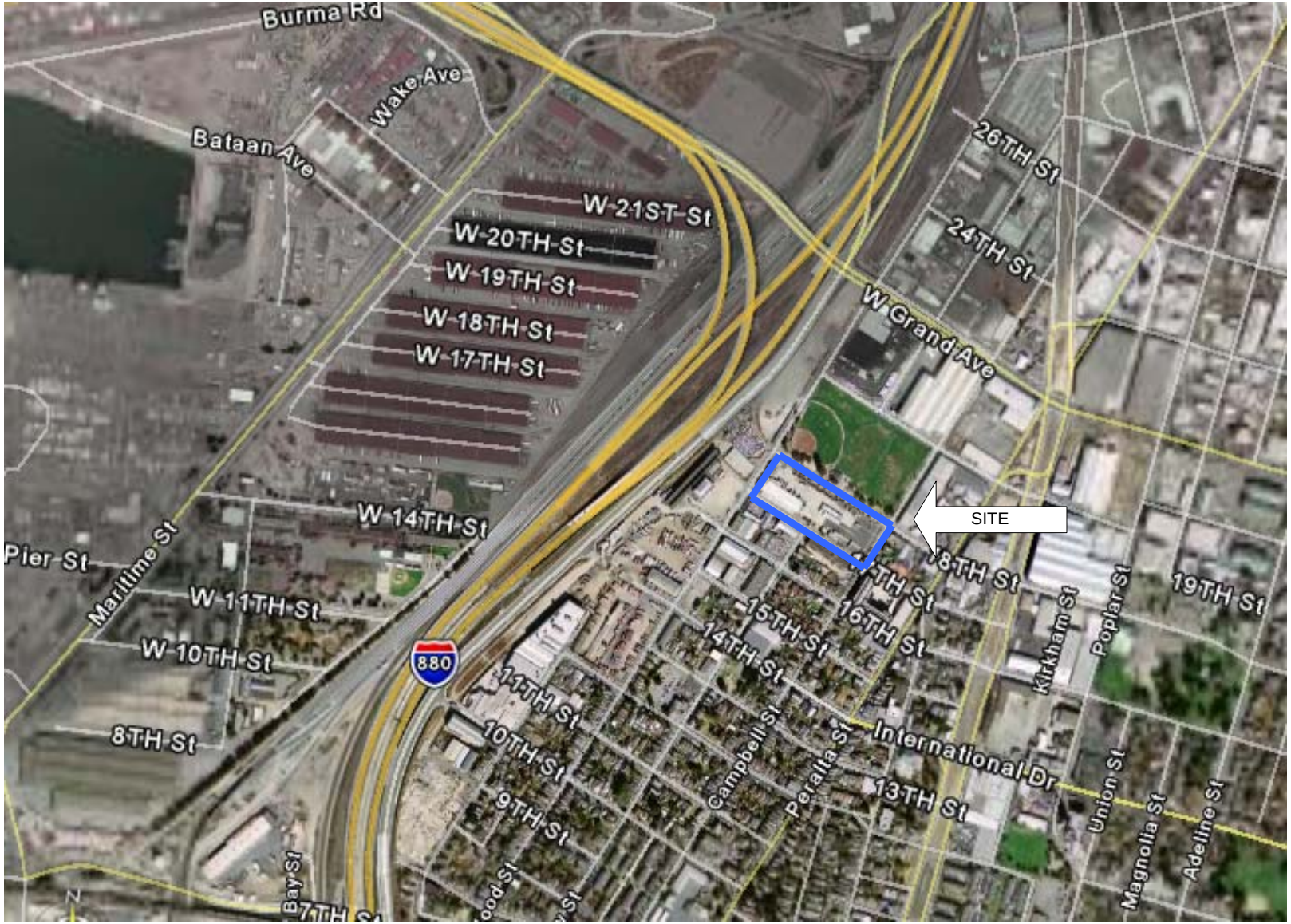
Figures



Source: Google Earth, 2006

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SINCE 1898

FIGURE 1
Site Vicinity Map
Roadway Express
1708 Wood St.; Oakland, CA

Source: Google Earth, 2006

1,320' 0 1,320' 2,640'

N
W E
S

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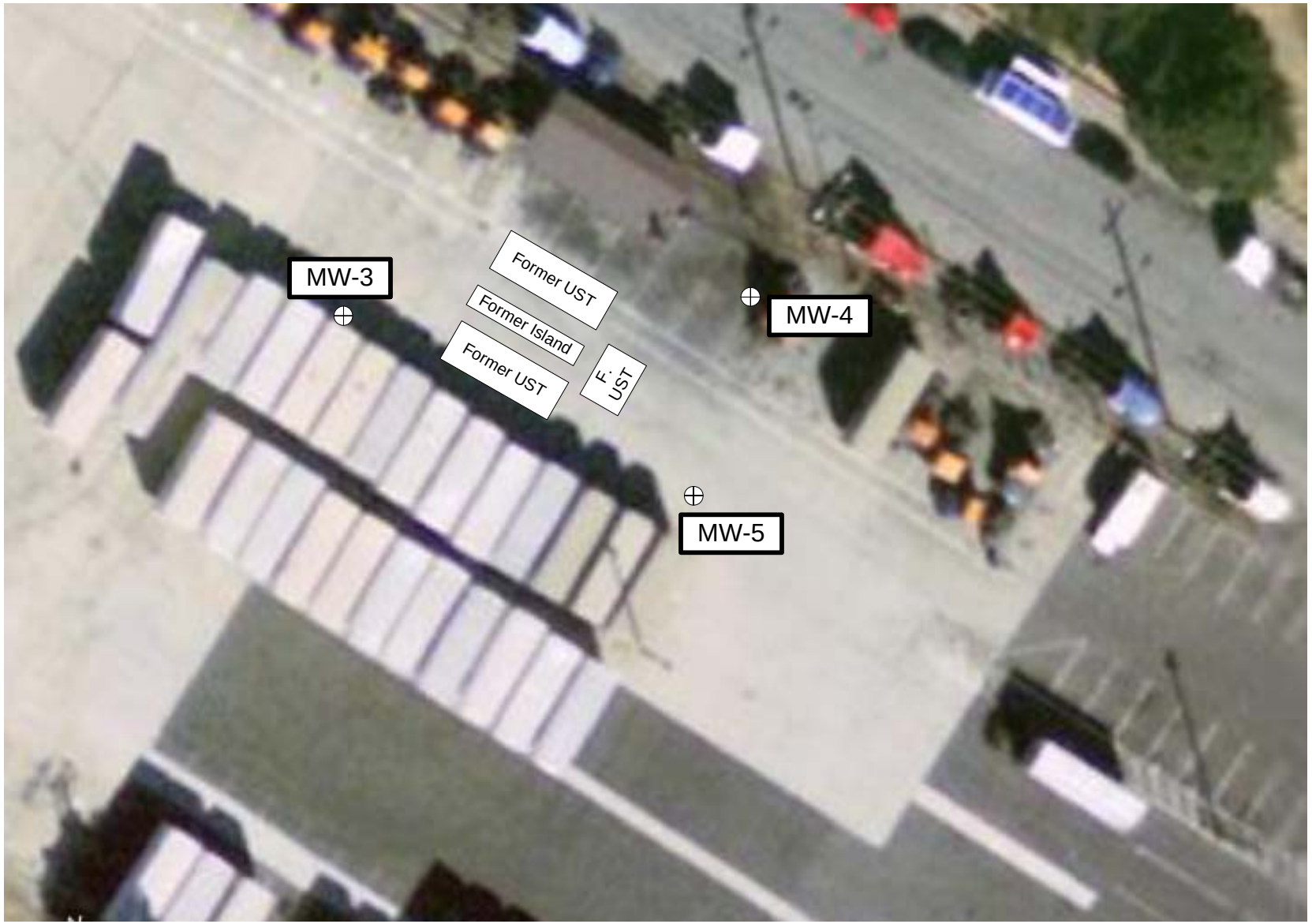
SINCE 1898

FIGURE 2
Site Map
Roadway Express
1708 Wood St.; Oakland, CA



Source: Google Earth, 2006

N
W E
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50' 0 50' 100'

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FIGURE 3
Former UST Area
Roadway Express
1708 Wood St.; Oakland, CA

Tables

Table 1
Analytical Methods, Holding Times, and Sample Containers for Soil Analyses
Site Investigation Work Plan
Roadway Express, Inc., 1708 Wood Street
Oakland, CA

Matrix	Parameter	Analytical Method	Sample Containers	Sample Preservation	Holding Times
Water	MTBE	8020	3 x 40-ml glass vials with Teflon lined septa in caps	Cool 4ºC, 4 drops HCL	14 days
	TPH-GRO	8015M	3 x 40-ml glass vials with Teflon lined septa in caps	Cool 4ºC, 2 drops HCL	14 days
	TPH-DRO	8015M	2 x 1 liter amber glass	Cool 4ºC	14 days for extraction 40 days for analysis
	Oil and Grease	1664	1x 1 liter amber glass	Cool 4ºC, 2 drops HCL	14 days for extraction 40 days for analysis
	SVOCs *	8270	2 x 1 liter amber glass	Cool 4ºC	7 days for extraction 40 days for analysis
	Halogneated VOCs *	8260B	3 x 40-ml glass vials with Teflon lined septa in caps	Cool 4ºC, 4 drops HCL	14 days

Detection limits for analyses may vary for individual samples due to sample conditions such as moisture content or matrix interference.
VOC - Volatile organic compound
TPH - Total petroleum hydrocarbon
GRO - Gasoline Range Organics
DRO - Diesel Range Organics
oz - ounce
mg/kg - Milligrams per kilogram
ml - Milliliter
mg/l - Micrograms per liter
* - Only if TPH-DRO > 100 mg/l

APPENDIX A

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN
FOR THE SITE ASSESSMENT PLAN
ROADWAY EXPRESS, INC.
1708 WOOD STREET
OAKLAND, CALIFORNIA

MAY 2006

BMcD Project No. 42497
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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF ACRONYMS AND ABBREVIATIONS

AETL	American Environmental Testing Laboratory, Inc.
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
CLP	Contract Laboratory Program
DQO	Data Quality Objective
DQORRA	Data Quality Objectives for Remedial Response Activities
EPA	United States Environmental Protection Agency
FSM	Field Site Manager
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PID	Photoionization detector
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
REC	Percent Recovery
RPD	Relative Percent Difference
SA	Site Assessment
TPHs	Total petroleum hydrocarbons
VOCs	Volatile organic compound
WP	Work Plan
YRCW	YRC Enterprise Services

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1.0 INTRODUCTION

1.1 PURPOSE

A Site Assessment (SA) is planned to assess potential impact from volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPHs) in the soil at Roadway Express, Inc , 1708 Wood Street, Oakland, California for the YRC Worldwide Enterprise Services, Inc. (YRCW). This Quality Assurance Project Plan (QAPP) presents the objectives and specific quality assurance (QA) and quality control (QC) activities designed to achieve data quality goals.

1.2 SCOPE

The scope of this document is based on the United States Environmental Protection Agency (EPA) guidance from Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, February 1983, Office of Monitoring Systems and Quality Assurance, ORD, EPA, QAMS-005/80. Subsequent chapters of this QAPP are as follows:

Section 2.0	Project Description
Section 3 0	Project Organization and Responsibilities
Section 4.0	Quality Assurance Objectives
Section 5.0	Sampling Procedures
Section 6.0	Sample Custody
Section 7.0	Calibration Procedures and Frequency
Section 8.0	Analytical Procedures
Section 9 0	Data Validation, Reduction, and Evaluation
Section 10 0	Internal Quality Control Checks
Section 11.0	Performance and System Audits
Section 12.0	Preventative Maintenance
Section 13.0	Assessment of Data Precision, Accuracy, and Completeness
Section 14.0	Corrective Action
Section 15 0	Quality Assurance Reports

The QAPP references information that has already been presented in the Work Plan (WP). A QAPP prepared and submitted by the off-site analytical laboratory is also referenced for laboratory-specific information to avoid unnecessary duplication. At a minimum, the QAPP provided by the laboratory will address the following items as they specifically pertain to this project:

- Sample storage procedures and storage times
- Sample preparation methods
- Analytical procedures (conforming to references above)

    - Scope and application of the procedures
    - Sample matrix
    - Potential interferences
    - Precision and accuracy of the methodology
    - Method detection/quantitation limits

- Calibration procedures and frequency
- Data reduction, validation, and reporting
- Internal quality control checks
- Preventive maintenance procedures, schedules, and critical spare parts list
- Corrective action
- Sample turnaround time

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2.0 PROJECT DESCRIPTION

As requested by YRCW, Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) will conduct a SA at the Site A description of the project is presented in the main text of the WP.

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3.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

SA activities will be managed by Burns & McDonnell. Key project personnel and other parties involved with this project are outlined in this section.

3.1 YRCW ENTERPRISE SERVICES (YRCW)

YRCW is the owner and occupant of the Site. Mr. Ruben Byerley is the designated Project Manager for YRCW. All documents and questions for YRCW shall be directed to Mr. Byerley.

3.2 BURNS & MCDONNELL ENGINEERING COMPANY, INC. (Burns & McDonnell)

Burns & McDonnell of Kansas City, Missouri, has been retained by YRCW to perform the SA activities at the Site. Key project personnel are presented herein.

Mr. Matt Cox will serve as Project Director/Manager, with the responsibility of carrying the Site Assessment through to completion, and will be responsible to YRCW for all Burns & McDonnell project-related activities.

Mr. Mitch Monroe will manage the field activities proposed as part of this project. As the Field Site Manager (FSM), Mr. Monroe will have direct responsibility for Site-specific activities and decisions regarding the immediate safety of investigation personnel. Mr. Monroe will report to the Project Manager.

Mr. Eric Wenger will serve as the Burns & McDonnell Health and Safety Officer and will be responsible for the health and safety of Burns & McDonnell's personnel.

Ms. Sharon Shelton shall serve as the QA/QC Officer, overseeing activities involving sampling, laboratory analyses, and audits of performance so that the data quality objectives (DQOs) are met.

3.3 ANALYTICAL LABORATORIES

American Environmental Testing Laboratory Inc. (AETL) of Burbank, California (a California-certified laboratory) or other approved vendor will perform analytical testing. Laboratory analytical testing for sediment and groundwater samples will be in accordance with EPA methodology. The laboratory will be responsible for all chemical sample analyses, data validation, and data reduction.

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4.0 QUALITY ASSURANCE OBJECTIVES

The principal objective of the QAPP is to maintain the quality of operational activities in the field and laboratory. This objective includes documentation of data quality through established review and audit procedures so that all data and resulting decisions are technically sound.

4.1 MEASUREMENT OBJECTIVES

All measurements will be made to yield consistent results that are representative of the media and conditions measured. Data will be reported in consistent units to allow data to be easily compared Samples to be taken during the SI are discussed in the WP.

4.2 METHOD DETECTION/QUANTITATION LIMITS

To provide laboratory analytical data necessary to meet the objectives of the SI, approved EPA methods provided in Table 3-1 of the WP will be used for analyses. Actual detection/quantitation limits for a specific sample will depend on the amounts and types of compounds present in the sample The EPA methods for laboratory analyses of contaminants of concern are provided in Table 1 of the WP. A significant concentration of the contaminant of concern may require that the sample be diluted, which in turn increases detection/quantitation limits accordingly.

4.3 QUALITY CONTROL PARAMETERS

To monitor progress towards achievement of the data quality objectives for the analytical laboratory, the following QC parameters will be assessed: precision, accuracy, representativeness, completeness, and comparability (PARCC).

4.3.1 Precision and Accuracy

Precision and accuracy are quantitative measures of the reproducibility of the analytical results and of the bias of a specific measurement method, respectively. Equations for evaluating precision and accuracy are presented in Section 13.0 of this QAPP.

Precision is expressed in terms of standard deviation or relative percent difference (RPD) and is assessed by evaluating duplicate sample results. Method blanks and calibration standards will be used to determine calibration stability and analytical method accuracy of the laboratory analysis. Field duplicates will be collected to evaluate the overall precision of field sampling, field screening methods, and laboratory analytical methods.

Accuracy is expressed in terms of percent recovery (REC) and measures the degree of agreement between a measurement and its true value. Accuracy is assessed by evaluating spike sample recoveries (i.e., surrogate and matrix spike samples) and blank results (i.e., laboratory, rinsate, and trip blanks).

4.3.2 Representativeness

Representativeness qualitatively expresses the degree to which sample analytical results accurately and precisely represent Site conditions. Representativeness is further addressed by explaining the rationale used to select sampling locations and analytical parameters. The WP describes the sampling approach and rationale established to obtain data that is representative.

The representativeness of the data will be evaluated by the following:

- Discussing major deviations from WP protocol and potential impact on results.
- Qualifying data to indicate problems encountered with precision or accuracy (see Subsection 4.3.1). Data identified as nonrepresentative (i.e., qualified as unusable from precision and accuracy QC results) will not be used to characterize the Site.
- Performing additional sampling when necessary to characterize Site conditions.

4.3.3 Completeness

Completeness defines the percentage of completed measurements that are judged to be valid. Sufficient amounts of valid data must be generated to make technical decisions. Field completeness is assessed by comparing the number of samples collected to the number of samples planned for collection in the WP. Laboratory completeness is assessed by comparing the number of samples with valid data to the number submitted for chemical analysis. Overall completeness is assessed by comparing the number of samples having valid laboratory data to the number of samples planned for collection in the WP. Equations for evaluating completeness are presented in Section 13.0 of this QAPP. Overall completeness objectives are 90 percent for groundwater and soil samples.

4.3.4 Comparability

Comparability qualitatively expresses how data developed during the SA compares with applicable criteria and with data available from other scientific studies of the Site. Data collected during this SI can be considered comparable to other data collected following the sampling procedures outlined in the WP and analyzed using EPA methods.

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5.0 SAMPLING PROCEDURES

Sampling rationale and procedures are presented in the WP

5.1 SAMPLING PROGRAM

The following elements of the sampling program are presented in Section 4.0 of the WP:

- Proposed sampling locations
- Sample types
- Analytical methods
- Number of samples
- Proposed sampling locations

5.2 SAMPLE COLLECTION, PRESERVATION, SHIPPING, AND STORAGE

Sample collection, preservation, packaging, shipping, and decontamination procedures are presented in Section 4 of the WP.

All sample bottles are to be supplied through a qualified sample bottle supplier or laboratory. All containers used for sample collection will be pre-cleaned. Each lot of sample containers is to be checked for cleanliness and integrity by the laboratory

5.3 DECONTAMINATION PROCEDURES

All direct push sampling tools will be decontaminated before and after each sampling or field measurement event to prevent sample cross-contamination. Specific decontamination procedures for sampling equipment are presented in Section 4.0 of the WP.

5.4 DOCUMENTATION PROCEDURES

Required documentation procedures for the field activities are presented in Section 3.0 of the WP.

5.5 CHANGES IN SAMPLING PROCEDURES

Actual field conditions may require a change in the sampling procedure or modifications to sample analytical requirements. Prior approval of the YRCW Project Manager is needed to revise the sampling

program. No revisions shall be made that would reduce or increase the number of samples taken or delete from or add to the analytical parameters specified without notification to YRCW.

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6.0 SAMPLE CUSTODY

6.1 FIELD SAMPLE CUSTODY

Required custody documentation for all field samples is presented in Section 4.0 of the WP.

6.2 LABORATORY SAMPLE CUSTODY

Laboratory custody procedures will conform to those presented in the laboratory's QAPP. These procedures must include the following as a minimum:

- Designation of a sample custodian authorized to sign for incoming field samples, including verification of data entered on Chain-of-Custody records in the field
- Custodian procedures for completing the Chain-of-Custody record, sample label, and laboratory request sheet (including documentation of sample condition upon receipt)
- Documentation of processing steps through use of a laboratory sample custody log consisting of serially numbered standard laboratory sheets
- Sample custody procedures to provide conformity in sample handling, storage, and disbursement for analyses
- Separate documentation to identify all laboratory quality control samples specific to each batch of samples
- Proper data logging and documentation procedures including maintaining custody of all original laboratory records.

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7.0 CALIBRATION PROCEDURES AND FREQUENCY

7.1 FIELD EQUIPMENT CALIBRATION PROCEDURES AND FREQUENCY

All field sampling equipment, pH/temperature/conductivity probes, photoionization detector (PID), and oxygen/explosive gas meter will be calibrated using known standards supplied by the manufacturer. At a minimum, calibration standards will be analyzed at the beginning of each day and approximately every 4 hours. No other type of field equipment is planned for use on this project

7.2 LABORATORY EQUIPMENT CALIBRATION PROCEDURES AND FREQUENCY

All laboratory equipment calibration procedures and frequencies will be documented in the laboratory's QAPP. These procedures, at a minimum, shall conform to the requirements of the analytical methods to be used in this investigation

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8.0 ANALYTICAL PROCEDURES

8.1 FIELD SCREENING ANALYTICAL PROCEDURES

The field screening methods will achieve QA/QC objectives for all chemical analyses on environmental samples according to standard industry practices.

8.2 LABORATORY ANALYTICAL PROCEDURES

The contracted analytical laboratory will achieve QA/QC objectives for all chemical analyses on environmental samples according to the methods outlined in Section 4.2.

* * * * *

9.0 DATA VALIDATION, REDUCTION, AND EVALUATION

Analytical data collected during SI activities and field analyzed or sent to an off-site analytical laboratory will be used to characterize the conditions on-site. To satisfy this use, the laboratory analytical data collected during the SI will meet at least Level III requirements as defined in EPA publication Data Quality Objectives for Remedial Response Activities, 1987 (DQORRA). Level III is defined in this document as "... analyses performed in an off-site analytical laboratory ...using EPA procedures other than CLP" [Contract Laboratory Program] and is typically accepted as those methods found in SW-846 Level III data are further defined in DQORRA as valid for use in the following:

- Risk assessment
- Site characterization
- Evaluation of alternatives (including engineering design)
- Monitoring during implementation

To provide the proper level of confidence in SI data, it is critical that only valid data are used This section presents the specific review procedures that will be used.

9.1 DATA VALIDATION

Data validation procedures determine whether individual project data are usable, usable with qualifications, or unusable. Guidelines for performing validation of organic analytical data are provided in EPA's National Functional Guidelines for Organic Data Review, 1991 Burns & McDonnell personnel will follow this guideline when validating organic analytical data for the following parameters:

- Holding times
- Blanks
- Surrogate spikes
- Matrix spike/matrix spike duplicates
- Quantitation limits

9.2 DATA REDUCTION

Analytical data generated through the SI activities will be compiled and organized into a database for use in developing the SI report. Raw data will be summarized in tables in the report and included as an

appendix All field logbooks, documentation forms, calculation worksheets, etc used for the SI will become a part of the record file.

9.3 DATA EVALUATION

The physical and chemical data generated during the SI will be evaluated, interpreted, and summarized in a brief letter report at the completion of the project.

* * * * *

10.0 INTERNAL QUALITY CONTROL CHECKS

10.1 FIELD INTERNAL QUALITY CONTROL CHECKS OF ANALYTICAL DATA

To monitor sampling proficiency and laboratory performance, QC samples will be submitted with the samples collected in the field for off-site laboratory analysis. Field screening results will also be compared to laboratory analytical results for comparability. Duplicate samples will be submitted for laboratory analysis. The laboratory sample results may provide an adequate database for evaluation of laboratory analytical data. The number and types of these samples to be prepared and analyzed at a laboratory are presented in the WP. The following subsections describe each of QA/QC samples to be prepared and submitted by field personnel.

10.1.1 Duplicate Samples

Duplicate (or replicated) samples, when collected, processed, and analyzed by the same organization, provide precision information for the entire measurement system including sample acquisition, homogeneity, handling, preparation, and analysis. Duplicate samples will be collected for the laboratory analytical portion of this project. Duplicate samples will be analyzed after every 20 samples or one per project, if less than 20 total samples

10.2 LABORATORY INTERNAL QUALITY CONTROL CHECKS

For EPA Methods proposed for this SI, the laboratory prepares and analyzes a variety of QA/QC check samples including matrix spikes (MS), matrix spike duplicates (MSD), laboratory control samples (LCS), and laboratory control sample duplicates (LCSD). Trip blanks are also prepared for analysis of volatile organic compounds (VOCs) and total petroleum hydrocarbons – as gasoline (TPH-GRO). The check samples are included in analytical batches as a means of assessing data quality for validation purposes and to assist in monitoring the performance of the method. Additional check samples may be included in the sample stream at the discretion of the QA Manager or when necessary to obtain statistical data for overall laboratory performance evaluations or revision of DQO. The specific procedures for preparation, treatment, and frequency of check samples will vary depending upon the method employed.

10.2.1 Matrix Spikes

Matrix spikes are included with every batch of samples and are used to assess the ability of the method to recover a known quantity of analyte from a real-world sample matrix.

10.2.2 Duplicates

Duplicate (or replicated) sampling/analysis is performed by collecting two samples from a single sample point, then analyzing both samples for the same analytical parameters. One sample is referred to as the original and the other is the duplicate sample. Duplicate samples, when collected, processed, and analyzed by the same organization, provide intra-laboratory precision information for the entire measurement system including sample acquisition, homogeneity, handling, shipping, storage, preparation, and analysis. Duplicate samples will be collected for matrix spikes and laboratory control samples for every batch of samples analyzed.

10.2.3 Laboratory Control Samples

Laboratory reference control samples are included with every analytical batch along with the rest of the check samples and are used to monitor the accuracy (in terms of bias) of the method. Reference samples are used to check the overall ability of the method to produce results within acceptable ranges of true or referenced values. The frequency of their analyses is dictated by the EPA Methods

* * * * *

11.0 PERFORMANCE AND SYSTEM AUDITS

11.1 FIELD PERFORMANCE AND SYSTEM AUDITS

The QA/QC Officer may schedule audits of field activities at various times to evaluate the execution of sample identification, sample control, chain-of-custody procedures, field documentation, and sampling and field measurement operations. Audits are scheduled with the FSM. The audit will include evaluation of whether field operations follow applicable procedures defined in the WP

The person conducting the audit, if performed, would be a senior technical reviewer familiar with technical, procedural, and quality control requirements governing field sampling. The auditor keeps a record of the evaluation using field notes and checklists. Following the audit, the auditor reviews preliminary results with the person in charge of the sampling. The auditor also prepares an audit report containing the results of the evaluation and recommendations for corrective actions

11.2 LABORATORY PERFORMANCE AND SYSTEM AUDITS

The laboratory periodically performs its own performance and system audits The schedule for those audits will be included in the laboratory's QAPP. These audits are performed to assure performance of SW-846 methods as specified under EPA protocol.

The laboratory services contract will require that the laboratory provide access to YRCW and EPA for the purpose of auditing their sample analysis procedures. This clause also states that the laboratory will perform analyses of a reasonable number of audit samples to verify the accuracy of its testing process.

* * * * *

12.0 PREVENTIVE MAINTENANCE

12.1 FIELD EQUIPMENT PREVENTIVE MAINTENANCE

Preventive maintenance of equipment is essential if project resources are to be used in a cost-effective manner. Preventive maintenance will occur as follows to minimize downtime and ensure accuracy of measurement systems:

- A schedule of preventive maintenance activities will be maintained
- Critical spare parts, backup systems, and equipment will be available.

Contract agreements with firms providing services will specify that any and all equipment used during the SI will be maintained in safe working order. Any equipment or device determined not to be in safe working order by Burns & McDonnell field personnel or the Health and Safety Officer will be replaced, repaired, or corrected at the subcontractor's expense.

12.2 LABORATORY EQUIPMENT PREVENTIVE MAINTENANCE

Preventive maintenance of laboratory equipment is performed according to equipment specifications. Complete details concerning preventive maintenance will be presented in the laboratory's QAPP.

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13.0 ASSESSMENT OF DATA PRECISION, ACCURACY, AND COMPLETENESS

PARCC parameters are indicators of data quality. Burns & McDonnell personnel will review the calculated accuracy results as reported by the laboratory for method analytical QC samples.

13.1 ACCURACY

Accuracy measures the bias of a measurement system. Sources of error introduced into the measurement system will be accounted for by evaluating spike sample recoveries (i.e., surrogate and matrix spike samples) and blank results (i.e., laboratory and trip blanks). Possible sources of error include the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analytical techniques

For spike samples, accuracy is expressed in terms of REC. The recovery is determined by splitting a sample into two portions, spiking one of the portions (adding a known quantity of the constituent of interest), and submitting both portions for laboratory analyses as independent samples. The REC is then calculated as follows:

$$REC = \frac{SSR \times SR}{SA} \times 100$$

Where: SSR = Spike Sample Results
SR = Sample Results
SA = Spike Added

Perfect accuracy would be defined by 100 percent recovery. Burns & McDonnell personnel will review laboratory QC results for spike samples (i.e., matrix spike samples and surrogates)

SW-846 protocol contains accuracy limits for QC sample measurements (i.e , REC maximum and minimum values). QC sample results will be reviewed to determine if data are acceptable for reporting Site conditions. Sample results reported in the VCI report will be qualified to indicate any problems encountered with QC measurements. For example, if a spike REC is low for a QC sample, field sample results associated with that spike sample will be qualified as estimated to indicate problems encountered in

quantifying results. SW-846 QC limits also specify levels beyond those where data becomes unacceptable or unusable. Results qualified as unusable will not be used to characterize Site conditions.

QC procedures for field measurements consist of calibrating instruments (where appropriate) for accuracy.

13.2 COMPLETENESS

Overall completeness (defined in Subsection 4.3.3) is calculated following data reduction and data validation. Percent completeness is calculated as follows:

$$Overall\ Completeness = \frac{Number\ of\ Samples\ Having\ Valid\ Data}{Number\ of\ Samples\ Planned} \times 100$$

* * * * *

14.0 QUALITY ASSURANCE REPORTS

A QA/QC report will be included as part of the QAPP report. The QA/QC report will include the results of the performance and document audits and any necessary corrective action procedures. A data quality assessment will be incorporated into the QA/QC report.

* * * * *

APPENDIX B

Site Health and Safety Plan

SITE HEALTH AND SAFETY PLAN
FOR THE SITE ASSESSMENT PLAN
ROADWAY EXPRESS, INC. SITE
1708 WOOD STREET
OAKLAND, CALIFORNIA

MAY 2006

BMcD Project No. 42497
YRC WORLDWIDE ENTERPRISE SERVICES, INC.

Burns & McDonnell Engineering Company, Inc.
Engineers-Architects-Consultants
Kansas City, Missouri

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

APPENDICES

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
ANSI	American National Standards Institute
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc
°C	Celsius
CFR	Code of Federal Regulations
CGI	Combustible gas indicator
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary resuscitation
DRO	Diesel range organics
EMS	Emergency medical services
°F	Fahrenheit
FID	Flame-ionization detector
FSM	Field Site Manager
GPS	Global positioning system
GRO	Gasoline range organics
HAZCOM	Hazard Communication
HAZWOPER	Hazardous Waste Operations
hr	Hour
kV	Kilovolt
LEL	Lower explosive limit
min	Minute
mph	Miles per hour
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NIOSH	National Institute for Occupational Safety and Health
O_2	Oxygen
OSHA	Occupational Safety and Health Administration
PAH	Polynuclear aromatic hydrocarbon
PEL	Permissible exposure limit
PHSM	Project Health & Safety Manager
PID	Photoionization detector
PM	Project manager
PPE	Personal protective equipment
ppm	Parts per million
SCBA	Self-contained breathing apparatus
SHSP	Health & Safety Plan
SHSS	Site Health & Safety Supervisor
SA	Site Assessment
SOP	Standard operating procedure
TLVs	Threshold limit values
TPHs	Total petroleum hydrocarbons
Tyvek	Chemical Resistant Clothing
VOCs	Volatile organic compounds
YRCW	YRCW Enterprise Services

TABLE 1
SITE AIR MONITORING SUMMARY

Area of Interest or Site Activity	Potential Chemical Hazard	Initial Level of PPE	Monitoring Equipment
Direct-push Sampling	VOCs and TPHs	Level D	PID with 10.6 eV lamp CGI

* * * * *

EMERGENCY INFORMATION

Site Emergencies Call:

Ambulance **911**

Fire: **911**

Police: **911**

Poison Control Center: **CA: 1-800-222-1222**

National Response Center: **1-800-424-8802**

Spills:
USEPA 913-281-0991
YRCW 913-344-3615 (Steve Shinners)
YRCW 913-344-3644 (Ruben Byerley)

Hospital **(310) 668-5105**

Highland General Hospital
1411 East 31st Street
Oakland, CA 94602

Directions Miles

The hospital is located along the I-580 freeway. The hospital is conveniently reached from the Park Boulevard exit when traveling east (towards Hayward) on I-580

1. Head northwest from Wood Street – go 0.2 miles
2. Turn right at 20th Street – go 0.2 miles
3. Turn left at 21st Street – go 200 feet
4. Turn left at Mandela Parkway – go 0.1 miles
5. Turn right at Grand Avenue – go 1.3 miles
6. Continue on Grand Avenue – go 1 0 mile
7. Bear right and head toward MacArthur Blvd – go 0.1 miles
8. Take the I-580 East ramp to Hayward/Stockton – go 0 6 miles
9. Take the exit to Park Blvd – go 0.2 miles
10. Continue on McArthur Blvd – go 0.3 miles
11. Turn right at Stuart Street – go 0 2 miles
12. Turn left at East 31st Street – go 100 feet.

Approximate travel time is 10 minutes.

EMERGENCY ASSEMBLY LOCATION: The emergency assembly location on 31st Street.

FIRST AID MEASURES

In the event that personnel exhibit symptoms of exposure, the following procedures will be used:

Eye Contact: Flush eye immediately with copious amount of water for a minimum of 15 minutes Repeat until irritation is eliminated and seek medical attention.

Skin Contact: Wash exposed area with soap and water for at least 15 minutes If dermatitis or severe reddening occurs, seek medical attention.

Inhalation: Move the person into fresh air. If symptoms persist, seek medical attention.

Ingestion: Do not induce vomiting Seek immediate medical attention

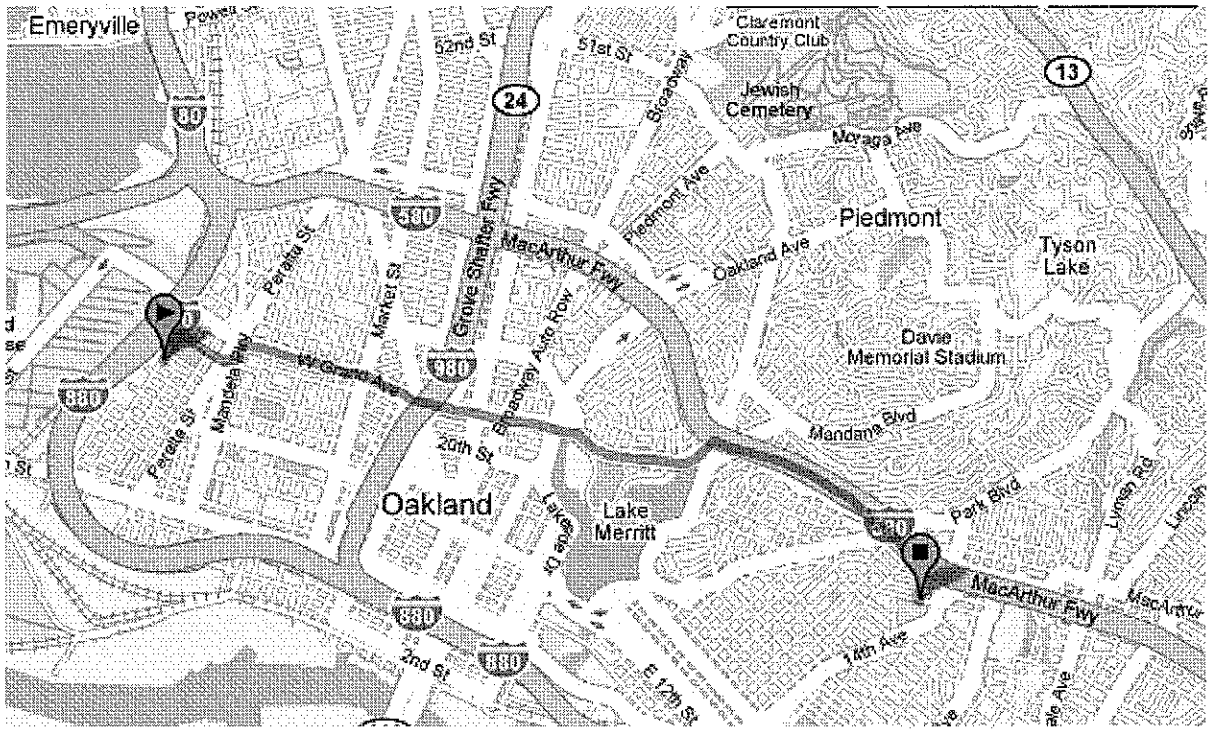
Important Numbers:

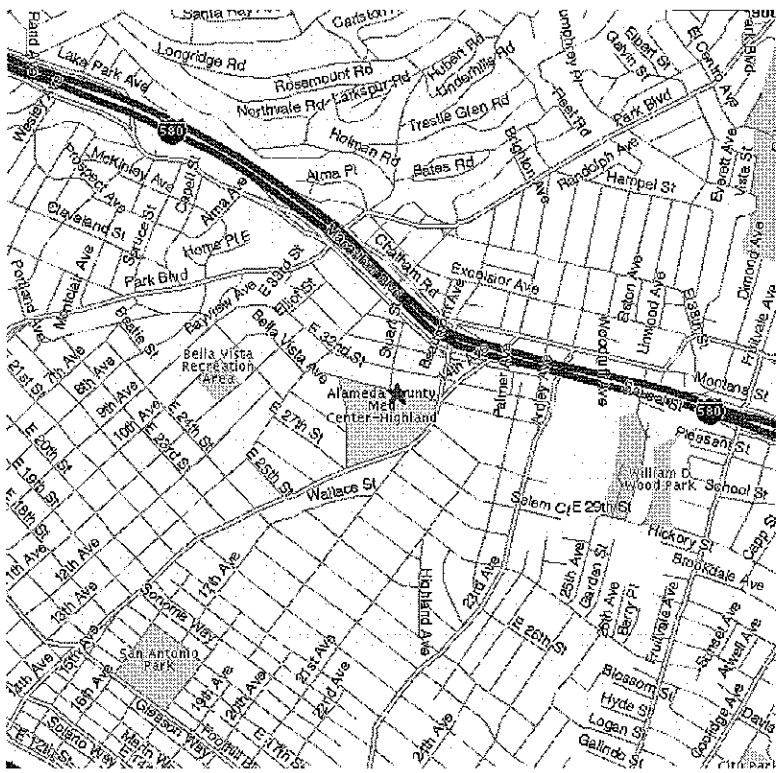
Project Manager:	Mr. Matt Cox	(816) 822-3299
Field Site Manager	Mr. Mitch Monroe	(650) 871-2926, ext. 250
Site Health & Safety Supervisor	Mr. Mitch Monroe	(650) 871-2926, ext. 250
Project Health & Safety Manager	Mr. Eric Wenger	(816) 822-3894
Safety Equipment for Burns & McDonnell	Mr. Greg Nieman	(816) 822-3488

* * * * *

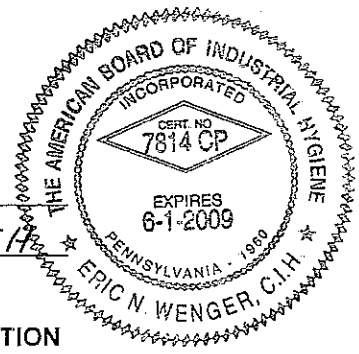
FIGURE 1

EMERGENCY MEDICAL ROUTE TO HOSPITAL





Project Name:	Roadway Express
Project Number:	42497
Location:	1708 Wood Street, Oakland, CA
Date Plan Approved:	May 26, 2006
Reviewer's Signature:	Eric Wenger, CIH



1.0 -- INTRODUCTION

1.1 GENERAL

This Site Health and Safety Plan (SHSP) has been prepared by Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) for the activities associated with the Site Assessment (SA) at the Roadway Express, Inc. (Site) for YRCW Enterprise Services (YRCW).

The health and safety protocols established in this plan are based on Burns & McDonnell *Corporate Health and Safety Policy and Procedures for Hazardous and Special Waste Operations*, Section B, Burns & McDonnell Corporate *Health and Safety Policy and Procedure Manual,* past field experiences, specific site conditions, and chemical hazards known or anticipated to be present from available site data. The following SHSP is intended solely for use during the proposed activities described in the project documents and technical specifications. Specifications herein are subject to review and revision based on actual conditions encountered in the field during site characterization activities. Such changes may be instituted by using the SHSP Field Amendment Form (see Appendix B).

Before site operations begin, all employees, including subcontractors for Burns & McDonnell covered by this plan, involved in these operations will have read and understood this SHSP and all revisions. Before work begins, all affected environmental workers will sign the Agreement and Acknowledgment Form (see Appendix B).

1.2 SITE HISTORY

The Site history is described in Section 2.0 of the Work Plan.

1.3 SCOPE

The objective of the SA is to define the extent of soil and groundwater contamination at the Site from former manufactured gas plant operations. Specific compounds that are suspected at the Site include

volatile organic compounds (VOCs), total petroleum hydrocarbons (TPHs), and fuel oxygenates. Field activities will include: soil and groundwater sampling using the direct-push techniques.

1.4 SUBCONTRACTOR ACTIVITIES

Future work may include a drilling/probing subcontractor who will advance soil borings at the Site using a truck-mounted rig. Subsurface soil samples would be collected from each soil boring to characterize Site conditions.

* * * * *

2.0 -- PROJECT ORGANIZATION

Key participants for this project include the Site Health and Safety Supervisor (SHSS), Field Site Manager (FSM), Project Manager/Coordinator (PM), and the Project Health and Safety Manager (PHSM). The SHSS, project team members, subcontractors, and visitors will be under the direct supervision of the Burns & McDonnell FSM (or designated representative) who will report to the PM. Individuals are identified by their titles in the Emergency Information section of this plan

2.1 SITE HEALTH AND SAFETY SUPERVISOR (SHSS)

The SHSS will establish a full-time Site presence for the purpose of overseeing Burns & McDonnell personnel on the Site. The SHSS has the authority to implement and enforce the Site Health and Safety Plan. The SHSS will report to the Field Site Manager on matters concerning the health and safety of employees and/or public. The SHSS may be required to serve as the backup on-scene incident commander in emergency situations. The SHSS should be consulted before any changes in procedures or protective clothing are made. The responsibilities of the SHSS at the Site include the following:

- The SHSS is to be trained and certified in the Hazardous Waste Operations and Emergency Response (HAZWOPER) 8-hour Supervisor Training, First Aid, cardiopulmonary resuscitation (CPR) and bloodborne pathogens, heat related illnesses and cold stress conditions, and Respiratory Protection Training.

- Conducting regular (at least weekly) safety meetings for Site personnel and subcontractors and summarize the training in the field logbooks. The following topics must be covered during safety meetings:

  - Hazard Communication [HAZCOM, i.e., Material Safety Data Sheet (MSDS) location, and container labeling, chemical hazards of non-routine tasks].

  - Determine applicability of Standard Operating Procedures (SOP) in Chapter 8 and communicate procedures

  - Review emergency Hand Signals (Section 9.6).

  - Give refresher training on heat or cold stress (Section 5.2 and 5.3) when appropriate.
  - Review Site emergency procedures.

  - Discuss location and use of a rig kill switch for drilling/boring operations.

- Twice daily conduct calibration and/or field leak test of direct-reading instruments Record calibration checks in the field logbook and on the Field Calibration Record.

- Approve and sign completed Field Safety Checklist for Intrusive Activities before drilling, boring, or excavating.

- Use caution tape or other methods to establish and restrict access to the exclusion zone to Site investigation personnel only.

Check that Air Monitoring results are recorded, such as on the boring logs

- If personal protective equipment (PPE) upgrade is necessary, follow this chain of communication: SHSS informs FSM who informs PM who communicates to the PHSM.

- Check that medical monitoring occurs for Site personnel e.g., pulse rate during conditions of heat stress.

- During cold conditions measure and record into field logbooks ambient temperature and estimated wind speed.

- For loud operations, evaluate noise levels using a noise level survey meter.

- Visually inspect conditions of all PPE and other equipment once decontamination procedures are completed.

- Conduct daily safety inspections of the Site, and record the results of the inspections in the field logbook Record in the field logbook corrective measures taken when potential hazards were identified. For other hazards, refer them to the FSM for correction. Record the communication transaction in the field logbook If necessary for immediate hazards, shut down field operations.

- Inspect monthly any self-contained breathing apparatus (SCBA) on Site, in storage, or after each use.

- At a minimum, any manhole, pipe, tank or hazardous excavation that must be entered will be a permit-required confined space. The SHSS will direct the Burns & McDonnell confined space entry procedures. Procedures involve Site investigation, completion, signing and posting of a confined space entry permit that includes air-testing results, before entry. The SHSS must be trained annually in confined space entry before supervising confined space activities.

- Check that all employees, visitors, and subcontractors read and sign the SHSP before entering the Site

- Before drilling/boring activities check that overhead electrical lines are at least 10 feet away and that no other overhead obstructions are present, for voltages 0-50 kilovolt (kV). For voltages greater than 50 kV refer to OSHA 29 Code of Federal Regulations (CFR) 1926 550 (a) (15) and 29 CFR 1910.333 (i) (1).

- In case of accident, near miss, or emergency response, conduct an incident investigation and document on the report form in Appendix B then submit to the PHSM with a copy placed into the project file.

2.2 FIELD SITE MANAGER (FSM)

The FSM reports to the PM. The FSM is the On-Site coordinator and overseer of operations. It is the FSM's duty to maintain Site security, supervise the Burns & McDonnell personnel on the Site, coordinate the activities of the subcontractor personnel, serve as the on-scene incident commander, and check that the SHSP is followed and modified when necessary. The FSM responsibilities include:

- The FSM is trained and certified in the HAZWOPER 8-hour Supervisor Training, First Aid, CPR and bloodborne pathogens as well as the Respiratory Protection Training, if required.
- Order and arrange transport of PPE, air monitoring equipment, and calibration supplies needed for the project.
- Provide, in the company vehicle, copies of MSDS for on Site chemicals.
- Bring appropriate number and type of fire extinguishers on the Site. If necessary, bring appropriate fire safety signage and flammable storage containers.
- Bring and have available on the Site, a first aid kit as approved by ANSI 2308.1-1, 1998, and include equipment necessary to protect against bloodborne pathogens.
- Provide a personal eyewash kit for each Burns & McDonnell vehicle at the Site.
- Provide an emergency spill cleanup kit for each vehicle at the Site.
- Maintain copies of emergency procedures with a map of the hospital route in all Burns & McDonnell Site vehicles and in the field office.
- Make water and/or an electrolyte drink available, if conditions warrant.
- Post Exit signs and require government and Occupational Safety and Health Administration (OSHA) posters as appropriate in field offices.
- Before Site activities, contact the hospital emergency room, local fire department, and local police department. If outside town, contact county officials and local emergency services.
- Before drilling, boring, excavation activities have the location of buried utilities checked and marked and complete a Field Safety Checklist Intrusive Activities form for each area that will be investigated (Appendix B).

- Correct and record into logbooks hazards found by SHSS or other Site workers. The hazard may be referred to the PM and/or PHSM for correction. If hazards are life threatening and can not be corrected then field operations must be shut.

- Contact emergency personnel during an emergency.

- Check that all employees, visitors, and subcontractors read and sign the SHSP before entering the Site.

- Before drilling, or boring activities, check that overhead electrical lines are at least 10 feet away and that no other overhead obstructions are present, for voltages 0-50 kV. For voltages greater than 50 kV refer to OSHA 29 CFR 1926.550 (a) (15) and 29CFR 1910 333 (i) (1), Table 5-5.

- In case of an accident, near-miss, or emergency response, conduct an investigation and document on the Incident Report Form in Appendix B, and submit to the PHSM and the project files.

2.3 PROJECT MANAGER/COORDINATOR (PM)

The PM has the primary responsibility for the fulfillment of the terms of the contract and overseeing operations for the purpose that includes meeting legal and safety requirements. It is the PM's responsibility to keep the project on schedule, within budget, and communicate with the client regarding the progress toward specified goals. The PM will inform the PHSM of all SHSP modifications, violations, injuries, and "near-miss" situations. The PM responsibilities include:

- Provide personnel time to read and understand the SHSP before fieldwork.

- Conduct project start-up health and safety briefing for: Field personnel, the FSM, the project team.

- Check that subcontractor supervisors and Site workers have appropriate HAZWOPER Training Certificates.

- Check that Site personnel, if required, have received Respiratory Protection Training, Fit testing and physician's approval to wear a respirator.

- Hazards identified during any Site audits are corrected. If necessary for immediate hazards, shut down field operations if hazards can not be corrected or the hazards present an immediate threat to life and health.

2.4 PROJECT HEALTH AND SAFETY MANAGER (PHSM)

The PHSM is a Certified Industrial Hygienist (CIH) who is responsible for providing professional health and safety advice and oversight management to the project. The PHSM will review and provide support about concerns regarding the health and safety of field personnel assigned to this project, including:

- approval of the SHSP,
- approval of all modifications to the SHSP,
- review of accident reports, inspections, and air monitoring results, when required, the PHSM will conduct a field audit of the Site to evaluate the adequacy of the program and implement the necessary changes through the SHSP.

2.5 PROJECT FIELD TEAM

The Project Team includes technicians, engineers, scientists, geologists, and possibly subcontractors who perform field activities. The Project Team reports to the FSM. Each individual team member will be responsible for understanding and personally complying with the SHSP and site health and safety requirements. Project Team members will report health and safety violations to either the FSM or the SHSS. Health and safety responsibilities, as discussed in this plan, which are shared by all Burns & McDonnell Site personnel include:

- Site employees who have a reasonable potential for entering the exclusion zone will have received 40 hours of initial HAZWOPER Training with an additional 24 hours of supervised field experience with 8 hours annual refresher thereafter.
- Retain copies at the Site of the following health and safety records:
  - Current HAZWOPER Training Certificate.
  - Respiratory Protection Training Certificate and current fit test record for potential respirator users.
  - Physician's approval for hazardous-waste fieldwork and/or respirator use.
  - First Aid/CPR and bloodborne pathogens training certificate.
  - Confined space training certificate, if required
- At least one person will drive the route to the hospital before beginning fieldwork
- Conduct air monitoring using instruments and procedures given in Section 4 of SHSP

- Follow proper electrical safety including use of ground-fault circuit interrupters on extension cords, used outdoors, and unless electrical equipment is of the double-insulated type, use 3-pronged electrical cords on all electrical equipment

The following individuals will have the authority and responsibility to change the levels of protection and, if necessary, shut down field operations:

- SHSS
- FSM
- PM
- PHSM

* * * * *

3.0 HAZARD COMMUNICATION

3.1 PROJECT TASKS

Table 1 (see Appendix A) is a summary of the various project tasks, operations within each task, associated risks, and personal protection requirements.

3.2 HEALTH ANALYSIS AND CHEMICAL RISK ASSESSMENT

Table 2 (see Appendix A) is a summary of the various physical, chemical, radiological, and/or biological hazards that may potentially be encountered, their associated health risks, and necessary protective action. Many chemical substances listed in these tables are not anticipated to be present in sufficient quantities or concentrations in air, soil, or groundwater to present a hazard to personnel. The principal chemical contaminants at the Site are expected to be VOCs and TPHs.

Chemicals may be purchased and transported to the site to support site characterization and remediation operations. The HAZCOM Standard (29 CFR 1910 1200 and 29 CFR 1926.59), requires Burns & McDonnell to provide employees, contractors, subcontractors, and visitors with information on the health effects of these chemicals and necessary actions to protect against exposure. This information is transmitted through MSDS, container labels, training, and a written HAZCOM program

Site activities will adhere to the Burns & McDonnell HAZCOM Program as described in the *Burns & McDonnell Corporate Health & Safety Policy and Procedure Manual, Chapter 8*. All site personnel, including subcontractors, will be briefed on this Program as part of the site orientation training before starting work. In accordance with this Program, the PM and FSM will check that each chemical brought to the site is accompanied by its MSDS. A copy of each MSDS will be made available to each site employee who may be potentially exposed to the chemical. In addition, the FSM will check that all subcontractors bring at least two (2) copies of MSDS for each chemical they bring onto the site. The FSM will also check that all chemical containers brought to the site to determine if they are labeled as to its contents and appropriate hazard warnings.

3.3 RISKS ASSOCIATED WITH DRILLING AND INTRUSIVE ACTIVITIES

Drilling operations will conform to the protocol found in Appendix C of this SHSP. During drilling operations, the subsurface is penetrated to obtain soil and/or groundwater samples. Contaminated soil cuttings and groundwater may be brought to the surface, creating a potential for exposure through skin contact and inhalation of vapors. The open borehole also creates a conduit for vapors to be released to

the atmosphere. However, the amount of vapors released to the atmosphere is relatively small and vapors are usually quickly diluted and dispersed in air. Air monitoring is required to determine if protective equipment is necessary, as described in Section 4.0 of this SHSP. Air monitoring results should be recorded as dictated in the work plan or in a field logbook

In addition to these chemical risks, the risk of drilling into a buried utility, such as a gas or electric line, is always present. Risks of injury associated with the drilling operation itself also exist. The risks of working near overhead electrical lines may also present a safety hazard. The SHSS will check for the presence of overhead lines and other obstructions. No drilling operations will be performed within 10 feet of overhead lines with voltages 0-50 kV; other voltages refer to 29 CFR 1926 550 (a) (15) and 29 CFR 1910 333 (i) (1) Each drilling location will have a Field Safety Checklist - Intrusive Activities filled out before drilling activities begin (see Appendix B)

3.4 NOISE HAZARDS AND CONTROLS

Exposure to high levels of noise may occur when working near drill rigs or other heavy equipment. Also, depending upon where the work is being performed, local equipment (e.g., airports, factory machines, etc.) may produce high levels of noise. The SHSS may evaluate employee noise exposures using a noise survey meter. The PHSM may conduct additional noise monitoring to determine the appropriate response to be taken Employees will be provided with ear plugs and/or earmuffs that have a sufficient noise reduction rating to protect their hearing in accordance with 29 CFR 1910.95.

* * * * *

4.0 AIR MONITORING AND PERSONAL PROTECTIVE EQUIPMENT

4.1 SITE AIR MONITORING REQUIREMENTS

To prevent exposure to hazardous conditions and aid in the selection of personal protective equipment, monitoring for the presence of airborne contaminants will occur when knowledge of the Site indicates their potential presence. One or more of the following direct-reading instruments may be used to aid in this determination. Photoionization detectors (PID) and Flame Ionization Detectors (FID) will measure non-specific organic gases and vapors. These instruments should be calibrated at least 2 times per day. Combustible Gas Indicators (CGI) will detect explosive atmospheres. CGIs should be calibrated prior to and at the end of the day. Oxygen (O_2) meters will detect fluctuations in oxygen concentrations.

Colorimetric detector tubes supplement PID and/or FID readings to measure specific gases and vapors. Aerosol meters will measure airborne particulates and mists. Radiation survey meters are used for Sites with potential radioactive contamination. Other direct-reading instruments are available for use to monitor for the presence of specific airborne Site contaminants. Heat and cold stress monitoring may also be conducted in accordance with Section 5.0 of the SHSP.

The breathing zone of the employee(s) anticipated to have the highest potential for exposure for each task will be monitored using an appropriate combination of some or all of these direct-reading instruments. Air monitoring will occur every 15 minutes during non-intrusive activities, or every 5 feet of penetration during intrusive activities. Site tasks and air monitoring requirements are shown in Table 4-1. Additional Site monitoring may occur at the discretion of the SHSS, FSM, or PHSM.

All air monitoring equipment must be calibrated as per manufacturer's instructions.

Breathing-zone air monitoring results will be recorded. PID readings will be a two-minute average sample in the breathing zone. If a peak PID reading of 1 ppm or greater is obtained during the two-minute sample, that peak should also be recorded. All such records will also include the location, date/time, weather conditions, person monitored, background concentration, and identification of specific contaminant whenever possible.

Table 4-1

Site Air Monitoring Requirements

Site Activity	Instrument	Frequency	Location	Caution
Direct-push/drilling activities	PID	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
	CGI	Every 15 minutes or 5 feet of penetration	In breathing zone of person nearest activity	Communicate with equipment operator before sampling
	Detector tubes	As indicated in Table 4-2 when exceed PID limits	In breathing zone of person nearest activity	Strong odors may require further testing.

During Site activities, the calibration of all direct-reading instruments will be checked twice daily using calibration gas supplied or recommended by the specific instrument manufacturer. Documentation of daily instrument calibration will be recorded in the field logbooks in addition to the Field Calibration Record (see Appendix B). The Field Calibration Record will be kept with the project files.

Air monitoring information will be utilized to evaluate personnel exposure and assess the appropriateness of PPE for Site conditions. The PPE for the Site are discussed in Section 4.2. PID, CGI, and detector tube readings measured in the employees breathing zone will be used to determine the level of protection required. PID readings refer to readings above background, which are sustained for at least 2 minutes and are measured during the performance of field tasks. PID readings are used for general screening. Levels of protection are specified for ranges of PID measurements.

4.2 ACTION LEVELS FOR PERSONAL PROTECTION EQUIPMENT

The initial level of protection and the action levels at which the PPE will be upgraded are determined based on the identification of specific chemicals expected to be present at a Site and the established OSHA Permissible Exposure Levels (PEL) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), whichever is lower. In the event more than one chemical is expected or exists at a Site, the most hazardous chemical will dictate the level of personal protection required. Table 4-2 shows the action levels for levels of personal protection equipment.

Table 4-2
Action Levels for Personal Protection Equipment

Monitoring Equipment	Hazard	Action Level Above Background	Action
PID/FID	Organic gas/vapor	< 1 ppm	Level D.
		1 to 5 ppm	Use detector tube(s) for benzene and reference Table 4-3 below
		> 5 ppm	Immediate Withdrawal. Contact the PM and PHSM for further instructions to proceed.
CGI	Explosive Atmosphere	< 10 % Lower Explosive Limit (LEL)	Level D
		10 % to 20 % LEL	Level D Continue to monitor using extreme caution Notify the SHSS and/or FSM
		> 20 % LEL	Immediate Withdrawal. Explosive hazard Contact the SHSS and PHSM for further instructions
Oxygen Conc. Meter	O_2 Conc.	< 19 5 %	Withdraw and upgrade to SCBA Combustible gas readings are not accurate below this concentration! Notify SHSS.
		19.5 % to 23.5%	Level D Check for airborne contaminants Continue investigation with caution
		> 23 5 %	Immediate withdrawal Fire hazard potential Notify the SHSS and/or the PHSM.

Detector tubes to be used are indicated for given ranges based upon the PID readings (Table 4-2). PID readings in conjunction with detector tubes will be utilized during the field activity and location anticipated having the highest level of contamination. This location will be selected by the FSM. If these measurements indicate exposure levels appropriate for Level D work, the use of detector tubes will be limited to situations where field conditions or activities have changed. Detector tubes will be available for use at the discretion of the FSM and the SHSS

Table 4-3
Action Levels for Detector Tubes

Detector Tube	Detector Tube Results (ppm)	Action
Benzene (Gastec Brand 121SP or Equivalent)	**<0.5 ppm**	Level D. Continue investigation.
	0.5-5 ppm	Level C. Continue investigation with caution. If condition persists more than one hour, notify SHSS.
	> 5 ppm	Immediate Withdrawal. Notify SHSS.

The following detector tubes will be used in this air monitoring protocol:

Detector Tube	OSHA PEL/ACGIH TLV	Measuring Range (ppm)
Benzene	1/0.5 ppm	0.5 – 10 ppm (3 pump strokes)

If readings exceed the range for level of protection indicated, personnel should withdraw and not return until an appropriate level of protection has been donned. Upgrading protection shall be communicated to the SHSS, who will in turn convey this information to the PHSM. Upon review of PID, CGI, and detector tube measurements, the PHSM may further adjust the PPE requirements. Any upgrading to higher levels of protection may require additional personal sampling using National Institute for Occupational Safety and Health (NIOSH) or OSHA methods for the collection and analysis of airborne contaminants.

Air monitoring equipment used on the Site should be calibrated with the following:

Calibration/Response Check

Types	Frequency	Gas Standard
PID	Twice Daily	100 parts per million (ppm) isobutylene in air
CGI	Twice Daily	Pentane
Universal Test Pump-Sensidyne (Refer to manufacturer for other brands)	Twice Daily	Leak Test: Insert unbroken detector tube into orifice, pull and lock handle in sampling position, wait 15-30 sec. And release handle. If handle does not return to 1/8", pump leaks.

Field personnel, in conjunction with the FSM and SHSS, may choose to allow ventilation of vapors before resuming work (rather than using higher levels of PPE). If ventilation is conducted, additional air monitoring will be performed prior to the resumption of work to determine the level of PPE required

4.3 LEVELS OF PROTECTION

Levels of protection for Site activities are described on the Site Air Monitoring Summary (see Page TC-6).

Level D includes the following equipment:

- Work uniform
- Disposable, inner nitrile gloves
- Chemical-resistant boots with steel toe
- Safety glasses
- Hard hat
- Disposable, chemical-resistant outer boot covers*
- Hearing protection*

The following levels of personal protective equipment (PPE) may also be necessary in the event that criteria for Level D protection are exceeded.

MODIFIED LEVEL D:

- Same as Level D including disposable, chemical-resistant clothing (Tyvek)

LEVEL C:

- Half-face or Full-face, air purifying respirator (MSHA/NIOSH approved)
- Disposable, hooded, chemical-resistant clothing
- Disposable, chemical-resistant outer gloves
- Disposable, inner nitrile gloves
- Chemical-resistant boots with steel toe
- Disposable boot covers
- Hard hat*
- Coveralls*

- Escape mask*
- Two-way radios*
- Face shield*
- Hearing protection*

(* Optional Equipment)

4.4 RESPIRATORY PROTECTION

Respiratory protection requirements are described in detail in the Burns & McDonnell Respirator Program as found in the *Burns & McDonnell Corporate Health & Safety Policy and Procedure Manual, Chapter 8*. Basic rules of respiratory usage are listed below:

- Facial hair that interferes with a satisfactory fit of the mask-to-face seal is not allowed on personnel required to wear respirators.
- Respirator cartridges should be replaced after approximately 8-hours of continuous or intermittent usage, unless otherwise noted. For protection against benzene vapors, the cartridges must be replaced at the start of each work shift. Cartridges should also be replaced if they become damaged, after the expiration date is exceeded, if vapor smell breakthrough occurs, or if filters become clogged causing resistance to breathing.
- Contact lenses may be worn when respiratory protection is required, in conjunction with additional eye protection to protect against particles or splashes, provided there is no interference with the respirator seal.
- Respirators shall be cleaned and disinfected after each day's use or more often, if necessary.
- Prior to donning, respirators will be inspected for worn or deteriorated parts. Emergency respirators or self-contained devices will be inspected at least once a month and after each use.
- After donning, personnel should perform a positive and negative user fit-check to determine if a good seal has been achieved.
- The employee will be familiar with all sections of the established respirator program found in the Corporate Burns & McDonnell Health & Safety Policy and Procedure Manual, Chapter 8.

* * * * *

5.0 HEALTH SURVEILLANCE PROGRAM

5.1 EMPLOYEE MEDICAL EXAMINATIONS

All Burns & McDonnell employees involved in work at the Site will participate in a medical surveillance program administered under the direction of an Occupational Physician. The physicals shall meet the minimum requirements established by the OSHA's standard for HAZWOPER. This program will include an annual medical evaluation.

Additionally, when respirators are required (as determined by the SHSS and PM), each employee will be evaluated to determine physical ability to perform work while using respiratory protective equipment in compliance with *29 CFR 1910 134*.

A post project, follow-up exam may be required if an exposure incident is reported or an employee shows specific symptoms associated with the known or suspected hazardous chemicals. The HSM and the Burns & McDonnell PM will determine when post project exams are required.

5.2 HEAT STRESS PROGRAM

5.2.1 Training

The SHSS will have received training developed by the American Red Cross in first aid and CPR, including training in heat-related illnesses.

Workers should be capable of recognizing and treating the signs and symptoms of heat stress conditions. During potential heat stress conditions, ice should be readily available to rapidly cool victims.

5.2.2 Body Fluid Replacement

Water will be made available at the Site for employee fluid replacement. When heat stress is determined to be a problem by the SHSS, employees will be provided with balanced, electrolyte solutions to replace fluid and electrolyte loss. Employees will be provided with replacement fluids at a minimum rate of 8 ounces each half hour per person.

5.2.3 Environmental Monitoring

Heat Stress and heat strain are conditions resulting from environmental factors including temperature, relative humidity, radiant heat transfer, and air movement, as they are affected by clothing. The primary objective of the heat

stress management program is to prevent heat stroke which is life threatening and the most serious of the heat-induced disabilities.

5.2.4 Rest Breaks

When heat stress conditions are applicable, all rest breaks should be taken out of the zone of exclusion into a cooler, shaded, rest area. If these conditions are not available, more frequent rest breaks will be taken.

5.2.5 Medical Monitoring

Always monitor sign and symptoms of heat-stressed workers. When water vapor impermeable clothing is worn, exposure to environmentally induced or activity induced heat stress will be discontinued for a person when:

- Sustained heart rate is greater than 160 beats per minute for those under 35 years of age; and 140 for 35 years or older
- Deep body temperature is greater than 38 degrees Celsius [°C, 100 degrees Fahrenheit (°F)], or
- There are complaints of sudden and severe fatigue, nausea, dizziness, lightheadedness, or fainting, or
- There are periods of inexplicable irritability, malaise, or flu-like symptoms, or
- Sweating stops and the skin becomes hot and dry

Procedure

The employee's pulse rate will be used to monitor their individual response to environmental and internal heat load. To measure the heart rate (pulse), have the individual employee monitor their radial pulse by counting the number of pulse beats in a 10-second time span, multiplying the number of pulse beats counted by six to calculate the pulse rate in beats per minute, and comparing the results with the chart below. This monitoring program will become effective when the ambient work area temperature exceeds 77°F. The pulse rate will be monitored at the beginning and end of each shift and during each rest break.

Heart Rate Work Time (continuum)	90-100 >8 hour (hr)	100-110 8 hr	110-120 2 hr	120-130 1 hr	130-140 30 minute (min)	140-150 15 min	Above 150-180 4-6 min

Pulse Rates between 60 to 90 beats per minute are considered normal and regularly scheduled work hours are recommended.

For unacclimatized workers, the lower pulse rate from each range should be used for the first 2 weeks

5.3 COLD STRESS MONITORING

This procedure applies to all employees who perform fieldwork in cold environments at risk of cold stress injury

5.3.1 Environmental Monitoring

Frostbite and hypothermia are two types of cold injury that personnel must be protected against during the performance of field duties. Two factors influence the development of a cold injury:

- Ambient temperature
- Wind velocity

The SHSS will monitor environmental conditions by recording ambient temperature and estimated wind-speed. Information contained in Tables 5-1 and 5-2 will be used to evaluate the possibility of hypothermia among workers on-Site

5.3.2 Protective Clothing and Rest Breaks

Using appropriate cold weather protective clothing when temperatures are at or below 40°F exposed skin surfaces must be protected. These protective items can include facemask, hand wear, and foot wear. Workers handling evaporative solvents during cold stress conditions will take special precautions to avoid soaking gloves and clothing because of the added danger of prolonged skin contact and evaporative cooling. Personnel will wear protective clothing appropriate for the level of cold and planned physical activity. The objective is to protect all parts of the body, with emphasis on the hands and feet. Eye protection against a glare and ultraviolet light will be worn in snowy and icy conditions

The work rate should not be so great as to cause heavy sweating that could result in wet clothing. If heavy work must be done, opportunities for rest breaks will be provided where workers have the opportunity to change into dry clothing. Conversely, plan work activities to minimize time spent sitting or standing still. Rest breaks should be taken in a warm, dry area. Windbreaks can shield the work area from the cooling effects of wind.

5.3.3 Identification and Treatment of Cold Stress

When frostbite, hypothermia, or other cold stress symptoms are suspected, treat the patient to relieve symptoms or transport them to the medical facility identified in Section 9.0.

5.3.4 Training

Burns & McDonnell workers have been trained in cold stress as part of their HAZWOPER 40-hour initial training. Site workers will receive refresher training by the SHSS in cold stress safety and health procedures. The training program will include, as a minimum, instruction in the following areas:

- Proper first aid treatment
- Proper clothing practices
- Proper eating and drinking habits
- Recognition of impending frostbite
- Recognition of the signs and symptoms of impending hypothermia or excessive cooling of the body when shivering does not occur
- Safe working practices

The SHSS will be trained by the American Red Cross in first aid, CPR, and cold stress conditions.

* * * * *

TABLE 5-1
Threshold Limit Values Work/Warm-up Schedule
for Four-Hour Shift*

Air-Temperature—Sunny Sky		No Noticeable Wind		5 mph Wind		10 mph Wind		15 mph Wind		20 mph Wind	
°C (approx.)	°F (approx.)	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks	Max. Work Period	No. of Breaks
-26° to -28°	-15° to -19°	(Norm. Breaks) 1		(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4
-29° to -31°	-20° to -24°	(Norm. Breaks) 1		75 min	2	55 min	3	40 min	4	30 min	5
-32° to -34°	-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Non-emergency work should cease	
-35° to -37°	-30° to -34°	55 min	3	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease	
-38° to -39°	-35° to -39°	40 min	4	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-40° to -42°	-40° to -44°	30 min	5	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	
-43° & below	-45° & below	Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease		Non-emergency work should cease	

*1. Schedule applies to any 4-hour work period with moderate to heavy work activity, with warm-up periods of ten. (10) Minutes in a warm location and with an extended bread (e.g., lunch) at the end of the 4-hour work period in a warm location. For Light-to-Moderate Work (limited physical movement): apply the schedule on step lower. For example, at -35°C (-30°F) with no noticeable wind (Step 4), a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4-hour period (Step 5).

2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph: light flag moves; 10 mph: light flag fully extended: 15 mph: raises a newspaper sheet: 20 mph: blowing and drifting snow.

3. If only the wind chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be 1) special warm-up breaks should be initiated at a wind chill cooling rate of about 1750 watts per square meter (W/m^2); 2) all non-emergency work should have ceased at or before a wind chill of 2250 W/m^2. In general, the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart slightly overcompensates for the actual temperatures in the cooler ranges because windy conditions rarely prevail at extremely low temperatures.

4. TLVs apply only for workers in dry clothing.

* Adapted from Occupational Health & Safety Division, Saskatchewan Department of Labor.

TABLE 5-2
Cooling Power of Wind on Exposed Flesh Expressed as

*Equivalent Temperature (under calm conditions)**

Estimated Wind Speed (mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds > 40 mph have little additional effect)	LITTLE DANGER If < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.			GREAT DANGER Flesh may freeze within 30 seconds.				
	Trench foot and immersion foot may occur at any point on this chart.											

* Developed by United States Army Research Institute of Environmental Medicine, Natick, MA

mph – miles per hour

* * * * *

6.0 -- SITE SECURITY AND CONTROL

Restricted Site areas will include, but not necessarily be limited to, the following zones:

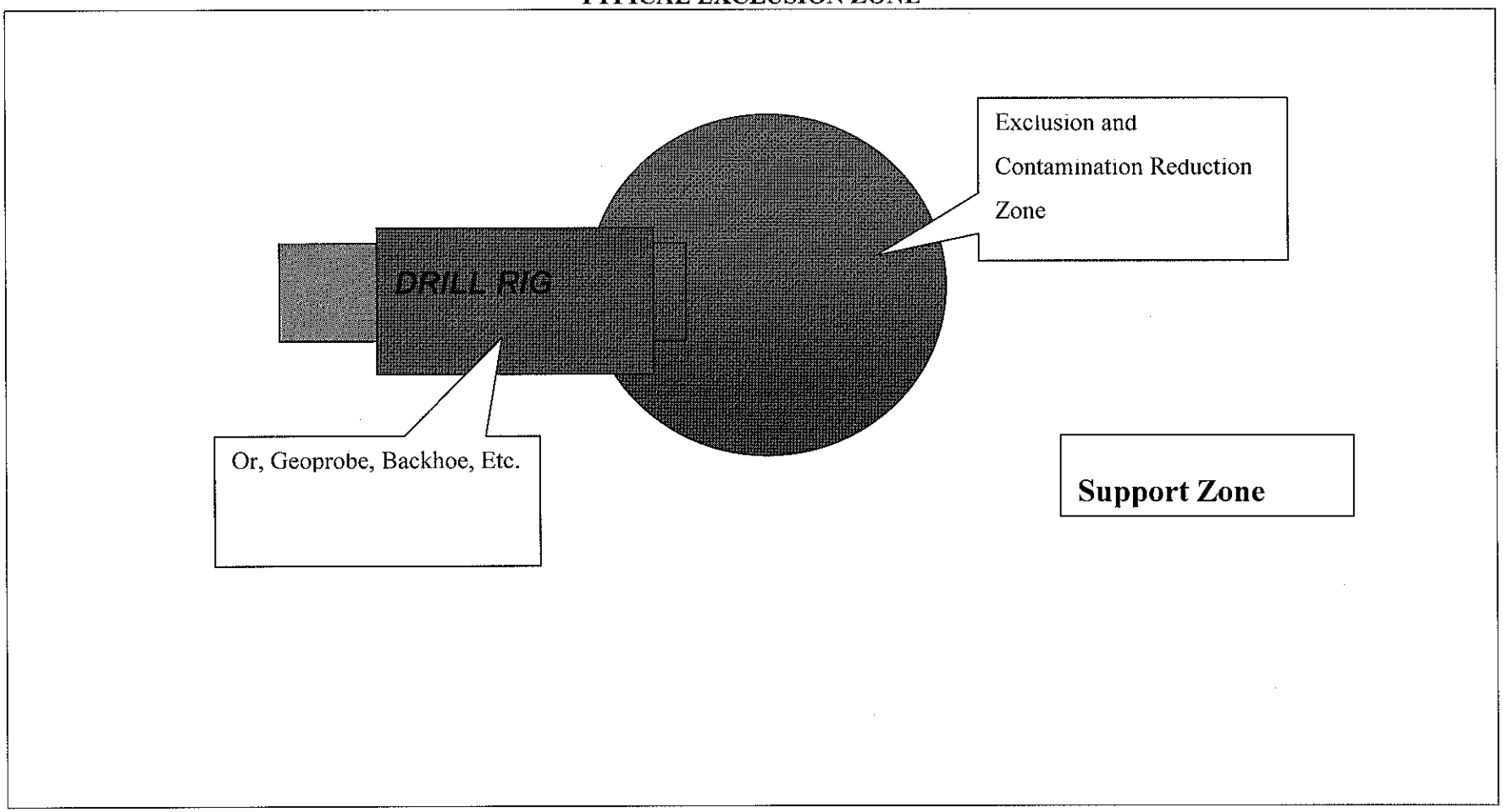
- **Zone of exclusion** - any area where contamination is either known or likely to be present in concentrations that could pose a threat to human health and safety or that potential for harm to personnel exists because of the type of work activities being conducted.
- **Contamination reduction zone** - any area where workers conduct personal and equipment decontamination.
- **Support zone** - areas where access is controlled, but the chance to encounter hazardous materials or conditions are minimal.

The establishment of these specific zones will be based upon the location of intrusive activities, air monitoring results, and Site environmental/topographic features. The zone of exclusion and contamination reduction zone will be demarcated with flags, caution tape, or other readily visible means. If working in a busy area, the zone should be built as to physically keep people out. The zone of exclusion and contamination reduction zone will initially be within a 20-foot radius of drilling or sampling operations. The exclusion and contamination reduction zone may be one designated zone and is subject to change based on the extent of contamination levels. Air monitoring will be conducted to determine contamination levels. The SHSS will restrict access to this area to Site investigation personnel. The personnel documentation station will be located at the entrance to the demarcated area. Figure 6-2 is an example of a work zone.

In the event on-Site personnel must upgrade their personal protective equipment, the work zones may require substantial modification in order to provide for the safety of nearby personnel not associated with this work. Any upgrade level will be communicated by the FSM to the PM. The PM will then inform the PHSM of this occurrence.

* * * * *

FIGURE 6-2
TYPICAL EXCLUSION ZONE



7.0 -- DECONTAMINATION PROCEDURES

7.1 PERSONNEL DECONTAMINATION

All personnel must complete appropriate decontamination procedures in a way that is responsive to actual Site conditions before leaving the Site. The decontamination of personnel and equipment will be performed within the exclusion and contamination reduction zones. Wash tubs containing an appropriate decon solution and soft bristle brushes will be used to decontaminate personal protective clothing and boots. Deionized water will be used for the final rinse. The SHSS will visually inspect all PPE and other equipment once decontamination procedures are completed. In general, the four types of decontamination solutions to be considered for PPE include:

- Water for removal of low-molecular weight hydrocarbons, inorganic compounds, salts, some organic acids, and other polar compounds.
- Dilute acids (vinegar) for removal of basic (caustic) compounds, amines, and hydrazines.
- Dilute bases (soaps and detergents) for removal of acidic compounds, phenols, thiols, and some nitro and sulfonic compounds.
- Organic solvents for removal of nonpolar compounds (organic).

The following procedures should be used when decontaminating personnel or equipment:

LEVEL D

- Establish a segregated equipment drop
- Remove disposable, outer boot covers, if applicable
- Remove chemical resistant, outer gloves, if applicable
- Remove hard hat and goggles, safety glasses, or face shield
- Remove disposable, inner gloves

MODIFIED LEVEL D

- Establish a segregated equipment drop
- Remove disposable, outer boot covers
- Remove chemical resistant, outer gloves
- Remove chemical resistant suit
- Remove hard hat and goggles, safety glasses, or face shield
- Remove disposable, inner gloves

8.0 STANDARD OPERATING PROCEDURES

The following SOPs will be applied to each location and activity where work is performed on a hazardous chemical Site. As hazards increase or decrease on the Site, the applicability of each SOP must be determined by the SHSS with the approval of any changes by the PM or the PHSM.

8.1 PERSONNEL PRECAUTIONS

1. Eating, drinking, chewing gum or tobacco, smoking, and any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the exclusion and contamination reduction zone or in any area known to be contaminated.

2. When decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.

3. Contact with contaminated or suspected contaminated surfaces should be avoided. When possible, do not walk through puddles, leachate, or discolored surfaces; kneel on the ground; or lean, sit, or place equipment on drums, containers, or the ground.

4. Medicine and alcohol can potentiate the effects from exposure to toxic chemicals Personnel should not take prescribed drugs at hazardous waste operations where the potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician Alcoholic beverage intake should be minimized or avoided.

5. All personnel must be familiar with standard operating safety procedures and any additional instructions and information contained in this SHSP. All visitors and subcontractors will read the SHSP before entering the Site.

6 All personnel will be aware of symptoms for heat or cold stress.

7 All personnel will be familiar with the chemicals used on-Site and the associated hazards as described in each respective MSDS. The MSDS for the chemicals on-Site will be available and located in the company vehicle. All personnel on-Site will be familiar with the Burns & McDonnell HAZCOM Program before performing any activities on-Site.

8.2 OPERATIONS

1. All personnel going to the Site must be adequately trained and thoroughly briefed on anticipated hazards, equipment, safety practices, emergency procedures, and communications

2. All personnel must wear any required respiratory protective devices and clothing going into areas designated for wearing protective equipment.

3. Personnel on the Site must use the buddy system when engaged in Level C work as specified in OSHA 29 CFR 1910.120. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

4 Visual contact must be maintained between pairs of Site and safety personnel. Entry team members should remain close to assist each other during emergencies

5. Personnel should practice unfamiliar operations before the actual procedure.

6. Entrance and exit locations must be designated, and emergency escape routes delineated. Warning signals, for Site evacuation must be established by the SHSS before field activities

7. Communications using radios, hand signals, or other means must be maintained between initial entry members at all times. Emergency communications should be prearranged in case of radio failure, the necessity for evacuating the Site, or other reasons.

8. Wind indicators visible to all personnel should be strategically located throughout the Site.

9. Personnel and equipment in the contaminated area should be minimized, consistent with effective Site operations.

10. Work areas for various operational activities will be established.

11. Procedures for leaving a contaminated area will be planned and implemented before going to the Site Work areas and decontamination procedures will be established based on expected Site conditions.

12. Frequent and regular inspections of Site operations will be conducted by the SHSS to check compliance with this SHSP. If changes in operation occur, the SHSP must be modified to reflect these changes

13. All electrical equipment (power tools, extension cords, instruments, radios, etc.) will conform with OSHA 29 CFR Part 1926.400 Subpart K. The SHSS will ensure that electrical equipment is free from recognized hazards that may cause physical harm to employees.

14. Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be according to OSHA 29 CFR Part 1926 150 Subpart F

15 Site Safety meetings will be held daily to discuss anticipated Site conditions and daily activities. This meeting will be summarized in field logbooks.

* * * * *

9.0 -- CONTINGENCY PLAN

9.1 MEDICAL EMERGENCIES

1. The name, address, telephone number, travel distance, and travel time to the nearest medical treatment facility are found in the Emergency Information section (see Page TC-6) of this SHSP. A map and direction for locating the facility is available in the Emergency Information section (see Page TC-8) of this SHSP

2. Emergency routes will be verified and driven before any Site activities. It may be quicker to transport a person with minor injuries than to wait for emergency medical services (EMS) to respond. Check with the local authorities for response times. Life threatening emergency situations will only be handled by emergency medical services.

3. If the facility lacks toxicological capacity, arrangements will be made for consultant services.

4. Before mobilization on-Site, the FSM will contact the local hospital emergency room personnel, local fire department, and local police department to brief them regarding the scope and hazards associated with the scheduled fieldwork. If the Site is outside an established town, contact will be made with county officials and local emergency services.

5. An emergency first aid kit with contents as per American National Standards Institute (ANSI) 2308.1-1, 1998 will be readily available on the Site, and personnel will have first aid training. The first aid kit also contains equipment necessary to protect first aid providers against the contraction of bloodborne pathogens. All first aid providers will have received Bloodborne Pathogens training and have been offered Hepatitis B vaccinations according to the *Burns & McDonnell Bloodborne Pathogens Exposure Control Plan*, Section B, Appendix A, Corporate Policy and Procedure, Health and Safety, Chapter 8 Manual

6. Any person who becomes ill or injured in the exclusion zone must be decontaminated as well as possible with consideration to which risk will be greater, the spread of contamination or the health of the individual. If the injury or illness is minor, full decontamination (remove contaminated clothing and wash hands and face with soap and water, See Section 7.1) should be completed and first aid administered before transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket). First aid should be administered while awaiting an ambulance or paramedics. The FSM is trained and certified in first aid and CPR.

7. If an injured victim is unconscious, notify EMS. Inform the EMS dispatcher as to the nature of the emergency. Do not move the victim unless it is absolutely necessary. Remain with the victim and wait for orders by the EMS dispatcher. The EMS dispatcher should determine what help is needed. Anyone transported to a clinic or hospital for treatment should take information on the chemicals they have reason to believe been exposed to at the Site.

8. When required, any vehicle used to transport contaminated personnel will be decontaminated.

9. Provisions must be made to identify the substance to which the worker has been exposed. This information must be given to medical personnel.

9.2 EMERGENCY EQUIPMENT

1. A personal eyewash unit that meets ANSI Z358.1-1998, Section 6 will be available in each Burns & McDonnell field vehicle at the Site. When chemical exposures have a pH of <3 or >11. The main purpose of the eyewash unit is to provide immediate flushing. With this accomplished, the individual may then be transported to the hospital for professional care. An ANSI Approved First-Aid Kit contains an eyewash bottle.

2. An emergency spill cleanup kit will be available in the field office at all times. Unplanned releases will be reported to the SHSS and/or FSM as soon as possible.

3. Sufficient water and/or dry chemical fire extinguishers (Class A, B, and C) will be maintained on the Site to cope with any situation until emergency services arrive.

9.3 FLAMMABLE CONDITIONS

1. In the event that combustible vapors exceed 10 percent of the LEL or strong odors are detected in the borehole, the following actions should be taken:

- Continue investigation using extreme caution. Personal protective equipment may need to be upgraded.
- Allow vapors to dissipate or use intrinsically-safe mechanical ventilation.
- If atmospheric conditions do not change, call in the listed sequence:
  - Project Manager.
  - Health and Safety Manager,
  - Fire Department.
- Provide answering personnel with the call back numbers, locations, directions, and situation assessment.

2. In the event that combustible vapors exceed 20 percent of the LEL, the following actions should be taken:

- Eliminate all ignition sources, smoking, and electric cutoff switches from the area. Do not turn electric switches on or off if strong odors are present, unless the switch is intrinsically safe. Do not allow cars to operate in the vicinity.
- Move personnel away from borehole.
- If atmospheric conditions do not change, call in the listed sequence:
  - Project Manager,
  - Health and Safety Manager,
  - Fire Department.

- Provide answering personnel with the call back numbers, locations, directions, and situation assessment.

9.4 SITE EVACUATION CONDITIONS

The following conditions will necessitate the cessation of fieldwork in the area of concern, withdrawal from the work area, and revisions to this SHSP:

- Fires and/or explosions
- Unexploded ordnance is detected
- A major accident or injury occurs
- CGI readings above 20 percent LEL.
- CGI readings above 23.5 percent oxygen concentration
- CGI readings at or below 19.5 percent oxygen concentration
- PID readings over 5 ppm sustained for more than 2 minutes
- Detector tube readings over the maximum action level for the contaminant specified
- Radiation levels greater than twice background (if applicable)

9.5 EMERGENCY COMMUNICATION SYSTEM

Emergency contacts and telephone numbers are provided at the beginning of this SHSP. Field crews will have some communication device at each active work location. These may include radios, mobile telephones, or walkie-talkies. Such communication devices will have sufficient range to contact the field office and/or emergency services. If an emergency occurs on-Site, the FSM is responsible for checking that appropriate emergency contact has been notified. At the time of the emergency response, the FSM or designee will brief the emergency personnel on the status of the emergency, including Site conditions. Copies of the emergency procedures and maps will be kept in all Burns & McDonnell Site vehicles and the field office, if appropriate.

Field personnel will use hand signals if there are noisy working conditions on the Site. The hand signals that will be used are shown below and will be reviewed by the SHSS during the on-Site safety briefing.

Signal	Meaning
Hands on top of head	Need assistance
Grip partner's wrist or place both hands around partner's arm	Leave area immediately
Thumbs up	OK; I am all right
Thumbs down	No; Negative
Hand gripping throat	Cannot breathe; Out of air

9.6 EMERGENCY RESPONSE FOLLOW-UP

If there is an accident, near-miss, or emergency response, the SHSS and/or the PHSM will investigate the Site and conduct interviews of all individuals involved in order to determine the actions taken before, during, and following the incident to determine if work may proceed. This initial investigation will be documented using the Incident Report Form (see Appendix B). The SHSS and/or other PHSM will then provide a critique of the response actions and training for individuals involved in the response trying to minimize the risk of further incidents and improve future response efforts.

* * * * *

10.0 EMPLOYEE TRAINING

All Burns & McDonnell employees will participate in routine health and safety education and training programs. These programs are designed to provide employees with a thorough knowledge of hazardous materials, health and safety hazard potentials, and federal OSHA requirements published in 29 CFR Part 1910. According to 29 CFR 1910 120(e), Site employees will have received 40 hours of initial HAZWOPER instruction and 24 hours of supervised field experience. In addition, project supervisory personnel, including the SHSS and FSM, will have received an additional 8 hours of specialized HAZWOPER Supervisor training. Attending HAZWOPER 8-hour annual refresher training maintains this initial training. It is the responsibility of the PM and each subcontractor's supervising manager to determine if the subcontractor staff meets these training requirements.

The SHSS will conduct Site-specific health and safety briefing for field personnel before the start of all fieldwork. Briefing attendees will include the FSM, the Project Team, and emergency services personnel. Emergency services personnel should include fire, emergency services, and/or client personnel as appropriate. The contents of the Site-specific training will include the following:

- Site-specific safety and health rules
- Health effects of various chemicals used on the Site
- Emergency response actions pertaining to operations on-Site

Daily safety meetings will be conducted to review past activities, plan ahead for new or changed operations, establish safe working procedures for anticipated hazards, and provide pertinent safety and health training and motivation. Daily meetings and Site-specific training will be documented in the field logbook by the SHSS.

All visitors entering the designated work zones will be subject to all applicable health and safety requirements during field operations at the Site. All visitors to a work Site will be given the opportunity to review the SHSP, will be escorted at all times, and will be required to stay a safe distance from Site activities. The SHSS will be responsible for determining the visitor's need to enter the contamination reduction zone. The FSM and/or the SHSS will be responsible for briefing all visitors on the Site hazards, Site safety precautions, and the Site emergency response plan

* * * * *

APPENDIX A

TABLE 1 SUMMARY OF PROJECT HAZARDS

TABLE 2 CHEMICAL HAZARD SUMMARY

Table 1

SUMMARY of RISKS

Job Task/Operation	INHALATION HAZARD	CONTACT with CONTAM. SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ	POTENTIAL FIRE HAZ	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	AQUAC. FACILITIES	Level of	Air Monitoring
Surveying Well Locations	X	X		X			X	X		X				X										Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Air Sampling	X	X	X	X	X	X	X	X		X	X			X							X	X	X	Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Sampling of Contaminated Soil	X	X	X	X	X	X	X			X				X										Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Preparation of Samples for Laboratory	X	X					X			X				X	X		X							Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Decontamination of Sampling Equipment	X	X		X			X			X				X			X							Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.

KEY: BZ = Breathing Zone; eV = electronvolt, the output of the UV lamp.

HSP 11/30/200

Burns & McDonnell
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Table 1

SUMMARY of RISKS

Job Task/Operation	INHALATION HAZARD	CONTACT with CONTAM. SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ	POTENTIAL FIRE HAZ	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	AQUAC. FACILITIES	Level of	Air Monitoring
Visual Observation of Site Activities	X	X		X		X	X			X				X							X			Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Sampling of Water and Soil from Groundwater Monitoring Wells	X			X			X			X				X			X							Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Decontamination of Geoprobe Sampling Equipment	X	X	X	X			X	X		X				X			X		X	X				Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Geoprobe Boring and Sampling	X	X	X	X			X			X		X	X	X	X					X				Level D, or as indicated by air monitoring and table 4-2 and 4-3.	PID with 11.7 eV lamp, CGI. CGI 1-5% approx TLV, avoid, dust/aerosol.
Site Survey of Utilities			X			X				X			X		X	X								Level D, or as indicated by air monitoring and table 4-2 and 4-3.	PID with 10.6 eV lamp, CGI

KEY: BZ = Breathing Zone; eV = electronvolt, the output of the UV lamp.

HSP 11/30/200

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Table 1

SUMMARY of RISKS

Job Task/Operation	INHALATION HAZARD	CONTACT with CONTAM. SOIL	NOISE HAZARD	HEAT STRESS	ELECTRICAL HAZ	POTENTIAL FIRE HAZ	CONTACT WITH CONTAM. LIQ.	COLD STRESS	COLLAPSE OF TRENCH	PHYSICAL INJURY	OVERHEAD POWER LINES	BURIED TANKS	UNDERGROUND PIPING	SKIN HAZARD	VENTILATION PROBLEM	CONFINED SPACE	SPILL LIQUIDS	VANDALISM	EQUIP. FREEZING	LEAKING LINES	SLOPE FAILURE	FALL INTO EXCAV.	ADJAC. FACILITIES	Level of	Air Monitoring
Operation of Heavy Equipment	X		X		X		X	X	X	X	X	X	X	X	X			X	X	X	X			Level D, or as indicated by air monitoring and table 4-2 and 4-3.	CGI, PID with 10.6 lamp and Detector tubes as indicated.
Monitoring and/or Extraction Well Installation	X	X	X	X	X		X	X		X	X		X	X			X							Level D, or as indicated by air monitoring and table 4-2 and 4-3.	PID with 10.6 eV lamp, CGI.

KEY: BZ = Breathing Zone; eV = electronvolt, the output of the UV lamp.

HSP 11/30/200

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TABLE 2
CHEMICAL HAZARD SUMMARY

Chemical Identification	Exposure Limits in Air	Route of Entry	Health Effects	PPE	Properties	
BENZENE Synonym: Benzol CAS#: 71-43-2, UN 1114	**PEL:** 1 ppm **TLV:** 0.5 ppm **REL:** 0.1 ppm ca **IDLH:** [500 ppm]	Con, Ing, Inh	Irrit eyes, nose, resp sys, giddy; headache, nausea, stagger; anorexia, fatigue; bone marow (leukemia)	**Glove Material:** Butyl, Neoprene **Respirator:** Organic Vapor	**LEL:** 1.2% **IP:** 9.24 eV **DOT:** Flam. Liquid	**Relative Density:** **Air:** Heavier **Water:** Floats
ETHYL BENZENE Synonym: Ethyl Benzol CAS#: 100-41-4, UN 1175	**PEL:** 100 ppm **TLV:** 100 ppm **REL:** 100 ppm **IDLH:** 800 ppm	Abs, Ing, Inh	Irrit eyes, muc memb; headache; dermatitis; narcosis, coma.	**Glove Material:** Viton **Respirator:** Organic Vapor	**LEL:** 0.8% **IP:** 8.76 eV **DOT:** Flamm. Liquid	**Relative Density:** **Air:** Heavier **Water:** Floats
PAHS Synonym: Polynuclear Aromatic Hydrocarbons; as Benzo(a)pyrene, Fluoranthene, CAS#: NA Coal Tar Pitch	**PEL:** **TLV:** **REL:** **IDLH:** 80 mg/M3 [	Inh (dust), Abs	Photosensitiz; skin cancer, long term; inh-posible lung cancer.	**Glove Material:** Nitrile **Respirator:**	**LEL:** NA **IP:** NA **DOT:**	**Relative Density:** **Air:** **Water:**
TOLUENE Synonym: Toluol; Methylbenzene CAS#: 108-88-3, UN 1294	**PEL:** 200 ppm **TLV:** 50 ppm **REL:** 100 ppm **IDLH:** 500 ppm	Abs, Con, Ing, Inh	Fainting, weakness, confusion, euphoria, dizziness, watery eyes. Liver & kidney damage.	**Glove Material:** Viton **Respirator:** Organic Vapor	**LEL:** 1.1% **IP:** 8.82eV **DOT:** Flamm. Liq.	**Relative Density:** **Air:** Heavier **Water:** Floats

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Date Prepared: 11/30/2005

KEY:

[ ] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

TABLE 2
CHEMICAL HAZARD SUMMARY

Chemical Identification	Exposure Limits In Air	Route of Entry	Health Effects	PPE	Properties	
VAR. HEAVY METALS Synonym: CAS#: NA	**PEL:** **TLV:** **REL:** **IDLH:** NA	Inh dust, ing	VAR	**Glove Material:** Butyl, neoprene **Respirator:**	**LEL:** NA **IP:** NA **DOT:**	**Relative Density:** **Air:** **Water:**
XYLENES - (ORTHO) Synonym: Dimethyl Benzene CAS#: 1330-20-7,UN 130	**PEL:** 100 ppm **TLV:** 100 ppm **REL:** 100 ppm **IDLH:** 900 ppm	Abs, Ing, Inh	Irritation eyes, nose, throat; dizziness, excit, drowsiness, staggering.	**Glove Material:** Neoprene, Viton **Respirator:** Organic Vapor	**LEL:** 0.9 % **IP:** 8.56 eV **DOT:** Flam. Liquid	**Relative Density:** **Air:** Heavier **Water:** Floats

Information Sources:

NIOSH Pocket Guide 1997	3M - Glove
TLV Booklet 1998	3M - Respirator
29CFR 1910	North Respirator
Guide to Occup	IATA 1997 Dangerous Goods

Burns & McDonnell
SINCE 1898

Date Prepared: 11/30/2005

KEY:

[ ] - Latest Change	IDLH - Immediately Dangerous to Life and Health	NA - Not Applicable
ABS - Skin Absorption	ING - Ingestion	ND - Not Determined
APR - Air Purifying Respirator	INH - Inhalation	PEL - Permissible Exposure Limit
Ca - Carcinogen	IP - Ionization Potential (by UV Lamp)	REL - Recommended Exposure Limit
CON - Skin and/or Eye Contact	LEL - Lower Explosive Limit	TLV - Threshold Limit Value
DOT - Department of Transportation	LIQ - Liquid	

APPENDIX B

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

HEALTH AND SAFETY PLAN FIELD AMENDMENT

FIELD SAFETY CHECKLIST - INTRUSIVE ACTIVITIES

INCIDENT REPORT FORM

FIELD CALIBRATION RECORD

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

Health & Safety Plan (SHSP) Agreement

Burns & McDonnell Engineering Company, Inc. Project Manager, Field Site Manager, Site Health and Safety Supervisor, and Health & Safety Manager have the authority to stop any work performed by Burns & McDonnell Engineering Company, Inc. subcontractors if it is not performed according to the requirements of this SHSP.

All Burns & McDonnell Engineering Company, Inc. project personnel and subcontractor personnel are required to sign the following agreement before performing work at the site

1. I have read and fully understand the SHSP and my individual responsibilities.

2. I agree to abide by the provisions of the SHSP.

_____ _____

Name Signature

_____ _____

Company Date

_____ _____

Name Signature

_____ _____

Company Date

_____ _____

Name Signature

_____ _____

Company Date

_____ _____

Name Signature

_____ _____

Company Date

AGREEMENT AND ACKNOWLEDGMENT FORM
(continued)

Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date
Name	Signature
Company	Date

HEALTH AND SAFETY PLAN FIELD AMENDMENT FORM

Project Name: _____ Amendment Number:

Project Number: _____ Amendment Effective Date:

Location:

Changes in field activities or hazards:

Proposed Amendment:

Proposed By: _____ Date:

Site Health and Safety Supervisor or others

Approved By: _____ Date:

Project Manager

_____ Date:

Project Health and Safety Manager

Declined By: _____ Date:

FIELD SAFETY CHECKLIST
INTRUSIVE ACTIVITIES*

Project Number _____ Project Abbreviation _____

Field Location _____ Date _____

	YES	NO	N/A
1. Reviewed work plans with client representative:	____	____	____
2. Requested maps of aboveground and underground utilities:	____	____	____
3. Reviewed utility maps (water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground piping):	____	____	____
4 Met with utility representative to review utility locations and asked each utility the following questions:			
a. Any underground utilities at work site?	____	____	____
b. Any ongoing construction that would affect field activities?	____	____	____
c. Any vapor releases associated with unit operations?	____	____	____
d. Any other hazards associated with operating units?	____	____	____
e Any special requirements?	____	____	____

5 Utility Representatives contacted:

Utility Representative Name: _____

Company: _____

Utility Representative Name: _____

Company: _____

Utility Representative Name: _____

Company: _____

Utility Representative Name: _____

Company: _____

Utility Representative Name: _____

Company: _____

6. Utility Location Services Reference Number: _____

7 Final approval for commencement of work:

Site Health & Safety Supervisor Signature: _____

Subcontractor Foreman Signature: _____

NOTE: Field activities will commence only when this form and clearance have been approved by the SHSS

* Intrusive activities include drilling, direct-push boring, and excavation activities. Page ___ of ___

INCIDENT REPORT

Incident Date:	Incident Time:
Site:	
Project Number:	Project Abbreviation:
Person Completing Form:	
Date and Time of Report Completion:	
Affected Person(s):	
Summary and Cause of Incident:	
Recommended Corrective Action:	
Corrective Action Authorization Dept. or Project Manager Signature and Date: Health & Safety Manager Signature and Date:	

FIELD CALIBRATION RECORD

Equipment Item:		Mfr. Serial # B&M Equip. #		Project Abbr. Project No		
Date Calibrated	Time	Known Standard	Instrument Reading	Adjustments Made	Calibrated By	Comments

Comments:

* * * * *

APPENDIX C

DIRECT-PUSH

C.0 – DIRECT PUSH

C.1 DIRECT PUSH

The following topics are the principal items that specifically address direct push safety procedures as part of the site health and safety guidelines. Each topic is explained in detail on the following pages:

- Underground utilities
- Hydraulic machinery
- Vehicle issues
- Site characteristics issues
- Kill switch
- Use of tools

C.2 UNDERGROUND UTILITIES

Several principles should be followed when investigation areas with underground utilities and tanks The first principle is to minimize the amount of drilling in the immediate vicinity of known or suspected underground utilities. This may conflict with the intent of a project; for example, to drill as near as possible to underground tanks or pipeline bedding material, to investigate subsurface contamination, or to drill into pipeline bedding material. The overriding factor in planning a subsurface investigation should be to minimize the risk of damage to subsurface utilities and tanks because such damage may have consequences affecting safety and contamination.

The second principle is that areas proposed for drilling or excavation should be checked with regard to the utilities by the site owner and, where applicable, any public utilities that may have underground lines or tanks. It is illegal in some states to perform any subsurface intrusive activities without calling the utilities clearance service for the state. Many owners and plant operators do not have clear knowledge about the locations of their underground utilities. Therefore, caution and discretion will be required to evaluate their judgements Utility clearance, including the ticket number, utilities notified, and the names of all persons granting utility clearance will be recorded on the Field Safety Checklist, Intrusive Activities. The Field Safety Checklist, Intrusive Activities, provided in Appendix B, will be completed for each area.

The use of a metal finder or another type of utility-finding remote sensor may be used for underground utility location This equipment should be used whether or not the local utilities or owner have acknowledged that the drilling location is clear of utilities. If uncertainty is present as to the location or existence of underground utilities or tanks, using a backhoe to carefully excavate down to common utility depths is warranted.

If a significant increase in resistance to pushing occurs in an area where bedrock is not expected, STOP WORK immediately, reassess the situation, reevaluate the data on the locations of underground utilities, and do not proceed until safety has been verified. Call the PM if any uncertainty exists as to the clearance of utilities.

In the event that underground utilities are encountered, the following steps should be taken:

1. Cease pushing immediately.
2. Notify the Safety Manager as soon as possible.
3. Notify the Group Manager as soon as possible.
4. Write a brief memorandum summarizing the event and transmit it as soon as possible to the PM.

The risks of encountering underground utilities include: the safety of personnel, financial risks of replacement and repair, and environmental risks of fuel leaks or other environmental problems caused by damaging utilities

C.3 HYDRAULIC MACHINERY

The hazards of hydraulic machinery include the following guidelines:

- Stay at least two feet from the hydraulic systems
- If machinery must be approached closer than two feet, minimize the amount of time in close proximity to the machinery and use caution.
- Be aware of where other workers are standing and moving so that no one is jostled into the machinery.

- Do not allow the operator to overdrive the sampler.

C.4 VEHICLE ISSUES

In heavy traffic areas, use extra caution in moving around the site. Observe contractor personnel on the site to ensure their safety as well. Precautions that can be taken include traffic barricades, cones, signs, a flag person who keeps a constant watch on traffic, and blocking the work area with vehicles. The following traffic areas may be present at the investigation area and need to be considered:

- Highway and road shoulders
- City streets
- Parking lots
- Construction sites
- Industrial sites, including refineries, landfills, airports and factories

C.5 SITE CHARACTERISTIC ISSUES

Working around direct push rigs requires the following precautions:

- Watch the operations to know where all machinery and equipment are located around the work site.

- Keep out of, or move cautiously, in areas where work is in progress, including the hoist and derrick, sample driving equipment, auger and drill rod storage and hoisting areas, water pump or compressor, and rig exhaust.

- Stay visible to the driller as much as possible.

Work inside buildings requires venting of the exhaust and monitoring of the air for exhaust gasses.

C.6 RIG KILL SWITCH

If the rig has a kill switch, learn where it is to shut it off in case of an emergency. A discussion should be held with the driller on each rig at the startup of the field work to discuss the location and use of the kill switch. The switch may be a button, pull line, or pull switch.

C.7 USE OF TOOLS

Burns & McDonnell personnel should not handle any of the subcontractor's tools, equipment, supplies, or machinery. This includes the following items:

- Direct push rig controls
- Vehicles, including rigs, trucks, bobcats, dozers, and backhoes
- Hand tools, such as shovels, wrenches, hammers, and tremie pipes
- Well construction materials, such as PVC pipe and cement

Burns & McDonnell personnel may handle sampling devices themselves, such as:

- Samplers
- Sub and Shoe
- Liner

* * * * *

APPENDIX C

Injury and Illness Prevention Plan

INJURY AND ILLNESS PREVENTION PLAN FOR THE SITE ASSESSMENT PLAN AT THE ROADWAY EXPRESS, INC. SITE 1708 WOOD STREET OAKLAND, CALIFORNIA

MAY 2006

BMcD Project No. 42497
YRC WORLDWIDE ENTERPRISE SERVICES, INC.

Burns & McDonnell Engineering Company, Inc.
Engineers-Architects-Consultants
Kansas City, Missouri

Table of Contents

1. PURPOSE:

To establish, implement, and maintain an effective Injury and Illness Prevention Program (IIPP) at the Roadway Express, Inc. Project.

2. SCOPE:

The scope of this procedure is to outline a written IIPP to ensure a healthy and safe work environment for all employees and visitors at the Roadway Express, Inc. Project, and to ensure compliance with Cal-OSHA Title 8, California Code of Regulations, Sections 3202.

The IIPP consists of the following eight elements:

3. RESPONSIBILITY:

The Injury and Illness Prevention Program administrators

Matt Cox	Project Manager
Mitch Monroe	Site Safety & Health Supervisor
Eric Wenger	Project Certified Industrial Hygienist

Program Administrators have the authority and responsibility for implementing the provisions of this program for; Roadway Express, Inc. Project.

All managers and supervisors are responsible for implementing and maintaining the IIPP in their work areas and for answering employee questions about the IIPP. A copy if this IIPP is available as part of the Hazardous Waste Site Health and Safety Plan.

4. COMPLIANCE:

Management is responsible for ensuring that all health and safety policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly.

All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a healthy and safe work environment.

The system of ensuring that all employees comply with the rules and maintain a healthy and safe work environment include:

1. Informing employees of the provisions of the IIPP.

2 Evaluating the safety performance of all employees
3 Recognizing employees who perform healthful and safe work practices
4 Providing training to employees whose safety performance is deficient
5. Disciplining employees for failure to comply with healthful and safe work practices
6. Training and retraining program
7. The following practices will apply on a daily, weekly and monthly basis:
    A) Job safety Analysis
    B) Safety Meetings
    C) Safety Committee

5. COMMUNICATION AND SAFETY COMMITTEE:

Open two-way communication between management and staff on health and safety issues is essential to an injury-free, productive work place. The following system of communication is designed to facilitate a continuous flow of health and safety information between management and staff in a form that is readily understandable. It consists of the following items:

- New employee orientation including a discussion of health and safety policies and procedures.
- Review of IIPP
- Work place health and safety training and retraining programs
- Regularly scheduled safety meetings.
- Effective communication of health and safety concerns between employees and supervisors, including translation where appropriate
- Post and / or distribute safety information.
- A system for employees to anonymously inform management about workplace hazards. Employees are encouraged to continuously inform site management of hazards at the workplace and without fear of reprisal. (suggestion box)
- All employees will conduct their work in accordance with the California Code of Safe Practices, California Code of Regulations, Title 8 Section 1938 (PlateA-3) and can be located in the field office.

To support and enhance a safe-work culture and open communication, a safety committee has been established This committee will:

- ✓ Meet weekly and not les than quarterly.
- ✓ Prepare written records of committee meetings, and make those records available to all employees.
- ✓ Review results of periodic and scheduled inspections.
- ✓ Review investigations of occupational accidents and causes of incidents resulting in occupational injury, occupational illness or exposure to hazardous substance and where appropriate, submit suggestions to management for the prevention of future incidents.

- ✓ Review investigations of alleged hazardous conditions brought to the attention of any committee member. When determined necessary by the committee, the committee may conduct an independent inspection and investigation to assist in remedial solutions.
- ✓ Submit recommendations to assist in the evaluation of employee safety suggestions.
- ✓ Upon a request by CAL-OSHA, verify abatement actions taken to abate citations issued by CAL-OSHA.

6. HAZARD ASSESSMENT:

Periodic inspections to identify and evaluate workplace hazards shall be performed by the following competent observer(s) in the following areas of the workplace:

Mitch Monroe — Site Safety and Health Supervisor

Periodic inspections are performed according to the following schedule:

1) Per shift, Daily, Weekly, Monthly, Quarterly, and Annually;
2) When IIPP was initially established;
3) When new substances, procedures or equipment which present potential new hazards are introduced into the workplace;
4) When new or previously unidentified hazards are recognized;
5) When occupational injuries and illnesses occur;
6) When personnel are hired, contracted, and for reassigned to processes, operations or tasks for which a hazard evaluation has not been previously conducted; and
7) Whenever workplace conditions warrant an inspection.

Periodic inspections consist of identification and evaluation of workplace hazards by utilizing the Facility Health & Safety Manual, Forms Section. Equipment Inspections, Job Safety Analysis, and any other effective methods to identify and evaluate workplace hazards.

7. ACCIDENT / EXPOSURE INVESTIGATIONS:

Procedures for investigating workplace accidents and hazardous substance exposure include:

1. Visiting the accident scene immediately following an incident;
2. Interviewing the injured workers and witnesses;
3. Examining the workplace for factors associated with the accident / exposure;
4. Determining the cause of the accident / exposure;
5. Conducting a Root Cause Failure Analysis, as needed;
6. Taking corrective action to prevent the accident from recurring; and
7. Recording the findings and corrective actions taken.

The Incident Report form in the Site Safety & Health Plan will be utilized to report, investigate and document accidents and near-miss incidents.

8. HAZARD COMMUNICATION:

Unhealthy and unsafe work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures;

1. When observed or discovered
2. When an imminent hazard exists which cannot be immediately abated without endangering employee (s) and / or property, all exposed employees will be removed from the area except those necessary to correct the existing condition. Personnel necessary to correct the hazardous condition shall be provided with the necessary protection, and
3. All such actions taken and dates they are completed shall be documented on the appropriate forms

Investigation of Accidents and Injuries will be utilized to document corrective actions to prevent the reoccurrence of accidents and near-miss accidents.

9. TRAINING AND INSTRUCTIONS:

All employees, including managers and supervisors, shall have training and instruction on general job-specific health and safety practices. Training and instructions shall be provided as follows:

1. When the IIPP is first established;
2. To all new employees, except for those in construction who are provided training through a CAL-OSHA approved construction industry occupational health and safety training program;
3. To all employees given new job assignments for which training has not been previously provided;
4. Whenever new substances, processes, procedures or equipment are introduced to the workplace and present a new hazard;
5. Whenever the employer is made aware of a new previously unrecognized hazard, Supervisors are to familiarize them with the health and safety hazards to which employees under their immediate direction and control may be exposed; and
6. To all employees with respect to hazards specific to each employees job assignment;
7. Workplace Health and Safety Training and retraining includes, but is not limited to the following;
    1) Explanation of the IIPP, Emergency Action Plan, and Fire Prevention Plan and measures for reporting any unsafe conditions or work practices, and injuries;

2) Use of appropriate clothing, gloves, footwear, hearing protection, eye protection, and other personal protective equipment;
3) Information about chemical hazards to which employees could be exposed and other Hazard Communication Program information;
4) Availability of toilet facilities, washing facilities, and drinking water facilities.
5) Provisions for medical services and first aid including emergency procedures.

In addition, specific instructions will be provided to all employees regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

Training is described in Chapter 10 of the Site Safety & Health Plan.

10. **RECORDKEEPING:**

The Following steps have been taken to implement and maintain the IIPP recordkeeping:

- Records of hazard assessment inspections including the person(s) conducting the inspection, the unsafe conditions and work practices that have been identified, and the action taken to correct the identified unsafe conditions and work practices are recorded on a hazard assessment and correction form
- Documents of health and safety training for each employee, including the employee's name or other identifier, training dates, and type(s) of training are recorded

Inspection records and training documentation will be maintained as follows:

- For at least one (1) year.
- Training records of employees who have worked less than one year will be provided their records upon termination of employment