After recording return to:	LINCOLN COUNTY, NV **2020-158944** Total:$0.00 **09/15/2020 09:13 AM** PIOCHE PUBLIC UTILITIES Pgs=117 AK 00005454202001589441171170 OFFICIAL RECORD AMY ELMER, RECORDER --------Above This Line Reserved For Official Use Only--------
Name:	Nathan Adams, PPU Manager
Address:	P.O. Box 35
City, State, Zip:	Pioche, NV 89043
Phone:	775-962-5840
Assessor's Parcel No.'s = 00632102 and 00630115	

WATER LINE EASEMENT

THIS INDENTURE (this "Easement") is made and entered into this 31st day of August, 2020, by and between GREENFIELD ENVIRONMENTAL MULTISTATE TRUST LLC, not individually but solely in its representative capacity as Trustee of the Multistate Environmental Response Trust, as Grantor (the "Multistate Trust"), having an address of 11 Flagg St., Unit No. 1, Cambridge, MA 02138, and LINCOLN COUNTY, a Nevada body politic and political subdivision of the State of Nevada, as Grantee (the "County"), having an address of P.O. Box 35, Pioche, NV 89043.

WITNESSETH:

WHEREAS, the Multistate Trust has been established pursuant to that certain Consent Decree and Environmental Settlement Agreement (the "Settlement Agreement") entered in the U.S. Bankruptcy Court for the Southern District of New York in the matter of *In re: Tronox Incorporated, et al.*, Case No. 09-10156 (ALG), and that certain Environmental Response Trust Agreement (together with the Settlement Agreement, the "Tronox Bankruptcy Agreements") entered into pursuant to the Settlement Agreement on February 14, 2011;

WHEREAS, pursuant to the Tronox Bankruptcy Agreements, (i) Tronox Incorporated and its affiliates (collectively, "Tronox") conveyed to the Multistate Trust by quitclaim deed Tronox's right, title and interest, if any, in and to the former Kerr-McGee/Tronox Caselton Mine Site located in Lincoln County, Nevada (the "Site"), and (ii) the Multistate Trust's responsibilities include, without limitation, holding its interest in the Site for the benefit of the United States and the State of Nevada (the "Beneficiaries") and investigating and remediating

the Site pursuant to budgets approved by the Nevada Division of Environmental Protection ("NDEP"), in consultation with the United States Environmental Protection Agency ("EPA"); and

WHEREAS, the County desires to locate a public water line on a portion of the Site, and, subject to the terms of this Easement, the Multistate Trust is desirous of granting to the County a non-exclusive right to go upon and use a portion of the Site for placement of said water line;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and subject to (i) any and all covenants, conditions, restrictions, easements, and encumbrances affecting the Site and/or the Easement Area, (ii) any other matters of record, fact or exception which an accurate survey of the Site and/or the Easement Area (as defined hereafter) would show, and (iii) the limitations and conditions enumerated below, the Multistate Trust hereby grants and conveys to the County and its successors and assigns a non-exclusive, perpetual easement to go over, on, above, across, and under the Thirty (30)-foot wide portion of the Site described and shown in Exhibit A attached hereto and incorporated herein by this reference (the "Easement Area") for the purpose of constructing, operating, using, maintaining, repairing, replacing, reconstructing and removing pipelines and all underground and surface appurtenances for conducting water (the "Utility System"), and for no other purpose whatsoever.

SUBJECT, HOWEVER, to the terms and conditions of this Easement including, without limitation, the following:

1. Access Conditions. In each instance that the County wishes to access the Easement Area, the County must provide the Multistate Trust with at least one (1) week's prior written notice in accordance with Section 10. County representatives shall not be permitted to access the Easement Area unless they have been properly trained in accordance with Section 3 or they are accompanied by a Multistate Trust representative or contractor at all times. Notwithstanding the foregoing, in an emergency situation (including a situation in which a resident of the County needs water service restoration or a situation in which there is danger or anticipated danger to an individual or property, whether belonging to the County or a third party) the County shall be permitted to enter upon the Easement Area, provided that the County (a) immediately notifies the Multistate Trust of the emergency access event via telephone or electronic mail as set forth in Section 10, and (b) provides the Multistate Trust with a detailed written description of actions taken in connection with the emergency access event within forty-eight (48) hours thereafter.

2. Compliance with Plans and Specifications. The County's work on the Easement Area must be performed in compliance with the plans and specifications approved by, as appropriate, the NDEP's Bureau of Safe Drinking Water or the Multistate Trust, including, without limitation, the County's health and safety plan relating to its proposed construction work attached hereto as Exhibit B and incorporated herein by this reference, describing, among other things, disturbance areas and specific mitigation measures.

3. Personnel Safety Precautions. Each County representative accessing the Easement Area shall be either appropriately trained to perform work on the Easement Area (in accordance with the Occupational Safety and Health Administration's ["OSHA"] Hazardous Waste Operations and Emergency Response ["HAZWOPER"] standards or otherwise) or shall be escorted/accompanied by a person so trained, and will wear appropriate personal protective equipment at all times while on the Easement Area. Subject to one or both Beneficiaries' approval, the Multistate Trust agrees to pay reasonable costs for up to three County individuals to participate in 40-hour HAZWOPER training under 29 CFR 1910.

4. Maintenance. The County shall have the right, but not the obligation, to cut, trim, or remove trees, brush, and other unauthorized obstructions, which may impede or interfere with the County's use.

5. Land Use Restrictions. Except for water line-related structures permitted hereunder, no buildings or structures (including walls, but excluding fences, which shall neither obstruct nor otherwise interfere with any of the rights granted to the County hereby), trees, or landscaping shall be placed upon, over or under the Easement Area for the duration of this Easement.

6. Reservation of Rights. The Multistate Trust reserves the right to enter upon and use such portions of the Easement Area as may be necessary for the Multistate Trust to comply with all applicable laws and perform the Multistate Trust's obligations under the Tronox Bankruptcy Agreements, including, without limitation, implementation of environmental site assessments and/or remediation work. In addition, the Multistate Trust reserves the right to require the County to cause any contractor not performing work in full compliance with applicable laws, permitting and regulatory requirements (including, without limitation, worker health and safety regulations and Environmental Laws (as defined hereafter)) to immediately cease its activities upon and depart from the Easement Area. The County shall: (a) cooperate with the Multistate Trust to the extent that any of the foregoing activities affect the Easement Area; (b) restore the Easement Area to its approximate level and condition that existed prior to construction of the Utility System; (c) solely bear the cost associated with such restoration of the Easement Area; (d) keep the Easement Area free from liens arising in any manner related to the County's use of the Easement Area, and promptly discharge any lien that may be asserted by any third party arising in any manner relating to the foregoing; (e) cooperate with the Multistate Trust to the extent that any of the foregoing activities affect the Easement Area; and (f) conduct any and all construction and/or repair or maintenance activities in a manner so as not to interfere with or impede the Multistate Trust's activities at the Site and/or the Easement Area.

7. No Representations or Warranties. The County, for itself and its successors and assigns, expressly acknowledges and agrees that no representations, warranties, covenants, guaranties or promises of any kind, express or implied, have been made by the Multistate Trust or the Multistate Trust's agents or representatives to the County or to the County's agents or representatives with respect to the Site and/or the Easement Area. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, THE COUNTY EXPRESSLY ACKNOWLEDGES AND AGREES THAT IT ACCEPTS THE UTILITY EASEMENT AREA AND THE RIGHTS GRANTED HEREUNDER "AS IS," "WHERE IS" AND "WITH ALL FAULTS." The

Multistate Trust hereby expressly disclaims any and all representations or warranties as to: (a) the Site's and/or the Easement Area's compliance with any and all federal, state or local laws, rules, regulations, ordinances or other requirements, including, without limitation, any such laws or other requirements with respect to the maintenance and/or removal of improvements, if any, on the Site and/or the Easement Area; (b) the environmental condition of the Site and/or the Easement Area; (c) the Site's and/or the Easement Area's compliance with Environmental Laws (as defined hereafter); (d) restrictions on usage of the Site and/or the Easement Area imposed by any governmental authority or the suitability of the Easement Area as a developable or useable site for any purpose; (e) the acreage or square footage of the Site and/or the Easement Area; and (f) the status of title to the Site and/or the Easement Area. The County hereby assumes, and shall be solely responsible for, all environmental matters affecting or arising as a result of the County's use of the Easement Area and the rights granted herein and for its compliance with all Environmental Laws (as defined hereafter) and the presence of any Hazardous Substances (as defined hereafter), if any, on, in, under, or migrating from or otherwise attributable to the Site and/or the Easement Area. "Environmental Laws" means any past, present, or future federal, state, or local laws, statutes, ordinances, regulations, judgments, and orders and the common law, including the law of strict liability and the law of abnormally dangerous activities, relating to environmental matters, including, without limitation, provisions pertaining to or regulating air pollution, water pollution, noise control, wetlands, watercourses, wildlife, Hazardous Substances, or any other activities or conditions which impact or relate to the environment or nature. "Hazardous Substances" means any hazardous waste, hazardous substance or material, as defined under any Environmental Law or any pollutant, contaminant, radioactive or biological material or waste, or petroleum or petroleum related products or waste.

8. Release and Covenant Not to Sue. The County, for itself and its agents, representatives, contractors, successors and assigns, hereby releases, remises and forever discharges the Multistate Trust, Greenfield Environmental Multistate Trust LLC (both in its individual capacity and in its representative capacity as the Trustee of the Trust), Greenfield Environmental Trust Group, Inc. (and each of their respective officers, directors, shareholders, partners, employees, members, agents and representatives), the Beneficiaries (and their respective agencies and departments), and the respective officers, directors, shareholders, partners, employees, members, agents, representatives, successors, and assigns of each of them (collectively, the "Multistate Trust Parties") from and against, and irrevocably and unconditionally waives, all Claims (as defined hereafter) and liability against the Multistate Trust Parties for or attributable to any and all losses, costs, claims, liabilities, expenses, demands, fees or obligations of any kind or nature whatsoever, whether known or unknown and foreseen or unforeseen, attributable to the environmental condition of the Site and/or the Easement Area, whether arising or accruing before, on or after the date hereof, and whether attributable to events or circumstances which have heretofore or may hereafter occur, including all losses, costs, claims, liabilities, expenses, demands, fees and obligations relating to the presence, discovery, release or removal of any Hazardous Substances in, at, under or about the Easement Area. "Claim," as used herein, means all demands, actions, causes of action, suits, proceedings, covenants, contracts, agreements, damages, claims, counterclaims, third-party claims, cross claims, contribution claims, indemnity claims, executions, judgments, losses, penalties, obligations and liabilities whatsoever, of every name, kind, type, nature or description, in law or in equity, arising under federal, state or local law or other statute, law, regulation or rule of any

kind, whether known, unknown, direct, indirect, absolute, contingent, disclosed, undisclosed or capable or incapable of detection. The County, for itself and its agents, representatives, contractors, successors and assigns, agrees that it and they will not institute any action, suit or proceeding, and will not implead, join, seek contribution or indemnification from, or otherwise involve any Multistate Trust Party in any action, suit or proceeding which is the subject of the release provided in this Section 8.

9. Institutional Controls. The County agrees to comply with and cause its contractors to comply with any restrictions on future use or other institutional controls on any portions of the Site and/or the Easement Area required by the Beneficiaries or any other governmental authority in accordance with applicable laws, permitting and regulatory requirements (including, without limitation, worker health and safety regulations and Environmental Laws).

10. Notices. All notices, requests and other communications to the Multistate Trust shall be only by electronic mail (except for emergency access events, in which case notices may be provided via electronic mail or telephone) to the email address set forth below, with the Multistate Trust agreeing to promptly reply with a read receipt upon actual receipt. Notice to the County shall be in writing addressed to the County as set forth below and shall be deemed to have been delivered one (1) business day after deposit with a nationally recognized overnight courier service. Actual knowledge may obviate the need to formally give or receive notice if actual knowledge can be demonstrated by conduct or communications.

If to the Multistate Trust:
Email: notices@g-etg.com and
tl@g-etg.com
Tel: 602.312.6993

If to the County:
Lincoln County, Pioche Public Utilities
P.O. Box 35
Pioche, NV 89043
Email: pputilities@lcturbonet.com
Tel: 775.962.5840

Each party may change its notice address(es) by providing notice of the new address to the other party.

11. Tronox Bankruptcy Agreements. Nothing in this Easement shall be interpreted as affecting or impairing in any way the exculpations, immunities, liability protections and other rights extended to the Multistate Trust and its related entities under the Tronox Bankruptcy Agreements.

12. Beneficiary Approval. This Easement is subject to the prior approval of the Beneficiaries. In the event the Multistate Trust is unable to procure such approvals, this Easement shall be null and void without recourse to the Parties.

13. Recording Fees. The County agrees to pay all recording fees and costs incidental to the recordation of this easement, and any and all other costs and expenses of County arising out of or relating to this Easement.

14. Successors and Assigns. All provisions of this Easement, including the benefits and burdens hereof, run with the land and are binding upon and inure to the benefit of the Multistate Trust and the County and their heirs, assigns, successors, tenants and personal representatives.

15. Governing Law. This Easement shall be governed by and construed in accordance with the laws of the State of Nevada.

[Signatures on following page]

IN WITNESS WHEREOF, the Multistate Trust and the County have caused this Easement to be executed as of the day and year first above written.

GREENFIELD ENVIRONMENTAL MULTISTATE TRUST LLC,
not individually but solely in its representative capacity as
Trustee of the Multistate Environmental Response Trust

By: Greenfield Environmental Trust Group, Inc., Member

By: _____
Name: Cynthia Brooks
Title: President

ACCEPTANCE OF GRANT OF EASEMENT

LINCOLN COUNTY, NEVADA

By: Lincoln County Board of Commissioners

By: _____
Name: Varlin Higbee
Title: Commision Chairman
* Loose Notary Certificate Attached *

State of Massachusetts)
)SS.
County of Middlesex)

On this 31st day of August, 2020, before me, the undersigned notary public, personally appeared Cynthia Brooks, provide to me through satisfactory evidence of identification, which were Mass Drivers License to be the person whose name is signed on the preceding document, and acknowledged to me that she signed it voluntarily for its stated purpose as President of Greenfield Environmental Trust Group, Inc., Member of Greenfield Environmental Multistate Trust LLC, Trustee of the Multistate Environmental Response Trust.

SUSAN DOUGLAS-PRECOBB NOTARY PUBLIC COMMONWEALTH OF MASSACHUSETTS MY COMMISSION EXPIRES ON 09-20-2024

_____
Notary Public
Name: Susan Douglas-Precobb
My commission expires: Sept 20, 2024

State of Nevada)
)SS.
County of Lincoln)

On this 10th day of March, 2020, before me appeared Varlin Higbee, to me personally known, who, being by me duly sworn, did say that he is the Chairman of the Lincoln County Board of Commissioners; and acknowledged the foregoing to be the free act and deed of said County.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal as of the day and year above written.

M Howard
Notary Public
Name: Mercedes Howard
My commission expires: 12/10/2023

M. HOWARD
Notary Public, State of Nevada
My Commission Expires: 12-10-23
Certificate No: 08-5566-11

** This instrument and Notary Certificate is attached to a Water Line Easement between Greenfield Environmental Multistate Trust LLC and Lincoln County for APN 006 32102 and 006 30115 **

APN: 006-301-15
BUREAU OF LAND MANAGEMENT

BY: TLT
JOB#: 04465
DATE:5/18/2020

EXHIBIT "A"
LEGAL DESCRIPTION
PROPOSED EASEMENT

A PARCEL OF LAND, BEING SITUATE IN THE NORTHWEST QUARTER OF SECTION 28 AND THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 1 NORTH, RANGE 67 EAST, MOUNT DIABLO MERIDIAN, LINCOLN COUNTY, NEVADA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A STRIP OF LAND 30' IN WIDTH, LYING 10 FEET SOUTHWESTERLY AND 20 FEET NORTHEASTERLY OF THE FOLLOWING DESCRIBED CENTERLINE:

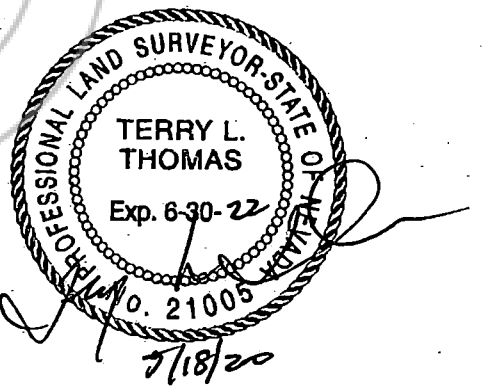
COMMENCING AT THE NORTHWEST CORNER OF SAID NORTHWEST QUARTER OF SECTION 28; THENCE ALONG THE WEST SECTION LINE OF THE SAID NORTHWEST QUARTER OF SECTION 28, S.00°21'29"W., A DISTANCE OF 1,638.37 FEET TO THE **POINT OF BEGINNING (POB)**; THENCE DEPARTING SAID SECTION LINE, N.73°29'35"E., A DISTANCE OF 85.54 FEET TO THE **POINT OF ENDING (POE)**.

THE SIDELINES OF SAID STRIP OF LAND SHALL BE PROLONGED OR SHORTENED AS TO TERMINATE AT A LINE PERPENDICULAR TO THE **POINT OF ENDING** AND TO TERMINATE AT THE WEST SECTION LINE OF SAID NORTHWEST QUARTER OF SECTION 28 AT THE **POINT OF BEGINNING.**

THE LANDS DESCRIBED HEREIN CONTAIN 2,520.60 SQUARE FEET, MORE OR LESS.

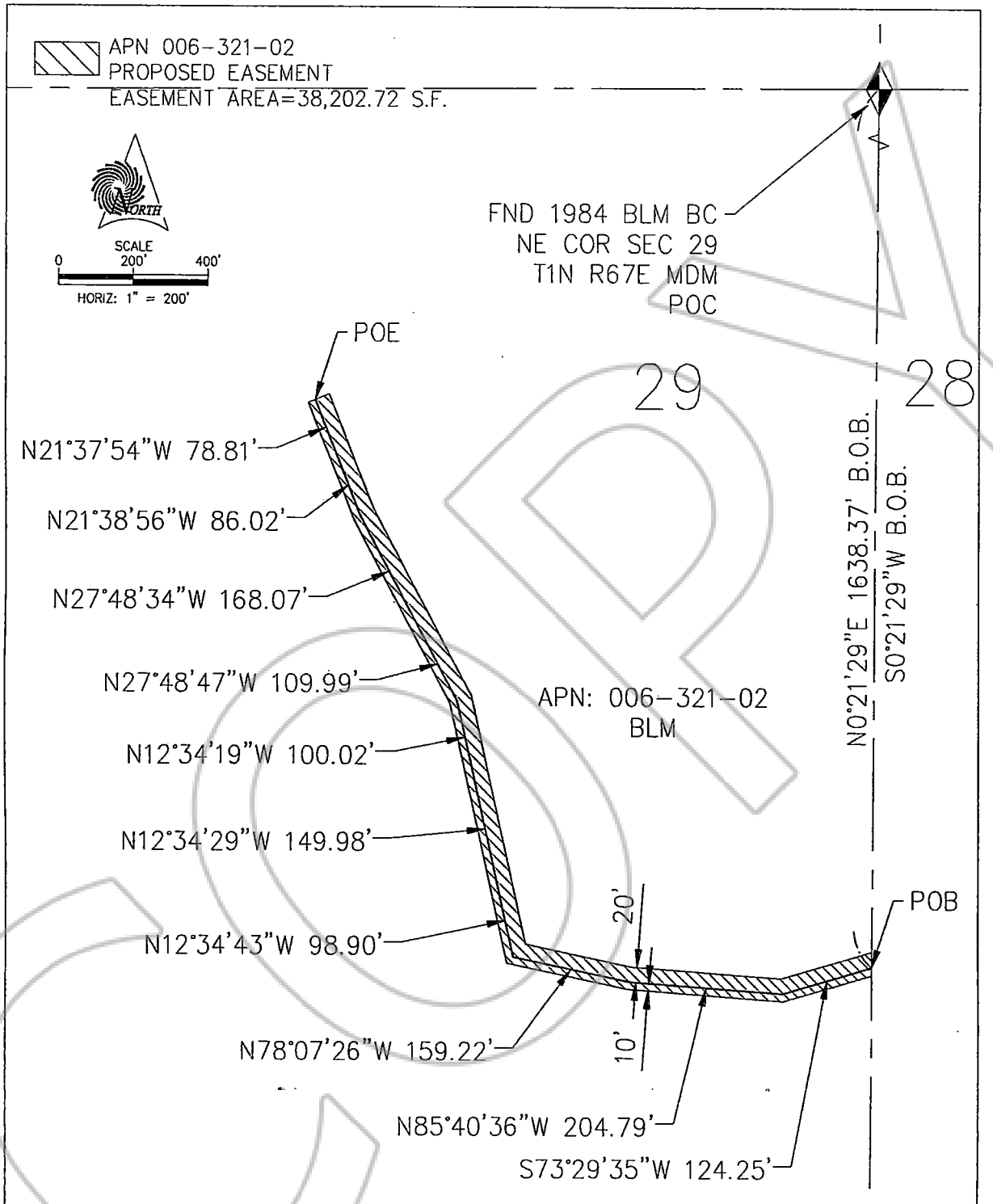
SEE EXHIBIT "B" ATTACHED.

BASIS OF BEARINGS:
THE BASIS OF BEARINGS FOR THIS SURVEY IS N.00°21'29"E., BEING THE WEST LINE OF AFORESAID NORTHWEST QUARTER OF SECTION 28, AS SHOWN ON RECORD OF SURVEY BOOK D, PAGE 0249 ON FILE IN THE OFFICE OF RECORDER, LINCOLN COUNTY, NEVADA.



TERRY L. THOMAS
NEVADA PROFESSIONAL LAND SURVEYOR
LICENSE NO. 21005

SUNRISE ENGINEERING
5135 CAMINO AL NORTE, SUITE 160
NORTH LAS VEGAS, NEVADA 89031
(702) 830-9174



SUNRISE ENGINEERING
5135 CAMINO AL NORTE, SUITE 160
NORTH LAS VEGAS, NEVADA 89031
TEL 702.830.9180
www.sunrise-eng.com

EXHIBIT "B2"

PROPOSED EASEMENT

SECTION 28, T.1N, R.67E, M.D.M., LINCOLN COUNTY, NV

DATE:	05/18/20
BY:	TLT
SCALE:	1" = 200'
SHEET NO.	2 OF 2

APN: 006-321-02
BUREAU OF LAND MANAGEMENT

BY: TLT
JOB#: 04465
DATE:5/18/2020

EXHIBIT "A"
LEGAL DESCRIPTION
PROPOSED EASEMENT

A PARCEL OF LAND, BEING SITUATE IN THE NORTHEAST QUARTER OF SECTION 29, TOWNSHIP 1 NORTH, RANGE 67 EAST, MOUNT DIABLO MERIDIAN, LINCOLN COUNTY, NEVADA, BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

A STRIP OF LAND 30' IN WIDTH, LYING 10 FEET SOUTHWESTERLY AND 20 FEET NORTHEASTERLY OF THE FOLLOWING DESCRIBED CENTERLINE:

COMMENCING AT THE NORTHEAST CORNER OF SAID NORTHEAST QUARTER OF SECTION 29; THENCE ALONG THE EAST SECTION LINE OF THE SAID NORTHEAST QUARTER OF SECTION 29, S.00°21'29"W., A DISTANCE OF 1,638.37 FEET TO THE **POINT OF BEGINNING (POB)**; THENCE DEPARTING SAID SECTION LINE, S.73°29'35"W., A DISTANCE OF 124.25 FEET; THENCE N.85°40'36"W., A DISTANCE OF 204.79 FEET; THENCE N.78°07'26"W., A DISTANCE OF 159.22 FEET; THENCE N.12°34'43"W., A DISTANCE OF 98.90 FEET; THENCE N.12°34'29"W., A DISTANCE OF 149.98 FEET; THENCE N.12°34'19"W., A DISTANCE OF 100.02 FEET; THENCE N.27°48'47"W., A DISTANCE OF 109.99 FEET; THENCE N.27°48'34"W., A DISTANCE OF 168.07 FEET; THENCE N.21°38'56"W., A DISTANCE OF 86.02 FEET; THENCE N.21°37'54"W., A DISTANCE OF 78.81 FEET TO THE **POINT OF ENDING (POE).**

THE SIDELINES OF SAID STRIP OF LAND SHALL BE PROLONGED OR SHORTENED AS TO TERMINATE AT THE EAST SECTION LINE OF SAID NORTHEAST QUARTER OF SECTION 29 AT THE **POINT OF BEGINNING** AND A LINE PERPENDICULAR TO THE **POINT OF ENDING.**

THE LANDS DESCRIBED HEREIN CONTAIN 38,202.72 SQUARE FEET, MORE OR LESS.

SEE EXHIBIT "B" ATTACHED.

BASIS OF BEARINGS:
THE BASIS OF BEARINGS FOR THIS SURVEY IS N.00°21'29"E., BEING THE EAST LINE OF AFORESAID NORTHEAST QUARTER OF SECTION 29, AS SHOWN ON RECORD OF SURVEY BOOK D, PAGE 0249 ON FILE IN THE OFFICE OF RECORDER, LINCOLN COUNTY, NEVADA.

TERRY L. THOMAS
NEVADA PROFESSIONAL LAND SURVEYOR
LICENSE NO. 21005

SUNRISE ENGINEERING
5135 CAMINO AL NORTE, SUITE 160
NORTH LAS VEGAS, NEVADA 89031
(702) 830-9174

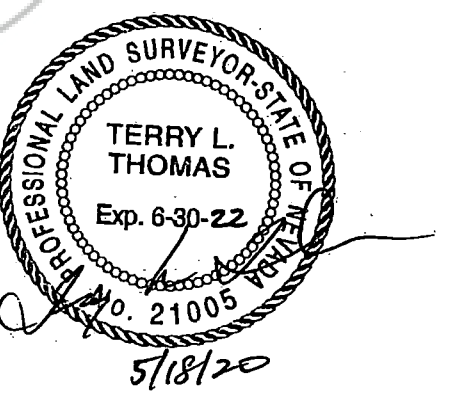
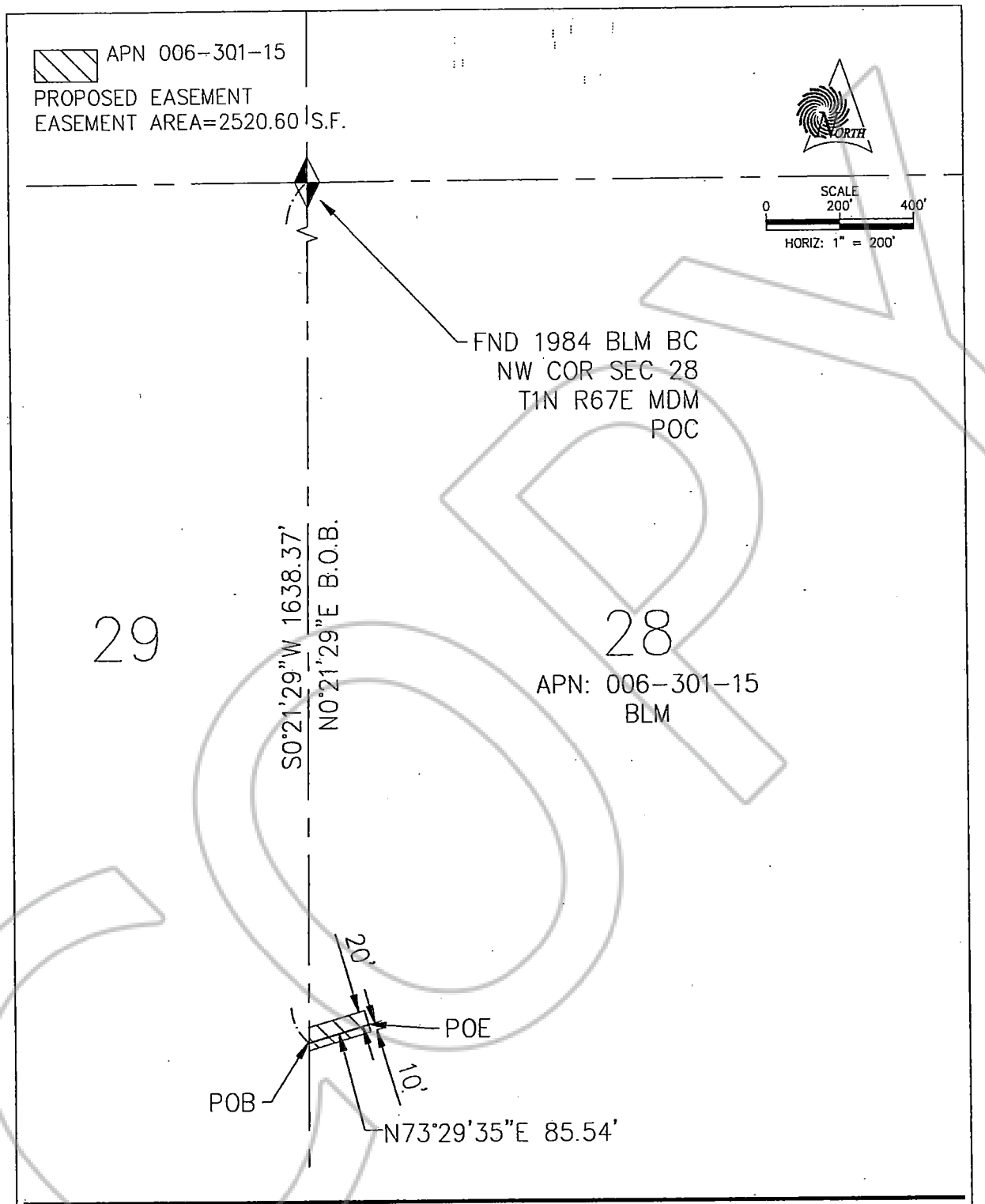


EXHIBIT A

Easement Area
[Attached]



SUNRISE ENGINEERING

5135 CAMINO AL NORTE, SUITE 160
NORTH LAS VEGAS, NEVADA 89031
TEL 702.830.9180
www.sunrise-eng.com

EXHIBIT "B"

PROPOSED EASEMENT

SECTION 28, T.1N, R.67E, M.D.M., LINCOLN COUNTY, NV

DATE:	05/18/20
BY:	TLT
SCALE:	1" = 200'
SHEET NO.	2 OF 2

EXHIBIT B

County Health and Safety Plan
[Attached]

HEALTH AND SAFETY PLAN

Caselton Public Water System Improvement Easement

Prepared for:

PIOCHE NEVADA

Pioche Town
644 Main Street
P.O. Box 127
Pioche, NV 89043

Prepared by:

SUNRISE ENGINEERING

Dow Yang, CEM (2386)
6875 South 900 East
Midvale, UT 84047

Signature

Reviewed by:

Derek Anderson, P.E.

Signature

Submitted to:

Greenfield Environmental Multistate Trust LLC,
Trustee of the Multistate Environmental Response Trust

April 27, 2020

HEALTH AND SAFETY PLAN

CASELTON PUBLIC WATER SYSTEM IMPROVEMENT EASEMENT

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1 INTRODUCTION

1.1 Purposes

The purpose of this site-specific Health and Safety Plan (HASP) is to establish in detail the procedures and protocols necessary for protecting site workers, on-site personnel, visitors and the general public from hazards associated with site activities during the excavation of soils and hazardous materials and site preparation for the installation of a water transmission line through the land transferred to the Multistate Environmental Response Trust (Multistate Trust) and managed by the Greenfield Environmental Multistate Trustee (Trustee) for the Caselton Public Water System Improvements Project proposed by Pioche Public Utilities (PPU). This HASP also establishes the work plan for the project that will be performed by PPU.

1.2 Background

Caselton is located approximately one mile southwest of Pioche, Nevada, as shown in **Figure 1**. PPU owns and operates a water system (Caselton water system) that provides culinary water to the citizens, businesses and visitors of Caselton. However, the Caselton water system is currently barely operational which may soon affect the health and well-being of the water users. This is due to severe leaking from the pipelines which are currently running aboveground and require a significant amount of maintenance. As a result, PPU has proposed to install 1,410 feet of 6-inch diameter PVC pipe at a location that will function well for future maintenance. Approximately 1,200 feet (or 85%) of the pipeline will be installed through Multistate Trust land, as shown in **Figure 1**. The topographic locale of the project site is in the northwestern quarter of Section 28 and the northeastern quarter of Section 29, Township 1 North, Range 67 East (see **Figure 1**).

The pipeline project will serve multiple purposes. It will allow for the Caselton water storage tank to be isolated while still providing the water users in the system with water and allowing for more efficient tank repairs and improvements. Additionally, upon the completion of the project, the aboveground leaking pipelines which require significant maintenance will be abandoned. Ultimately, this project will improve efficiency and is the only viable option to continue to serve the current water users in Caselton with potable drinking water.

Since part of the project will require an easement for pipeline installation from Multistate Trust, Multistate Trust and its Contractor, Brown and Caldwell (BC), have reviewed the preliminary project plan and conducted site visits to the project area on May 14 and October 23, 2019. BC indicated the following three potential health and safety concerns:

1. Portions of the proposed easement area appear to be in or closely adjacent to waste rock dump material that likely originated from the Caselton Mine. No analytical data on the dump material in the project area is available. However, in the Treasure Hill area (about 1.5 miles east of the project area, as shown in **Figure 1**), the waste rock piles contained lead at an average

concentration of approximately 7,000 mg/kg (ppm). Even if the waste rock in the project area is less impacted by lead than Treasure Hill, it is likely the lead concentration is still greater than 1,000 ppm. Assuming a concentration of 1,000 ppm, there is a potential inhalation hazard for workers exposed to high dust levels during excavation operations. PPU should evaluate the hazards and implement appropriate mitigation and protection measures.

2. A hazardous building materials survey has not been performed for the buildings adjacent to the proposed pipeline corridor. Considering the age of the buildings, the presence of asbestos-containing material (ACM) is likely and it is unknown if ACM is present in the soils around the buildings, ACM in soils is a potential hazard to be evaluated.
3. A leaking transformer was observed to be adjacent to the mine electrical substation. This transformer is of an age where polychlorinated biphenyl (PCB) oils were typically used. If so, the excavation area for the pipeline may pass through PCB impacted soils. However, the pipeline is not expected to pass through the transformer enclosure.

1.3 Statement of Safety and Health Policy

This HASP is intended to provide site-specific procedures to address known hazardous conditions and potentially hazardous conditions that may be encountered at the site. Site activities in conjunction with this project may pose unique safety, chemical, and/or physical hazards that require specialized expertise to address. The Emergency Response Section of the HASP addresses hazards that have not been identified or anticipated.

This HASP addresses topics required by OSHA 29 CFR 1910.120(b)(4) and 1926.65(b)(4). The objectives of this document include but are not limited to:

- Statement of safety and health policy
- Site description and contamination characterization
- Safety and health risk analysis and activity hazard analysis
- Regulations
- Staff organization/administration
- Hazard communication training
- Medical surveillance
- Exposure monitoring
- Health and safety equipment
- Standard operating procedures
- Identification and evaluation of potential and unanticipated hazards
- Definition of levels of protection required for certain work activities
- Establishment of work zones
- Formation of emergency action plans
- Development of personnel training
- Development of decontamination procedures (personal and equipment)

- Heat and cold stress
- Emergency equipment and first aid requirements
- Spill enclosure program
- Logs, reports and recordkeeping
- Inspections and audits
- Permit required confined space entry program

PPU views the HASP as an important document that is necessary to the success of the work at the project site. Every effort will be made to facilitate the HASP in compliance with applicable federal, state and local regulations.

The purpose and intent of the HASP is to protect workers from exposure to hazardous materials and to ensure that the work at the project site is conducted in a safe manner. The on-going program will be directed at recognizing and dealing with the specific hazards at the site as needed to protect employees.

Along with site personnel safety, a second major objective is to perform site operations in such a manner as to minimize the possibility of any unplanned or sudden release of hazardous waste contaminants into the environment that could adversely affect local receptors. The HASP has been developed to meet these essential objectives and facilitate the safe execution of this project.

The HASP is a dynamic document and will be reviewed and modified (if necessary) throughout the duration of the project to facilitate flexibility and adaptability as changes occur and new situations develop. These changes will be reviewed and/or accepted by the project manager of PPU and the Multistate Trust representative. Any changes to the plan may necessitate additional training.

Standard Operating Procedures (SOPs) are attached to this HASP (see **Attachment A**) for preventing accidents and protecting personnel from occupational illness for all operations having significant accident potential. These procedures are required to be read and observed by all workers, on-site personnel and visitors to the site. These SOPs are generic in nature and may be modified to fit the specific needs of this project. They are included for general reference only and are not a specific requirement of this HASP.

Maintaining effective communication is important to assuring the safe completion of the project. PPU will notify Multistate Trust as quickly as possible should any unforeseen safety hazard or condition becomes evident during the performance of the work.

1.4 Applicable Regulatory Requirements

The site-specific HASP shall be consistent with the requirements of:

1. Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) including amendments as stated in Federal Register March 6, 1989: 9294-9336 (Final Rule, 29.CFR 1910.120 "Hazardous Waste Operations and Emergency Response").
2. United States Environmental Protection Agency (EPA) Standard Operating Safety Guidelines, Office of Emergency and Remedial Response, Hazardous Response Support Division. Revised November 1984.
3. National Institute of Occupational Safety and Health NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance (OSHG) Manual for Hazardous Site Activities, October 1985, Department of Health and Human Services (DHHS), NIOSH Publ. No. 85-115.
4. OSHA Construction Asbestos Standard 29 CFR 1926.1101.
5. Other federal regulations, codified in the Code of Federal Regulations, and consensus standards developed by ANSI and ACGIH are referenced in the HASP. These include:
    a) ACGIH: (2009) Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices
    b) ANSI Z358.1 (1990) Emergency Eyewash and Shower Equipment
    c) 29 CFR 1904: Recording and Reporting Occupational Safety and Health Injuries and Illnesses
    d) 29 CFR 1910: General Industry Standards
    e) 29 CFR 1926: Construction Industry Standards
    f) 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response
    g) 40 CFR 260-270 EPA Hazardous Waste Regulations
    h) 49 CFR 172 Department of Transportation Hazardous Materials Tables, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements (for transporters of hazardous waste).

1.5 Definitions

The following definitions shall be used throughout this HASP.

1. On-site Personnel – Personnel employed by PPU, any subcontractor hired by PPU, Owner's representative, Property Owner's representative, and any state or local regulatory authorities.
2. Contractor/Subcontractor Personnel – Any employees hired by a contractor or subcontractor for this project. The contractor or subcontractors involved with soil intrusive activities shall develop their own HASP specific for the site activities they will be performing.
3. Owner – PPU
4. Property Owner – Multistate Trust and other property owners involving the project
5. Visitor – Anyone other than On-Site Personnel.
6. Site Safety and Health Officer (SSHO) – The designated "competent person" responsible for overseeing site safety activities for PPU or their personnel. PPU or their designee will provide an SSHO to implement this plan. The SSHO will be on site during all work performed within the fenced area on Multistate Trust land.

7. Site – For the purpose of the HASP, the site shall be all the area within the project limits as defined by the Site Plan.
8. Monitoring – The use of direct or indirect reading field instrumentation to provide information regarding the levels of gases and vapors or other airborne contaminants which are or may be released during site activities. Monitoring is conducted to evaluate employee exposures to toxic materials as well as off-site migration of airborne contaminants. Perimeter air monitoring will be performed within 50 feet of the fenced area. Refer to Section 6 of the HASP.
9. Physician – A licensed Physician with experience in the practice of occupational medicine.

1.6 Minimum Requirements

This HASP includes the following subjects:

1. Site description and evaluation
2. Names of key personnel for site safety and health
3. Health and safety assessment and risk analysis for each site task
4. Training & education
5. Personal protective equipment (PPE)
6. Medical surveillance
7. Air monitoring
8. SOPs, engineering controls
9. Site control measures
10. Personnel hygiene and decontamination
11. Logs, reports and housekeeping
12. Emergency equipment and first aid
13. Emergency response plan
14. Heat/cold stress monitoring
15. Vapor control
16. Fire/explosion
17. Temporary facilities
18. Site control
19. Action levels and responses

2 ORGANIZATION AND SAFETY RESPONSIBILITY

2.1 Introduction

Implementation of this site-specific HASP is a key management responsibility. The HASP includes a listing of health/safety personnel, and a description of their specific responsibilities for implementation of the program. Clear lines of authority, consistent with good operating policies and procedures, have been established for enforcing safety compliance. The qualifications of the site safety and health personnel are included in the appendices.

2.2 Line Management/Chain-of-Command

PPU's current general manager will be the Project Manager. The Project Manager has overall accountability for contractual issues on this project, for the selection of subcontractors and for scheduling and timetable for work. The Project Manager also has overall accountability for implementation of the HASP by PPU and subcontractor employees.

PPU's current general manager will be the Project Superintendent. The Superintendent has accountability for day-to-day operations at the site, for activities of the subcontractors, for implementation of the HASP by PPU employees and subcontractors, to conduct periodic safety meetings, and to investigate accidents and near misses on the site.

2.3 Site Safety and Health Officer (SSHO)

The Site Safety and Health Officer (SSHO) will be designated and provided by PPU prior to the start of construction. The SSHO will provide for the on-site safety of PPU personnel.

The experience of the SSHO shall include training for Level C, Level D and Modified Level D sites; specialized training in personal and respiratory protective equipment, program implementation, and use of air monitoring instrumentation and methodology; a working knowledge of Federal and state safety and health regulations; current certification in first aid and cardio-pulmonary resuscitation; and 40 hour OSHA HAZWOPER training, current refresher certificates, and medical monitoring approval in addition to supervisory training.

The SSHO will monitor work locations for employee health and safety purposes, as well as document any employee exposures and/or substance releases that may occur through the course of this project. The SSHO is trained and experienced to be proficient in the proper use and limitations of all monitoring equipment that may be utilized. The SSHO is responsible for operating the equipment, implementing the HASP, and performing any other duties assigned to him. The SSHO is also empowered to deny access to the site or restrict the presence of any persons (under his control), and also has the authority to cease activities on-site if and when conditions present uncontrollable risks to site personnel and off-site

receptors. The SSHO shall also be responsible for coordinating, conducting and documenting any required training activities, performing and maintaining record keeping duties, and carrying out any other duties specified by site management.

The SSHO will be the main contact for any on-site emergency situation. Except in an emergency, the SSHO may modify the approved HASP only after the consultation with the Multistate Trust.

The SSHO will be familiar with all matters pertinent to this project and shall implement the HASP as required. This includes field supervision; maintaining contamination control zones; enforcing safe work practices and decontamination procedures; ensuring proper use of personal protective equipment; and communicating modified safety requirements to site personnel.

2.4 Preconstruction Safety Conference

Prior to the start of soil intrusive work, PPU shall conduct a safety conference to discuss the hazards anticipated on the site, training on hazard recognition, response to emergencies, explanation of site activities, purchasing safety supplies, identifying safety personnel, decontamination procedures, levels of PPE required, air monitoring activities, and other topics relevant to the safety of site workers. The safety conference will apply to all PPU employees and their subcontractors.

2.5 Training and Site Briefing/Education

The SSHO or his designee will present a safety briefing to inform employees, contractors, subcontractors, and visitors who will be performing work in or entering the Exclusion Zone (EZ) or Contaminant Reduction Zone (CRZ) during field operations. This briefing will cover the special hazards and procedures to control these hazards. All prime and subcontractor employees, Project Engineer's representatives and visitors shall complete this briefing before working in identified portions of the site. A copy of training records for all workers completing this training shall be kept by PPU and submitted with the HASP.

The SSHO shall keep records of training for all site personnel and site visitors. Copies of the training records for all workers associated with the project will be made available upon request. All workers and visitors shall sign a daily log before entering the CRZ or EZ. The locations of the CRZ and EZ areas are identified by the limits of excavation and fencing. A copy of the records will become a part of the permanent project documentation.

All personnel of PPU or their subcontractors shall receive appropriate training as asbestos abatement workers and supervisors. Training shall include a minimum of two hours of site-specific asbestos-related training (general awareness) for all persons involved in operations conducted within areas where asbestos fibers are presumed to be present. All persons conducting removal activities that may involve

direct contact with potential asbestos fibers, hand excavation etc. shall have 32 hours of asbestos abatement worker's training.

PPU employees and subcontractor employees that do not perform soil intrusive activities or are working outside the limits of the work area, including office personnel, fence installation and truck drivers who remain in vehicles do not have to be licensed as abatement workers/supervisors. Workers within the area where ACM is presumed to be present, but who do not perform intrusive work in contaminated soil, will receive the minimum two hours of asbestos general awareness training.

2.5.1 Training Requirements

This plan will go into effect at any time when performing soil intrusive activities; when employees are exposed or have the potential to be exposed to a hazardous material at concentrations which exceed an applicable OSHA standard; in the event of a release or an emergency situation occurs such as encountering unanticipated drums, storage tanks or pockets of petroleum contaminated soils; in areas where the level of volatile organic carbons (VOCs) exceeds 1 ppm above the background for a period of ten minutes continuously, in areas where there is visible evidence of asbestos fibers, oils or hazardous materials or other indicators that employees may be exposed to elevated levels of degradation products from fill or other chemicals. **It is anticipated that most or all of the work within the Multistate Trust land will be performed at Level C, while work outside Multistate Trust land will be at Level D or Modified Level D. Soil excavation and other activities within the fenced area until the protective cover is restored will be performed at Level C. The length of the soil excavation work within the fenced area is anticipated to take less than 30 days. A decision to upgrade PPE above Level C represents a change in condition at the site.**

All PPU personnel or their subcontractors and subcontractor employees who will be entering any of the EZ or CRZ areas will be required to provide proof of having received appropriate training. All site personnel are required to have Hazard Communication Training which meets the OSHA Construction Industry requirements detailed in 29 CFR 1926.59. Proof of this training for each worker will be provided as necessary.

Workers who will be incidental to the site work, such as individuals working in project trailers or those who work in Support Zones and who will not be coming into contact with excavated or removed soil from the site, do not require Hazard Communication training but will be required to attend a site safety briefing from the SSHO. Drivers of trucks hauling dirt from the site do not require Hazard Communication training provided they remain in their trucks and demonstrate that they have received Hazard Communication training during the previous 12-month period.

2.5.2 Site Safety and Health Briefing

All PPU personnel covered by this HASP will be required to read and understand this document. Prior to any on-site activity involving a disturbance of the protective cover, all on-site personnel and visitors will be required to attend a site safety and health briefing from the SSHO or other designated, qualified person. This is applicable to all on-site personnel located within EZ, CRZ and Support Zones who are involved with site work, and all visitors who will enter either the EZ or CRZ. Periodic updates will be undertaken by the SSHO when operational or site conditions change or when designated refreshers are so warranted. The topics to be covered by the training include the entire contents of the HASP with emphasis on emergency procedures, areas of restricted access, methods of decontamination, asbestos awareness and general safety.

A brief daily safety "tailgate" meeting will be held for all on-site personnel and shall be conducted by the SSHO or his designee. Notes of the subjects covered and a list of those attendees at the daily meeting will be maintained for the documentation package.

2.6 Medical Surveillance

All affected on-site personnel shall provide evidence of a medical examination when required which meets the requirements of 29 CFR 1910.120(f) and 29 CFR 1926.65(f). Workers who might be required to wear a respirator must complete the OSHA Respirator Medical Evaluation Questionnaire (Mandatory) (1910.134 App C). Medical examinations are required by OSHA once the HASP goes into effect for the following employees involved in hazardous waste operations:

1) All employees who are exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators for 30 days or more per year;
2) All employees who wear a respirator for 30 days or more per year; or
3) All employees who are injured or develop signs and symptoms related to overexposure from an emergency incident involving hazardous substances or health hazards.

These employees shall have a medical examination within the last 12 months prior to the start of the project. They shall have a medical examination following any recordable illness or injury. The physician must provide a written opinion that an employee can return to work without restrictions following an OSHA recordable illness or injury.

The physician will specify the content of the exams, the need for additional tests and frequency using the guidelines of the referenced documentation. The following areas should be addressed in the examination: complete medical and occupational history (initial only), general physical exam including evaluation of all organ systems, pulmonary function testing including FVC and FEV1.0, blood chemistry

screening profile (i.e. SMAC 20/25), urinalysis with microscopic examination, eye exam and visual acuity, audiometric testing, chest x-ray (as directed by the physician), electrocardiogram (as directed by the physician), cardiac stress test (as directed by the physician), and biological monitoring (as directed by the physician).

2.6.1 Lead

PPU employees or their subcontractor workers will be involved in the machine and occasionally hand excavation of waste rock dump materials within Multistate Trust land. The waste rock material potentially contains lead at an estimated level of >1,000 ppm. The final standard for lead in the construction industry requires initial medical surveillance consisting of biological monitoring to include blood lead and ZPP level only where employees are exposed to or have the potential for exposure to lead at concentrations at or above the action level.

EPA has established 400 ppm for lead in bare soils in play areas and 1,200 ppm for non-play areas for federally funded projects. Personal monitoring of employees during soil excavation activities **is not** required to meet the requirements of the "initial determination" under the OSHA lead standard given the elevated levels of lead at the site.

Full-shift personal breathing zone samples should be collected for PPU employees in the event they engage in intrusive work that has the potential to exceed the OSHA standard for lead of 50 micrograms per cubic meter of air ($\mu g/m^3$). These individuals are not required to have specific medical monitoring as defined by the "initial determination" requirement in 29 CFR 1926.62(m) unless exposures exceed the Action Level. Medical surveillance will be made available to employees in the event they are exposed to lead above the Action Level more than 30 days each year.

PPU employees and their subcontractors will have contact with the soil. OSHA has a Construction Industry standard, 29CFR 1926.62 and a General Industry standard, 29 CFR 1910.1025 for lead.

2.6.2 Asbestos-Containing Materials (ACM)

PPU employees or their subcontractors may encounter ACM in soil throughout the site during excavation activities. All soil excavation work within the enclosure shall be performed as if it was ACM-contaminated. Smaller pieces of ACM may be present in the soil and may cause fibers to be released as the excavation proceeds. Exposure to ACM may cause diseases including asbestosis and mesothelioma.

2.6.3 Polychlorinated Biphenyls

PPU employees or their subcontractors may encounter PCB contaminated soil that may be present in the vicinity of an old transformer (**Figures 1** and **2**). Studies of PCBs in humans have found increased rates of melanomas, liver cancer, gall bladder cancer, biliary tract cancer, gastrointestinal tract cancer,

brain cancer, and may be linked to breast cancer. PCBs are known to cause a variety of types of cancer in rats, mice, and other study animals.

2.7 Emergency Medical Care

Emergency medical care services are available from Grover C. Dils Medical Center located at 700 North Spring Street in Caliente, approximately 30 miles south of the project area. The telephone number is (775) 726-3171. The hospital should be notified about the potential hazards associated with the site. Ambulance services are available twenty-four hours per day by contacting Grover C. Dils Medical Center. The emergency telephone number is 911 or (775) 726-3643. Any employees who are seriously injured on site should be transported to the hospital by EMS personnel. A map showing the emergency route to the hospital is provided in **Attachment B**.

2.8 Accident Reporting and Recordkeeping

The SSHO will evaluate whether to notify the administration of PPU regarding any accident/incident. Within two working days of any reportable accident, the SSHO will complete and submit an Illness/Injury Accident Report. If the illness or injury is recordable as defined by OSHA, such illness or injury will be recorded on the OSHA 300 log for the project.

Note that OSHA recordkeeping regulations require that all accidents involving a fatality, or three or more persons sent to the hospital for treatment from a single event, must be reported to the Area Office of OSHA within eight hours following the accident or notification of the accident.

2.9 Site Emergency Equipment

PPU will provide ANSI approved portable eyewash units in accordance with ANSI Z358.1, a portable first aid kit, and 10-pound dry chemical fire extinguishers of sufficient quantity with a minimum rating of 2A:10B:10C in the following locations:

- Project trailer
- Supervisor's vehicles

The locations of the safety equipment shall be marked with a sign. Workers shall be informed in the "tailgate" meetings when the location of the safety equipment is changed. Any safety equipment required for confined space entry will be brought to the project trailer if it is needed on a project site. This equipment includes safety harnesses, wristlets, retrieval lines, a tripod (required for entering manholes or other utilities with fixed openings), air horns, and two-way radios.

2.10 Daily Safety Inspections

The SSHO or designee will conduct daily safety inspections of the site to determine compliance with the HASP. These inspections will be systematic and follow good safety and health procedures. The SSHO will conduct a minimum of two visual inspections per day during work activities. The SSHO will advise the Project Supervisor of any unsafe acts or actions observed and will record observations in a daily logbook. These inspections will become a part of the permanent project record.

2.11 Safety Responsibility

The ultimate responsibility for the health and safety of the individual employee rests with the employee himself, and his or her colleagues. Each employee is responsible for exercising the utmost care and good judgment in protecting his or her own health and safety as well as that of fellow employees and the general public which might be affected by site activities. Should any employee observe a potentially unsafe condition or situation, it is the responsibility of that employee to immediately bring the observed condition to the attention of the appropriate health and safety personnel as designated above.

Should any employee find himself or herself in a potentially hazardous situation the employee shall immediately discontinue the hazardous procedure(s) and either personally effect appropriate preventative or corrective measures, or immediately notify the Project Manager or SSHO of the nature of the hazard. In the event of an immediately dangerous or life-threatening situation, the employee always has "stop work" authority.

Extenuating circumstances such as budget or time constraints, equipment breakdown, changing or unexpected conditions, etc., never justify unsafe work practices or procedures. In fact, under stressful circumstances, all project personnel must be mindful of the temptation to consciously or unconsciously compromise health and safety standards and must be especially safety conscious.

2.12 Site Security

PPU is responsible for maintaining security on the job site. This includes limiting access to authorized individuals and managing traffic flow to prevent accidents. The area around the project is largely residential. There is automobile traffic on Scott Road as well as the side streets off Scott Road. All access to/from the site for workers and trucks will be on Scott Road. Access to the fenced area will be secured and protected by a lockable rigid enclosure on the decontamination station. All employees should consider themselves responsible for construction-related security or otherwise securing the access to the enclosure when leaving the site at the conclusion of the workday. PPU will periodically check the enclosure during non-working hours as a part of their normal rounds. Any damage to or forced entry into the fenced area will be reported and fixed. Contact information is available in Section 8.

The names and emergency telephone numbers will be available for personnel during off-shift hours.

2.13 Noise and Dust Control

Control of noise and dust on and off the site will be critical to the success of the project. A dust control program will be implemented during this project. A perimeter monitoring program will be established to document that the controls in place are effective. Work will be halted if visible emissions are observed from the enclosure as a result of the work. Visible emissions from non-suspect sources such as vehicle exhaust or road dust will not be considered cause for work stoppage. Refer to Section 6 for further details.

2.14 Subcontractor Support

Each contractor and subcontractor hired by PPU has a contractual obligation to perform their work utilizing safe methods and to comply with the HASP for this project, OSHA regulations, and all other applicable federal, state and local requirements.

3 SITE CHARACTERIZATION AND ANALYSIS

3.1 Site Information

Information regarding the characterization of the overall site has been reviewed in preparation for this HASP, with data obtained from Multistate Trust. No fieldwork has been performed. Analysis of the general background information is included in the development of this HASP, as the data could be predictive of conditions at the site and is used for reference purposes only.

This HASP was prepared for site excavation activities performed during the installation of a water transmission pipeline to address the potential for the presence of lead, ACM and PCBs in the soil.

3.1.1 Lead

Lead is more hazardous if inhaled than if ingested but is toxic either way. If inhaled or ingested, lead causes irritation to the skin, eyes and respiratory tract. Lead is a neurotoxin and affects the central nervous system, kidneys, blood and reproductive systems. The symptoms of lead poisoning include abdominal pain and spasm, nausea, vomiting and headache. Lead is a cumulative poison. Based on results from Treasure Hill, the concentration of lead in the waste rock dump in the area of the work may be greater than 1,000 ppm.

3.1.2 Asbestos-Containing Materials

Due to the demolition of old buildings in the area, the presence of asbestos fibers in soil is possible. However, testing for ACM has not been performed in the project area. PPU employees or their subcontractors may encounter ACM within Multistate Trust land while excavating soil and waste rock materials. Therefore, an Activity and Use Limitation to protect public health due to the potential presence of asbestos fibers in the soil is in effect over the area in which the utility work is to be conducted. All soil excavation work within the enclosure shall be performed as if it was asbestos-contaminated.

3.1.3 PCBs

Due to the present of an old transformer, Multistate Trust suspects that PCBs may be present in the vicinity. However, testing for PCBs has not been performed in the project area.

3.2 Physical Hazards

Review of the site location reveals that existing physical hazards that are or may be of concern include but are not limited to:

1. Potential pedestrian and vehicle traffic in the vicinity of the project site.
2. Operation of heavy machinery, including excavators, trenchers, and trucks.
3. Proper use of trench boxes or other trenching techniques.
4. Excavation stability from soil stability.
5. Entry into permit-required confined spaces.
6. Lockout/tagout especially in the event "hot taps" are required for utilities support.
7. Exposure to temperature extremes and noise.
8. Electrical shock from overhead or buried power lines
9. Falls from elevated levels.

Caution should be exercised when in the vicinity of heavy machinery on the site. The entire area is a hard hat, safety glasses and safety shoe area. Hard hats shall be non-conductive and shall meet the specifications of ANSI Z89.1, "Protective Headwear for Industrial Workers". Reflective safety vests will be used by all workers doing utility work in or near active heavy equipment on site and when working on public roadways. Safety shoes will conform to ANSI standards. Workers will be advised of all known hazards at the site prior to startup and thereafter as needed.

Employees will be encouraged to be observant of site safety and health hazards and to report them directly to the SSHO or to the SSHO through their supervisor. Other potential hazards that could cause injuries or illnesses include slips, trips, falls, bumps, cuts, pinch points, falling objects, and crushing injuries typical of every construction-related job site.

The location of all underground utilities including electrical lines, natural gas lines, water and sewer lines, and telephone lines must be identified and clearly marked before starting excavation work and should be coordinated through Safe Digging. The toll-free Safe Digging telephone number for Nevada is 811.

3.3 Chemical Health Hazards

Site workers should always be alert for unrecognized or previously undiscovered or unanticipated hazards. Potential hazards include:

- Inhalation of potentially toxic vapors including components of PCBs; contact with underground storage tanks or buried drums.
- Inadvertent ingestion of potentially toxic substances via hand to mouth contact or deliberate ingestion of food, or tobacco products inadvertently contaminated with potentially toxic materials;
- Dermal exposure to substances which may affect the skin directly or which may exhibit other toxic effects via percutaneous (skin) absorption.

Based upon historical experience, the potential routes of exposure to hazardous compounds are through dermal contact, inhalation or ingestion.

Exposure via ingestion can be controlled effectively using personal protective equipment such as gloves, boots, and disposable coveralls, as well as good personal hygiene habits and a ban on smoking, eating and drinking in the contaminated areas. Employees will be required to wash their hands before eating, drinking or smoking. Soap, water and disposable towels will be provided at wash stations.

Similarly, dermal exposure can be virtually eliminated by good personal hygiene, the use of gloves and appropriate personal protective clothing, and conscientious personal decontamination procedures. All soil and water should be treated as if it was contaminated and the contaminants are capable of being absorbed through intact skin.

Air monitoring within the exclusion zone will be performed for the protection of employees by the SSHO for PPU or their designee. Ambient air monitoring at the perimeter of the work zone will be conducted by the SSHO for PPU. Perimeter air samples will be collected to document the control measures implemented. In the event ACM is identified in the perimeter air samples at a concentration that exceeds 0.01 fibers per cubic centimeter (f/cc) of air, work on the excavation shall be halted, and the controls reviewed. **It is anticipated that most of the work for the project will be performed at Modified Level D. Respirators will be required during all dust generating activities (Modified Level C). All work inside the fenced area will be performed at Modified Level D or Level C until the protective cover has been restored. A decision to upgrade PPE above Modified Level C during dust generating activities constitutes a change in condition.**

3.4 Unanticipated Hazards

The following conditions and situations are not anticipated at this site and therefore, safety procedures appropriate to the following are not included in this HASP:

- The need to handle or open drums or containers which may contain hazardous substances
- Encountering underground storage tanks or buried drums
- Unanticipated releases
- Activities requiring personal protective equipment more extensive than Level C
- Field work in non-illuminated areas during periods of darkness
- Work during periods of severe weather and/or high wind

If any of these conditions are encountered, all work will be suspended, and the area will be marked off.

3.5 Confined Space Entry

Entry into permit-required confined spaces may be anticipated by PPU personnel or by the subcontractors during this project. The project includes excavation of soils to a depth of at least 5 feet for placement of the new pipeline with connections to existing utilities. The excavation work will be largely completed by heavy machinery with occasional hand labor. PPU will utilize appropriate trench boxes or trenching techniques as described in Section 3.6. According to the Natural Resources Conservation Service (NRCS) soil survey information, the soil at the project site is described as gravelly sandy soil. The potential for sidewall collapse is moderate and ACM is assumed to be present in soils to be excavated. An engulfment or entrapment potential should be considered as a condition for determining the need for an Entry Permit. Based on the work description, work in Permit-Required Confined Spaces will be required.

3.5.1 Entry Permits

In all situations where trenching exceeds five feet in depth and where there is a potential for a hazardous atmosphere, employees are required to use the procedures described in **Attachment A** (SOP), Confined Space Entry Procedures. The pipeline will be buried at least 4 feet below grade and excavation will be to at least 5 feet. Therefore, this condition will be encountered on at the site. All employees who may be required to enter a permit-required confined space shall have been trained in Confined Space Entry, in compliance with the OSHA requirements. This section describes and addresses compliance with the OSHA standard, "Permit-Required Confined Spaces".

Prior to entering a Permit-Required Confined Space, an Entry Permit shall be issued by the Entry Supervisor. The permit will outline the requirements for PPE, air monitoring, emergency backup, egress equipment, lockout/tagout requirements, and any special circumstances. The entry permit will be re-issued daily and will be valid only for that day. The SSHO shall serve as the entry supervisor for this project. Air monitoring, using a four-gas meter and a VOC meter, shall be used to check air quality prior to and intermittently throughout the entry period.

The permit will be canceled at the conclusion of the task or at the end of the day, whichever occurs first. In the event a task lasts longer than one day, a new permit will be issued for each succeeding day. The completed permit will be retained for a minimum of one year beyond the end of the calendar year in which it was issued.

The entry supervisor will determine all PPE and rescue equipment to be used in conjunction with the entry. An attendant will remain outside the excavation and will maintain visual communication with the entrant(s) at all times.

3.6 Shoring and Trenching

In the event any walls and faces of the excavation are more than four feet deep, they shall be properly supported using "a trench box or lateral bracing system of soldier piles and sheeting as indicated by the dimensions of the opening, and the degree of soil stability". All trenching and excavation work shall be performed by trained individuals. It is planned to have a trench box system at the perimeter of the excavated soil.

A stairway, ladder or ramp, or other means of egress shall be provided to limit lateral travel to 25 feet to reach a point of egress, in accordance with 29 CFR 1926.651(c)(2).

3.7 Site Inspections by the SSHO

Once the HASP is in effect in the EZ and CRZ, the SSHO shall visually inspect the enclosure where activities by PPU or their subcontractors are underway at least twice each shift for compliance with the HASP. Deficiencies in compliance will be corrected upon discovery and noted in the daily logbook. The log will become a part of the documentation package at the completion of the project.

3.8 Hazard Analysis/Risk Assessment

A following is a limited hazard analysis and risk assessment presented by task. The objective is to identify and plan for hazards that might be encountered in this project but does not include emergency planning for remote events. The assessment also defines the appropriate control measures to minimize risk to on-site employees, as well as to the general public.

Hazard Analysis/Risk Assessment

Task	Hazard Codes	Controls	Employee Risk	Public Risk
Mobilization/ Demobilization	4, 6, 7, 9, 10	Traffic control, motor vehicle safety	Low	Low
Install perimeter fence	7, 9, 10	Motor vehicle safety, safe machine work practices	Low	Low
Erect fence	4, 7, 9, 14	Safe machine work practice, motor vehicle safety, PPE, fugitive dust control	Low-moderate	Low
Soil excavation	1, 2, 3, 4, 5, 7, 9, 11	Safe machine work practices, PPE, fugitive dust control	Moderate	Low
Trenching/shoring	1, 2, 3, 4, 5, 7, 8, 9, 11, 13	Trench/shoring system, safe machine work practices, motor vehicle safety, PPE, fugitive dust control	Moderate	Low-moderate
Soil sampling and analysis	1, 2, 3	PPE, air monitoring program	Low-moderate	Low
Stockpiling of soil inside fenced area	1, 4, 7, 9, 10	Safe machine work practices, dust suppression, truck covers, air monitoring program, truck decontamination program, traffic control	Moderate	Low
Installation of PVC Pipeline	4, 5, 6, 7, 9, 11, 13	PPE, respiratory protection, confined space, procedures, fugitive dust control	Moderate	Low

Hazard Codes

1 – Inhalation of vapor or dust
2 – Ingestion of contaminated soil
3 – S in penetration/absorption of toxic chemicals
4 – Heavy machinery operation (accidents, crushed by, struck by)
5 – Confined space entry
6 – Exposure to temperature extremes
7 – Exposure to noise
8 – Electrical shock
9 – Slips, trips, falls, other miscellaneous construction accidents
10 – Pedestrian accident (motor vehicle)
11 – Trenching/shoring hazards
12 – Contact with underground tanks, utility lines
13 – Lockout/tagout
14 – Contact with rodents, poison ivy, snakes, ticks etc.

4 SITE CONTROL

Site control zones will be established in order to contain contamination within the smallest area possible. The SSHO will ensure that each employee has the proper PPE for the area or zone in which he or she is to perform work. Only authorized persons will be permitted access to the EZ and CRZ. All entrance to these areas will be restricted by means of regulated personnel flow, with only trained and authorized employees permitted to enter. The purpose of this site-specific HASP is to establish in detail the procedures and protocols necessary for protecting workers and the general public from potential hazards associated with contaminated soil encountered during the excavation, backfilling, handling, analysis, and disposing of excavated soils.

This section shall define the work zone delineations, site communication, and site access control measures to be employed.

4.1 Exclusion Zone (EZ)

The EZ (contamination work zone) is the area(s) where lead, ACM and PCBs may exist. This area has been designated in **Figure 2**.

The EZ shall include and encompass areas designated for soil excavation associated with the handling of contaminated soils fully contained within the enclosure, commonly referred to as the Hot Line.

The enclosure for the work zone within Multistate Trust land will include two separate entry points – one for employees and a second for heavy equipment and roll-offs for soil. Each will include a decontamination area.

Special precautions will be taken to ensure that pedestrians and non-essential persons are not allowed near the excavation equipment during the excavation and trenching operations. Caution tape and/or traffic cones will be used to delineate the travel lanes for personnel, trucks and heavy equipment. The enclosure will be secured with a lockable gate and a rigid frame around the decontamination areas for non-work hours. No eating or smoking is allowed anywhere within the area of the site.

The required protective equipment for use by personnel working within or entering the EZ or CRZ is specified in Section 5. Access to the EZ or CRZ is restricted to on-site and PPU personnel who are wearing the proper PPE and who have received the required site training and medical clearance. All workers will sign into a logbook in the Support Zone prior to entering the Exclusion Zone.

4.2 Contamination Reduction Zones (CRZ)

The CRZ is a buffer zone between the EZ and the Support Zone and is located at the interface of the two zones. Personnel, equipment and vehicle decontamination stations such as washing stations will be located in this area and will be marked by barrier tape or similar means. The CRZ serves as an area to decontaminate personnel, equipment, and vehicles prior to entering the support zone. If necessary, clothing change facilities for reusable PPE shall be located in the contamination reduction zone. The CRZ will be a zone extending approximately 20 feet beyond the EZ on one or more sides as required for site access. All access to the EZ shall be through the CRZ.

4.3 Support Zone (Non-Contaminated)

The Support Zone is the area outside of the CRZ where there is no potential for contact with contaminants. The Support Zone contains the following: work rest area, support operations, communications, transportation, and storage facilities. Eating and drinking of fluids are permitted in this area and only after site workers have properly decontaminated themselves. A description of the decontamination process and location is found in Section 7.

4.4 Fugitive Dust and Odor Control

Air monitoring and fugitive dust and odor control programs will be implemented for this project; the air monitoring program is described in Section 6.

A fugitive dust suppressant program will be in effect as a part of the HASP. In the event odors are encountered during soil excavation, operations shall be halted temporarily to apply odor suppressant foams or other chemicals on the exposed surface. Products such as Earthbind® or equivalent are useful for dust suppression and soil stabilization. The roll-offs will be loaded with soil, covered, sealed and decontaminated within the fenced area.

Water mists, calcium chloride and other recognized dust suppression techniques will be implemented in the event other controls are not effective. If visible dust is observed outside the enclosure, work will be temporarily halted. Visible emissions from non-suspect sources such as vehicle exhaust or road dust will not be considered grounds for work stoppage.

All roll-offs, excavators and other heavy equipment used inside the fenced area will be cleaned, decontaminated and visually inspected by the SSHO before leaving the fenced area. Trucks and support vehicles that remain outside the enclosure do not have to be decontaminated since they will not come into contact with soil from within the fenced area.

Indications of "overt" contamination include but are not limited to the following:

1) staining or unusual color to the soil
2) unusual or blackish color to trench or excavation water
3) visible sheen or rainbow on top of the groundwater entering the trench or excavation
4) smells of gasoline, oils, or solvents coming from the soils or water
5) buried drums, tanks, or suspicious structures
6) excavated soils contain DNAPL or percent levels of oils or hazardous materials
7) signs or symptoms of hydrogen sulfide or reactive cyanide exposure

Personnel, vehicles and equipment used during the handling of soils, hazardous chemicals and materials shall be decontaminated before leaving the EZ using work site procedures contained in this HASP.

4.5 Site Communication

The relatively small size of the active work site and the presence of heavy equipment presents the potential for accidents to occur, especially as equipment moves on and off the site and trucks carrying soil need to exit the site. Therefore, it is always important to maintain adequate communication on site to protect the safety of on-site employees and expedite the decision-making process in the event contamination is encountered. All requests for emergency services will take place through PPU so that appropriate security arrangements may be made to protect facility employees.

The job supervisor(s) will carry a two-way radio or cell phone and will be in continuous contact with site personnel in the event emergency services are required. Verbal communication and hand signals may be used to communicate among workers on the site. Compressed air horns could also be used to signal evacuation of the work site in the event of an emergency such as a spill, release, uncontrolled fire, or explosion occurs. The following signals may be used to indicate an emergency situation:

- One long blast repeated three times at five second intervals - Man down
- Three short blasts repeated three times at five second intervals - Evacuate site
- Alternating short and long blasts - All clear

The evacuation area and rally point will be located just outside entries to the project site and adjacent to Scott Road (**Figure 2**). This area will be posted with a sign and a yellow flag. In the event an evacuation is ordered, all PPU employees and subcontractor employees will cease work and meet at the rally point.

4.6 Signs

PPU shall post warning signs designed to provide guidance and direction to on-site personnel and visitors. The signs at the job trailer or Supervisor's vehicle shall be posted in locations approved by the SSHO and should be large enough to visibly see from a reasonable distance.

Visitor Signs: Signs shall be posted directing all visitors to the project trailer.

No Smoking: No smoking signs shall be posted in areas of high visibility immediately adjacent to the Exclusion Zones.

Asbestos: Asbestos caution signs shall be posted on the outside of the enclosure by the personnel and equipment entry points.

4.7 Engineering Controls

Special engineering controls are anticipated for this project. Dust suppression in the form of light water sprays, foams, dust suppressants, and calcium chloride will be implemented as required to control dust during truck loading activities and excavation. Alternatively, intrusive activities may be reduced or curtailed under high wind or heavy rain conditions, which in the opinion of the SSHO may pose a safety hazard to the workers, or nearby members of the community.

4.8 Site Control Measures

4.8.1 Access and Egress Patterns

Specific movement patterns of both project personnel and equipment through designated site zones shall be maintained during routine operations at the project site. The following movement pattern will be utilized to assure compliance with this plan. Movement shall be monitored by the SSHO or other project management personnel.

Access Procedure

1. All site personnel are to log in at the project trailer prior to proceeding on-site.
2. Access to the EZ and CRZ shall be limited to onsite, contractor personnel and approved visitors. Visitors shall be restricted to the Support Zone, unless approved by the Project Manager and/or SSHO. These personnel shall have proper PPE and provide proof of training.
3. All personnel shall proceed to the EZ designated entrance locations that are clearly marked.
4. Access of routine personnel shall be monitored by the SSHO or other on-site project management personnel.
5. All equipment will have access to the EZ through appropriate equipment routes.

Exiting Procedure

1. All personnel shall exit the EZ through the designated personnel decontamination CRZ.
2. Prior to proceeding from the CRZ to the support zone all personnel are required to undergo designated decontamination activities.
3. Once decontamination is complete, site personnel may proceed to the support zone prior to leaving the site. Do not reenter the EZ or CRZ.

4. All equipment on-site shall proceed from the EZ to the CRZ and undergo appropriate decontamination prior to exiting the enclosure.
5. Adherence to these specific exiting procedures shall be monitored by the SSHO or other appropriate project supervisory personnel.

4.8.2 Operation Procedures

The following procedures shall be maintained during routine activities associated with the site control procedures:

1. A copy of this HASP shall be maintained on-site.
2. All personnel shall be instructed in the contents of the plan.
3. Proper delineation of site control zones will be maintained, and signs placed in visible locations.
4. Copies of access and egress procedures will be posted on the project bulletin board located at the command center.
5. Access and exiting routes are contained in this report for both equipment and personnel. They shall also be posted on the project bulletin board located in the support zone.
6. Any modifications to the plan including delineation of work zone boundaries shall be submitted to the Multistate Trust for review and concurrence, and all personnel shall be briefed in the modification prior to implementation.

The following general work practice guidelines are intended to prevent injuries and adverse health effects. These guidelines represent the minimum standard procedures for reducing potential risks associated with the project and are to be followed by site workers at all times.

- Safety and protective equipment shall be worn at all times in designated areas, by all persons, and in conformance with the HASP.
- Always observe the buddy system. Never enter or exit the site alone, and never work alone in an isolated area. Never wander off by yourself.
- Always maintain a line-of-sight.
- No eating, drinking, or smoking outside the designated Support zone.
- In the event PPE is ripped or torn, work shall cease, and the PPE removed and replaced.
- Be alert to any unusual changes in your own condition; never ignore warning signs. Notify SSHO as to suspected exposures or accidents.
- A vehicle will be readily available exclusively for emergency use at all times when workers are on site. All personnel going on-site shall be familiar with the most direct route to the nearest hospital.
- In the event of direct skin contact, the affected area shall be washed immediately with soap and water.
- Note wind direction. Personnel shall remain upwind whenever possible during on-site activities.
- Never climb over or under refuse or obstacles.

- Hands and face must be thoroughly washed before eating, drinking, etc.
- Any modifications to this safety plan must be approved by the SSHO after consultation with the Multistate Trust.

5 PERSONAL PROTECTIVE EQUIPMENT

5.1 Introduction

Personal protective equipment (PPE) is the main method used to minimize potential employee exposure to site contamination. The levels of protection for on-site personnel have been based on OSHA requirements. All PPU personnel, contractors and subcontractors on-site are required to provide their own PPE in accordance with the HASP. All PPE shall be kept clean and maintained in a proper manner. Personnel will have been trained in the proper use and maintenance of PPE.

At a minimum, all on-site workers and visitors are required to have ANSI-approved hardhats, steel toe safety shoes or boots and safety glasses whenever on-site. Additional PPE as prescribed in the HASP shall also be worn on-site. Loose sleeves, cuffs, loose clothing, ties, or other objects that may become entangled in machinery are not permitted. Reflective vests will be used whenever working in or around vehicle or truck traffic.

OSHA has implemented a standard for PPE, 29 CFR 1910.132. This standard defines approved types of PPE for eye and face, head, and foot protection. The appropriate types of PPE shall be designated for the hazards of the particular task. All PPE shall comply with the appropriate ANSI designation as referenced in the standard.

Based on the information provided in the site characterization reports, controls will be implemented to reduce the potential for personnel to be exposed to contaminants at levels above the OSHA Permissible Exposure Limits (PELs), ACGIH (American Conference of Government Industrial Hygienists) Threshold Limit Values (TLVs), or encounter conditions that are Immediately Dangerous to Life and Health (IDLH). The greatest potential for exposure will be inhalation of dust containing lead as well as fugitive dust containing lead, PCBs and ACM that may be released to the air as the soil material is excavated.

Based on potential concentrations of lead in the soil (>1,000 ppm) and the potential for ACM and PCBs, the site is generally considered to have a low to moderate hazard evaluation. Contingencies have been made to upgrade the site if necessary. It is anticipated that most if not all of the work will be performed at Level D or Level C, given the site activities and the hazards at the site. Excavation, backfill, or other dust generating activities within the fenced area will be at Level C. The anticipated schedule to complete soil excavation activities is expected to be less than 30 days. PPE for all remaining work outside of the fenced area will be at Level D for all clean areas and in support locations and Modified Level D in areas where skin contact with hazardous materials may occur.

Relative to worker protection, adjustments to PPE requirements (upgrade/downgrade) may be triggered as indicated by the Air Monitoring Plan or when visible contamination is observed as defined by the HASP. The following criteria may be used as guidelines for making this determination in soil samples: lead levels exceed 300 mg/kg. Triggers for upgrade/downgrade include if levels of VOCs exceed 10 ppm

for a period of ten continuous minutes, if levels of airborne dust exceed 0.25 mg/m^3 for ten minutes, if asbestos fiber levels inside the fenced area exceed 0.1 f/cc, or if visible dust is observed from work or other activities performed within an asbestos-regulated area. If any conditions requiring protection above Level C occur outside the fenced area, work will be stopped, and the HASP will be reviewed by the SSHO to reflect the more critical requirements of this level of work. **Any work required to be performed using a PPE Level above Level C will be considered a change in condition.**

5.2 Description of the Levels of Protection

The following is a brief description of levels of protection to be used by site personnel:

Level D:
- Work clothes
- Safety shoes with outer rubber slush boots (for water)
- Gloves
- Hard hat
- Safety glasses with side shields
- Reflective vest (in high traffic areas and after dusk)

Modified Level D:
- Tyvek or dust-resistant cloth coveralls - Dry work and areas of low contamination
- Outer rubber slush boots
- Outer chemically resistant gloves - butyl/neoprene
- Hard hat
- Safety shoes
- Safety glasses with side shields or goggles
- Reflective vest (in high traffic areas and after dusk)

Level C:
- Half-face respirator with organic vapor/P-100 cartridges
- Tyvek uncoated disposable coveralls
- Outer rubber boots
- Outer chemically resistant Gloves - butyl/neoprene
- Hard hat
- Safety shoes
- Safety glasses with side shields or goggles
- Reflective vest (in high traffic areas and after dusk)

5.3 Preliminary Minimum Protection Level for Workers by Site Activity

PPU personnel or their subcontractors will be performing most of the on-site activities. The following represents the recommended minimum levels of PPE to be utilized while performing specific tasks:

Mobilization/demobilization ..... Level D
Fence installation ..... Modified Level D
Excavation and handling of fill/natural soils (clean) outside the EZ ..... Level D
Excavation, loading of lead, ACM or PCBs-contaminated soils,
laying pipe, backfilling soil inside the EZ ..... Level C
Soil stockpiling of imported clean soil and handling clean fill
on-site by Contractor ..... Level D
Soil sampling and analysis ..... Level D

5.4 Action Levels for Upgrade/Downgrade of Level of Protection

The action levels for the upgrade or downgrade of worker PPE are based on information published by ACGIH, OSHA and EPA. The action levels are based on the Permissible Exposure Limits (PEL) established by OSHA, Threshold Limit Values by ACGIH, and Short-Term Exposure Limits by ACGIH. The action levels have been established for each work activity/contaminant present.

5.4.1 ACM

The OSHA PEL for asbestos on a construction site is 0.1 f/cc. Personal samples will be collected for workers involved with asbestos abatement activities. In the event samples for asbestos are greater than 0.1 f/cc, employees will be required to use half-face air purifying respirators at a minimum when performing soil excavation work inside the EZ.

5.4.2 Total Volatile Organics

The action level of 10 ppm sustained for ten minutes will be used for upgrade/downgrade of PPE using a level of total volatile organic compounds. In the event TPH is encountered, a level of 0.5 ppm for benzene will also be used as an upgrade/downgrade, based on one-half of the PEL for benzene.

The upper level of 250 ppm VOCs for air-purifying respirators was established using five times the TLV for toluene. The level of 5 ppm for benzene is also based on 5 times the TLV for that compound. If levels of TVOCs exceeds 250 ppm, or for benzene (5 ppm for five minutes), then all work will cease, and workers shall leave the work area until additional assessment is made in conjunction with the CIH. If the level of protection will be upgraded above Level C, all work will temporarily cease, and additional engineering controls will be implemented. This will not be performed until the HASP is reviewed and amended to reflect the change in site conditions and controls.

5.4.3 Lead Particulates

Lead may be present in the soils in the fenced area at concentrations estimated to be greater than 1,000 ppm. Therefore, respiratory protection will be required during excavation, backfill or other dust generating activities. Half-face air-purifying respirators equipped with HEPA (P-100) filters and organic vapor cartridges will provide a high level of protection, where Level C is required. HEPA, now called (P-100) filters by definition, remove 99.97 percent of all particulates greater than 0.3 microns in size, and the organic vapor cartridges remove volatile organic compounds up to 1,000 ppm in concentration. Airborne dust will be substantially larger sized particles. The protection factor afforded by the respirator will vary by individual based on their ability to fit the respirator and wear it properly during use. Fit protection factors in excess of 10 are normally associated with half-face air purifying respirators. Periodic visual observations and monitoring for total suspended particulate will be used as a surrogate measurement for lead exposures during excavation of fill.

5.5 Respiratory Protection

Respiratory protection will be required for on-site personnel exposed to the potential inhalation of suspected hazardous contaminants in the EZ. Initially, excavation activities are assigned a protection level of Level C within the EZ, and Level D outside the EZ. Protection levels are assigned based on the job responsibility and the contamination present within the soils. Protection levels may be up or downgraded based on initial monitoring results. In the event that VOCs are determined to be present at levels requiring an upgrade, then half-face respirators will be used outside the EZ.

If upgrading the site above Level C is necessary, all work will be ceased temporarily, and the HASP will be reviewed. All workers required to wear air purifying respiratory equipment will be required to show proof of medical examination to the SSHO that indicates they are capable of wearing such a device. Proof of initial and annual training and qualitative or quantitative fit testing for use of air purifying respirators is also necessary.

5.6 Standard Operating Procedures for Respirators

When a half-face respirator with HEPA (P-100) filters and organic vapor/P-100 cartridges is used, respirators shall be cleaned daily according to procedures prescribed by the manufacturer. Cartridges will be used and replaced at least daily, or at any time if breakthrough is detected while in use. Negative and positive pressure fit checks will be performed daily by each individual respirator wearer upon donning the respirator. The following additional checks shall also be performed on a daily basis:

- Exhalation Valve – pull off plastic cover and check valve for debris or tears in the neoprene valve (which could cause leakage). Also check valve cover for tightness.
- Inhalation Valves (two) – unscrew cartridges and visually inspect neoprene valves for tears. Make sure the inhalation valves and cartridge receptacle gaskets are in place.

- Make sure a protective lens cover is attached to the lens. Lenses are expensive to replace and should always be protected.
- Make sure you the correct cartridge is employed. Cartridges are not interchangeable among respirators.
- Make sure the face piece harness is not damaged. The serrated portion of the harness can fragment which will prevent proper face seal adjustment.
- Make sure the speaking diaphragm retainer ring is hand tight (if applicable).

A detailed description of the respirator program is contained in **Attachment A** (SOP) of this HASP.

6 AIR MONITORING INSTRUMENTATION

6.1 Introduction

The following describes on-site monitoring instrumentation that will be employed during the course of site work for determining the level of protection to be worn by workers. Personnel operating the instrumentation shall be trained and experienced in its use and operation. Monitoring within the fenced area and at the perimeter of the fenced area will be performed by the SSHO.

6.2 Site Monitoring Equipment for Employee and General Public Protection

The following monitoring equipment will be required during construction:

- Photoionization Detector (PID) with 10.2 eV probe
- Total Suspended Particulates (Dust-Trak or equivalent) – Used as needed for perimeter measurements and in the EZ breathing zone.
- Sample pumps for asbestos fibers

The photoionization monitor may be an H-Nu Model PI-101, Thermo Environmental Instruments OVM Model 580 B, Mini-RAE or equivalent. The PID should be equipped with a 10.2 eV lamp to maximize sensitivity for TPH compounds. As an alternative, a Flame Ionization Detector (FID) may be used on site; however, it is not recommended.

At a minimum, exposure monitoring and air sampling during EZ activities shall be performed in the worker breathing zone and at the upwind and downwind limits of the EZ. Sampling shall be recorded at the following frequencies:

Total Organic Vapors: Surveyed and recorded at least every 60 minutes whenever measurements at the perimeter of the work area exceed 1 ppm above background for ten minutes, or in the excavation, 10 ppm for ten minutes.

Total Particulates: Surveyed and recorded at least every 60 minutes and whenever measurements exceed 0.25 mg/m^3 within the enclosure or 0.075 mg/m^3 at the perimeter of the fenced area.

6.3 Air Monitoring Plan

6.3.1 Sampling for Asbestiform Fibers

Air monitoring for asbestos fibers will be performed within the EZ for employee protection. Air monitoring will be performed around the perimeter of the EZ to assure the effectiveness of the controls in place.

Personal samples will be collected from individuals working within the EZ. The personal samples will be collected by the SSHO or designated representative of PPU. The samples will be collected by drawing air through 25 mm mixed cellulose ester membranes using personal sampling pumps. The samples will be collected at flow rates of 2.0 to 2.5 liters per minute for the entire shift. Personal samples will be brought to an asbestos laboratory licensed in the State of Nevada where they will be analyzed using phase contrast microscopy in accordance with NIOSH Method 7400.

Perimeter air samples will be collected up to 50 feet from the boundary of the EZ. The samples will be collected by drawing air through 25 mm mixed cellulose ester membranes at a flow rate of 8 to 10 liters per minute for a minimum period of two hours. The samples will either by analyzed on site or at an asbestos laboratory licensed in the State of Nevada where they will be analyzed using phase contrast microscopy in accordance with NIOSH Method 7400. The analyst performing the analysis shall be on the Asbestos Analyst Registry.

In the event the EZ perimeter samples exceed 0.01 f/cc, all work will temporarily stop until the sampling is repeated. The work practices in use will be reviewed to make certain the best available practices are being implemented. Work will resume once the cause has been identified and corrected.

6.3.2 Sampling for Dust

Measurements will be collected for airborne dust periodically throughout the day when soil intrusive activities are underway within the enclosure. In addition, monitoring is required when there is visual evidence of dust. This monitoring will be performed both visually and using direct reading instrumentation. A meter capable of measuring total suspended particulates, such as a Dust-Trak or equivalent shall be used to measure airborne particulate levels. Work will be halted if visible dust is observed from work or other activities performed within an asbestos-regulated area. The general contractor will perform monitoring for airborne dust around the perimeter of the EZ.

A level of 0.25 mg/m^3 is established for work within the enclosure. The limit is based on the use of particulate as a surrogate for metals and is described in Section 5.4.3. A level of 0.075 mg/m^3 is used for perimeter monitoring and is based on one-half of the National Ambient Air Quality Standard of 0.15 mg/m^3 for a 24-hour average concentration. If the dust level is exceeded and the source is from activities within the enclosure, work will be temporarily stopped until the dust suppression activities are

reviewed. If the source is determined to be from nonwork related activities (i.e. passing traffic or ambient conditions), no corrective actions will be required.

6.3.3 Sampling for VOCs

Monitoring for VOCs is performed with a 10.2 eV photoionization detector (PID) to measure total volatile organic compounds during excavation of fill during soil intrusive activities. The results of the monitoring will be used to implement engineering and work practice controls and to make upgrade and downgrade decisions in the level of required PPE.

A level of 10 ppm for a period of ten minutes will be used for activities inside the EZ. A level of 1 ppm above the background for a period of ten minutes will be used for perimeter monitoring. Monitoring will also be performed if odor complaints are received from adjacent parties.

6.4 Calibration

When an instrument is used to monitor airborne concentrations of a known substance, it should be calibrated to that specific substance at a concentration comparable to the action levels or concentrations anticipated in the field. Since this is rarely the case, an instrument is typically calibrated in the field with a gas that is representative of the instrument's response to the widest variety of substances. In the case of the PIDs, isobutylene is typically used. The dust monitors are calibrated at the factory. Typically, field calibration of the dust meters is not required.

The direct reading air monitoring instruments used at the site must be returned to the factory, calibrated and checked out on an annual basis. The calibration must also be checked in the field at least two times per day, including the beginning and ending of shift, to both establish a frame of reference and verify the instrument is working properly. The results of the calibration will be noted in the daily log.

6.5 Recording Air Monitoring Data

All particulate concentrations detected above the action levels at the EZ and work zone boundary shall be recorded. The location, date, time, monitoring device, calibration data, and weather conditions (temperature, wind speed and direction) shall all be recorded on monitoring log sheets. Copies of all monitoring log sheets shall be included in the weekly report to Multistate Trust upon request. A summary of the sampling data, including the actions taken and their effectiveness shall be included in the weekly report as well.

Information gathered during the air monitoring program shall be used by the SSHO to determine appropriate measures to be taken to protect employees, contractors and subcontractors during:

1. Soil excavation, trenching and removal

2. Soil stockpiling
3. Soil classification
4. Soil transport and removal

6.6 Air Monitoring Responsibilities

This HASP has established air monitoring strategies and sampling frequency to characterize and quantify any airborne release and transport of contaminants during soil excavation. These strategies and protocols address appropriate air monitoring for volatile organic compounds in the active work zones at the site and at the active site perimeter. Monitoring will be performed by the SSHO.

6.7 Prework Baseline Monitoring

Prior to commencement of work, the SSHO should establish and document a baseline concentration for asbestos fibers at the perimeter of the EZ. This establishes the contribution from non-project related sources such as automotive traffic and local commerce that may impact the project area.

Air Monitoring Plan

	Possible	Measuring	Initial Level	Level	Action
Inside EZ	Total Suspended Particulate	Visual and/or dust Trak	Level C	>Background <0.25 mg/m^3	Maintain Level C
Perimeter	Total Suspended Particulate			>0.075 mg/m^3	Initiate dust suppression program
Suspected ACM area near Buildings, Inside EZ	ACM	Personal sampling	Level C	>0.1 f/cc	Maintain Level C
Perimeter[1]	ACM	Area sampling	Level D	>0.01 f/cc	Stop work and evaluate, may upgrade to Level C
Perimeter	VOCs	Area sampling	Level D	>1 ppm/10 min	Stop work and evaluate, may upgrade to Level C
Inside EZ	VOCs	PID	Level C	>10 ppm/10 min	Maintain Level C

Note:

1. Perimeter is defined herein as 50 feet outside the EZ.
2. The duration of the monitoring measurements will be continuous.
3. All measurements will be taken in the worker breathing zone.
4. Readings for upgrade and downgrade decisions will be for a continuous 5-minute period.

7 DECONTAMINATION

7.1 Introduction

Appropriate decontamination activities will be conducted whenever site workers have completed performing soil intrusive activities in the area(s) where contamination is known or suspected to exist, and where exposure to this contamination could cause risk to the health of on-site workers in the absence of PPE defined for that area.

The excavator, roll-offs, and all equipment used within the EZ will be decontaminated and visually inspected by the SSHO before it is removed. Water used to decontaminate equipment inside the CRZ will be pitched so that water flows through stone and then into the soil. The sign in/sign out record shall have a category to reflect that all equipment used in the EZ has been decontaminated.

Trucks and other vehicles that remain outside the EZ will not require decontamination because they will not encounter soil from the excavation.

7.2 Personnel Decontamination

Decontamination procedures will be followed by all personnel leaving the EZ. Under no circumstances (except emergency evacuation) will personnel be allowed to leave the site prior to decontamination. A three-chambered decontamination facility will be used as a personnel decontamination station. A potable water wash station will be available for washing hands and face. Designated locations will be identified for decontamination of personnel and equipment using portable barriers or stanchions, and barrier tape. When worn, disposable items (i.e., Tyvek or dust-resistant cloth coveralls, inner gloves, and overboots) will be changed daily as required unless there is a reason to change sooner. Respirator cartridges will be changed daily, unless more frequent changes are deemed appropriate, such as breakthrough.

Portable wash down facilities such as water buckets, sprayers, hoses or other designated equipment will be available in the decontamination area for wash down and cleaning of personnel and equipment. All personnel will wash their face and hands before leaving the site. Given the short duration of the project and the time of year, it is not anticipated that a wash facility will be required for employee decontamination. Portable bathrooms and wash stations will be provided by PPU as described in Section 8.5 in this document, and in accordance with OSHA regulations on Sanitary Facilities.

Solid waste and contaminated materials encountered shall be managed in a manner that ensures the protection of health, safety, public welfare and the environment. The intent is to re-use most of the soil on-site. A six-inch cap of clean soil will be placed on top. PPU will be the generator of any soil requiring disposal from the site, shall approve the disposal location, and sign manifests used for tracking soil shipments. Debris deemed unsuitable and/or surplus shall be removed and disposed off-site.

If non-disposable equipment (i.e., boots, gloves, respirators, etc.) are visibly contaminated, they should be washed before leaving the CRZ for another site. This water will be discharged back to the ground unless otherwise directed by PPU. Workers are to segregate and store their PPE separate from their personal clothing. Under no circumstances are workers allowed to take from the site or wear home any contaminated clothing or equipment.

7.3 Small Equipment Decontamination

Small equipment will be protected from contamination as much as possible by covering the instruments with plastic (to the extent feasible) without hindering operation of the unit. Contaminated equipment will be cleaned as needed. The units will be checked, standardized, recharged as necessary for the next day's operation, and then prepared with new protective coverings. Hand tools including shovels and buckets will be pressure washed and inspected by the SSHO before removal.

7.4 Heavy Equipment Decontamination

All equipment that enters the designated EZ will be required to undergo decontamination prior to exiting the site. All decontamination activities will be undertaken at the location designated within the Site Control Plan. Excavators and other heavy equipment will first be brushed off to remove caked on soil and then pressure washed until visibly clean.

Care shall be exercised when loading lined roll-offs to prevent spillage of soil on the ground. The roll-offs will be lined off-site and delivered to the site with the plastic overlapping the outsides of the roll-off. Once filled, the plastic on the roll-offs will be pulled over the top of the soil, sealed with spray adhesive and taped. The outside of the roll-offs will be cleaned and washed, and the wash water discharged as described above. The roll-offs will be stored adjacent to the enclosure for a period not exceeding 48 hours prior to removal.

7.5 Disposal of Decontaminated Materials

All protective gear, decontamination fluids (for both personnel and equipment), and other disposal materials will be disposed of in accordance with the soil management plan and applicable regulations. Soiled PPE will be collected and placed in drums for later disposal.

8 EMERGENCY/CONTINGENCY PLAN

8.1 Emergency/Contingency Plan

This section identifies the emergency contingency planning undertaken for operations at the site and includes further information to be used under emergency conditions such as emergency telephone numbers, routes to emergency medical facilities and emergency signals.

8.2 Evacuation

Withdrawal Upwind - When conditions which endanger the safety or health of workers warrant moving away from the work site, the crew will relocate upwind at a distance of approximately 100 feet or farther, as indicated by site monitoring instruments. An area located west of the entries (**Figure 2**) will be used as the rally point for PPU employees in the event evacuation is ordered. This area will be discussed as safety meetings and marked with a sign and a yellow flag. In the event of withdrawal, the SSHO and a member of the crew (the buddy system must be used) may return to the work site to determine if the condition noted is transient or persistent.

If persistent levels of air contaminants remain, an alarm should be sounded to notify personnel of the situation and the need to leave the site. The site management will be notified of conditions. This alarm will be given using both a compressed air horn and portable radios, using a prearranged signal or tone, or message as described in the HASP. The following signals will be used to indicate an emergency situation:

- One long blast repeated three times at five second intervals - Man down
- Three short blasts repeated three times at five second intervals - Evacuate site
- Alternating short and long blasts - All clear

When site access is restricted, thus hindering escape, the crew may be instructed to evacuate the site rather than move upwind, especially if withdrawal upwind moves the crew away from escape routes. PPU and/or subcontractors will have designated "counters" with the responsibility to account for all employees and visitors in the event of an evacuation.

Site Evacuation - When conditions warrant site evacuation, the work party will proceed upwind of the work site and notify the SSHO, security force, and field office of site conditions. The Project Manager, Site Foreman or SSHO have authority to order an evacuation of the site.

8.3 Heat Stress

SOP (**Attachment A**) deals with the signs, symptoms and first aid for heat stress victims. Monitoring for heat stress should begin whenever the work area temperature exceeds 70°F. All employees will be

trained in recognition of the signs and symptoms of heat stress and will be required to do proper monitoring whenever they feel it is necessary. Any employee who feels that they are suffering the effect of heat stress shall inform the SSHO immediately.

PPU employees shall follow the recommendations for monitoring requirements, and suggested work/rest schedules for heat stress found in the ACGIH-02, TLV Booklet (2008). For workers who wear semi-permeable or impermeable clothing (i.e. Saranex or PVC coated Tyvek), the technical guidelines in NIOSH Publication 85-115 shall be observed. The project is scheduled to start in Fall 2020, and site activities will continue for about 30 days. Given the duration of the contract, the level of PPE for most tasks and an opportunity for acclimatization, heat stress is not likely to become a significant issue on this project.

The procedures for monitoring heat stress shall be to measure the radial heart rate (pulse) during a 30-second interval at the beginning of a rest period. If the heart rate exceeds 110 beats per minute, shorten the next work cycle by one-third, while keeping the rest period the same length. If the heart rate exceeds 110 beats per minute at the beginning of the next rest period, shorten the following work cycle by one-third. Continue monitoring and shortening work cycles until the heart rate is less than 110 beats per minute. Fluids will be available in the Support Zone for employees to maintain fluid intake during warm work periods.

8.4 Cold Stress

SOP (**Attachment A**) deals with the signs, symptoms and first aid for cold stress victims. Monitoring for cold stress should begin whenever the work area temperature drops below 50°F. Employees should be aware of the symptoms of cold stress and frost bite. If any signs or symptoms appear, report it immediately. The project is scheduled to start in Fall 2020, and site activities will continue for about one month. Depending on the project start date, cold stress may become an issue for this project. In the event of extreme cold conditions, procedures to monitor and avoid cold stress shall be followed in accordance with the current TLV's for Cold Stress as recommended by ACGIH. This includes the use of layered clothing, periodic breaks in a heated area, and the use of warm non-alcoholic beverages.

8.5 Sanitation

Provisions have been made for temporary sanitation facilities for the work force. At a minimum, the provision of toilet facilities will meet the requirements of 29 CFR 1910.120(n), which includes one facility for less than 20 employees, or one toilet and one urinal for every 40 employees, up to 200; then one of each for every 50 employees. Facilities shall be provided to allow employees to wash hands and face with soap and water at breaks, end of shift and when using sanitary facilities.

8.6 Emergency Information

EMERGENCY RESPONSE

Primary

EMERGENCY NUMBERS

AMBULANCE	911 (Lincoln County Ambulance Service)
POLICE DEPARTMENT	911 (Lincoln County Sheriffs Department – Pioche)
FIRE DEPARTMENT	911 (Pioche Volunteer Fire Department – Station 2)
HOSPITAL	(775) 726-3171 (Grover C Dils Medical Hospital) 700 North Spring Street, Caliente, NV 89008
Nevada Poison Control	(800) 222-1222
Pioche Public Utilities	(775) 962-5840
Sunrise Engineering	(435) 652-8400
Safe Digging	811

PROCEDURES FOR HANDLING PERSONNEL WITH EXCESSIVE EXPOSURE TO CHEMICALS OR CONTAMINATED SOIL

Decontamination will be done at a location that is convenient to the area where the Emergency Response actions are occurring, and in an upwind location. The decision to decontaminate a victim is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of lifesaving first aid. For others, decontamination may aggravate the injury or delay lifesaving treatment. If decontamination does not interfere with essential treatment it will be performed, and will include a wash, rinse and/or removal of protective clothing and equipment.

If decontamination cannot be done, the victim will be wrapped in blankets, plastic or rubber to reduce contamination of other personnel. Emergency and off-site medical personnel will be alerted to potential contamination. An individual familiar with the incident will be sent if possible.

Fire/Explosion

Upon notification of a fire or explosion on-site, all personnel will evacuate the site, immediately proceed upwind to the agreed upon evacuation location. The Pioche Volunteer Fire Department – Station 2 shall be alerted along with the Project Manager. Upon their arrival, the senior responding officer for the Fire Department shall assume the role of incident commander. All PPU personnel shall take directions from the incident commander and assist with any given directions.

Personal Protective Equipment Failure

If any site personnel experience a failure or alteration of PPE that affects the protection factor, that person and his/her buddy shall immediately leave the EZ. Reentry shall not be permitted until the PPE has been repaired or replaced.

Other Equipment Failure

If any other equipment on-site fails to operate properly, the SSHO shall be notified to determine the effect of this failure on continuing operations on-site. If the failure affects the safety of onsite personnel or prevents completion of the tasks, all personnel shall leave the EZ until the situation is evaluated and appropriate actions are taken.

In all situations, when an on-site emergency results in evacuation of the EZ, all personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. All site personnel have been briefed on any changes in the HASP.

9 RECORDING, LOGS AND REPORTS

9.1 General Requirements

All required records, logs and forms will be maintained according to the appropriate regulations. This includes all safety inspection reports, site entry logs, accident/incident reports, monitoring logs, medical certifications, first aid/cpr, 40-hour training, current 8-hour refresher training, current 8-hour supervisor training, hazard communication training, air monitoring results, etc.

All exposure and medical monitoring records will be maintained according to OSHA 29 CFR 1910.20 (Access to Records), 29 CFR 1910.120 (Hazardous Waste Operations and Emergency Response) and 29 CFR 1926.

All personnel conducting activities that may involve direct contact with asbestos fibers including work with soils, loading trucks, and sealing filled truck lining will have at a minimum 32 hours of asbestos abatement worker's training and be certified by the State of Nevada as abatement workers. All removal activities will be overseen by a certified abatement supervisor.

9.2 Daily Safety Inspection Logs

The daily safety inspection log will include at a minimum:

1. Date
2. Area (site specific) checked
3. Employees in a particular area
4. Equipment being utilized by employees
5. Protective clothing being worn by employees
6. Protective devices being used
7. Contractor's Personnel
8. Visitors
9. Designated State and Federal Representatives
10. Air Monitoring Data
11. SSHO signature and date

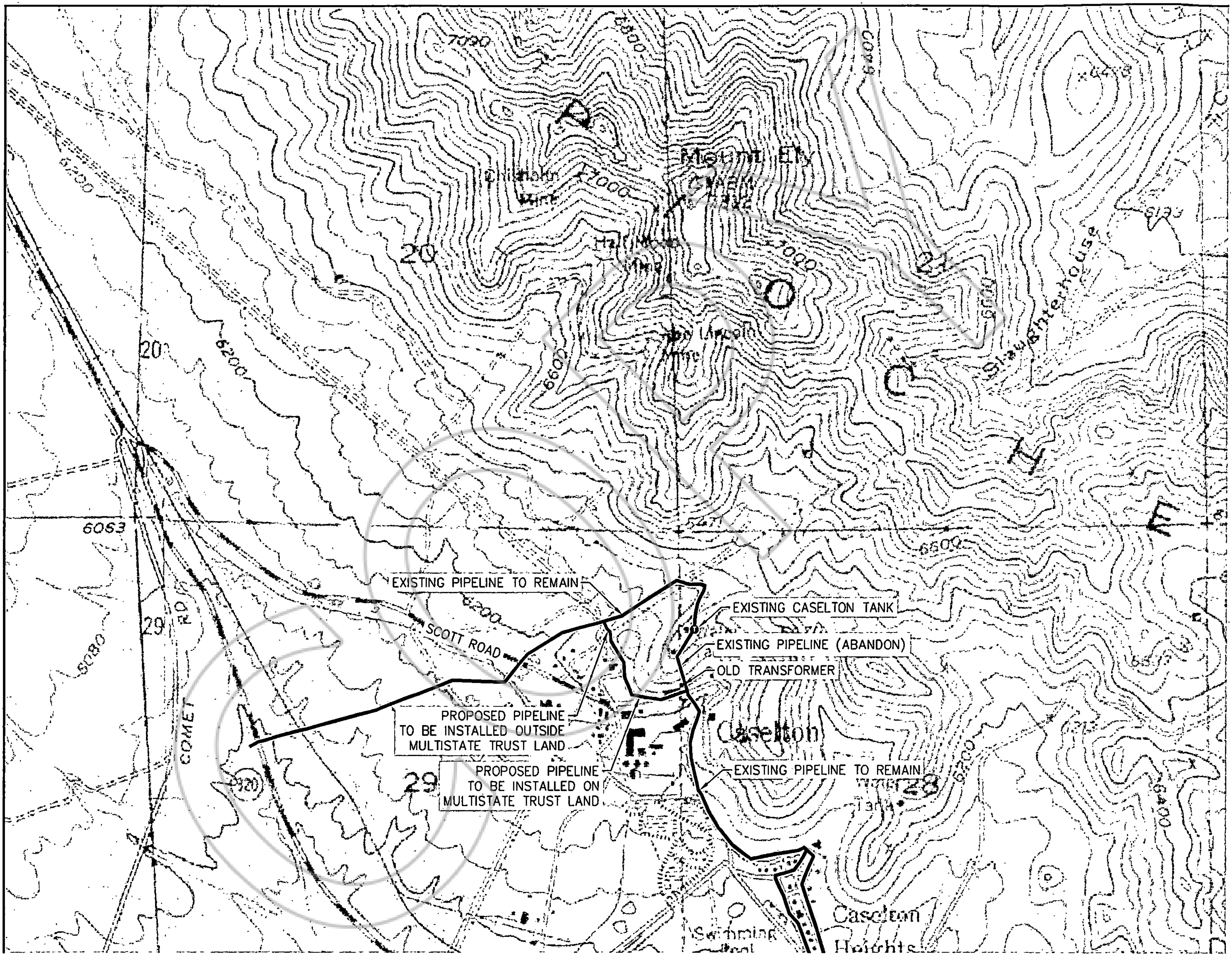
9.3 Other Reports

Other reports to be maintained by the SSHO include a weekly report detailing the monitoring results, actions taken, and the results of those actions; minutes of required safety meetings; and a phase-out report to be prepared at the conclusion of the project. All reports will be maintained in duplicate by PPU.

10 AS-CONSTRUCTED SURVEY

Following the installation of the 1,200 feet of 6-inch diameter PVC pipe through Multistate Trust land (see **Figure 1**), the location of the pipeline will be surveyed in place. The as-constructed survey will facilitate requirements from Lincoln County to record the easement.

Figures


EXISTING PIPELINE TO REMAIN
EXISTING CASELTON TANK
EXISTING PIPELINE (ABANDON)
OLD TRANSFORMER
PROPOSED PIPELINE
TO BE INSTALLED OUTSIDE
MULTISTATE TRUST LAND
PROPOSED PIPELINE
TO BE INSTALLED ON
MULTISTATE TRUST LAND
EXISTING PIPELINE TO REMAIN
SCOTT ROAD
COMET RD
Mount Ely
Slaughterhouse
Caselton
Caselton Heights
6063
20
21
28
29


SCOTT ROAD
PERSONNEL ENTRY/DECONTAMINATION
EXCLUSION ZONE (EZ)
EVACUATION AREA & RALLY POINT
HEAVY EQUIPMENT ENTRY/DECONTAMINATION
CONTAMINATION REDUCTION ZON
OLD TRANSFORMER
EXISTING PIPELINE (ABANDON)
EXISTING CASELTON TANI
T

Attachments

Attachment A

Standard Operating Procedures

I PERSONAL PROTECTIVE EQUIPMENT PROGRAM

I.1 Purposes

To provide minimum requirements for protection of employees, visitors, and contractors from injury or ill health through the proper selection and use of Personal Protective Equipment (PPE).

I.2 Program Responsibilities

A. The Site Health and Safety Officer (SSHO) is the PPE administrator and has the responsibility to:
   1. Coordinate the program.
   2. Ensure that annual training is conducted.
   3. Review the program annually.

B. Supervisors are responsible for informing workers of the PPE requirements within their department/area. The supervisor will also ensure that workers have been instructed in the proper donning, wearing, removal and the cleaning or disposal procedures for such equipment, and that the worker has understood the instructions. The supervisor will provide additional instructions as needed and will strictly enforce site rules related to PPE use.

C. Workers are responsible for properly donning, wearing, removing, cleaning, and disposing of the required protective equipment.

D. The SSHO is responsible for ensuring that Contractors provide their own PPE as specified in this Program.

E. The SSHO is responsible for maintaining the site PPE inventory control program.

F. The Project Manager and SSHO are responsible for the purchase of PPE, including respiratory protection.

I.3 General Requirements

A. Employees shall only use PPE supplied by the company.

B. Visitors will be supplied with the appropriate PPE.

C. PPE requirements are posted in the site-specific HASP.

D. Disposal of PPE and cleaning of reusable PPE is governed by the procedures specified in the Respirator Program.

E. Written procedures governing the safe use of PPE that might be required in an emergency are contained in this Standard Operating Procedure. These plans also contain the training requirements for emergency PPE.

I.4 Chemical Protective Clothing

A. Selection of Chemical Protective Clothing (CPC) will be based on the following:
   1. Manufacturers' instructions and degradation, penetration permeation data
   2. Published literature such as the ACGIH Guidelines Selection of Chemical Protective Clothing

Selected clothing will be contained in the HASP.

I.5 PPE Inspection

A. Respirators will be inspected in accordance with the Respiratory Protection Program.

B. Other PPE should be inspected prior to use by the wearer. Inspection considerations should include: obvious signs of contamination; tears and holes; proper function of closures; seams, etc. Sample PPE inspection checklists are found in Standard Operating Procedure II.
C. PPE stored for emergency use should be inspected monthly.

I.6 Storage

Storage of PPE at the site will follow the following general guidelines:

A. Boots are decontaminated and stored on a boot rack at the hot line to dry.
B. Disposable protective clothing may be stored before use at the hot line. However, a covering or other method should be provided to prevent contamination. Disposable clothing articles are placed in waste containers at the hot line after being removed. Disposable clothing is not to be reused.
C. Respirators are stored in accordance with the Respiratory Protection Program. They should not be stored in the open air in contaminated areas.
D. Reusable PPE should be stored in accordance with manufacturer's instructions to prevent equipment failure.
E. Potentially contaminated coveralls worn under disposable coveralls, are stored in containers in a separate area from street clothing.

I.7 Work Mission Duration

Since the work mission durations vary from site to site and task to task, it will be the responsibility of the Project Manager and the SSHO to maintain adequate supplies of PPE and breathing air to accomplish the work mission and comply with this program.

II RESPIRATORY PROTECTION PROGRAM

II.1 Respirator Training Outline

A. Training of respirator wearers in the use, field maintenance, capabilities and limitations of respirators is given initially upon employment to all employees whose work will require the use of respirators, or where an employee changes into a job classification which requires respiratory protection. Retraining is given at least annually thereafter. No worker is permitted to wear a respirator in a work situation until he or she has been trained.

B. Each employee is trained as follows:

1. Instruction in the nature of the respiratory hazards and what may happen if the respirator is not used properly.
2. An explanation of the engineering and administrative control measures being used and why respirators are needed to provide protection.
3. Instruction in the selection, use, sanitary care, maintenance, proper storage, and limitations of each applicable respirator type.
4. Demonstrations and practice in proper fitting, wearing, adjusting, and checking the face-to-face piece seal of each applicable respiratory type.
5. An opportunity to handle the respirator and to wear it in a safe atmosphere for an adequate period of time to ensure familiarity with the characteristics of the respirator.
6. An opportunity to wear the respirator in a test atmosphere (such as atmospheres generated by smoke tubes or isoamyl acetate) to demonstrate that the respirator protects the worker.
7. Instructions in how to recognize and cope with emergency situations requiring respiratory protection.
8. An explanation of the requirement for a self-contained breathing device for work in unknown concentrations and immediately dangerous to life or health (IDLH) atmospheres, and for firefighting.
9. An explanation of the medical surveillance program as it relates to the use of respiratory protective equipment.
10. An explanation of the requirements for maintaining the respirator gas-tight seal, including beard and facial hair policies; and the policy prohibiting the use of contact lenses while wearing respirators.

C. Records of the training given to each individual are placed in the workers training record file.

II.2 Respirator Fit Test Form

Employee Name		
Respirator Type (1)		
Face Piece (2)		
Make, Model		
Size		
Cartridge Used		
Test (3)		
Normal Breathing		
Deep Breathing		
Side to Side		
Up and Down		
Speaking		
Bending		
Jogging		
Normal Breathing		
Sensitive to Smoke		
Pass (P) or Fail (F)		

Comments:

Person Conducting Fit Test: _____ Date: _____

(1) Respirator Type: AP (air purifying); SA/SCBA (supplied air with SCBA escape bottle); SCBA (self-contained breathing apparatus
(2) Face Piece: F (full face); H (half mask)
(3) Test: IS (irritant smoke); QN (quantitative)

II.3 Monthly Written Respiratory Protection Program Evaluation

The following are 11 Points from 29 CFR 1910.134

A. There are written standard operating procedures governing the selection and use of respirators.
B. Respirators are selected on the basis of hazards to which the worker is exposed.
C. Approved or accepted respirators are used when they are available.
D. The user is instructed and trained in the proper use of respirators and their limitations.
E. Where practical, the respirators are assigned to individual workers for their exclusive use.
F. There are regular inspection and evaluations to determine the continued effectiveness of the program.
G. Persons will not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment; i.e., medically qualified.
H. Respirators will be regularly cleaned and disinfected.
I. Respirators will be stored in a convenient, clean and sanitary location.
J. Respirators used routinely will be inspected during cleaning.

K. Appropriate surveillance of work area conditions and degree of employee exposure or stress will be maintained.

Reviewed by: _____ Date of Review: _____

III FIRST AID FOR THE IDENTIFICATION OF HEAT EXHAUSTION OR HEAT STROKE

III.1 Heat exhaustion

A. Symptoms: Usually begins with muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, breathing is shallow. The victim may faint unless he lies down. This may pass, but sometimes it persists and, while heat exhaustion is generally not considered life-threatening, death could occur.

B. First Aid: Immediately remove the victim to the decontamination area in a shady or cool area with good air circulation. Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make the victim lie down, raise feet 6-12 inches, maintain body temperature but loosen all clothing.) If the victim is conscious it may be helpful to give sips of water. Transport victim to a medical facility.

III.2 Heat Stroke

A. Symptoms: This is the most serious of heat casualties due to the fact that the body excessively overheats. Body temperatures often are between 107-110°F. The victim will have a red face and may not be breathing. First there is often pain in the head, dizziness, nausea, depression, and a dryness of the skin and mouth. Unconsciousness follows quickly and death is imminent if exposure continues. The attack will usually occur suddenly. Heat stroke is always serious.

B. First Aid: Immediately evacuate the victim to a cool and shady area in the Decontamination Reduction Zone. Remove all protective outer wear and all personal clothing. Lay the victim on his back so that the head and shoulders are slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels, ice bags, etc., to the head and groin. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place in a tub of cool water. The main objective is to cool without chilling. Do not administer stimulants. Transport the victim to a medical facility as soon as possible.

IV IDENTIFICATION AND TREATMENT OF FORSTBITE

Frostbite is a localized injury, resulting from a freezing of tissue. It is most common to the fingers and toes due to reduced circulation in the extremities and on the face and ears as they are most commonly exposed (uncovered) to the weather. For frostbite to occur, there must be subfreezing temperatures. It is most prevalent in very cold temperatures or when cold temperatures are extenuated by the wind (wind chill).

A. Symptoms
   1. Pre-Frostbite - Affected area feels painfully cold, but usually flushed (redrosy) in color.
   2. First Degree Frostbite (frost nip - Crystallization in superficial tissues. Affected area no longer feels cold and is completely numb. Skin coloration is a small grayish-yellow waxy patch. Immediate treatment will completely reverse the condition with no ill effects.
   3. Second Degree (Deep) Frostbite - A deep freezing of the fluids in the underlying soft tissues. Symptoms and treatment are the same as for above. Usually results in a death of tissue, blistering, black skin, loss of toes, etc., with possible complications from gangrene.

B. First Aid
   1. Cover and protect the affected part
   2. Provide extra clothes
   3. Bring indoors as soon as possible
   4. Give warm drink
   5. Re-warm frozen part quickly by immersing in warm water (if thawed and refrozen, warm at room temperature)
   6. Do not rub - causes tissue death
   7. Do not apply direct heat
   8. Do not break blisters
   9. Do not allow to walk after feet thaw
   10. Discontinue warming as soon as part becomes flushed
   11. Exercise thawed part
   12. Separate fingers and toes with sterile gauze
   13. Elevate frostbitten parts
   14. Seek medical attention because of chance of infection, or gangrene.

C. Treatment
   For all frostbite - rapid re-warming (thawing) as soon and as quickly as possible is the preferred treatment. Do not warm tissue that will only be refrozen, or warm feet if they are to be walked upon. Second degree frostbite requires medical attention and the victim should not be re-exposed to the cold.

D. Prevention
   1. Fatigue, cigarettes, alcohol, lack of food and drink, clothing which restricts circulation, and any other factors which reduce circulation will contribute to frostbite.
   2. Properly insulate all body parts. Extreme cold may require a face mask. Use insulated gloves and boots.

3. Winds and wetness will accentuate frostbite. Keep dry and do not expose skin to the wind.
4. Be observant of each other. Look at ears, rosy cheeks, etc. Often the victim does not realize he has frostbite.

V IDENTIFICATION AND TREATMENT OF HYPOTHERMIA

Hypothermia is a systematic lowering of the body temperature. Extreme cases (core temperature below 90°F) result in death of the victim. Hypothermia is the most common cause of death for persons involved in outdoor wilderness sport activities. It does not require freezing temperatures and, in fact, can occur in ambient temperatures as high as 70°F. Wind and wetness greatly accentuate hypothermia due to the enhanced cooling. Typical hypothermia conditions are a rainy, windy day with 50°F air temperatures.

A. Symptoms
   1. First Stage: goose bumps, shivering, feeling chilly
   2. Second Stage: violent shivering, blue lips, pale complexion, feeling extremely cold
   3. Third Stage: no longer feel cold, lack of coordination, mild unresponsiveness, drowsiness, stumbling
   4. Fourth Stage: failing eyesight, victim barely responsive, cannot speak, barely able to or cannot walk.
   5. Fifth Stage: coma and rapid death

B. Treatment

   For all levels - remove wet, frozen or restrictive clothing. Dry the victim. Rewarming should be via an external heat source which completely envelopes the victim - a warm vehicle, a warm room, a sauna, a tub of warm water, by placing the victim in a sleeping bag with another person(s), etc. - and not a source of radiant heat which will warm only one side of the victim. Be prepared to administer CPR. Do not give the victim alcohol.
   1. First Stage: Put on hat, shirt, additional clothing, wind breaker, etc. Eat and drink. Exercise on tense muscles.
   2. Second Stage: Same as above, only more so. Warm drinks and re-warm if possible. NOTE: In hypothermia beyond second stage, the victim can no longer warm himself and must have an external heat source.
   3. Third Stage: Re-warming, warm food and drink.
   4. Fourth Stage: Remove wet or cold clothing and gradually re-warm victim so that blood trapped in extremities is re-warmed before it is circulated back into inner body to prevent afterdrop. Afterdrop is a further lowering of the body core temperature which results from recirculation of cold blood. Avoid hot, radiant heat sources which will warm surface blood before inner blood has been warmed. Do not give warm drinks which fool the body internally into feeling it is warm. Fourth stage hypothermia victims are best treated by supervised, experienced medical help, as complications can cause death. Place victim in warm vehicle and evacuate immediately to a medical facility.
   5. Fifth Stage: Gradual re-warming but requires sophisticated medical help to prevent death from aftershock (a recirculation of chilled blood causing heart fibrillation).

C. Prevention
   1. Wear proper clothing which will insulate the body, keep it dry and break the wind.

2. Cover the head, neck, wrists, and ankles in particular, as heat loss is most prevalent from these points.
3. Eat and drink warm fluids. Avoid eating snow.
4. Keep active to raise body temperature.
5. Avoid fatigue, alcohol, smoking and drugs.
6. Be aware of team members' condition and note symptoms.

VI CONFINED SPACE ENTRY POLICY

VI.1 Confined Space Classification

OSHA has recently implemented the "Permit-Required Confined Space Entry" Standard. This regulation establishes a series of requirements for spaces which meet the definition of a permit-required confined space. In this project, trenches or excavations in excess of 5 feet in depth which will be entered by employees, meet the definition of a confined space. For each of these spaces, if there is a potential for exposure to an oxygen-deficient, toxic, or combustible environment, or if there is the potential for entrapment or engulfment due to soil stability, or rain, that space meets the definition of a permit-required confined space.

Entry into confined spaces may be required by project personnel. Employees have been trained and in the event entry is required for inspection, it will be performed in conjunction with the subcontractor. Entry to this space requires the issuance of an entry permit, along with a series of requirements for training, supervision of the entry, and preparation for a rescue, should one be required. Prior to entry, the trench or excavation must also be properly trenched, shored, or benched to prevent spillage of dirt into the hole where workers are present.

VI.2 Entry Procedures

Team Size - A minimum of three workers is required for each confined space activity (two entry and one standby; or one entry, one rescue, and one standby).

The one entry/one rescue/one standby arrangement should only be used when the confined space is relatively small and/or the entry person will be in the line of sight at all times. In this instance, the rescue person acts as the second person in the "buddy system."

The two entry/one standby arrangement is used when the area of the confined space is larger, and the tasks may take the worker away from the entryway. Again, care must be taken with this arrangement because the standby person cannot enter the confined space and attempt rescue unless adequately protected (i.e., respiratory and dermal) and replaced by another qualified standby person.
This number of workers is the minimum buddy for these activities and, in most cases, should only be used for relatively nonhazardous confined spaces. Additional crew may be needed if entering a permit-required confined space. Additional crew could include rescue, decontamination, and line-of-sight personnel.

VI.3 General Entry Procedures

The following steps must be taken when entering a confined space:

A. Inspect all pieces of equipment to ensure they are in good working order. DO NOT ENTER CONFINED SPACE WITH DEFECTIVE EQUIPMENT.

B. Conduct a background check to identify all potential hazards that may be encountered in the confined space. Determine if there is a potential for fire/explosion hazards, as well as a potential for a toxic or oxygen-deficient atmosphere.

C. Before entry, the atmosphere inside the confined space must be tested. An attempt should be made to test the atmosphere without opening the entryway (i.e., through a vent line or a small opening). If the entryway must be opened to test and only low levels are expected in the confined space; crack open entryway, test breathing zone first, and then test the confined space. If potentially high levels are expected in the breathing zone, respiratory protection should be worn prior to opening the entryway cover.

D. If explosive, toxic, or oxygen-deficient atmosphere is detected, purge or ventilate the confined space prior to entry. Retest the atmosphere three times at 5-minute intervals. A person can enter the confined space without respiratory protection only if all three test results are below the Permissible Exposure Limit/Threshold Limit Value (PEL/TLV), 10 per cent of the LEL, and above 19.5 per cent oxygen (all three conditions must be met). (NOTE: Any downward deflection of the readings on the oxygen meter from background (i.e., 20.9 per cent) should be viewed as a potential for an IDLH atmosphere. Unless contaminants are known to be nontoxic, do not enter the confined space without respiratory protection if the oxygen level is below background.)

E. Blank, double block and bleed, or otherwise isolate, lockout, and tag all chemical, physical, and/or electrical hazards wherever possible. Reduce all forms of energy to a zero energy state.

F. If using an air-purifying respirator or if an IDLH and/or explosive atmosphere exists, air monitoring must be on a continuous basis. If respiratory protection is not used and there is potential for atmospheric conditions to change due to work practices or conditions, air monitoring should be done periodically. In all these cases, a 5-minute escape pack must be used.

G. Record all results of the tests for hazardous conditions including the location, time, date, weather (if applicable), and readings on the PID, combustible gas meter, oxygen deficiency meter, Drager tubes, and any other equipment.

H. Wear appropriate clothing for site conditions, as determined by the Site Safety and Health Officer (SSHO).

I. A safety belt or harness with lifeline must be worn if hazardous conditions exist, although good safety precautions dictate their use regardless of "existing" conditions. If the diameter of the entryway is less than 18 inches, the wrist-type harness must be used, and special provisions made if a supplied air respirator is necessary.

J. One person (standby) must remain at the entryway at all times and must keep continuous contact with the person entering the confined space. Contact can be maintained by line-of-sight, listening for sounds, the safety line, and/or radio. The standby person must not enter the confined space unless another trained person is available to act as standby, and he/she is equipped with adequate respiratory and dermal protection. (In most cases, respiratory protection would be an airline respirator or SCBA.)

K. Do not smoke when working in or near confined spaces and do not take flash-lighted photographs when explosive gases are known or suspected to be present.

L. Do not rely on permanent ladders because they are often in poor condition. If they must be used, be sure of footing. Inspect permanent ladders for deterioration before entering and while descending. Try each step with one foot, while standing on the step above. When in doubt, use a portable ladder of adequate height to reach 3 feet above opening or a rope ladder, or lower the entry person using the tripod. If a portable ladder is used, it should be tied off, if possible; otherwise, it should be held in place by the standby person.
M. Do not work without adequate lighting. Use only "explosion-proof" lights or hand lamps.
N. The entry person must not remain in the confined space if he/she becomes even slightly drowsy, faint, dizzy, or otherwise uncomfortable. Many of the gases that cause the most problems are odorless, tasteless, and invisible.

VI.4 MANHOLE/SEWER ENTRY

There are no reported plans to enter manholes or sewers as a part of this project. The following information is included in the event the scope changes to include such activities. The Plan should be reviewed at that point, prior to any entry to a manhole or sewer. When preparing to enter a manhole/sewer, the following safety measures must be taken:

A. Inspect all pieces of equipment to ensure they are all in good working order. DO NOT ENTER CONFINED SPACE WITH DEFECTIVE EQUIPMENT.
B. Park the vehicle near the manhole (do NOT leave the vehicle running). If the manhole is in the street, it is best to park so as to detour oncoming traffic around the manhole. The vehicle's emergency flashers and portable yellow warning beacon must be ON. The vehicle serves as protection from oncoming traffic, can be used to store emergency equipment (e.g., SCBA and first aid kit), and can be used in an extreme emergency to slowly pull an injured person from the confined space if a tripod with hoist attachment is unavailable or inoperative.
C. Erect portable barricades or cones around the manhole and in front of the vehicle to see that traffic is adequately diverted and to prevent pedestrians from falling in. Reflective vests should be worn so that workers are visible to approaching traffic.
D. If there are openings large enough to admit sampling tubes, test for the presence of explosive and toxic gases before removing each manhole cover. Otherwise, raise one side of the cover using the cover hook or pick, prop it slightly open, and conduct the tests.
E. If toxic or explosive gases are detected in the sewer, report this immediately to the local Fire Department and/or Department of Public Works.
F. Record the results of tests for hazardous conditions, including location, manhole number (if applicable), time and date, weather (if applicable), and the readings on the PID, combustible gas meter, oxygen deficiency meter, and Drager tube.
G. Remove manhole covers with a cover hook or pick; do not improvise. Be careful of fingers and toes; the cover is usually heavy and difficult to handle. Unless the cover is extremely heavy, it is safer for only one worker to handle it.
H. Test the atmosphere; if a toxic, flammable, or oxygen-deficient atmosphere exists, ventilate the sewer. Depending on the hazard, ventilation can be accomplished in a variety of ways: for example, (1) remove and vent the adjoining upstream and downstream manhole covers, as soon

as possible, and well in advance of entering the manhole (high hazard); and (2) vent the manhole in which entry will occur (very low hazard). If a blower is used, it is desirable to establish a flow of air in the sewer, in one manhole and out another. Ensure that the air intake is well away from automobile exhaust, and combustible and/or toxic atmospheres. Appropriate traffic control measures must be taken by barricading or otherwise marking the open manholes.

I. After ventilating, test for explosive and toxic gases and oxygen deficiency in the manhole at ground level and at the bottom; record results. If entering the sewer itself, make the same tests at the manholes at either end. If ventilation is necessary, monitor the atmosphere in the manhole while work progresses, or continue operation of the blower. Continuous monitoring (i.e., equipment ON during entire entry) is imperative because conditions within the sewer may change rapidly. Do not enter a manhole while there is an oxygen deficiency without a pressure-demand, air-supplied breathing apparatus. If the oxygen level is lower than 20.9 per cent of background, caution must be taken because an IDLH atmosphere may exist.

J. When entering manholes or tanks, wear hardhats, protective clothing, and unless inappropriate, respiratory protection and safety belt or harness with lifeline. If the manhole is less than 18 inches in diameter, a wrist-type harness must be used and special provisions made if air-supplied respirators are necessary. When working in manholes greater than 12 feet deep, in the sewer itself, of where potential exists for gases to appear unexpectedly, a 5-minute emergency egress air supply is required (unless the time required to don the emergency respirator is greater than what would be needed to exit the manhole.)

K. At least one person (i.e., standby) must remain at the manhole at all times and must keep continuous contact with the person entering the sewer. Contact can be maintained by line-of-sight, listening for sounds, and the safety line and/or radio. The standby person must not enter the manhole unless another trained person is available to act as standby and has adequate respiratory and dermal protection available. (in most cases, respiratory protection will be an airline respirator or SCBA). The standby/rescue person should be suited up (but not yet on air) before the work crew enters the confined space.

L. Do not smoke when working in or near manholes. Do not take flash-lighted photographs when explosive gases are known or suspected to be present.

M. Do not rely on the manhole ladders because they are often in poor condition. If they must be used, be sure of footing. Inspect manhole ladders for deterioration before entering and while descending. Try each step with one foot, while standing on the step above. When in doubt, use a portable or rope ladder of adequate height to reach 3 feet above the manhole opening, or lower the entry person using the tripod. If a portable ladder is used, it should be tied off if possible; otherwise, it should be held in place by the standby person.

N. Do not work without adequate lighting. Use only "explosion-proof" lights or hand lamps in the manhole or sewer.

O. The entry person must not remain in the manhole or sewer if he/she becomes even slightly drowsy, faint, dizzy, or otherwise uncomfortable. Remember that carbon monoxide, carbon dioxide, methane, and hydrogen sulfide, which cause the most trouble, are odorless (hydrogen sulfide has a distinct odor only during initial exposure), tasteless, and invisible.

CONFINED SPACE ENTRY PERMIT

Confined Space Location/Description/ID Number **Date:**

Purpose of Entry

Time In: _____ **Permit Canceled Time:** _____
Time Out: _____ **Reason Permit Canceled:** _____

Supervisor: _____

Rescue and Emergency Services-

Hazards of Confined Space	Yes	No	Special Requirements	Yes	No
Oxygen deficiency			Hot Work Permit Required		
Combustible gas/vapor			Lockout/Tagout		
Combustible dust			Lines broken, capped, or blanked		
Carbon Monoxide			Purge-flush and vent		
Hydrogen Sulfide			Secure Area-Post and Flag		
Toxic gas/vapor			Ventilation		
Toxic fumes			Other- List:		
Skin- chemical hazards			**Special Equipment**		
Electrical hazard			Breathing apparatus- respirator		
Mechanical hazard			Escape harness required		
Engulfment hazard			Tripod emergency escape unit		
Entrapment hazard			Lifelines		
Thermal hazard			Lighting (explosive proof/low voltage)		
Slip or fall hazard			PPE- goggles, gloves, clothing, etc.		
			Fire Extinguisher		

Communication Procedures:

DO NOT ENTER IF PERMISSABLE ENTRY LEVELS ARE EXCEEDED		**Test Start and Stop Time:** **Start**	**Stop**
	Permissable Entry Level		
% of Oxygen	19.5 % to 23.5 %		
% of LEL	Less than 10%		
Carbon Monoxide	35 PPM (8 hr.)		
Hydrogen Sulfide	10 PPM (8 hr.)		
Other			

Name(s) or Person(s) testing: _____

Test Instrument(s) used- Include Name, Model, Serial Number and Date Last Calibrated:

CFM-Ventilation	Size-Cubic Feet	Pre Entry Time	☐ Central Notified Before Entrance	Time Notified:
			☐ Central Notified After Entrance	Time Notified:

Authorized Entrants

_____

_____

_____

Authorized Attendants

_____

_____

_____

PERMIT AUTHORIZATION **I Certify that all actions and conditions necessary for safe entry have been performed.**	
Name-Print:	
Signature:	
Date:	Time:

Entry Procedure Checklist: Complete the following steps before, during, and after a confined space entry:

Step 1
Obtain a Permit-Confined Space Entry Form from Program Coordinator.

Step 2
Notify Supervisor before the **Confined Space Entry**

Step 3
Verify Confined Space Meter has been calibrated and is in working order

Step 4
Complete the top portion of the Permit-Confined Space Entry Form

Step 5
Ensure all rescue equipment (e.g. tripod, body-belt, lanyard) is in place prior to entry

Step 6
Monitor the confined space with the MSA 4-Gas Detector prior to entry. The entrant and attendant should sign the permit authorization section on the bottom of the permit to ensure all actions and conditions necessary for safe entry have been performed.

Step 7
Employee entering the confined space should wear the 4-Gas Detector after the pre-atmosphere test. The employee should also have a full body harness and lanyard attached to the rescue tripod. Employee shall have a radio and any other necessary personal protective equipment.

Step 8
Employee can enter the confined once Step 7 is completed. The entrant and attendant should complete the Hazards of Confined Spaces and Special Requirements Section of the Permit-Confined Space Entry Form once the employee is within the confined space. The entrant should also gather the % Oxygen, % Explosive Gases, Carbon Monoxide, and Hydrogen Sulfide readings and communicate them to the attendant to place on the Permit Form.

Step 9
The attendant should maintain constant communication with the entrant until the entrant has exited the confined space.

Step 10
The attendant should contact Supervisor once the entrant has exited the confined space.

Step 11
The Permit-Confined Space Entry Form should be given to program coordinator, to file in the Confined Space Records.

VII UNDERGROUND UTILITIES

Underground utilities pose hazards to workers involved in drilling, excavation, soil vapor contaminant analysis, and other invasive operations. These hazards include electrical hazards, explosion, chemical exposure, asbestos exposure and asphyxiation, as well as costly and annoying hazards associated with damaging communication, sewer, water, and/or irrigation lines.

The estimated location of underground installations, including sewer, telephone, fuel, electric, water lines, or other underground installations that reasonable may be expected to be encountered during invasive work shall be determined prior to the start of any invasive work. This may be determined by contacting appropriate utilities, contacting a utility clearance service, using site maps and prominent site features, using a pipe and cable locator, etc. Buried utilities encountered during invasive operations must be protected while digging to prevent risks to site personnel and damage to the utilities. The Contractor must request and received an assessment of the site from Safe Digging. The telephone number for Safe Digging in Nevada is 811.

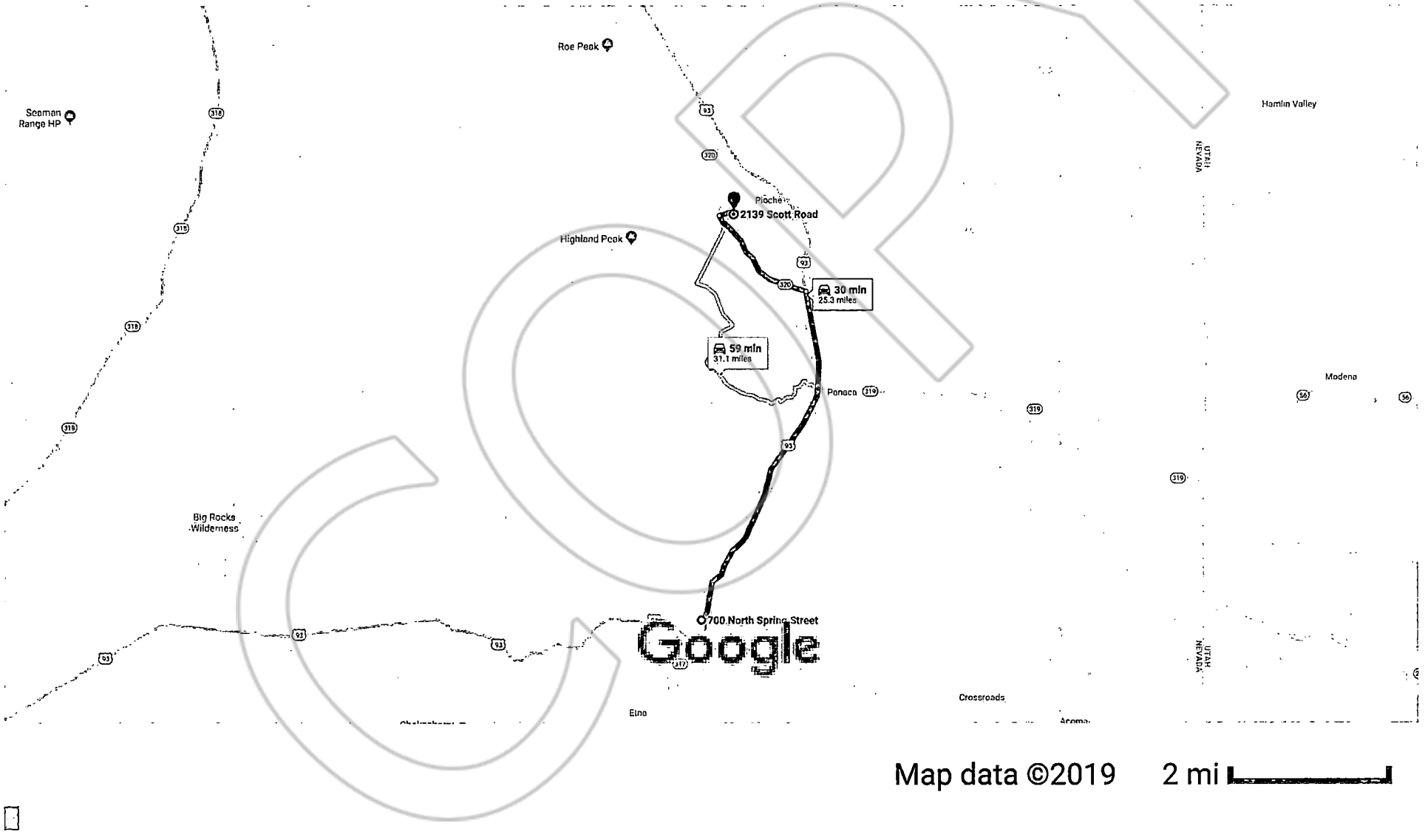
Attachment B

Location of Site/Directions to Hospital

Google Maps

700 N Spring St, Caliente, NV 89008 to 2139 Scott Rd, Pioche, NV 89043

Drive 25.3 miles, 30 min



via US-93 N — 30 min

Fastest route — 25.3 miles

via US-93 N and Bennett Springs Rd — 59 min

31.1 miles

Explore 2139 Scott Rd

Restaurants Hotels Gas stations Parking Lots More

Attachment C

Site Safety Sign-In Sheet

SITE SAFETY SIGN-IN SHEET

Each individual attending the pre-construction safety briefing must sign below, indicating they have been trained in the hazards associated with the site and have been given access to the Hazardous Materials Health & Safety Plan.

Project: Caselton Water System Improvement Project

Name (Print)	Company	Signature

Site Safety & Health Officer: _____

Date: _____

Attachment D

Material Safety Data

Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

Product Name • **Asbestos, Chrysotile**

Synonyms • Chrysotile Asbestos; Serpentine chrysotile; White asbestos

Product Code • 02107A-AB; 02701-AB; 02740A-AB; 02740-AB

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified use(s) • Laboratory standard in the microscopy laboratory

1.3 Details of the supplier of the safety data sheet

Manufacturer • SPI Supplies Division Structure Probe, Inc.

206 Garfield Ave.
West Chester, PA 19380
United States
http://www.2spi.com
SDS@2spi.com

Telephone (General) • 1-(610)-436-5400

1.4 Emergency telephone number

Manufacturer • 1-(800)-424-9300 - Chemtrec

Manufacturer • 1-(703)-741-5970 - Worldwide

Section 2: Hazards Identification

EU/EEC

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 2015/830]

2.1 Classification of the substance or mixture

CLP • Carcinogenicity 1A - H350
Specific Target Organ Toxicity Repeated Exposure 1 - H372

2.2 Label Elements

CLP

DANGER

Hazard statements • H350 - May cause cancer.
H372 - Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention • P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe dust.
P264 - Wash thoroughly after handling.

P270 - Do not eat, drink or smoke when using this product.
P281 - Use personal protective equipment as required.

Response • P308+P313 - IF exposed or concerned: Get medical advice/attention.
P314 - Get medical advice/attention if you feel unwell.

Storage/Disposal • P405 - Store locked up.
P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other Hazards

CLP • According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

OSHA HCS 2012 • Carcinogenicity 1A
Specific Target Organ Toxicity Repeated Exposure 1

2.2 Label elements

OSHA HCS 2012

DANGER

Hazard statements • May cause cancer.
Causes damage to organs through prolonged or repeated exposure.

Precautionary statements

Prevention • Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.

Response • IF exposed or concerned: Get medical advice/attention.
Get medical advice/attention if you feel unwell.

Storage/Disposal • Store locked up.
Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

OSHA HCS 2012 • Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Section 3 - Composition/Information on Ingredients

3.1 Substances

Composition					
Chemical Name	**Identifiers**	**%**	**LD50/LC50**	**Classifications According to Regulation/Directive**	**Comments**
Asbestos, chrysotile	**CAS:**12001-29-5 **EU Index:**650-013-00-6	> 99.99%	NDA	**EU CLP:** Annex VI, Table 3.1: Carc. 1A, H350; STOT RE 1, H372 ** **OSHA HCS 2012:** Carc. 1A; STOT RE 1 (Lungs)	NDA

3.2 Mixtures

- Material does not meet the criteria of a mixture.

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation
- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.

Skin
- Wash skin with soap and water. Flush with copious amounts of water for 15 minutes.

Eye
- In case of contact with substance, immediately flush eyes with running water for at least 20 minutes. Get medical attention immediately.

Ingestion
- Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician
- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media
- Water, Foam, Dry Chemical.

Unsuitable Extinguishing Media
- No data available

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards
- Negligible fire and explosion hazard. Toxic gases and asbestos particulate may be released in a fire.

Hazardous Combustion Products
- No data available

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions
- Ventilate enclosed areas. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away.

6.2 Environmental precautions

- Avoid run off to waterways and sewers.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up
- Avoid generating dust.

Measures

Use HEPA vacuum wet methods when feasible.
Carefully shovel or sweep up spilled material and place in suitable container.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Minimize dust generation and accumulation. Wear appropriate personal protective equipment, avoid direct contact. Do not breathe dust. Avoid contact with skin, eyes, and clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Store in well-sealed container in cool, dry area in accordance with all current regulations and standards.

7.3 Specific end use(s)

- This item is not being offered for clinical or diagnostic applications, agricultural uses or for human or animal consumption. Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines		
	Result	OSHA
Asbestos, chrysotile (12001-29-5)	TWAs	0.1 fiber/cm3 TWA

8.2 Exposure controls

Engineering Measures/Controls

- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment).

Personal Protective Equipment

Respiratory

- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls

- Controls should be engineered to prevent release to the environment, including procedures to prevent spills, atmospheric release and release to waterways. Follow best practice for site management and disposal of waste.

Additional Protection Measures

- An eyewash station and emergency shower must be available to the work station.

Key to abbreviations

NIOSH = National Institute of Occupational Safety and Health
OSHA = Occupational Safety and Health Administration
TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Material Description			
Physical Form	Solid	Appearance/Description	White, gray, greenish, or yellowish, odorless, fibrous solid.
Color	White, gray, greenish, or yellowish.	Odor	Odorless
Odor Threshold	Data lacking		
General Properties			
Boiling Point	Data lacking	Melting Point/Freezing Point	> 500 °C(> 932 °F)
Decomposition Temperature	1000 °C(1832 °F)	pH	Data lacking
Specific Gravity/Relative Density	2.2-2.6 g/cc	Water Solubility	Data lacking
Viscosity	Data lacking	Explosive Properties	Data lacking
Oxidizing Properties:	Data lacking		
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Data lacking	UEL	Data lacking
LEL	Data lacking	Autoignition	Data lacking
Flammability (solid, gas)	Data lacking		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity

10.1 Reactivity

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization will not occur.

10.4 Conditions to avoid

- Avoid generating dust.

10.5 Incompatible materials

- Strong oxidizers, strong acids, and bases.

10.6 Hazardous decomposition products

- None known.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

Components		
Asbestos, chrysotile (> 99.99%)	12001-29-5	**Multi-dose Toxicity:** Inhalation-Hamster TCLo • 30 mg/m³ 6 Hour(s) 78 Week(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; *Lungs, Thorax, or Respiration*:**Changes in lung weight**; Inhalation-Rat TCLo • 8210 µg/m³ 6 Hour(s) 20 Day(s)-Intermittent; *Lungs, Thorax, or Respiration*:**Fibrosis (interstitial)**; **Tumorigen / Carcinogen:** Ingestion/Oral-Rat TDLo • 7100 mg/kg 39 Week(s)-Continuous; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Liver*:**Tumors**; *Kidney, Ureter, and Bladder*:**Kidney tumors**; Inhalation-Man TCLo • 400 mppcf 1 Year(s)-Continuous; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Fibrosis, focal (pneumoconiosis)**; *Lungs, Thorax, or Respiration*:**Tumors**; Inhalation-Rat TCLo • 11 mg/m³ 26 Week(s)-Intermittent; *Tumorigenic*:**Carcinogenic by RTECS criteria**; *Lungs, Thorax, or Respiration*:**Tumors**

GHS Properties	Classification
Acute toxicity	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Skin corrosion/Irritation	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Serious eye damage/Irritation	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Skin sensitization	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Respiratory sensitization	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Aspiration Hazard	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Carcinogenicity	**EU/CLP** • Carcinogenicity 1A; May cause cancer **OSHA HCS 2012** • Carcinogenicity 1A
Germ Cell Mutagenicity	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
Toxicity for Reproduction	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
STOT-SE	**EU/CLP** • Data lacking **OSHA HCS 2012** • Data lacking
STOT-RE	**EU/CLP** • Specific Target Organ Toxicity Repeated Exposure 1 **OSHA HCS 2012** • Specific Target Organ Toxicity Repeated Exposure 1

Potential Health Effects

Inhalation

Acute (Immediate)

- Exposure to dust may cause irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)

- Overexposure to breathing asbestos may cause asbestosis, pulmonary fibrosis, mesothelioma, other lung disorders or cancer. All types of asbestos are known to cause inflammatory changes in lungs and pleurae. However, there is experimental and epidemiologic evidence that there may be differences in the potential of different asbestos types to produce disease. It has been suggested that crocidolite has greatest potential to produce disease; chrysotile, the smallest; with amosite occupying an intermediate position.

Skin

Acute (Immediate)

- Exposure to dust may cause mechanical irritation.

Chronic (Delayed)
- No data available

Eye

Acute (Immediate)
- Exposure to dust may cause mechanical irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)
- No data available

Ingestion

Acute (Immediate)
- Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.

Chronic (Delayed)
- No data available

Carcinogenic Effects
- Repeated and prolonged exposure may cause cancer.

Carcinogenic Effects				
	CAS	OSHA	IARC	NTP
Asbestos, chrysotile	12001-29-5	Specifically Regulated Carcinogen	Group 1-Carcinogenic	Known Human Carcinogen

Key to abbreviations
TC = Toxic Concentration
TD = Toxic Dose

Section 12 - Ecological Information

12.1 Toxicity
- Material data lacking.

12.2 Persistence and degradability
- Material data lacking.

12.3 Bioaccumulative potential
- Material data lacking.

12.4 Mobility in Soil
- Material data lacking.

12.5 Results of PBT and vPvB assessment
- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects
- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

Product waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Packaging waste
- Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	UN2590	Asbestos, chrysotile	9	III	NDA
IMO/IMDG	UN2590	ASBESTOS, CHRYSOTILE	9	III	NDA
IATA/ICAO	UN2590	White Asbestos (Chrysotile)	9	III	NDA

14.6 Special precautions for user
- None specified.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
- Data lacking.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

SARA Hazard Classifications
- Chronic

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Asbestos, chrysotile	12001-29-5	No	No	No	No	No

Canada

Labor

Canada - WHMIS 1988 - Classifications of Substances

• Asbestos, chrysotile	12001-29-5	D2A

Canada - WHMIS 1988 - Ingredient Disclosure List

• Asbestos, chrysotile	12001-29-5	0.1 %

Environment

Canada - CEPA - Priority Substances List

• Asbestos, chrysotile	12001-29-5	Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

• Asbestos, chrysotile	12001-29-5	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Asbestos, chrysotile	12001-29-5	1.0 fiber/cm3 Excursion Limit (See 29 CFR 1910.1001, 30 min); 0.1 fiber/cm3 TWA

Environment

U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants

• Asbestos, chrysotile	12001-29-5	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Asbestos, chrysotile	12001-29-5	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
• Asbestos, chrysotile	12001-29-5	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - California - Proposition 65 - Developmental Toxicity		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Female		
• Asbestos, chrysotile	12001-29-5	Not Listed
U.S. - California - Proposition 65 - Reproductive Toxicity - Male		
• Asbestos, chrysotile	12001-29-5	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Revision Date
- 19/December/2016

Preparation Date
- 14/January/2016

Disclaimer/Statement of Liability
- Caution! Do not use SPI Supplies products or materials in applications involving implantation within the body; direct or indirect contact with the blood pathway; contact with bone, tissue, tissue fluid, or blood; or prolonged contact with mucous membranes. Products offered by SPI Supplies are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. SPI Supplies will not provide to customers making devices for such applications any notice, certification, or information necessary for such medical device use required by US FDA (Food and Drug Administration) regulation or any other statute. SPI Supplies and Structure Probe, Inc. make no representation, promise, express warranty or implied warranty concerning the suitability of these materials for use in implantation in the human body or in contact with internal body tissues of fluids. The information and recommendations set forth above are taken from sources believed to be accurate as of the date hereof, however SPI Supplies and Structure Probe, Inc. make no warranty with respect to the accuracy of the information or the

suitability of the recommendations, and assume no liability to any user thereof. The information contained in this sheet does not constitute a hazard assessment and should not be used in place of the user's own assessment of work place risks as required by other health and safety legislation. Be aware of the Structure Probe, Inc. Copyright Policy. Structure Probe, Inc. grants a nonexclusive license to make unlimited copies of this safety sheet for internal use only. Quite obviously, this information would pertain only to this material when purchased from SPI Supplies as product from other sources, with other ingredients and impurity levels could have substantially different properties.

Key to abbreviations

NDA = No Data Available

LEAD METAL

MSDS Number: L2347 --- *Effective Date: 12/08/96*

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575
CAS No.: 7439-92-1
Molecular Weight: 207.19
Chemical Formula: Pb
Product Codes: J.T. Baker: 2256, 2266 Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	7439-92-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain,

and increased lead blood levels may follow. See also Ingestion.

Ingestion:
POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:
Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:
Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:
Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:
Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

Explosion:
Not considered to be an explosion hazard.

Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter

sewers or waterways.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For lead, metal and inorganic dusts and fumes, as Pb: -OSHA Permissible Exposure Limit (PEL): 0.05 mg/m3 (TWA) For lead, elemental and inorganic compounds, as Pb: -ACGIH Threshold Limit Value (TLV): 0.05 mg/m3 (TWA), A3 animal carcinogen ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information). For lead, inorganic: -NIOSH Recommended Exposure Limit (REL): 0.1 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face high efficiency dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as

appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

---

9. Physical and Chemical Properties

Appearance:
Small, white to blue-gray metallic shot or granules.

Odor:
Odorless.

Solubility:
Insoluble in water.

Density:
11.34

pH:

No information found.

% Volatiles by volume @ 21C (70F):
0

Boiling Point:
1740C (3164F)

Melting Point:
327.5C (622F)

Vapor Density (Air=1):
No information found.

Vapor Pressure (mm Hg):
1.77 @ 1000C (1832F)

Evaporation Rate (BuAc=1):
No information found.

---

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.

Hazardous Decomposition Products:
Does not decompose but toxic lead or lead oxide fumes may form at elevated temperatures.

Hazardous Polymerization:
Will not occur.

Incompatibilities:
Ammonium nitrate, chlorine trifluoride, hydrogen peroxide, sodium azide, zirconium, disodium acetylide, sodium acetylide and oxidants.

Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

---

11. Toxicological Information

Toxicological Data:
Investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:
Lead and other smelter emissions are human reproductive hazards. (Chemical Council on Environmental Quality; Chemical Hazards to Human Reproduction, 1981).

Carcinogenicity:
EPA / IRIS classification: Group B2 - Probable human carcinogen, sufficient animal evidence.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category

Lead (7439-92-1)	No	No	2B

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to leach into groundwater. This material may bioaccumulate to some extent.

Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Although not a listed RCRA hazardous waste, this material may exhibit one or more characteristics of a hazardous waste and require appropriate analysis to determine specific disposal requirements. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

---

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Lead (7439-92-1)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Lead (7439-92-1)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Lead (7439-92-1)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Lead (7439-92-1)	10	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Pure / Solid)

Prop 65:
THIS PRODUCT CONTAINS CHEMICALS KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER AND BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: No information found.
Poison Schedule: S6

WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: 3 **Flammability:** 1 **Reactivity:** 0

Label Hazard Warning:
POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing. Do not breathe dust. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling.

Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.

Product Use:
Laboratory Reagent.

Revision Information:
Pure. New 16 section MSDS format, all sections have been revised.

Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

File 1; Entry 1; Accession No. 7216860

(CAS) CAS Registry Number: 1336-36-3
(MAT) Material Name: $$$ POLYCHLORINATED BIPHENYLS $$$
(USS) Common Uses: COOLANTS IN TRANSFORMERS; FLUORESCENT LIGHT BALLASTS; ELECTRICAL INSULATION; PLASTICIZER; EPOXY PAINTS; CARBONLESS REPRODUCTION; PAPER LUBRICANTS; MUCH OF THE TOTAL PRODUCTION OF PCBS IS STILL IN USE AS DIELECTRIC (INSULATOR), HEAT-TRANSFER, OR HYDRAULIC FLUIDS. (DPIRDU 1,81/SAX) PCBS HAVE BEEN THE MAJOR COMPONENTS OF ASKARELS USED IN THE UNITED STATES SINCE 1932. ASKAREL IS A GENERIC TERM USED FOR A BROAD CLASS OF NONFLAMMABLE SYNTHETIC CHLORINATED HYDROCARBON INSULATING LIQUIDS USED IN ELECTRICAL CAPACITORS, TRANSFORMERS, NUCLEAR REACTORS, AND ACCESSORY EQUIPMENT. (CRSOE* 77-225,77/NIOSH) UPDATED 11/84.
(CON) Containers: FORMER PCB SHIPMENT CONTAINERS INCLUDE GLASS BOTTLES (5 L), EARTHENWARE (5 L), PLASTIC BOTTLES (5 L), AND METAL CANS AND DRUMS (30 AND 250 L, RESPECTIVELY) (85EZAO 78/IMCO) (49CFR* 101.1) (RARAD5 80/IATA) DOT (DEPARTMENT OF TRANSPORTATION) HAZARDOUS MATERIALS TABLE: SPECIFIC PACKAGING REQUIREMENTS ARE CITED IN 49CFR 173.510 (GENERAL PACKAGING REQUIREMENTS). MAXIMUM NET QUANTITY IN ONE PACKAGE: NO LIMIT ON PASSENGER AIRCRAFT OR RAILCAR; NO LIMIT ON CARGO-ONLY AIRCRAFT. DEPARTMENT OF TRANSPORTATION OPTIONAL HAZARDOUS MATERIALS TABLE (49CFR* 172.102,10-31-83/DOT): UN PACKING GROUP II. ICAO INSTRUCTIONS (ICAO** 83/ICAO)--PACKING GROUP II; PACKING INSTRUCTIONS FOR PASSENGER AIRCRAFT 907 AND FOR CARGO AIRCRAFT 907. MAXIMUM NET QUANTITY IN ONE PACKAGE: 100 L ON PASSENGER AIRCRAFT, 220 L ON CARGO-ONLY AIRCRAFT. UPDATED 11/84.
(STO) General Storage Procedures: STORE PCBS IN ISOLATED AREAS WHERE THE DRUMS ARE NOT VULNERABLE TO DAMAGE FROM VEHICLES, FORKLIFTS, OR OTHER MOVING EQUIPMENT. (PCBA** 79/EPA) STORE AT AMBIENT TEMPERATURES WITH OPEN VENTING. (CGHCD* 78/USCG) UPDATED 12/84.
(HND) General Handling Procedures: WEAR GLOVES AND APRONS MADE OF NEOPRENE, VITRON, OR POLYETHYLENE AND IMPERVIOUS SHOES. HANDLE ONLY WITH AN ADEQUATE VENTILATION SYSTEM. (CFCTS* 80-83/BUR) CANCER SUSPECT AGENT. DO NOT GET IN EYES OR ON SKIN OR CLOTHING. WEAR PROTECTIVE CLOTHING IMPERVIOUS TO PCBS: GLOVES, BOOTS, OVERSHOES, AND BIB-TYPE APRONS THAT COVER BOOT TOPS. FOR EYE PROTECTION, WEAR CHEMICAL SAFETY GOGGLES, FACE SHIELDS AT LEAST 8 INCHES LONG WITH GOGGLES, OR SAFETY GLASSES WITH SIDE SHIELDS. FOR ROUTINE OPERATIONS, ENGINEERING CONTROLS MUST BE USED TO KEEP THE AIRBORNE PCB CONCENTRATION BELOW THE RECOMMENDED TWA. DO NOT WEAR WORK CLOTHING AWAY FROM PLACE OF EMPLOYMENT. WEAR CLEAN WORK CLOTHING DAILY. INFORM CLEANING ESTABLISHMENTS OF HAZARDS AND PROPER WASTEWATER DISPOSAL PROCEDURES. WASH HANDS AND EXPOSED SKIN BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES. FOOD, DRINK, OR SMOKING MATERIALS ARE NOT PERMITTED IN AREAS WHERE PCBS ARE HANDLED, PROCESSED, OR STORED. (CRSOE* 77-225,77/NIOSH) FOR RESPIRATOR SELECTION FOR EMERGENCIES OR FOR NONROUTINE MAINTENANCE OR REPAIR ACTIVITIES AND FOR INSTALLATION AND TESTING OF REQUIRED ENGINEERING CONTROLS, SEE FIELD SAF. UPDATED 11/84.
(BIN) Binary Reactants: PCBS ARE GENERALLY INERT WHEN PLACED IN CONTACT WITH OTHER MATERIALS UNDER NORMAL CONDITIONS OF TEMPERATURE AND PRESSURE. HOWEVER, STRONG SUNLIGHT CONDITIONS MAY CAUSE THE FORMATION OF PHENOLIC MATERIALS AND TRACES OF POLYCHLORINATED DIBENZOFURANS. (EVHPAZ 1,15,72/HUT) (BECTA6 10(6)372,73/CRO)
(LDL) Detection Limit (Lab.; Techniques, Ref) (ppm): IN AIR, POLYCHLORINATED BIPHENYLS (PCBS) ARE ABSORBED BY FLORISIL IN A TUBE. THEY ARE DESORBED WITH HEXANE AND ANALYZED BY GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION. DETECTION LIMIT: 0.01 MG/M3. INTERFERENCES: CONTAMINANTS. NIOSH METHOD 253 (NIOSH* II,1,77/TAY). IN WASTEWATERS AT PH 5 TO 9, [illegible]INATED BIPHENYLS (PCBS) ARE EXTRACTED WITH DICHLORAMETHANE,

PRECONCENTRATED, AND ANALYZED BY GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE OR HALOGEN-SPECIFIC DETECTORS. DETECTION LIMIT RANGE: 0.00004 TO 0.00015 MG/L. INTERFERENCES: PHTHALATE ESTERS. EPA METHOD 608. (FEREAC 44FR69510, 12-3-79/EPA) IN WASTEWATERS OF PH 7 TO 10, POLYCHLORINATED BIPHENYLS (PCBS) ARE EXTRACTED WITH DICLORAMETHANE, PRECONCENTRATED, AND ANALYZED BY PACKED COLUMN GAS CHROMATOGRAPHY INTO A MASS SPECTROMETER. DETECTION LIMIT: 0.1 TO 1.0 MG/L. INTERFERENCES: CONTAMINANTS FROM GLASSWARE AND SOLVENTS. EPA METHOD 625. (FEREAC 44FR60540, 12-3-79/EPA) IN POULTRY FAT, FISH, AND DAIRY PRODUCTS, POLYCHLORINATED BIPHENYLS (PCBS) ARE EXTRACTED FROM HOMOGENIZED SAMPLES WITH CH3CN AND PETROLEUM ETHER OR METHANOL, CH3CN, AND PETROLEUM ETHER FOR FATTY FOODS. THE EXTRACTS ARE FLORISIL CLEANED AND ANALYZED BY GAS CHROMATOGRAPHY WITH ELECTRON CAPTURE DETECTION. DETECTION LIMIT: NOT GIVEN. INTERFERENCES: PHTHALATE ESTERS. AOAC METHOD 29. (ME026* 80/AOAC) IN BLOOD SERUM, POLYCHLORINATED BIPHENYLS (PCBS) ARE EXTRACTED WITH 1:1 ETHYL ETHER AND N-HEXANE. THE EXTRACT IS TREATED WITH 2% METHANOLIC KOH AND SILICA GEL COLUMN CLEANUP. THE CLEANED HEXANE EXTRACT IS CONCENTRATED AND ANALYZED BY GAS CHROMATOGRAPHY USING ELECTRON CAPTURE DETECTION. DETECTION LIMIT: 0.030 MG/L. INTERFERENCES: OTHER PESTICIDE RESIDUES, EXPECIALLY DDT METABOLITES. NIOSH METHOD 329. (NIOSH* II,6,77/TAY) UPDATED 11/84.

(STD) Standard Codes: SUPERFUND DESIGNATED (HAZARDOUS SUBSTANCES) LIST. REPORTABLE QUANTITY (RQ): 10 LB.) (STATUTORY SOURCE UNDER CERCLA IS CWA, SECTIONS 311(B)(4) AND 307(A).). FINAL RQ: 10 LB (4.54 KG (CATEGORY A). (FEREAC 50FR13456, 4-4-85) ASSOCIATION OF AMERICAN RAILROADS STCC NUMBER 4961666. (BUXEH* 81/STU) DOT HAZARDOUS MATERIALS TABLE (FEREAC 48FR23551,5-25-83)--UN NO. 2315; NO LABEL REQUIRED, HAZARD CLASS: ORM-E; STOW ON DECK OR UNDER DECK FOR PASSENGER AND CARGO SHIPS, STOW IN A RECOVERABLE POSITION SEPARATED FROM ALL FOODSTUFFS. (49CFR* 172.101,6-12-84/DOT) DEPARTMENT OF TRANSPORTATION OPTIONAL HAZARDOUS MATERIALS TABLE (49CFR* 172.102,10-31-83/DOT)--IMCO CLASS: 9; UN NUMBER UN 2315; LABELS REQUIRED: NONE; PACKAGING GROUP II. VESSEL STOWAGE REQUIREMENTS ON CARGO AND PASSENGER VESSELS, STOW ON DECK OR UNDER DECK. OTHER REQUIREMENTS: STOW IN A RECOVERABLE POSITION. STOW AWAY FROM FOODSTUFFS. ICAO RECOMMENDATIONS (ICAO** 83/ICAO)--UN CLASS OR DIVISION 9. UPDATED 11/84.

(FLM) Flammability: FLAMMABLE (MERCK* 83/WIN)

(TCP) Toxic Combustion Products: PCBS EMIT HIGHLY TOXIC VAPORS WHEN HEATED TO DECOMPOSITION INCLUDING CO, HCL, AND CL2. (HBTND* 83/KIM) HEXACHLOROBENZENE IS EMITTED BELOW 950 DEGREES CELSIUS. (14CYAT 2B,81/CLA) UPDATED 11/84.

(EXT) Extinguishing Method: BUREAU OF EXPLOSIVES RECOMMENDATIONS--USE EXTINGUISHING AGENT SUITABLE FOR TYPE OF SURROUNDING FIRE SINCE PCBS DO NOT BURN OR BURN WITH DIFFICULTY. (BUXEH* 81/STU) EXTINGUISH WITH WATER, FOAM, DRY CHEMICAL, OR CARBON DIOXIDE. (CGHCD* 78/USCG) UPDATED 11/84.

(EXP) Explosiveness: STABLE

(MLT) Melting Point (C.): 28 TO 184

(SPG) Specific Gravity: 1.182 TO 1.44 (DPIRDU 1,81/SAX)

(PER) Persistency: HIGH; HIGHLY CHLORINATED FORMS OF PCBS CONTAINING 5 OR MORE CHLORINE ATOMS PER BIPHENYL MOLECULE ARE MUCH MORE PERSISTENT IN THE ENVIRONMENT THAN PCBS CONTAINING 1, 2, OR 3 CHLORINE ATOMS. TETRACHLOROBIPHENYLS ARE CONSIDERED INTERMEDIATE IN PERSISTENCE. (AWQCD* PB81-117798,80/ECAO) ENVIRONMENTALLY, APPROXIMATELY ONE CHLORINE ATOM OF EACH CHLORINATED BIPHENYL IS LOST PER YEAR. (39KOAS 56,78/BUN) MICROBIAL AEROBIC DEGRADATION STUDIES USING MIXED CULTURES IN WATER INDICATED THAT AROCLOR 1242 WAS 98% DEGRADED IN LESS THAN 10 DAYS. PCB ISOMERS WITH FEWER THAN 4 CHLORINE ATOMS WERE BIODEGRADED, BUT THOSE WITH HIGHER CHLORINE CONTENT WERE NOT SIGNIFICANTLY DEGRADED. THIS GROUP WOULD INCLUDE AROCLOR 1248, 1254, AND 1260. (LDHW** 169,78/GRI)

(PFA) Potential for Accumulation: HIGH IN LIVER AND FATTY TISSUES. FRESHWATER RESIDUE DATA SHOW THAT PCBS ACCUMULATE TO RELATIVELY HIGH LEVELS IN INVERTEBRATE TISSUES AND THAT FOR MOST SPECIES PCBS ARE NOT

RAPIDLY DEPLETED WHEN EXPOSURE IS DISCONTINUED. BIOCONCENTRATION FACTORS FOR INVERTEBRATE SPECIES RANGE FROM 2700 TO 108,000. BIOCONCENTRATION FACTORS FOR PCB EXPOSURES OF FISH SPECIES RANGE FROM 3000 TO 274,000. (AWQCD* PB81-117798,80/ECAO)

(EDF) Etiological Potential: PCB EXPOSURES MAY INITIATE OR AGGRAVATE SKIN, LIVER, LUNG, AND NERVOUS DISEASES. ACUTE EXPOSURE MAY INITIATE CHLORACNE AND EYE IRRITATION, DERMATOLOGICAL SIGNS ASSOCIATED WITH FOLLICULAR KERATOSIS, AND VARIOUS NERVOUS SYMPTOMS. OCCUPATIONAL EXPOSURES HAVE BEEN RELATED TO CHLORACNE, JAUNDICE, AND ACUTE YELLOW LIVER ATROPHY. (IMEMDT 18,78/IARC) THE NIOSH RECOMMENDED STANDARD OF 1 .MU.G/M3 WAS DESIGNED TO REDUCE THE RISK OF DEVELOPMENT OF CARCINOGENIC, ADVERSE REPRODUCTIVE, HEPATOTOXIC, AND DERMATOLOGIC EFFECTS. (CRSOE* 77-225,77/NIOSH) UPDATED 11/84.

(CAG) Carcinogenicity: IN 1979, PCBS WERE CLASSIFIED AS "PROBABLY CARCINOGENIC FOR HUMANS" BY A WORKING GROUP OF THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER (IARC), AN AGENCY OF THE WORLD HEALTH ORGANIZATION (WHO). (IMEMDT 1-20,1,79/IARC) IN JAPAN, 9 OF 22 DEATHS (OR 41%) WERE DUE TO MALIGNANT NEOPLASMS (TUMORS IN STOMACH, LIVER, LUNGS, AND BREAST) AFTER PROLONGED EXPOSURE TO PCBS. (IMEMDT 18,78/IARC) TWO RETROSPECTIVE MORTALITY STUDIES OF A COHORT OF WORKERS OCCUPATIONALLY EXPOSED TO THESE CHEMICALS HAVE BEEN CONDUCTED. IN THE U.S., TWO MALIGNANT TUMORS AND FOUR OTHER CANCERS WERE DIAGNOSED IN 31 WORKERS (OR 19%) HEAVILY EXPOSED TO PCBS. FORTY-ONE PERCENT WERE DUE TO MALIGNANT NEOPLASMS (TUMOR IN STOMACH, LIVER, LUNGS, AND BREAST) AFTER PROLONGED EXPOSURE TO PCBS. (IMEMDT 18,78/IARC) THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH STUDIED 2,500 PCB-EXPOSED ELECTRICAL EQUIPMENT WORKERS, OVER 50% EXPOSED > 20 YEARS, AND FOUND NO SIGNIFICANT INCREASE IN CANCER, CARDIOVASCULAR DISEASE, OR NEUROLOGICAL MANIFESTATIONS. (PECODC 16,240,83/HAM) PCBS HAVE BEEN REPORTED TO CAUSE LIVER CANCER IN ANIMALS. SEE INDIVIDUAL AROCLOR PROFILES FOR MORE INFORMATION. UPDATED 11/84.

(MUT) Mutagenicity: AROCLOR 1221 CAUSES MUTAGENIC EFFECTS IN SALMONELLA TYPHIMURIUM. AROCLORS 1242 AND 1268 HAVE NOT CAUSED MUTAGENIC EFFECTS. (RCOCB* 15,653,76/WYN) (IMEMDT 18,78/IARC) RTECS ONLINE CITES REPORTS OF POSITIVE MUTAGENIC EFFECTS BY AROCLORS 1254 AND 1260 AND KANECHLOR 400. UPDATED 11/84.

(TER) Teratogneicity: TERATOGENIC EFFECTS WERE PRODUCED IN RHESUS MONKEYS FED PCBS (AROCLOR 1248). INFANTS BORN TO WOMEN SUFFERING FROM YUSHO DISEASE (EXPOSURE TO PCBS IN CONTAMINATED OIL) HAD ABNORMAL PIGMENTATION, OCULAR DISCHARGE, HYPERKERATOSIS, AND OTHER SKIN ABNORMALITIES AND WERE SMALLER THAN AVERAGE. (IMEMDT 18,78/IARC) IN JAPAN, SEVERAL TERATOGENIC EFFECTS IN OFFSPRING OF PATIENTS SUFFERING FROM YUSHO DISEASE WERE NOTED, INCLUDING SKULL DEFORMATIONS, INCREASED MELANIN PIGMENTS, SMALL SIZE FOR AGE, AND STILLBORN INFANTS. (PDTNBH 6(1)20,77/YAM)

(TRT) Major Species Threatened: BIRDS (EGG PRODUCTION), AQUATIC LIFE, AND PREDATORS.

(INH) Inhalation limit (value): 5; 10 (5 MG/M3 IS THE IDLH FOR PCBS WITH 54% CHLORINE; 10 MG/M3 IS THE IDLH FOR PCBS WITH 42% CHLORINE.)

(INT) Inhalation Limit (Text): REGULATIONS--
OSHA PEL\0.1 MG/M3 (54% CHLORINE)\\(29CFR* 1910)
OSHA PEL\1 MG/M3 (42% CHLORINE)\\(29CFR* 1910)
RECOMMENDATIONS--
NIOSH TWA\.001 MG/M3\\(CRSOE* 77-225,77/NIOSH)
NIOSH IDLH\5 MG/M3 (54% CHLORINE)\\PKTGD* 80/MAC
NIOSH IDLH\10 MG/M3 (42% CHLORINE)\\PKTGD* 80/MAC
ACGIH TLV (TWA) (SKIN)\0.5 MG/M3 (54% CHLORINE)\\(TLVADM 84/ACGIH)
ACGIH TLV (TWA) (SKIN)\1 MG/M3 (42% CHLORINE)\\(TLVADM 84/ACGIH)
ACGIH STEL (SKIN)\1 MG/M3/15 MIN (54% CHLORINE)\\(TLVADM 84/ACGIH)
ACGIH STEL (SKIN)\2 MG/M3/15 MIN (42% CHLORINE)\\(TLVADM 84/ACGIH).
UPDATED 11/84.

(IRL) Irritation Levels (Value): 0.013 TO 0.264 (MG/M3 AIR)

000004

(IRT) Irritation Levels (Text): WORKERS COMPLAIN OF THROAT AND EYE IRRITATION WHEN EXPOSED TO CONCENTRATIONS BETWEEN 0.013 TO 0.264 MG/M3. UNBEARABLE IRRITATION OCCURRED AT 10 MG/M3. (CRSOE* 77-225,77/NIOSH)

(DRC) Direct Contact: PCBS ARE READILY ABSORBED THROUGH THE SKIN. (NRCC** 16077,78/ROB) LIQUID OR SOLID PCBS ARE IRRITATING TO SKIN AND EYES. VAPORS CAUSE SEVERE IRRITATION OF EYES AND THROAT AND CAN CAUSE EYE AND LUNG INJURY. (CGHCD* 78/USCG) UPDATED 11/84.

(JNS) General Sensation: PCBS HAVE A WEAK ODOR OR ARE PRACTICALLY ODORLESS. (CGHCD* 78/USCG) SIGNS AND SYMPTOMS REPORTED FROM INGESTION OF PCBS IN OIL IN JAPAN: ACUTE EXPOSURE SYMPTOMS: INCREASED EYE DISCHARGE AND SWELLING OF UPPER EYELIDS, ACNEFORM ERUPTIONS, AND FOLLICULAR ACCENTUATIONS, BRONCHITIS, PIGMENTATION OF THE SKIN, SWELLING, JAUNDICE, NUMBNESS OF LIMBS, SPASMS, HEARING AND VISION PROBLEMS, AND GASTROINTESTINAL DISTURBANCES. ACUTE EXPOSURE SIGNS: DECREASE IN ERYTHROCYTE COUNT, INCREASE IN LEUKOCYTE COUNT AND SERUM LIPIDS, PARTICULARLY TRIGLYCERIDES, LIVER DAMAGE, AND ADRENOCORTICAL AND OVARIAN DYSFUNCTION. THE HIGHER THE CHLORINE CONTENT, THE MORE TOXIC. OXIDES ARE STILL MORE TOXIC. CHRONIC EXPOSURE SYMPTOMS: PERSISTENT HEADACHES, GENERAL FATIGUE, WEAKNESS AND NUMBNESS OF LIMBS, AND WEIGHT LOSS. (AWQCD* PB81-117798,80/ECAO) (IMEMDT 18,78/IARC) SIGNS AND SYMPTOMS REPORTED FROM OCCUPATIONAL EXPOSURE TO PCBS, MOSTLY INHALATION AND DERMAL CONTACT. ACUTE EXPOSURE SYMPTOMS: DRY SORE THROAT, SKIN RASH, GASTROINTESTINAL DISTURBANCE, EYE IRRITATION, HEADACHES. ACUTE EXPOSURE SIGNS: CHANGES IN FAT METABOLISM, MILD DISTURBANCES IN LIVER FUNCTION, CHROMODERMATOSIS OF FINGER JOINTS AND NAIL BEDS, ACNEFORM EXANTHEMA. CHRONIC EXPOSURE SYMPTOMS: CHLORACNE (AWQCD* PB81-117798,80/ECAO) UPDATED 11/84.

(DHI) Direct Human Ingestion (mg/kg): 7

(SAF) Personal Safety Precautions: FOR PROTECTIVE CLOTHING AND EYE PROTECTION, SEE FIELD HND. NIOSH RESPIRATOR SELECTION GUIDE: FOR CONCENTRATIONS GREATER THAN 1.0 .MU.G/M3 FOR EMERGENCY SITUATIONS, USE EITHER (1) A SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE OR (2) A COMBINATION TYPE C SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE AND AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE. (CRSOE* 77-225,77/NIOSH) UPDATED 11/84.

(AHL) Acute Hazard Level: PCBS ARE MODERATELY TOXIC TO HUMANS THROUGH ORAL, DERMAL, AND INHALATION ROUTES BASED ON INFORMATION IN FIELDS INT AND INS. LOWEST TOXIC ORAL DOSE FOR HUMANS REPORTED TO BE 7 MG/KG IN FIELD DHI.

(CHL) Chronic Hazard Level: PCBS ARE STRONG CHRONIC IRRITANTS. TOXIC. SKIN ABSORPTION POTENTIAL. LIVER AND SKIN DISORDERS IN HUMANS. REPRODUCTION ABNORMALITIES IN HUMANS AND MAMMALS. IN BIRDS, CAUSES THIN EGG SHELLS. PROBABLE HUMAN CARCINOGEN AS REPORTED IN FIELD CAG.

(HEL) Degree of Hazard to Public Health: WHILE ACUTE TOXICITY OF PCBS IS REPORTED LOW, TYPICAL CONTAMINANTS IN PCBS ARE SOME OF THE MORE TOXIC MATERIALS KNOWN TO MAN. CONSIDERED STRONG IRRITANT. HIGHLY TOXIC WHEN INHALED OR INGESTED. CHRONICALLY TOXIC WITH INHALATION OR SKIN ABSORPTION. RAPIDLY ACCUMULATES IN FOOD CHAIN. SOME OF THE HAZARDS OF THE PCBS CAN BE ATTRIBUTED TO POLYCHLORODIBENZOFURAN CONTAMINANTS. (BECTA6 10(6)372,73/CRO)(AWQCD* PB81-117798,80/ECAO)

(AIR) Air Pollution: TOXIC. PCBS VOLATILIZE SLOWLY FROM BODIES OF WATER.

(ACT) Action Levels: NOTIFY AIR AUTHORITY. RESTRICT ACCESS TO AFFECTED WATERS OR LAND SPILL AREAS. EVACUATE AREA IF NEAR HOMES. BUREAU OF EXPLOSIVES RECOMMENDATIONS--AVOID CONTACT WITH SPILLED MATERIALS. KEEP UPWIND TO AVOID BREATHING VAPORS OR DUST. FOR A LAND SPILL, BUILD DIKES TO CONTAIN FLOW AND KEEP MATERIAL OUT OF WATER SOURCES AND SEWERS. SUITABLE DIKE MATERIALS INCLUDE SOIL, SAND BAGS, FOAMED POLYURETHANE, OR FOAMED CONCRETE. OR ABSORB SPILLED LIQUID WITH FLY ASH OR CEMENT POWDER. (BUXEH* 81/STU) UPDATED 11/84.

(AML) In Situ Amelioration: SEEK ENVIRONMENTAL ENGINEERING ASSISTANCE

THROUGH EPA'S ENVIRONMENTAL RESPONSE TEAM (ERT), EDISON, NJ, 24-HOUR PHONE NO. 201-321-6660. SINGLE-STAGE CONTACTOR DOSE OF POWDERED CARBON REQUIRED TO REDUCE THE INITIAL CONCENTRATION (C.F.) MRI RECOMMENDATIONS 12/84--SEEK PROFESSIONAL HELP TO EVALUATE PROBLEM AND IMPLEMENT CONTAINMENT PROCEDURES. ABSORB SPILLED MATERIAL WITH VERMICULITE, FULLER'S EARTH, PEAT MOSS, SAND, BENTONITE, OIL SPILL ABSORBANT PADS, OR OTHER COMMERCIAL ABSORBENTS. REMOVE CONTAMINATED SOIL. CONTAMINATED SOIL OR ABSORBENT MAY BE PACKAGED FOR DISPOSAL. FOR SMALL SPILLS, WASH IMPERVIOUS SURFACES WITH SOAP AND WATER AFTER USE OF ABSORBENTS. COLLECT WASH WATER FOR DISPOSAL. CONFIRM ALL TREATMENT PROCEDURES WITH RESPONSIBLE ENVIRONMENTAL ENGINEER AND REGULATORY OFFICIALS. BUREAU OF EXPLOSIVES RECOMMENDATIONS FOR PCBS SPILLED IN WATER--TRAP MATERIAL AT BOTTOM UTILIZING NATURAL DEEP WATER POCKETS, EXCAVATED LAGOONS, OR SAND BAG BARRIERS. APPLY ACTIVATED CARBON AT TEN TIMES THE AMOUNT OF SPILLED PCBS IN AREAS WHERE CONCENTRATION IS OVER 10 PPM. REMOVED TRAPPED MATERIAL ON BOTTOM WITH SUCTION HOSES OR MECHANICAL DREDGES AND LIFTS. (BUXEH* 81/STU)

(SHR) Beach/Shore Restoration: ABSORB SPILLED PORTIONS WITH CARBON OR PEAT. DO NOT BURN. REMOVE CONTAMINATED SOIL.

(AVL) Availability of Countermeasure Materials: PUMPS - FIRE DEPARTMENT; VACUUM SWIMMING POOL SUPPLIERS; CARBON - WATER TREATMENT PLANTS, SUGAR REFINERIES; PEAT - NURSERIES, FLORAL SHOPS.

(DIS) Disposal Methods: CAPACITORS (SMALL AND LARGE); PROPERLY DRAINED TRANSFORMERS; CONTAMINATED SOIL, DIRT, RAGS, AND OTHER DEBRIS, DREDGE SPOILS; MUNICIPAL SLUDGES; AND PROPERLY DRAINED CONTAINERS (DRUMS) MAY BE SENT TO EPA-APPROVED CHEMICAL WASTE LANDFILL SITES FOR BURIAL. LIQUID PCB WASTE MUST BE STORED AND SENT TO INCINERATION OR HIGH TEMPERATURE BOILER FACILITIES APPROVED BY EPA. USE OF SELECTED NON-THERMAL METHODS ARE PERMITTED FOR TREATMENT OF TRANSFORMER OIL CONTAINING NOT MORE THAN 1000 PPM AROCLOR. CONFIRM DISPOSAL PROCEDURES WITH RESPONSIBLE ENVIRONMENTAL ENGINEER AND REGULATORY OFFICIALS. (PCB*** 81/SAV)

(DSN) Disposal Notification: CONTACT EPA REGIONAL OFFICES FOR LOCATION OF EPA APPROVED CHEMICAL WASTE LANDFILLS AND INCINERATION FACILITIES.

(WTP) Effects on Water Treatment Processes: PCBS WITH FEWER THAN 5 CHLORINES WERE DEGRADED BY ACCLIMATED SLUDGE MICROORGANISMS; 100% OF BIPHENYLS DEGRADED IN 48 HOURS, 15% OF 4 CHLORINE COMPOUNDS. ANOTHER STUDY FOUND DEGRADATION SHARPLY REDUCED IF SLUDGE SOLIDS WERE PRESENT. (ETPCB* PB84142579,83/LEI) UPDATED 11/84

(WAT) Major Water Use Threatened: FISHERIES, POTABLE SUPPLY, RECREATION.

(LOC) Probable Location and State of Material: LIQUID, WAXY SOLIDS, OR RESINS. WILL SINK TO BOTTOM OF STREAMS OR PONDS AND DISSOLVE ONLY SLIGHTLY.

(DRT) Soil Chemistry: ALL PCBS ADSORB STRONGLY ON SOILS. PCB DECOMPOSITION IN SOILS DEPENDS ON LEVEL OF CHLORINATION. PCBS WITH FEWER THAN 5 CHLORINES HAVE A HALF-LIFE OF 30 DAYS OR LESS; THOSE WITH OVER 5 CHLORINES HAVE HALF-LIVES GREATER THAN 1 YEAR. (ETPCB* PB84142579,83/LEI) UPDATED 11/84.

(HOH) Water Chemistry: HYDROLYSIS--PCBS ARE INERT AND STABLE TO CONDITIONS OF HYDROLYSIS. (IMEMDT 18,78/IARC) HYDROLYSIS NOT LIKELY TO OCCUR EVEN UNDER SEVERE ACIDIC AND BASIC CONDITIONS. (ETPCB* PB84142579,83/LEI) VOLATILIZES FROM WATER WITHOUT SEDIMENTS, HALF-LIVES OF 10 TO 12 HOURS REPORTED. ADSORPTION PREVENTS LOSS THROUGH VOLATILIZATION IF SEDIMENT IS PRESENT. (ETPCB* PB84142579,83/LEI) UPDATED 11/84.

(COL) Color in Water: COLORLESS

(DAT) Adequacy of Data: GOOD