



ENVIRONMENTAL RESTORATION, LLC
ACTION/WORK PLAN

PROJECT NAME: Gold King Mine
PROJECT JOB NO: GK8-51
PROJECT LOCATION: Silverton, CO
CONTRACT NO.: EPS81302
TASK ORDER NO.: 51
DATE: MAY 2015

1.0 SITE BACKGROUND

The Gold King Mine near Silverton, Colorado is a historic gold mine at approximately 11,300' elevation. The mine includes a year around discharge that is a significant contributor of manganese, copper, zinc and cadmium into the Cement Creek drainage of the Animas River watershed. The Gold King Mine has not had maintenance of the mine working since 1991, and the workings have been inaccessible since 1995 when the mine portal collapsed. This condition has likely caused impounding of water behind the collapse. In addition, other collapses within the workings may have occurred creating additional water impounding conditions. Conditions may exist that could result in a blow-out of the blockages and cause a release of large volumes of contaminated mine waters and sediment from inside the mine, which contain concentrated heavy metals.

It is proposed to re-open the Gold King Mine portal and workings to investigate the conditions to assess the on-going releases. This will require the incremental de-watering and removal of such blockages to prevent blowouts. The work is intended to take place in late Summer or Fall, 2015. In addition, the secondary purpose of the work is to attempt to identify and characterize specific water flows into the mine and evaluate potential means to mitigate those flows if possible.

2.0 SCOPE OF WORK

The project work includes improving site access, grading the top of the dump as a work area, directing mine discharge to the pond at the Red and Bonita work site, establishing a water treatment system, removing the material covering the adit, installing a new portal structure and rehabilitating the adit as directed by the OSC. Upon completion of activities the site will be stabilized with the discharge solely directed to its original drainage.

3.0 OPERATIONAL APPROACH

The following sections discuss ER's approach to the execution of the Task Order Statement of Work tasks. Significant tasks are identified with details on how ER will accomplish the SOW requirements. Whenever practical ER will perform concurrent tasks and share resources (both equipment and personnel) with TO62.

3.01 PRE-MOBILIZATION ACTIVITIES

ER will prepare the following plans for submittal, review and acceptance by the US Environmental Protection Agency prior to site mobilization.

- ✓ Work Plan (contained herein)
- ✓ Cost estimate (Attachment A)
- ✓ Project Schedule (Attachment B)
- ✓ Site Health and Safety Plan (HASP) (attachment C)

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ER has begun solicitation and procurement efforts to initiate the commencement of on-site operations. The following is an initial list of items to be identified and addressed prior to mobilization;

- ✓ Local authorities, property owners, and mine claim holders will be contacted and informed of site operations and schedule [OSC function –ER will support as requested]
- ✓ Coordinate with respective utilities on clearances/locates to ensure safe Site work zones
- ✓ Lodging, Equipment and material sources will be identified and tentatively scheduled
- ✓ An underground contractor will be procured for underground work and mine construction specific tasks such as portal installation and stabilization of the brow

3.02 MOBILIZATION

Mobilization will occur from ER's Denver office and shall consist of the Site Removal Team. The Removal Team shall consist of the Response Manager (RM), foreman equipment operator, and two laborers. The initial mobilization will include site preparation and set-up activities including the mobilization of required site equipment and materials identified to complete the startup of the project. A complete estimate of equipment, materials and supplies required for the project that are outlined in section 4 (Resources) below.

ER will mobilize additional personnel, equipment, and materials as warranted by site tasks/operations. The RM will directly coordinate with the OSC in determining resources required to perform the identified tasks.

3.03 PHASE 1 SITE PREPARATION

Site preparations will occur as possible during work on the red and Bonita to expedite mobilization of the Gold King subcontractor. Tasks included in Site Preparation are:

- HASP review with site crew
- Restore access road
- Grade portal work area to allow drainage to North
- Drop grade of dump to allow access to adit floor
- Use removed material to create manlift access ramp to area above portal
- Install drainage hose/pipe from the North end of the Gold King dump that proceeds down slope westward to the Red and Bonita settling pond. This effort will involve widening the access road from the last switchback to the portal to allow access by vehicles and heavy equipment, and installing a combination of durable lay-flat hose, PVC and aluminum (if pH adjustment occurs prior) pipe to convey the AMD from the N end of the Gold King to dump to the settling pond at Red and Bonita. The conveyance system will be anchored along its path and inspected daily.

3.04 PHASE 2 PORTAL INSTALLATION AND ADIT REHABB

The underground subcontractor (Harrison Western, HW) will be mobilized to provide expertise in mine site related activities. ERRS will support HW by providing earth moving equipment, operators and laborers as necessary for outside operations. It is not anticipated that ERRS personnel will provide underground work other than carrying in supplies as necessary and only under supervision of someone qualified to identify underground hazards. The ERRS team will comprise the OSHA required 5 person rescue team during underground operations. Tasks planned for HW/ERRS after mobilization include:



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- Utilize ramp created in site set up to access slope above portal
- Excavate loose material from the top of the high wall.
- Drill in wire mesh anchors.
- Hang wire mesh on the high wall as excavation to the sill of the portal proceeds.
- Excavate to the sill and into the competent rock face at the portal.
- Gradually lower the debris blockage with the appropriate pumping of the impounded water to water management/treatment system (at Red and Bonita and described in TO62 Work Plan), to prevent the uncontrolled release of mine water. If possible a 4" steel stinger will be inserted through the blockage to lower the mine pool prior to any removal.
- Install bedding material for a 20' length of 10' diameter culvert section.
- Install an estimated 20' length of 10' diameter culvert section.
- Install a drain pipe(s) below the portal culvert. The drain will be sized for a minimum capacity of 200 GPM. It will be extended into the adit as necessary to keep the steel sets dry.
- Seal the culvert at the rock face.
- Grout around the portal pipe and brow/adit connection as directed by OSC
- Backfill the portal over the top with 2' of material back 5' from the rock face, and 5' high on both sides for 15' lateral. Non-mineralized material will be used against the pipe.
- Install utilities for underground operations during construction including 2" air line for drilling, a 2" water line for drilling, 2" discharge line for removal of mine water, a 120 VAC power line for lights and small tools, a 480 VAC power line for pumps to control mine water when needed, and if required a 12" ventilation line. All electrical requirements will be supplied by a 100 KW portable generator. A mine phone communication line will also be installed if required.
- Build access road for tunnel mucker.
- Support the brow at the portal.
- Muck and rehab 100' in-by the portal, as determined appropriate by the OSC.
- Install a locking double adit door closure 8'Hx8'W adapted from DRMS Standard drawings #5 and #7.
- Return flow to original path, construct flume and measuring station as directed by OSC
- Remove drainage system from hillside to Red and Bonita
- Remove equipment and debris from site
- Reinstall gully on access road suitable for Spring runoff
- Demobilize personnel and equipment

4.0 RESOURCES

The following table identifies the different resources ER will employ to complete the SOW elements.

PERSONNEL	QUANTITY	COMMENTS
Project Manager	1	[REDACTED]
Foreman	1	[REDACTED]
Equipment Operator	1	TBD
Laborers	2	TBD
Truck Drivers	1	As necessary for supply delivery

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Field Clerk (offsite)	1	TBD
EQUIPMENT	QUANTITY	COMMENTS
Truck, P/U	3	ER owned -mobe Denver
Mobile storage placed at Gladstone	1ea	Rental-competitive procurement through local / regional sources
Piping – rental layflat or aluminum	2000 ft	
Excavator shared with TO62	1	Rental-competitive procurement through local / regional sources
6” diesel pump shared with TO62	1-2	Rental-competitive procurement through local / regional sources
Front End Loader shared with TO62	1	Rental-competitive procurement through local / regional sources
Finish Grade Dozer if necessary	1	Rental-competitive procurement through local / regional sources
OFCs	QUANTITY	COMMENTS
Trash Service	TBD	Competitive procurement through local sources
Lodging	TBD	Lodging at local Hotel
Bulkhead Subcontractor	TBD	Competitive procurement
Underground Contrcator	1	Harrison Western Construction. Selected through competitive procurement that included local sources
Portable Toilets	4ea.	Competitive procurement through local sources

5.0 OPERATIONAL COSTS

Contained in Attachment A

6.0 SITE SCHEDULE

Contained in Attachment B

ATTACHMENT A

Cost Estimate



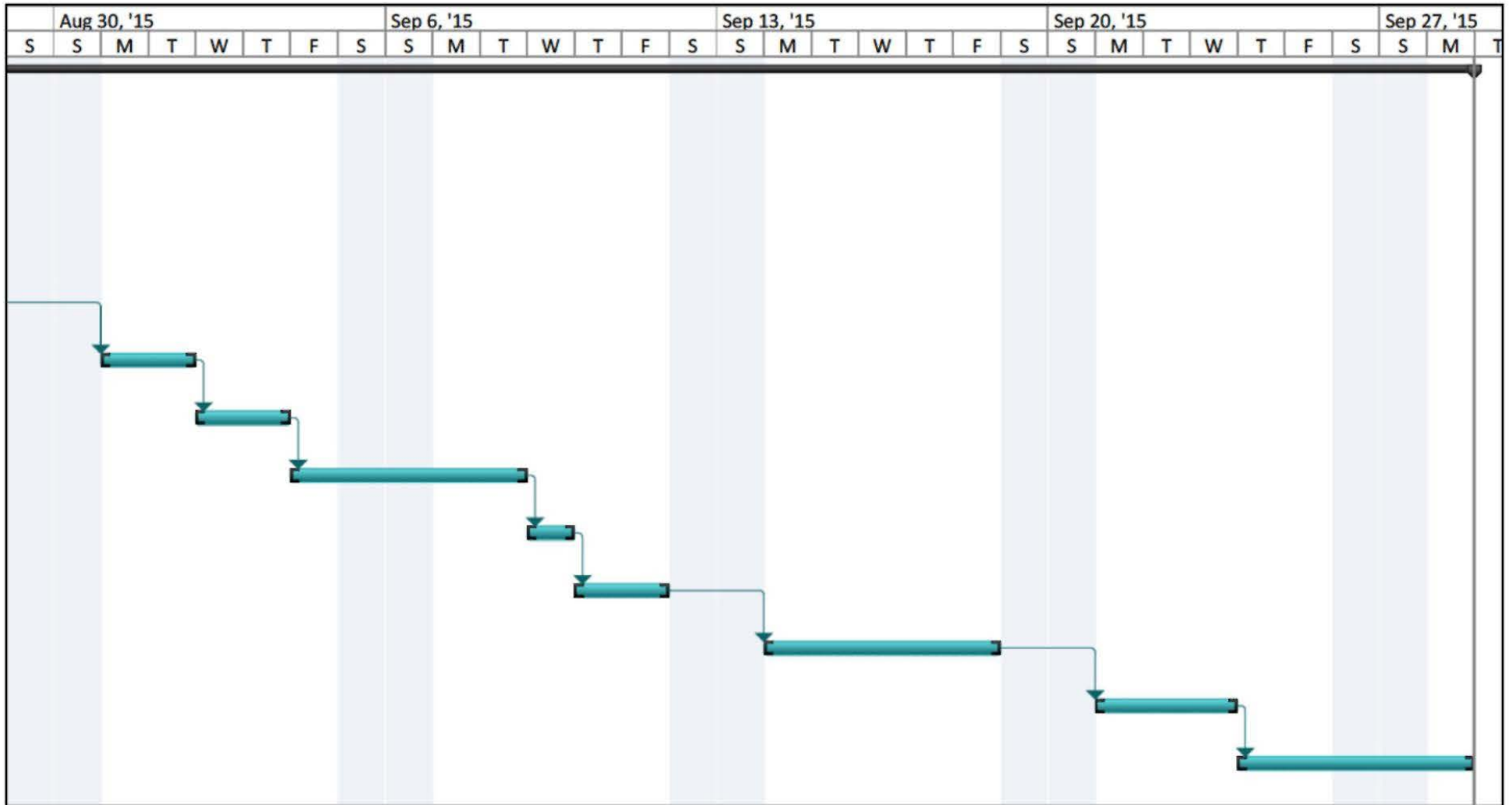
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ATTACHMENT B

Schedule

ID	Task Mode	Task Name	Duration	Start	Finish	Aug 16, '15							Aug 23, '15						
						S	M	T	W	T	F	S	S	M	T	W	T	F	
1		Gold King Portal Development	31 days	Mon 8/17/15	Mon 9/28/15														
2		Mobilize and Set-up	6 days	Mon 8/17/15	Mon 8/24/15														
3		Establish Access to High Wall	1 day	Tue 8/25/15	Tue 8/25/15														
4		Support High Wall - Mesh and Bolt	2 days	Wed 8/26/15	Thu 8/27/15														
5		Excavate Highwall to Sill Level	1 day	Fri 8/28/15	Fri 8/28/15														
6		Set-up Pumping System	2 days	Mon 8/31/15	Tue 9/1/15														
7		Install Drain Line	2 days	Wed 9/2/15	Thu 9/3/15														
8		Install Portal Pipe Culvert	3 days	Fri 9/4/15	Tue 9/8/15														
9		Bolt Tunnel Brow	1 day	Wed 9/9/15	Wed 9/9/15														
10		Reestablish Access to Portal	2 days	Thu 9/10/15	Fri 9/11/15														
11		Clean and Support 100' of Tunnel	5 days	Mon 9/14/15	Fri 9/18/15														
12		Fabricate and Install Portal Gate	3 days	Mon 9/21/15	Wed 9/23/15														
13		Demobilize	3 days	Thu 9/24/15	Mon 9/28/15														

Project: Gold King Schedule Date: Tue 8/11/15	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	



Project: Gold King Schedule Date: Tue 8/11/15	Task		External Milestone		Manual Summary Rollup	
	Split		Inactive Task		Manual Summary	
	Milestone		Inactive Milestone		Start-only	
	Summary		Inactive Summary		Finish-only	
	Project Summary		Manual Task		Deadline	
	External Tasks		Duration-only		Progress	



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ATTACHMENT C

Health & Safety Plan



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**ERRS REGION 8, CONTRACT EPS8 1302
SITE HEALTH AND SAFETY PLAN
GOLD KING SITE**

**Final
SITE HEALTH AND SAFETY PLAN**

EMERGENCY AND RAPID RESPONSE SERVICES

**Gold King Site
Silverton, CO**

Prepared for

**U.S. Environmental Protection Agency - Region 8
1595 Wynkoop St.
Denver, CO 80202-1129**

**Contract No.: EP-S8 1302
Task Order: 051
Project No: GK8-51**

SEPTEMBER 04, 2013



**Environmental Restoration LLC
1666 Fabick Drive
Fenton, MO 63026
www.erllc.com**



**Final
SITE HEALTH AND SAFETY PLAN**

EMERGENCY AND RAPID RESPONSE SERVICES

**Gold King Site
Silverton, CO**

I hereby certify that the enclosed Site Health and Safety Plan, shown and marked in this submittal, has been prepared in accordance with OSHA 29 CFR 1910 and is proposed to be incorporated with Contract No.: EP-S-08-02 Task Order 10. This Site Health and Safety Plan is submitted for Government review and acceptance.

Plan Preparer:

[Redacted Name]

7/13/15

Date

[Redacted Phone Number]

Phone Number

Response Manager

Plan Approval:

[Redacted Name]

Date

Phone Number

Vice President, Health and Safety

Accepted as a submittal:

(b)(6) [Redacted Name]

7/13/15

Date

(b) (6) - Phone

Phone Number

On Scene Coordinator
USEPA Region 8
Personal
Privacy



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GLOSSARY OF ACRONYMS

AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
COC	contaminant of concern
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CRZ	Contamination Reduction Zone
CSP	Certified Safety Professional
dBA	decibel A-weighted
DEET	N, N-diethyl-m-toluamide
EMR	experience modification rate
EMT	emergency medical technician
ERRS	Emergency and Rapid Response Services
USEPA	United States Environmental Protection Agency
EZ	Exclusion Zone
HASP	Site Health and Safety Plan
HAZWOPER	Hazardous Waste Operation and Emergency Response
HIPO	high loss potential
HMIS	Hazardous Materials Identification System
HSO	Site Health and Safety Officer
HTRW	hazardous, toxic and radioactive waste
IDLH	immediately dangerous to life and health
kV	kilovolt
MCL	Maximum Contaminant Level
µg/kg	micrograms per kilogram
mg/kg	milligrams per kilogram
mg/m³	milligrams per cubic meter
MSDS	Material Safety Data Sheet
NFPA	National Fire Prevention Association
NIOSH	National Institute of Occupational, Safety and Health
NPL	National Priority List
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PM	Project Manager
POL	petroleum, oils, and lubricants
PPE	personal protective equipment
RAWP	Removal Action Work Plan
RIR	recordable incident rate
SCBA	self-contained breathing apparatus
SOP	Standard Operating Procedure
SOW	Scope of Work
START	Superfund Technical Assistance and Response Team
WNV	West Nile Virus



1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

This document describes the health and safety guidelines developed for the Gold King Mine Site, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes. The procedures and guidelines contained herein were based upon the best available information at the time of the plan's preparation. Specific requirements will be revised when new information is received or conditions change. A written amendment will document all changes made to the plan. Any amendments to this plan will be included in Attachment A. Where appropriate, specific OSHA standards or other guidance will be cited and applied.

All work practices and procedures implemented on site must be designated to minimize worker contact with hazardous materials and to reduce the possibility of physical injury. All work will be performed in accordance with applicable Federal 29CFR 1910 and 1926 Health and Safety Regulations and the Federal 29CFR 1910.120 Hazardous Waste Site Safety Regulations.

1.1 Daily Safety Meetings

Daily safety meetings will be held at the start of each shift to ensure that all personnel understand site conditions and operating procedures, to ensure that personal protective equipment is being used correctly and to address worker health and safety concerns.

1.2 Site Specific Training and Acknowledgement

The Response Manager shall be responsible for informing all individuals assigned to this project of the contents of this plan and ensuring that each person signs the Site Specific Training Record in Attachment Z. By signing the Site Specific Training Record, individuals acknowledge receipt of this training and that they recognize the potential hazards present on-site and the policies and procedures required to reduce the risk of exposure or adverse effects associated with these hazards.

1.3 Key Personnel

Project No./Task Order No.: RB8-10 Gold King Site	
Key Personnel	
Names and Titles	Contact Information
(b) (6) - USEPA R8 OSC Ph	(b) (6) - Phone (Mobile) Email: @epa.gov
- ER Response Manager	
- ER Site Health and Safety Officer	
- ER Project HS Manager	
Subcontractors	
Company	Scope of Services
	Underground construction
	Water Treatment System setup/tear down



2.0 ROLES AND RESPONSIBILITIES

2.1 Response Manager (RM): [REDACTED]

The Response Manager, as the field representative for ER and its subcontractors, has the responsibility for fulfilling the terms of the contract. The RM must oversee the project and ensure that all technical, regulatory and safety requirements are met. The Response Manager is the onsite Health and Safety Officer (HSO) when the HSO is not on site. The Response Manager is responsible for the duties listed in Section 2.2.

2.2 Site Health and Safety Officer (HSO): [REDACTED]

The ER Site Safety Officer will be assigned to the site on a full-time basis with functional responsibility for implementing the Site Health and Safety Plan as ER applies to ER personnel.

Specific Duties Include:

- a. Assist RM in providing a safe and healthful work environment.
- b. Assist RM in reporting and investigating all incidents.
- c. Ensure proper decontamination of personnel and equipment is accomplished.
- d. Ensure that air monitoring equipment is calibrated and operational.
- e. Conduct personal air monitoring as required.
- f. Perform respirator fit tests, as necessary.
- g. Inventory and inspect PPE prior to personnel entries into exclusion zone.
- h. Prepare summary letter of personal air sampling results as necessary.
- i. Ensure proper personal protective equipment is being utilized.
- j. Assist RM in obtaining required personnel training and medical records.
- k. Inspect first aid kits and fire extinguishers.

2.3 Other:

Any persons who observe safety problems should immediately report observations/concerns to appropriate key personnel listed in Section 2.1 or 2.2 above.

SUBCONTRACTORS			
COMPANY NAME	[REDACTED]		
CONTACT NAME	[REDACTED]		
PHONE	[REDACTED]		
ADDRESS	[REDACTED]		
SCOPE OF WORK	PORTAL CONSTRUCTION AND UNDERGROUND SUPPORT		
TRAINING REQUIRED? (CHECK ONE)	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO	MSHA
CONTRACTOR PREQUALIFIED?	YES	XNO	

3.0 SITE BACKGROUND AND SCOPE OF WORK

3.1 Site Background



The Gold King site is an inactive mining site located near Silverton CO in the Gladstone area. The site consists of an adit with a constant flow of water at approximately 100gpm. The State of CO Division of Mining and Reclamation Services (DRMS) geologists need to investigate the adit to determine if it is hydraulically connected to the Red and Bonita mine.

USEPA R8 is supporting the investigation by installing a portal and ground support as necessary and treating the water to remove solids disturbed during the entry process. ER has installed a settling pond and piping for this effort. The current effort will involve installation the water treatments system and additional piping. ER has subcontracted Harrison Western to provide experienced underground mine workers to construct the portal and evaluate underground conditions to determine if additional ground support is necessary.

3.2 Scope of Work

- Provide Work Plan and Health & Safety Plan (HASP), prior to commencement of work on-site.
- Provide for site operations as follows:
 - Mobilize personnel and equipment
 - Establish site controls corresponding to the design report
 - Create work space for treatment system and subcontractors equipment
 - Run-on and run-off drainage controls: Prepared for all work areas.
 - Provide ventilation for underground investigation
 - Treat water to remove suspended solids

4.0 HAZARD ASSESSMENT

This section is to be addressed in the daily tool box safety meeting as each task is to be initiated. Each Activity Hazard Analysis is designed to develop awareness to chemical and physical hazards specific to each task. It would be impractical to repeat in complete detail each control measure and SOP for each job task. Sources, Hazards and Control Measures will be addressed for each job task.

Specific work tasks with unique hazards and/or PPE requirements must be evaluated or reevaluated prior to beginning work. This task review will be led by the Project Health and Safety Manager and the HSO, and will include knowledgeable individuals such as the worker(s) and the supervisor. PPE requirements, based on this assessment, will be included in Section 6 of the HASP or in the AHA for the specific task. All workers must be trained in the requirements of the HASP and the applicable AHAs prior to beginning work. The required PPE may be changed by the HSO, based on the results of additional air monitoring, or on task-specific needs. Downgrades will require the approval of the Project Health and Safety Manager unless otherwise permissible by the HASP.

The following section outlines the AHAs, Referenced Standard Operations Procedures (SOPs) and Chemical Hazards associated with this project. Applicable SOPs are available from ER's Health and Safety Database. AHAs will be developed for each of the SOW activities listed in Section 3.2 and submitted prior to the start of field work. The AHAs should be revised for site-specific activities and review with the work crew before commencing any activity.

The following table lists ER health and safety SOPs that are applicable to this project.

Referenced SOPs:	
ER SOPs applicable to this project or task order:	
HS-02 Blood Borne Pathogens Exposure Control Plan HS-04 Flammable Liquid Transfer (Bonding and Grounding) HS-05 Cold Stress Safety HS-08 Decontamination Measures HS-10 Motor Vehicle Operation HS-12 Electrical Safety HS-13 Excavation and Trenching Operations HS-15 Hazard Communication	HS-17 Heat Stress Safety HS-18 Heavy Equipment Operation HS-24 Personal Protective Equipment HS-36 Proper Lifting Techniques HS-49 Tool Safety and Inspection HS-50 First Aid HS-51 Incident Reporting and Investigation HS-52 General Waste Management



Referenced SOPs:	
ER SOPs applicable to this project or task order:	
HS-16 Hearing Conservation	HS-53 Spill Prevention Response
UXO known or suspected to present?	UXO support and plans provided
Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Lifts Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Items to be lifted: filter bags	Critical <input type="checkbox"/> Ordinary X
Excavations Yes	No X

4.1 Chemical Hazards

Site Contaminants/Chemicals of Concern					
Chemical	Media	PEL (ppm)	TLV (mg/m3)	Route of Entry	Symptoms Acute/Chronic
As	Soil	0.5	.01	Ingestion, inhalation, adsorption	Convulsions, coma, death, mucous membrane irritation, cancer, burning lips, throat constriction, vomiting, diarrhea, dysphagia, abdominal pain
Pb	Soil	50	50	Ingestion, inhalation, adsorption	Insomnia, delirium, headache, memory loss, abdominal pain, nausea, diarrhea, constipation, muscle pain
Cd	Soil	.005	.01	Ingestion, inhalation, adsorption	Nausea, vomiting, abdominal pain, diarrhea, chest pain

The above listing should not be taken as a complete assessment of the hazards posed by materials at the Gold King Site. Therefore, personnel must be alert for symptoms of possible exposure such as unusual smells, stinging, burning eyes, nose and throat, skin irritation, as well as feeling extremely well, depressed, sleepy or tired. Symptoms must be immediately reported to the site supervisor.

4.2 Task Specific Hazards and Controls

Task Specific Safety Assessment		
Job Task: Mobilization & Demobilization		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
Struck by/caught between	Vehicle & Equipment Operation/Traffic	<ul style="list-style-type: none"> - Follow HS-10 Motor Vehicle Operation - Follow HS-18 Heavy Equipment Operation - Only qualified drivers permitted to operate vehicles - Wear ANSI Type 2 high-visibility safety vest - Back up alarms functional and loud enough to hear over surroundings - Wear seat belts while in operation
Ergonomics	Lifting and bending	<ul style="list-style-type: none"> - Follow HS-36 Proper Lifting Techniques - Buddy system/Proper lifting techniques - No individual lifting over 40 lbs.
Heat/Cold Stress	Seasonal Temperatures/ Excessive heat/cold	<ul style="list-style-type: none"> - Cool/Warm break areas - Follow ER SOP HS-17 - Follow ER SOP HS-5 - Plenty of Fluids & breaks - Maintain communication/observation of co-worker
Noise	Hand tools	<ul style="list-style-type: none"> - Hearing protection required when operating open-cab equipment - Hearing protection required when working near equipment
Fire	Electrical devices/service	<ul style="list-style-type: none"> - Fire extinguishers with at least a 3A:40B:C rating shall be placed in



Task Specific Safety Assessment		
Job Task: Mobilization & Demobilization		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
		when working
Electrocution	Power tools/equipment	<ul style="list-style-type: none"> - Inspect all power cords prior to use - Use GFCI on all connections
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear cut resistant gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Structure/roof trusses Uneven terrain/debris	<ul style="list-style-type: none"> - Keep area organized - Identify/mark hazards - Remove debris from walking/ working surfaces
Wildlife	Insect/Ticks/spiders/Dogs/Snakes	<ul style="list-style-type: none"> - Beware of and Avoid contact, - Notify supervisor immediately if stung/bitten - Use insect spray per manufacturer recommendations

Task Specific Safety Assessment		
Job Task: Installing/Operating Water Delivery /Treatment System		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
Steep Slope Construction	Mine Dump	<ul style="list-style-type: none"> - Ensure slope stability - Remove un-stable conditions - Limit turn radius to slow and controlled turns - Avoid overloading the bucket - Provide level footing and support - Avoid sliding on slopes - Avoid full extension of boomed equipment - Keep loads close and balanced w/ counterweight - Avoid rocking or tipping of machinery from unbalanced loads
Struck by/caught between	Vehicle & Equipment Operation/Traffic	<ul style="list-style-type: none"> - Follow HS-10 Motor Vehicle Operation - Follow HS-18 Heavy Equipment Operation - Only qualified drivers permitted to operate vehicles - Wear ANSI Type 2 high-visibility safety vest - Wear seat belts while in operation - Back up alarms functional and loud enough to hear over surroundings
Ergonomics	Lifting and bending	<ul style="list-style-type: none"> - Follow HS-36 Proper Lifting Techniques - Buddy system/Proper lifting techniques - No individual lifting over 40 lbs.
Handling NaOH	Chemical Burns	<ul style="list-style-type: none"> - Use of proper PPE including chemical resistant gloves, face shields, apron or Saranex suit
Heat/Cold Stress	Seasonal Temperatures/ Excessive heat/cold	<ul style="list-style-type: none"> - Cool/Warm break areas - Follow ER SOP HS-17 - Follow ER SOP HS-5 - Plenty of Fluids & breaks - Maintain communication/observation of co-worker
Noise	Hand tools	<ul style="list-style-type: none"> - Hearing protection required when operating open-cab equipment - Hearing protection required when working near equipment
Fire	Electrical devices/service	<ul style="list-style-type: none"> - Fire extinguishers with at least a 3A:40B:C rating shall be placed in when working
Electrocution	Power tools/equipment	<ul style="list-style-type: none"> - Inspect all power cords prior to use - Use GFCI on all connections
Cuts/Punctures	Sharp Objects – Sheet Metal/ Nails/screws	<ul style="list-style-type: none"> - Beware of sharp objects - Wear cut resistant gloves - Use safety utility knife - Always cut away from body
Slip/Trip/Fall	Uneven terrain/debris	<ul style="list-style-type: none"> - Stay out of unsafe buildings - Keep area organized - Identify/mark hazards



Task Specific Safety Assessment		
Job Task: Installing/Operating Water Delivery /Treatment System		
Personal Protective Equipment: Level D		
Hazard	Sources	Control Measures
		- Remove debris from walking/ working surfaces
Wildlife	Bears/Coyotes	- Beware of and Avoid contact - Secure trash and food waste

4.3 Physical Hazards

Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
Electrical	<ol style="list-style-type: none"> 1. Locate and mark existing energized lines. 2. De-energize lines if necessary to perform work safely. 3. All electrical circuits will be grounded. 4. All 120 volt single phase which are not a part of the permanent wiring will have a ground-fault interrupter in place. 5. Temporary wiring will be guarded, buried or isolated by elevation to prevent accidental contact by personnel or equipment. 6. Evaluate potential for high moisture/standing water areas and define special electrical wiring needs-typically requirement for low voltage lighting systems. 	<ol style="list-style-type: none"> 1. Utilize Qualified Electrical Contractor for any new or temporary electrical construction. 2. Ensure electrical equipment/material meet all local, state and federal code and specifications 3. Use GFCI for all power tool usage.
Ergonomic	<ol style="list-style-type: none"> 1. All operations evaluated for ergonomic impact. 2. Procedures written to define limits of lifting, pulling, etc. 3. Procedures to define how personnel will utilize proper ergonomic concepts and utilize mechanical material handling equipment. 4. Necessary mechanical material handling equipment specified and ordered for project. 	<ol style="list-style-type: none"> 1. Proper body mechanics techniques stressed and enforced on a daily basis. 2. Mechanical handling equipment maintained and utilized. 3. Proper body mechanics stressed in scheduled safety meetings. 4. Injuries reported and medically treated if in doubt about severity. 5. Operations changed as necessary based on injury experience or potential.
Existing Site Topography	<ol style="list-style-type: none"> 1. Survey site prior to layout. Identify areas unsafe for personnel or equipment due to physical conditions. 2. Identify/locate existing utilities. 3. Determine impact of site operations on surrounding properties, communities, etc. 4. Identify mechanized equipment routes both on site and onto and off the site. 5. Layout site into exclusion and contamination reduction zones based on initial site evaluation. 	<ol style="list-style-type: none"> 1. Awareness to work environment - regular inspection/audits to identify changing conditions. 2. Shut down operations when unknown conditions encountered.
Fires & Explosions	<ol style="list-style-type: none"> 1. Evaluate all operations for fire and explosion potential. 2. Define specific procedures for unique operations presenting unusual hazard such as flammable tank demolition. 3. Ensure that properly trained personnel and specialized equipment is available. 4. Define requirements for handling and storage of flammable liquids on site, need for hot work permits and procedures to follow in the event of fire or explosion. 5. Define the type and quantity of fire suppression equipment needed on site. 6. Coordinate which local fire fighting agencies to discuss unique fire hazards, hazardous materials, etc. 7. Ensure site operations comply with 29CFR 1910.157G. 	<ol style="list-style-type: none"> 1. Inspect fire suppression equipment on a regular basis. 2. Store flammables away from oxidizers and corrosives. 3. Utilize Hot Work Permit for all hot work on-site. 4. Follow any site specific procedures regarding work around flammables. 5. Review and practice contingency plans. 6. Discuss on regular basis at scheduled safety meetings.
Flammable Vapor and Gases	<ol style="list-style-type: none"> 1. Evaluate site to determine sources of likely flammable gas or vapor generation. 2. Develop specific procedures to be followed in the event of exposure to flammables. 3. Specify specialized equipment needs for inerting flammable atmospheres, ventilating spaces and monitoring flammable vapor concentrations. 4. Define requirements for intrinsically safe equipment. 5. Develop contingency plan to follow in the event of fire or explosion. 	<ol style="list-style-type: none"> 1. Calibrated monitoring equipment available and utilized by trained personnel whenever working where flammable gas or vapor is present. 2. Monitoring performed at regular frequency and in all areas where vapor could generate or pool. 3. Equipment and operations shut down when threshold levels are exceeded.



Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
		<ol style="list-style-type: none"> Contingency plans reviewed regularly by all involved personnel. Work areas are carefully inspected to look for possible ignition sources. Sources are removed. Operations shut down if specific task procedures can't be followed to the letter.
Heavy Equipment Operation	<ol style="list-style-type: none"> Define equipment routes and traffic patterns for site. Insure that operators are properly trained on equipment operation for all equipment required on project. Define safety equipment requirements, including back up alarm and roll over, for all equipment on site. Define equipment routes and traffic patterns for site. Implement SOP of requiring operators to safety inspect equipment on a daily basis in accordance with manufacturer requirements. Evaluate project requirements to ensure that equipment of adequate capacity is specified. 	<ol style="list-style-type: none"> Equipment inspected as required. Equipment repaired or taken out of service. Ground spotters are assigned to work with equipment operators. Utilize standard hand signals and communication protocols. Personnel wear the proper PPE; utilize hearing protection, gloves for handling rigging, etc. Equipment safety procedures discussed at daily scheduled safety meetings. Personnel do not exceed lifting capacities, load limits, etc. for equipment in question. Personnel follow basic SOP's which prohibit passengers on equipment, activating brakes and grounding buckets, securing loads prior to movement, etc.
Illumination	<ol style="list-style-type: none"> Evaluate all operations and work areas to determine lighting requirements. Specify specialized lighting requirements including explosion proof, intrinsically safe, lighting needs. Determine if nighttime outdoor operations are necessary. Evaluate tasks to be performed and number of light plants necessary to allow operations. Ascertain if outdoor lighting from nighttime operations will have an impact on surrounding communities. 	<ol style="list-style-type: none"> Inspect specialized equipment and discard or replace as needed. Add additional lighting to areas with lighting deficiencies. Inspect drop cords and portable lights on regular basis. Replace or repair as necessary.
Noise	<ol style="list-style-type: none"> Local community noise standards examined. Expected loud operations evaluated to determine compliance with community standards. Loud operations scheduled for approved time periods. Noise level standards established for equipment brought onto site. Hearing protection requirements defined for personnel expected to have excessive exposures. 	<ol style="list-style-type: none"> Personnel receive annual audiogram. Personnel required to wear hearing protection. Routine noise level monitoring and dosimeter performed. Defective equipment repaired as needed. Ongoing hearing conservation education promoted at scheduled safety meetings. Medical evaluation following noise (impact) exposure if symptoms present themselves.
Personal Injuries	<ol style="list-style-type: none"> Site operations will be evaluated for exposures with serious injury potential such as falling objects, pinch points, flying objects, falls from elevated surfaces, etc. A written Fall Prevention Program will be developed if workers will be required to work at heights greater than 6 feet from unguarded work locations. PPE requirements will be based on potential for injury. 	<ol style="list-style-type: none"> Personnel will wear required PPE. Specialized equipment such as rope grabs, winches, etc. will be inspected prior to each use. Defective equipment will be immediately replaced. All injury and near miss incidents will be reported to the HSO. First aid/CPR trained person on site at all times. First aid on site. Transport for medical care if necessary.
Small Equipment Usage	<ol style="list-style-type: none"> Site operations will be evaluated to determine need for specialized intrinsically safe, explosion-proof and UL approved equipment and instruments. Implement requirement for G.F.I., double insulated tool usage, or assured grounding program in all outdoor operations, will be utilized. Specify equipment needs to ensure that equipment used only for the purpose for which it is designed and to prevent abuse or misuse of the equipment. Specify requirements for the inspections and maintenance of specialized equipment. 	<ol style="list-style-type: none"> Inspect each tool prior to each use. Ensure all guards are in use and properly positioned. Ensure item being worked on is properly braced if necessary. Get help when appropriate to hold or brace item being worked on. Wear cut resistant or other appropriate gloves in addition to level C PPE.



Physical/Environmental Hazard Analysis		
Hazard	Pre Planning to Control Hazard	Active Control Measures
	5. Specify that all equipment utilized on the project meets all OSHA requirements.	
Weather Conditions	1. Evaluate prevailing weather conditions for the site. 2. Contingency plans developed for likely severe weather conditions such as tornado, and extreme thunderstorm. 3. Provide for daily weather forecast service in extreme weather areas. 4. Plan to weatherize safety systems, such as showers and eye washes that would be impacted by extreme cold weather. 5. Order necessary specialized cold weather clothing. 6. Grounding and bonding requirements defined for thunderstorm areas. 7. Sheltered air conditioned break areas provided for extreme hot and cold weather zones.	1. Employees trained in contingency plan for severe weather conditions. 2. Emergency water sources inspected regularly in cold areas. 3. Weather service contacted regularly during storm conditions. 4. Supervisory personnel cease operations during extreme storm conditions (i.e., thunderstorms). 5. Personnel evacuate to safe assembly area.
Heat Stress	1. Anticipate possible high temperatures (summer months). 2. Be aware of heat stress symptoms, quit sweating, pale, clammy skin, dizziness	1. Cool break area. 2. Drink water. 3. Buddy system/ awareness 4. First aid on site. 5. Medical care if symptoms persist.
Cold Stress	1. Anticipate possible low temperatures (winter months). 2. Remember the temperature does not have to be below freezing to have a cold stress situation.	1. Warm break area. 2. Warm decaffeinated drinks. 3. Buddy system/ awareness. 4. First aid on site. 5. Medical care if symptoms persist

5.0 TRAINING REQUIREMENTS

This section describes ER's project training requirements and site visitor policy. Training of all personnel shall be in accordance with OSHA 29 CFR 1910.120 and the National Fire Protection Association (NFPA) standards.

5.1 Project Training Requirements

The training listed in Table 5-1 will be provided to project participants as noted. All required training will be documented and this documentation maintained onsite.

Project Training Requirements:		
Topic	Description	Personnel
General Training		
Site Safety and Health Plan	Site-specific hazards and control requirements, before commencement of field work. Includes training in proper use and care of PPE.	All project personnel
Activity Hazard Analysis	Activity-specific hazards, controls and training requirements for a specific phase or activity, prior to commencement of activity	Workers, supervisors and oversight personnel engaged in the activity
Daily Safety Briefing	In addition to plan-of-the-day and daily hazard reminders, often used to cover a specific topic; provided refresher training on various issues; or changes in hazards, controls or procedures.	All field workers, supervisors and field oversight personnel
Emergency Action Plan	Roles, responsibilities, recognition of emergency conditions, reporting and notification, evacuation and other procedures.	All project personnel, with detailed information on procedures for workers with special responsibilities
OSHA 40-Hour Hazardous Waste Operation (HAZWOPER) Training	General hazards and controls for hazardous waste activities at remediation sites, prior to performing work in an exclusion zone.	General site workers, supervisors, oversight personnel on HAZWOPER sites
OSHA 8-Hour Supervisor	Managing HAZWOPER work activities	Supervisors and management support staff on HAZWOPER sites
OSHA 8-Hour Refresher	Current annual refresher for HAZWOPER sites.	Workers, supervisors and oversight personnel engaged in the activity
Hazard Communication	Requirements for MSDS, labels; hazards of site materials and controls; location of and access to inventories and MSDS.	All project personnel potentially exposed to hazardous materials
Fire Extinguisher	General education on selection, distribution, and proper use of fire extinguishers.	All project personnel



Project Training Requirements:		
Topic	Description	Personnel
Special Training		
First aid/ Cardiopulmonary Resuscitation (CPR)	Red Cross, National Safety Council or other authorized course, with current refresher	At least 2 project personnel
Fall Protection	Fall (from elevation) hazards, fall protection techniques, especially proper use of personal fall arrest systems and rescue procedures.	Task-specific, workers exposed to fall hazards.
Lockout/tagout	Site-specific energy control and verification procedures.	Authorized personnel working on de-energized systems, and affected employees whose work may be impacted by a lockout/tagout situation.
Other Heavy Equipment operations	Qualified by Construction Manager, Superintendent or Equipment Supervisor as documented on ER Equipment Operator Qualifications Form	Equipment Operators
Power tools (e.g. chain saws, chippers, powder-actuated tools, compressed air systems)	Hazards and proper use and maintenance as described in operations manual. Powder-operated tool users certified by manufacturer.	Tool users

5.2 Visitor Indoctrination Policy

All site visitors will be required to review the daily tailgate safety issues and sign the visitor log. At a minimum, all visitors must be informed of the anticipated hazards and PPE requirements, designated work zones, escort procedures, and emergency procedures.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The following is a brief description of the personal protective equipment, which may be required during various phases of the project. The U.S. EPA terminology for protective equipment will be used; Levels A, B, C and D.

Respiratory protective equipment shall be NIOSH-approved and use shall conform to OSHA 29 CFR Part 1910.134 Requirements. Each employer shall maintain a written respirator program detailing selection, use, cleaning, maintenance and storage of respiratory protective equipment. The written Respirator Program will be maintained at the local and regional offices.

6.1 Level A Protection Shall Be Used When: (NOT ANTICIPATED)

- The extremely hazardous substance requires the highest level of protection for skin, eyes and the respiratory system;
- Substances with a high degree of hazard to the skin are known or suspected;
- Chemical concentrations are known to be above IDLH levels; or,
- Biological hazards requiring Level A are known or suspected.

6.2 Level B Protection Shall Be Used When: (NOT ANTICIPATED)

- The substance(s) has been identified and requires a high level of respiratory protection but less skin protection;
- Concentrations of chemicals in the air are IDLH or above the maximum use limit of an APR with full-face mask;
- Oxygen deficient or potentially oxygen deficient atmospheres (<19.5%) are possible; and/or, Confined space entry may require Level B.
- Incomplete identification of gases and vapors, but not suspected to be harmful to skin or skin absorbable

Level B Protection Equipment at a Minimum Shall Consist of:



Air-supplied Breathing Apparatus	Pressure Demand Full-face
Chemical Resistant/Protective Coveralls	Chemical Resistant (Saranex, potential acid suit or equivalent)
Inner Gloves	Nitrile or equivalent
Outer Gloves	Nitrile or equivalent*
Safety shoes/Boots	Steel Toed/Chemical Resistant
Hard Hat	ANSI approved
Respiratory Inserts	As required
Modifications:	*Use cut resistant gloves when handling sharp objects.

6.3 Level C Protection Shall Be Used When: (NOT ANTICIPATED)

- The same level of skin protection as Level B, but a lower level of respiratory protection is required;
- The types of air contaminants have been identified, concentrations measured, and an air-purifying respirator is available that can remove contaminants; or,
- The substance has adequate warning properties and all criteria for the use of APR respirators has been met

Level C Protective Equipment at a Minimum Shall Consist of:

Air Purifying Respirator	Full-face
Cartridges (type)	Organic Vapor/Particulate Combination
Chemical Resistant/Protective Coveralls	Particulate resistant (i.e. Tyvek or equivalent)
Gloves	Cotton or Leather Work Gloves*
Safety shoes/Boots (type)	Steel Toed
Hard Hat	ANSI approved
Respiratory Inserts	As required
Other (List _____)	N/A
Modifications:	*Use cut resistant gloves when handling sharp objects.

6.4 Mod Level D Protection Shall Be Used When: Handling NaOH

- The atmosphere is demonstrated to be within OSHA permissible limits
- Work functions include splashes, immersion or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Mod Level D Protection Equipment at a Minimum Shall Consist of:

Chemical Resistant/Protective Coveralls	Particulate resistant (i.e. Pro Shield or equivalent)
Safety Shoes/Boots	Steel toed/shank work boots
Boot Covers (booties)	Latex
Work Gloves	Nitrile inner/Nitrile outer*
Hard Hat	ANSI approved
Face Shield	As necessary
Safety Glasses	ANSI approved
Modifications:	*Use cut resistant gloves when handling sharp objects.

6.5 Level D Protection Shall Be Used When:

- The atmosphere is demonstrated to be below OSHA permissible exposure limits
- Work functions preclude splashes, immersion or the potential for unexpected inhalation of, or contact with, hazardous concentrations of harmful chemicals.

Level D Protection Equipment at a Minimum Shall Consist of:

Standard Work Clothes	Long Pants/sleeved shirt
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Rain Suit	As required
Safety Shoes/Boots (type)	Steel Toed
Boot Covers (booties)	During muddy conditions as necessary
Work Gloves	Cotton or leather work gloves*
Hard Hat	ANSI approved
Safety Glasses	ANSI approved
Modifications:	*Use cut resistant gloves when handling sharp objects.

6.6 Decisions to Upgrade/Downgrade PPE

All decisions to downgrade from Level B to C or D must be accompanied by air monitoring results. The Regional Safety Managers must be advised of on-site decisions to downgrade. All decisions must be documented with an Addendum to the Plan.

The following conditions will necessitate reevaluation of PPE use.

- commencement of a new work not previously identified
- change of job tasks during a work phase
- change of season/weather
- contaminants other than those identified in Safety Plan
- change in ambient levels of contaminants
- change in work which affects degree of chemical contact

6.7 Project Personal Equipment Requirements

Project Personal Protective Equipment Requirements:							
Activity	Respiratory Protection	Body Protection	Head Protection	Hand Protection	Eye/Face Protection	Foot Protection	Hearing Protection
Site Mobilization & Demobilization (Level D)	None	Standard Work clothes	ANSI-approved Hard Hat	Leather or cut resistant work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when using power tools
Installation and operation of water treatment system (Level D)	None	Standard Work clothes	ANSI-approved Hard Hat	Leather or cut resistant work gloves	ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when using power tools
Handling NaOH	None	Chemical resistant apron or coveralls	ANSI-approved Hard Hat	Nitrile inner and outer gloves	Face shield in combination with ANSI-approved safety glasses	ANSI-approved safety boots	Plugs or muffs when using power tools

Personal Protective Equipment Inspection and Care

Inspection and care of PPE are covered in the ER Corporate SOP HS-24.

6.8 Respiratory Protection Program

ER shall implement HS-26 Respiratory Protection Program for its employees and subcontractors and train them on its contents. The program will be administered by the HSO.

Respiratory protective equipment shall be NIOSH-Approved and use shall conform to OSHA 29 CFR Part 1910.134 Requirements. ER and subcontractors shall maintain a written respirator program detailing selection, use, cleaning, maintenance and storage of respiratory protective equipment.



7.0 MEDICAL MONITORING REQUIREMENTS

7.1 Pre-Employment Medical Examination

- a) Pre-employment medical examinations are required for persons working at hazardous waste sites.
- b) All examinations must be completed and documented prior to assignment to this site.
- c) All examinations will be conducted following parameters established by WorkCare™.

7.2 Site Specific Medical Examination

- a) Not applicable for this project.

7.3 Annual Medical Examination

The medical examination must have been within a 12-month period prior to on-site activity and repeated annually.

7.4 Suspected Exposure Medical Examination

- a) Following any suspected uncontrolled exposure to site contaminants, personnel should be scheduled for a special medical examination.
- b) The medical examination will be specific for the contaminants and the associated target organs or physiological system.
- c) Questions regarding the type of medical examination can be directed to ER's Vice President, Health and Safety.

7.5 Contractor Physical Examination Requirements

All subcontractors entering the contamination reduction or exclusion zone will have adequate medical surveillance satisfying 29 CFR 1910.120.10 (f).

8.0 Health and Hazard Monitoring

According to 29 CFR 1910.120 (h) Air Monitoring shall be used to identify and quantify airborne levels of hazardous substances and health hazards in order to determine the appropriate level of employee protection needed on-site. ER will maintain an air monitoring program to evaluate concentrations of specific chemical groups or contaminants in ambient air during work activities. This program will include both real-time, direct monitoring equipment, and chemical-specific personal air monitoring as appropriate.

Both area and personal monitoring will be conducted to document potential exposures to hazardous constituents, as well as to evaluate the adequacy of the Personal Protection Equipment (PPE) program.

8.1 Routine Air Monitoring Requirements

- Upon initial entry to rule out IDLH conditions
- When the possibility of an IDLH condition or flammable atmosphere has developed
- When work begins on a different portion of the site
- Contaminants other than those previously identified are being handled
- A different type of operation is initiated
- Employees are handling leaking drums or containers or working in areas with obvious liquid contamination
- During confined space work

Air monitoring will consist at a minimum of the criteria listed below. All air monitoring data will be documented and available in the command post site files for review by all interested persons. Air monitoring instruments will be



calibrated and maintained in accordance with the manufacturer's specifications. Calibration and maintenance performed will be entered in the site log and/or instrument log book. Area monitoring using the Data Ram 4, AreaREA and SKC will be conducted by URS.

8.2 Site Specific Air Monitoring Requirements

Health Hazard Monitoring:					
Real Time (Air, noise, heat, radiation, light)					
Activity	Target Analyte	Instrument	Frequency	Action Levels	Actions/Upgrade and Rationale
Heat Stress Monitoring	None	Thermometer	Per HS-17	Depending on work activity	Move to shaded area, drink water, loosen clothing, and monitor

8.3 Integrated Personnel Exposure Monitoring

Not anticipated for this project.

9.0 SITE CONTROL AND STANDARD OPERATING PROCEDURES

9.1 Work Zones

The primary purpose for site controls is to establish the work area perimeter, to minimize access by unauthorized persons. At the end of each workday, the site should be secured, to prevent unauthorized entry. Site work zones will include:

Clean Zone/Support Zone

This uncontaminated support zone or clean zone will be the area outside the exclusion and decontamination zones and within the geographic perimeters of the site. This area is used for staging of materials, parking of vehicles, office and laboratory facilities, sanitation facilities, and receipt of deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, etc., who will not necessarily be permitted in the exclusion zone. All personnel arriving in the support zone will upon arrival, report to the RM and sign the site entry/exit log.

Decontamination Zone

The decontamination zone will provide a location for removal of contaminated personal protective equipment and final decontamination of personnel and equipment. All personnel and equipment should exit via the decon area. A separate decontamination area will be established for heavy equipment.

1. The decontamination zone is a buffer zone between contaminated and clean areas.
2. Decon facilities are located at the portal and adjacent to the NaOH handling area. Heavy equipment decon will occur at the pond area

Exclusion Zone/Hot Zone

The exclusion zone will be the "hot-zone" or contaminated area inside the site perimeter. Entry to and exit from this zone will be made through a designated point and all personnel will be required to sign the hot zone entry/exit log located at the decon area. Appropriate warning signs to identify the exclusion zone should be posted (i.e. "DANGER - AUTHORIZED PERSONNEL ONLY", "PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT", etc.) Exit from the exclusion zone must be accompanied by personnel and equipment decontamination as described in Section 10.0.

1. Will be identified by the portal.
2. General Safety Rules for Exclusion Zone
 - a. wear the appropriate level of PPE defined in plan



- b. do not remove any PPE or break the integrity to pick, scratch, or touch parts of your body
- c. no smoking, eating or drinking
- d. no horseplay
- e. no matches or lighters in this zone
- f. implement the communication and line of sight system
- g. entry restricted to Fronteir Environmental Services (FES) and DRMS personnel. ER personnel will only enter after having received training and escort by FES

9.2 General Field Safety Rules

- Horseplay is not permitted at any time.
- All visitors must be sent to the command post.
- It is ER policy to practice administrative hazard control for all site areas by restricting entrance to exclusion zones to essential personnel and by using operational SOPs.
- Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Stay away from any waste drums unless necessary. Protect equipment from contamination by bagging.
- Eating, drinking, or smoking is permitted only in designated areas in the support zone.
- Cell phone use is not allowed in EZ, unless authorized by Project HS Manager.
- Cell phone use while operating equipment is not allowed.
- Cell phone use while operating motor vehicles must comply with applicable DOT regulations
- Hands and face must be thoroughly washed upon leaving the decon area.
- Beards or other facial hair that interferes with respirator fit will preclude wearing a respirator.
- All equipment must be decontaminated or discarded upon exit from the exclusion zone.
- All personnel exiting the exclusion zone must go through the decontamination procedures described in Section 10.0.
- Safety Equipment described in Section 6.0 will be required for all field personnel.
- Personnel will only travel in vehicles where individual seats for each occupant are provided.
- Seat belts will be worn as required.
- Fire extinguishers will be available on site and in all areas with increased fire danger such as the refueling area.
- A minimum of two personnel will always be on site whenever heavy equipment is operated.
- Only necessary personnel need to be on or around heavy equipment.
- Employees will not interfere with or tamper in any way with air monitoring equipment.
- Backhoes or other equipment with booms shall not be operated within 10 feet of any electrical conductor.

Minimum Clearance from Energized Overhead Electric Lines

NOMINAL SYSTEM VOLTAGE	MINIMUM REQUIRED CLEARANCE
0-50 kV	10 feet
51-100 kV	12 feet
101-200 kV	15 feet
201-300 kV	20 feet
301-500 kV	25 feet
501-750 kV	35 feet
751-1000 kV	45 feet



- Visitor log will be maintained at the command post or with the security guard. All personnel coming on site will sign in and out on a daily basis.
- Security will be maintained at the site by closing all gates during normal work hours. Site will be locked up in the evening.
- If unauthorized members of the public are found on site, contact RPM immediately and do not leave the individual unattended.
- Visitors are not allowed in the work areas without authorization. Visitors must sign in at the Command Post and receive authorization to enter the site.
- Buddy System
 - The buddy system is mandatory at anytime that personnel are working in the exclusion zone, remote areas, on tanks, or when conditions present a risk to personnel.
 - A buddy system requires at least two trained/experienced people who work as a team and maintain at a minimum audible and/or visual contact while operating in the exclusion zone.
- Communication Procedures
 - Radios will be used for onsite communications and Channel(Repeater) will be the designated channel.
 - The crews should remain in constant radio or visual contact while on site.
 - The site evacuation signal will be 3 blasts on the air or vehicle horn.

10.0 DECONTAMINATION PROCEDURES

In general, everything that enters the exclusion zone at this site must either be decontaminated or properly discarded upon exit from the exclusion zone. All personnel, including any state and local officials must enter and exit the hot zone through the decon area. Prior to demobilization, contaminated equipment will be decontaminated and inspected before it is moved into the clean zone. Any material that is generated by decontamination procedures will be stored in a designated area in the exclusion zone until disposal arrangements are made.

NOTE: The type of decontamination solution to be used is dependent on the type of chemical hazards. The decontamination solution for this site is **dry gross**.

10.1 Procedures for Equipment Decontamination

Following decontamination and prior to exit from the hot zone, the Project Superintendent shall be responsible for insuring that the item has been sufficiently decontaminated. This inspection shall be included in the site log.

Equipment decontamination will consist of the following steps: **Remove large deposits of mud and soil using sharp shooter and/or spud bar**

10.2 Procedure for Personnel Decontamination

The following describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site. Decontamination procedures will ensure that material which workers may have contacted in the hot, or exclusion zone do not result in personal exposure and are not spread to clean areas of the site. The sequence describes the general decontamination procedures. The RM and the HSO will ensure that the decontamination procedures are adequately implemented.

All personnel exiting the "HOT ZONE" (or "WARM ZONE" for decontamination line workers) will follow the decontamination procedures outlined below when leaving the zone. The control zones must be clearly established and discussed with all entry, rescue and decontamination workers prior to each and every site entry. All personnel will follow the preset traffic flow patterns when entering and exiting the hot zone.

Decontamination procedures are described below. All personnel exiting the hot zone will remove (doff) PPE in the order described below as they progress through the decontamination stations.



This decontamination procedure applies to personnel at this site wearing Level D protection. These are the minimum acceptable requirements.

- Station 1: Brush boots clean of soil prior to exiting property
- Station 2: Remove work gloves
- Station 3: Wash hands and face
- Station 4: Personnel will not wear or bring dirty/decontaminated clothing into the break areas.

Eating, drinking, chewing gum/tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and/or ingestion of materials is prohibited in any areas where the possibility of contamination exists and is permitted only in the designated break area. Personnel will not wear or bring dirty/decontaminated clothing into the break areas.

10.3 Disposition of Decontamination Wastes

- 1. All equipment and solvents used for decontamination shall be decontaminated or disposed of with the established waste streams.

11.0 HAZARD COMMUNICATION PROGRAM

Each contractor will be responsible for maintaining a copy of their Hazardous Communication Program and MSDSs on site. The following items are specific to this job site:

11.1 Material Safety Data Sheets

- 1. Material Safety Data Sheets will be maintained at the Command Post in the Health and Safety Binder or be readily available via the internet.
- 2. MSDS' will be available to all employees for review during the work shift.
- 3. See Attachment C and/or the ER Health and Safety Binder. Will also be available on internet. Chemicals being brought to the site include NaOH, Chitosan and LBP flocculent and fuels

11.2 Container Labeling

- 1. All containers received on site will be inspected by the contractor using the material to ensure the following:
 - a. all containers clearly labeled
 - b. appropriate hazard warning
 - c. name and address of the manufacturer

11.3 Chemicals Brought to Site: (add as required)

- 1. Gasoline _____
- 2. Diesel Fuel _____
- 3. NaOH 25% soln _____
- 4. Brennfloc _____
- 5. PVC primer and cement _____

11.4 Employee Training and Information

- 1. Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following:
 - a. an overview of the requirements contained in the Hazardous Communication Standard
 - b. Hazardous chemicals present at the site
 - c. the location and availability of the written Haz Com Program
 - d. physical and health effects of the hazardous chemicals



- e. methods of preventing or eliminating exposure
- f. emergency procedures to follow if exposed
- g. how to read labels and review MSDS' to obtain information
- h. location of MSDS file and location of hazardous chemical list

12.0 EMERGENCIES/INCIDENTS/INJURIES

It is essential that site personnel be prepared in the event of an emergency. Emergencies can take many forms; illnesses or injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather. The following sections outline the general procedures for emergencies. Emergency information should be posted as appropriate.

12.1 Emergency Contacts for the Concord Chemical Site

Emergency Call List and Project Organization		
Service	Name/Organization	Emergency Phone
Fire	Silverton Volunteer Fire Dept	911
Police	San Juan County Sheriff	911
Sheriff	San Juan County Sheriff	911
Underground rescue	San Juan Mine Rescue	See Attachment C for call down list
*Hospital	Mercy Regional Hospital 1010 Three Springs Blvd Durango CO 81301	970 247 4311
*Occupational Medicine Clinic	Mosely Health Care Complex 700 N Henson St Lake City, CO 81235	911
Client Representative	(b) (6) - [REDACTED] JSEPA R8 OSC	(b) (6) - Phone [REDACTED]
ER Response Manager	Ph [REDACTED]	(b)(5) [REDACTED]
ER Site Health and Safety Officer	[REDACTED]	(b)(5) [REDACTED]
ER Project HS Manager	[REDACTED]	(b)(5) [REDACTED]

NOTE: Maps and directions to the hospital will be posted in the site office trailer/pickup truck.

The following individuals have been trained in CPR and First Aid [REDACTED]

12.2 Additional Emergency Numbers

Poison Control Center	800-222-1222
National Response Center	800-424-8802
Center for Disease Control	404-488-4100 (24 hr)
AT&F (Explosives Information)	800-424-9555
Chemtrec	800-424-9300

Environmental Restoration Contacts

Environmental Restoration	888-814-7477 (24 Hr.)
Environmental Restoration (St. Louis)	636-227-7477

12.3 Emergency Equipment Available On-Site

Communications Equipment	Location
---------------------------------	-----------------



Public Telephones	County Building and lodging
Mobile Telephones	303 994 6611
Two-Way Radios	On site
Emergency Alarms/Horns	Vehicle Horns/Air Horn
Other:	Not Anticipated

Medical Equipment	Location
First Aid Kits	ER Vehicles /With Crews
Eye Wash Bottles/Station: (within 100 feet of hazard zone)	ER Vehicles / With Crews
Safety Shower	55 gal drum filled with fresh water at NaOH handling area, portal and base area

Fire Fighting Equipment	Location
Fire Extinguishers	ER Vehicles / FES Tool trailer

Spill or Leak Equipment	Location
Absorbent Boom/Pads:	Support Zone/Storage trailers
Dry Absorbent:	Support Zone/Storage trailers

12.4 Incident Reporting/Investigations

- All incidents, including personal injury and property damage, must be reported to the RM, Supervisor, or SHSO **immediately**.
- The RM will contact the Project Health and Safety Manager by telephone immediately. The RM, SHSO, and effected employee(s) will conduct an immediate investigation of the incident and document all results on the Incident and Investigation Report form.
- The Response Manager will assign a supervisory individual to accompany all injured personnel to the clinic and follow guidelines outlined in the ER Return to Work Program.
- Copies of all Incident and Investigation Reports will be sent to the ER Vice President, Health and Safety.

13.0 Emergency Response Contingency Plan

13.1 Project Personnel Responsibilities During Emergencies

As the administrator of the project, the RM has primary responsibility for responding to and correcting emergency situations. The RM will:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, total evacuation and securing of the site or up-grading or down- grading the level of protective clothing and respiratory protection.
- Take appropriate measures to protect the public and the environment including isolating and securing the site, preventing run-off to surface waters and ending or controlling the emergency to the extent possible.
- Ensure that appropriate Federal, State and local agencies are informed, and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. In the event of an air release of toxic materials, the local authorities should be informed in order to assess the need for evacuation. In the event of a spill, sanitary districts and drinking water systems may need to be alerted.
- Ensure that appropriate decon treatment or testing for exposed or injured personnel is obtained.
- Determine the cause of the incident and make recommendations to prevent the recurrence.
- Ensure that all required reports have been prepared and submitted.



13.2 Medical Emergencies:

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to Corporate Health and Safety.

Onsite First Aid Support

Onsite medical support during project execution will be available from two or more individuals who are trained in First Aid and Cardiopulmonary Resuscitation (CPR) and blood borne pathogens. First aid kits shall be Type III, 16 unit kits, including one pocket mouthpiece or CPR barrier. Kits shall be checked prior to use, and at least weekly when work is in progress to ensure that contents are replaced as used.

Medical Transport of Employees and Case Management

For non-emergency injuries, a local clinic will be identified with the assistance of the Corporate Medical Consultant, WorkCare Incident Intervention (II) will be contacted immediately to establish a medical treatment plan prior to transporting the injured worker to the clinic. The WorkCare II consultant will attempt to contact the clinic ahead of the arrival of the patient to establish oversight of case management. Under no circumstances will an injured employee drive unescorted to a hospital, clinic, etc. An employee with minor injury may be transported by car after first aid treatment is given. The HSO or other project management personnel will transport the injured person to the facility. The employee who transports the injured person shall be trained in first aid and CPR whenever possible. When the injury is severe, or when in doubt concerning the severity of injury, the employee will be transported by ambulance.

Injured employees that require medical treatment or are taken to a doctor, hospital, clinic, etc., will not be allowed to resume work without a written return to work statement from the treating physician. This statement shall supply a medical diagnosis of the problem, the date of return to work, and work limitations. Should a return to work statement such as "light duty" be given, the treating physician will be contacted to determine the specific limitation. ER will make an assessment of work the employee normally performs whether or not the limitation interferes with the employee's normal work.

Whenever there are questions on the appropriateness of the diagnosis or prescribed course of treatment, WorkCare will be contacted to arrange for a second opinion. Copies of all Incident and Investigation Reports will be sent to the ER Vice President of Health and Safety.

13.3 Fire or Explosion:

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival the RM or designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site.

If it is safe to do so, site personnel may:

- Use firefighting equipment available on site.
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

13.4 Spills, Leaks or Releases:

In the event of a spill or a leak, site personnel will:



- Locate the source of the spillage and stop the flow if it can be done safely.
- Begin containment and recovery of the spilled materials.

13.5 Evacuation Routes and Resources:

Evacuation routes and rally points have been established by work area locations for this site. This work area has only one exit down a steep rocky 4X4 road. The rally point is the equipment drop zone in Gladstone. Evacuation should be conducted immediately, with care taken to not cause additional hazard by recklessly proceeding down the 4X4 road.

Evacuation notification will be three blasts on an air horn, vehicle horn, or by verbal communication via radio.

- Keep upwind of smoke, vapors or spill location.
- The RM will conduct a head count to insure all personnel have been evacuated safely.
- In the event that emergency site evacuation is necessary, all personnel are to:
 1. Escape the emergency situation;
 2. Decontaminate to the maximum extent practical; and,
 3. Meet at the designated rally point in Gladstone



**ENVIRONMENTAL
RESTORATION, LLC**

**ERRS REGION 8, CONTRACT EPS8 1302
SITE HEALTH AND SAFETY PLAN
GOLD KING SITE**

**ATTACHMENT A
SITE SAFETY PLAN AMENDMENTS**



**ENVIRONMENTAL
RESTORATION, LLC**

**ERRS REGION 8, CONTRACT EPS8 1302
SITE HEALTH AND SAFETY PLAN
GOLD KING SITE**

**ATTACHMENT B
SITE MAPS**



**ENVIRONMENTAL
RESTORATION, LLC**

**ERRS REGION 8, CONTRACT EPS8 1302
SITE HEALTH AND SAFETY PLAN
GOLD KING SITE**

ATTACHMENT C

MINE RESCUE CALL DOWN LIST

C



Silverton, CO to mercy hospital durango Drive 55.5 miles, 1 h 17 min
co

o Silverton, CO

- ↑ 1. Head southeast on W 12th St toward Greene St
92 ft
- 2. Turn right at the 1st cross street onto State Hwy 110/Greene St
Continue to follow State Hwy 110
0.6 mi
- ↑ 3. Merge onto US-550 S
52.5 mi
- ↑ 4. Continue onto US-160 E
1.7 mi
- ↙ 5. Use the left 2 lanes to turn left onto Three Springs Blvd
0.5 mi
- o 6. At the traffic circle, take the 2nd exit and stay on Three Springs Blvd
Destination will be on the right
0.2 mi

o Mercy Regional Medical Center

1010 Three Springs Boulevard, Durango, CO 81301

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

EMERGENCY ACTION PLAN
(Site Specific Health and Safety Plans are Onsite)

Communications

- **Currently no communications into the site is possible unless the Satellite Phone is carried to a point where signal is obtained.**
- **Satellite Phone Calls Out: Turn Phone On and Carry it to a point West of the trailer to obtain a signal.**

Operational Area: The Red and Bonita Mine located on County Road 53 north of Gladstone, and the Gold king Mine located on off County Road 52 ???.

Site Satellite Phone Located in EPA trailer at base of the Red and Bonita Mine waste dump by water treatment facility Maximum coverage in open area west of treatment ponds, marked with yellow stake and flagging.

SAT Phone

San Juan Mine Rescue Cooperative 970-318-6079 (See Roster for Alternate numbers)

San Juan County Fire Department 970-387-5023 or 911

San Juan County Sheriff 970-387-5531 or 911

Flight for Life 800-332-3123

Mercy Regional Medical Center 970-247-4311

More phone numbers in Red Folder in EPA trailer

Site Location: 1 mile north of Gladstone, CO on County Road 53; 8 miles north of Silverton
Hospital maps located in the EPA trailer red folder.

Flight for Life Landing Zone at Gladstone: 37°53'20.8"N 107°38'56.1"W

Check-In Point for Major Emergency - **Gladstone Gold Fields Metal Building Staging Area**
EVACUATION MUSTER POINT (FOREST FIRE CONDITIONS): South West End of the Pond – near discharge / filter bags. Account for all personnel before leaving.

- **Secondary Location is Glandstone**

MUSTER POINT – Non Fire: Meet at the staging area / Safety Meeting Location

IN-MINE EMERGENCY

Cave in or other observable incident in mine: THE PORTAL ATTENDANT DOES NOT ENTER THE MINE

1. Portal attendant notifies site managers: ER Response Manager ([REDACTED]), START, EPA-OSC or other personnel at base of hill by radio. Provide best description possible of incident. If safe,

stay at top of mine dump to provide ongoing updates to personnel at bottom of hill. If not, evacuate away from hazard.

2. 1 st contact by site personnel: Call San Juan County EMS / 911 or numbers above using the Satellite Phone. Clearly explain the situation and describe location (see above).
3. 2 nd contact the San Juan Mine Rescue cooperative if personnel are underground needing assistance and may be trapped.
4. ERRS is the initial responder until San Juan Mine Rescue arrives for underground assistance; SCBA's located outside mine at top of waste dump in the MES trailer. However, local responders in Silverton have mine rescue capability especially for injuries not involving a mine collapse.
5. Response Personnel Entry: The decision to enter the mine shall be made by the ER Response Manager and the EPA-OSC. Appropriate PPE must be used, monitoring for hazardous atmosphere, additional site personnel must support potential entry teams.

In-mine personnel do not come out at agreed time and cannot be contacted by portal attendant.

1. Portal attendant notifies Matt Francis, START, EPA or other personnel at base of hill by radio
2. Base of hill personnel contacts San Juan Mine Rescue cooperative. Explain situation. Describe location (see above).
3. Monitor situation, and prepare to have the response team onsite enter to evaluate the scene

INJURIES: First Aid kits are located in the EPA white trailer and in the ER trucks.

Medical emergency in mine –

1. Notify the Site managers.
2. Evacuate the injured party from the mine if conditions allow – coordinate with MES crew.
3. If evacuation by site personnel is not possible
 - a. Call San Juan County Fire Department/Sheriff or 911
 - b. Call San Juan Mine Rescue Cooperative
4. Personnel on scene shall evaluate and monitor the situation as conditions allow

Medical emergency – personnel can be evacuated from mine

1. Call San Juan County Fire Department
2. Render First Aid as appropriate

Minor medical event

1. Remove personnel to Durango or Montrose for medical care. Maps are located in the red folder in the EPA trailer.

CAUSTIC INCIDENT:

Totes with 250 gallons each are stored at the Colorado Gold Fields facility in Gladstone. (HOW MANY??) Transportation between the storage area and the mine site is the most likely situation when an incident may occur.

1. Secure the Scene – prevent unauthorized personnel or personnel without PPE from entering the spill area.

2. Request assistance from site personnel and notify the site managers (EPA-OSC, ERRS RM and/or START)
3. Take actions to prevent off-site migration if wearing appropriate PPE or outside spill area as defensive measure – such as trenching or diversion dams.

Tote or 55 gallon drum Rupture

1. Trained personnel dons Saranex PPE, Gloves (nitrile) and eye protection to respond to spill.
2. |
3. If on site near treatment system: Personnel in PPE opens headgate to pond system to direct caustic to ponds and continue pumping Pond at discharge cell until NaOH impacts the discharge water pH above 9.5 su – THEN STOP.
4. Secure the leaking container if possible to minimize release and assess the loss volume.
5. Monitor ponds to ensure pH is between 4 and 10 su maximum prior to discharge from pond system, if possible. Continue to add mine water to neutralize the caustic – do not add caustic at the treatment system.
6. Spills Outside the Treatment area: Caustic should flow toward drainage channel on east side of CR 53. If not, personnel with appropriate PPE may use a shovel to direct water to channel and ponds.
7. Soil cleanup will be performed after securing the leaking container and the downstream migration is controlled.

Exposure to NaOH – See MSDS sheet in EPA Trailer

Eye Exposure

1. PERSONNEL HANDLING CAUSTIC SHOULD NOT WEAR CONTACT LENSES – If wearing them have personnel not in contact with caustic remove contact lenses.
2. Flush eyes with running water for at least 15 minutes. Eyewash is located in back of EPA trailer. Back gate will be open during operating hours. Step is available for shorter personnel.
3. Seek immediate medical attention.

Skin Exposure

1. Remove potentially impacted clothing. Tyvek and Saranex suits are available in EPA trailer for cover after skin is thoroughly washed.
2. Thoroughly wash affected area with DI water. Soap may be used. DI water is located in EPA trailer and adjacent to NaOH totes.
3. For serious skin contact, seek medical attention. For extremely serious skin contact, contact San Juan County Fire Department.

Ingestion

1. Do not induce vomiting. Loosen tight clothing.
2. It may be hazardous to perform rescue breathing.
3. Seek immediate medical attention

Inhalation

1. Rest
2. Seek immediate medical attention.

SITE PERSONNEL:

EPA OnScene Coordinators (OSC):

1. (b) (6) - Phone Number, Personal
Privacy Phone Number, Personal
2. (b) (6) - Phone Number, Personal
Privacy Phone Number, Personal
3. (b) (6) - Phone Number, Personal
Privacy Phone Number, Personal

Environmental Restoration:


1. [REDACTED]
- 2.

Weston Consulting Inc

- 1.



SITE SPECIFIC TRAINING RECORD

This is to advise that  conducted a Site Specific Training Course
(Instructor's name)

for ERLLC at the
(Company Name)

GK8-51 project on July 13 2015
(TO #, Project Name) (Date)


The total duration of the instructions was 5 hours.

Instruction covered the topics checked off below:

- Site Location, Description and History
- Potential site hazards (chemical, physical, and biological)
- Chemical, physical, and toxicological properties of site contaminants
- Safe work practices
- Training requirements
- Medical Surveillance
- Control Zones
- Monitoring
- Selection, use, and limitation, of personal protective equipment
- Personnel and equipment decontamination
- Emergency response procedures
- Hazard communication
- Review of subcontractor H&S Plan

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The following participant attended the training course for the full duration indicated above.


Name (Print)


Signature



SITE SPECIFIC TRAINING RECORD



This is to advise that _____ conducted a Site Specific Training Course

(Instructor's name)

for ERLLC at the

(Company Name)

GK8-51 project on

(TO #, Project Name)

July 13 2015

(Date)

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[Redacted]
Name (Print)

[Redacted]
Signature



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[redacted]

Name (Print)

[redacted]

Signature



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[redacted]
Name (Print)

[redacted]
Signature



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This is to advise that [REDACTED] conducted a Site Specific Training Course

(Instructor's name)

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(Company Name)

GK8-51 project on July 13 2015

(TO #, Project Name)

(Date)

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[REDACTED]

Name (Print)

[REDACTED]

Signature



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GK8-51 project on July 13 2015

(TO #, Project Name)

(Date)

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for ERLLC at the

(Company Name)

GK8-51 project on July 13 2015

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(Date)

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(Company Name)

GK8-51

(TO #, Project Name)

project on July 13 2015

(Date)

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Name (Print)

Signature



SITE SPECIFIC TRAINING RECORD

This is to advise that _____ conducted a Site Specific Training Course

(Instructor's name)

for _____ at the

(Company Name)

_____ project on _____

(TO #, Project Name)

(Date)

The total duration of the instructions was 5 hours.

Instruction covered the topics checked off below:

- Site Location, Description and History
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The following participant attended the training course for the full duration indicated above.

Name (Print)

Signature



SITE SPECIFIC TRAINING RECORD

This is to advise that [redacted] conducted a Site Specific Training Course
(Instructor's name)

for ER LLC at the
(Company Name)

GKE-S1 project on July 13 2015
(TO #, Project Name) (Date)

The total duration of the instructions was 5 hours.

Instruction covered the topics checked off below:

- Site Location, Description and History
- Potential site hazards (chemical, physical, and biological)
- Chemical, physical, and toxicological properties of site contaminants
- Safe work practices
- Training requirements
- Medical Surveillance
- Control Zones
- Monitoring
- Selection, use, and limitation, of personal protective equipment
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- Review of subcontractor H&S Plan

The following participant attended the training course for the full duration indicated above.

Name (Print)

Signature

SAFETY DATA SHEET

Issue date SEP 2010

Page 1 of 2



1 Identification of Substance & Company

AGRICULTURAL LIME

Companies:

Breedon Aggregates England Limited
Breedon Quarry
Breedon on the Hill
Derby
DE73 8AP
Telephone: 01332 694010
Fax: 01332 863149
Emergency Telephone: 01332 694010

Breedon Aggregates Scotland Limited
Ethiebeaton Quarry
Kingennie
Newbigging
Angus
DD5 3RB
Telephone: 01382 537600
Fax: 01382 537619
Emergency Telephone: 01382 537600

2 Composition / Information on Ingredients

Crushed limestone aggregate.

3 Hazards Identification

These products are NOT classified as hazardous in accordance with the CHIP regulations (SI 3247:1994).

If inhaled in excessive quantities over a prolonged period or extended period, respirable dust can constitute a long term health hazard. Dusts containing Respirable Crystalline Silica (Quartz) present a greater hazard.

Advice on the Quartz content and other chemical information is available from the supplying unit.

4 First Aid Measures

Summary of First Aid Procedures

Inhalation

Immediately remove to fresh air. If breathing is stopped or irregular, apply artificial respiration and seek medical attention.

Skin Contact

Wash with water. Prolonged contact may cause irritation.

Eye Contact

Immediately and thoroughly irrigate with water. The material is abrasive and may scratch the surface of the eye. If pain persists seek medical attention.

Ingestion

Remove to fresh air and give water to drink. Seek medical advice.

5 Fire Fighting Measures

Suitable Extinguishing Media

Not applicable.

Unsuitable Extinguishing Media

Not applicable.

Special Exposure Hazards in Fire

None.

Special Protective Equipment for Fire Fighters

None.

6 Accidental Release Measures

Personal Precautions

Avoid breathing in dust.

Environmental Precautions

Entry into watercourses should be avoided.

Methods for Cleaning

Spray with water to prevent airborne dust.
Avoid dry sweeping which creates dust.

7 Handling and Storage

Handling

The product should be handled to minimise the creation of airborne dust.

Storage

No special requirements.

8 Exposure Controls / Personal Protection

Take Measures to Prevent

Inhalation of dust from aggregates should be avoided.

Exposure Control Limits / Source

Total Inhalable Dust: W.E.L. 10mg/m³
8 Hours T.W.A.

Respirable Dust: W.E.L. 4mg/m³
8 hours T.W.A.

Respirable Quartz:
Crystalline Silica SiO₂ W.E.L. 0.1mg/m³
8 Hours T.W.A.

W.E.L. = Workplace Exposure Limit

T.W.A. = Time Weighted Average

Respiratory Protection

Suitable dust masks should be worn in enclosed spaces where the handling or further crushing of dry aggregates is taking place and where adequate ventilation is not provided.

Hand Protection

Gloves.

Eye Protection

Goggles may be required.

Skin Protection

Overalls.

SAFETY DATA SHEET

Issue date SEP 2010

Page 2 of 2



9 Physical and Chemical Properties

Appearance	Granular solid
Odour	None
pH	Various
Boiling Point / Range	Not determined
Melting Point / Range	Not determined
Flash Point	Not applicable
Flammability	Not applicable
Auto Flammability	Not applicable
Explosive Properties	Not applicable
Oxidising Properties	Not determined
Vapour Pressure	Not applicable
Relative Density	Varies
Water Solubility	Dependent on rock type
Fat Solubility	Not determined

10 Stability and Reactivity

Conditions to Avoid
None.

Materials to Avoid
Acids (for aggregates containing CaCO_3 & MgCO_3)

Hazardous Decomposition Products
Limestone aggregates may react with acid groundwater to release carbon dioxide gas, which may build up in confined spaces to hazardous concentrations.

11 Toxicological Information

If inhaled in excessive quantities over a prolonged period or extended period, respirable dust can constitute a long term health hazard.

12 Ecological Information

Environmental Assessment
When used and disposed of as intended, no adverse environmental effects are foreseen. Aggregates are naturally occurring minerals.

Mobility
Aggregates are non volatile materials that will sink in water and form a solid layer on the surface of the ground.

Persistence and Degradability
Aggregates are resistant to degradation and will persist in the environment.

Ecotoxicity
Not expected to be toxic to aquatic organisms.

13 Disposal Considerations

Likely Residues / Waste Product
None.

Safe Handling of Residues / Waste Product
Aggregates are inert but should be disposed of in accordance with local and national legal requirements. See the Environmental Protection Act 1990 "Duty of Care".

14 Transport Information

Special Carriage Requirements
None - open vehicles to be sheeted to avoid dust nuisance.

15 Regulatory Information

This product is NOT classified as dangerous for transport.

16 Other Information

Training Advice
Wear and use of PPE.

Recommended Uses and Applications
Industrial and construction applications.

Further Information
The Director of Health, Safety and Environment
Breedon Aggregates England Limited
Telephone: (01332) 694010

Key Data Used to Compile Data Sheet
HSE Guidance Note EH40/2007

PPE Regulations 1992

COSHH Regulations 2002 (fifth edition) 2005

Control of Respirable Crystalline Silica in Quarries (HS(G)73)

Environmental Protection Act 1990

HSE Crystalline Silica EH59

If you have purchased this product for supply to a third party for use at work, it is your duty to take all necessary steps to ensure that any person handling or using the product is provided with the information in this sheet.

If you are an employer, it is your duty to tell your employees and others who may be affected of any hazards described in this sheet and any of the precautions which should be taken.

Further copies of this Safety Data Sheet may be obtained from either Breedon Aggregates England Limited or Breedon Aggregates Scotland Limited.

DIESEL FUEL

MATERIAL SAFETY DATA SHEET

NATIONAL COOPERATIVE REFINERY ASSOCIATION (NCRA)

BOX 1404 MCPHERSON, KS 67460
316-241-2344 OR 2345, PRODUCT INFORMATION, S. G. CATER

EMERGENCY CONTACT: CHEMTREC 1-800-424-9300 - USE ONLY IN THE CASE OF EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT INVOLVING CHEMICALS.

SUBSTANCE IDENTIFICATION

SUBSTANCE: DIESEL FUEL

CHEMICAL FAMILY: PETROLEUM HYDROCARBON

CAS NUMBER: 68334-30-5

TRADE NAMES/SYNONYMS: DIESEL OIL; DIESEL FUEL; DIESEL OIL, LIGHT; DIESEL OIL PETROLEUM PRODUCT; DIESEL FUEL, NO. 1-D; NO. 1-D FUEL OIL; PETROLEUM DIESEL OIL PRODUCT; SUMMER DIESEL; DIESEL FUEL #1.

CERCLA RATINGS (SCALE 0-3): HEALTH = 1 FIRE = 2 REACTIVITY = 0
PERSISTENCE = 1

NFPA RATINGS (SCALE 0-4): HEALTH = 0 FIRE = 2 REACTIVITY = 0

COMPONENTS AND CONTAMINANTS

<u>HAZARDOUS INGREDIENTS</u>	<u>CAS NUMBER</u>	<u>PERCENT</u>
DIESEL FUEL	68334-30-5	>99

MAY INCLUDE TRACES OF SULFUR

HYDROGEN SULFIDE	7783-06-4
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EXPOSURE LIMIT:

MINERAL OIL MIST:

5 MG/M³ OSHA TWA
5 MG/M³ ACGIH TWA
10 MG/M³ ACGIH STEL
5 MG/M³ NIOSH RECOMMENDED TWA
10 MG/M³ NIOSH RECOMMENDED STEL

MEASUREMENT METHOD:

PARTICULATE FILTER; 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE; INFRARED SPECTROMETRY; (NIOSH VOL. III #5026).

HYDROGEN SULFIDE:

10 PPM (14 MG/M³) OSHA TWA
15 PPM (21 MG/M³) OSHA STEL
10 PPM (14 MG/M³) ACGIH TWA
15 PPM (21 MG/M³) ACGIH STEL
10 PPM NIOSH RECOMMENDED 10-MINUTE CEILING
10 PPM (14 MG/M³) DFG MAK TWA
20 PPM (28 MG/M³) DFG MAK 10-MINUTE PEAK MOMENTARY
VALUE: 4 TIMES/SHIFT

MEASUREMENT METHOD:

DRYING TUBE/MOLECULAR SIEVE TUBE; THERMAL DESORPTION APPARATUS; GAS CHROMATOGRAPHY WITH FLAME IONIZATION DETECTION; (NIOSH VOL. II(6) #296).

PHYSICAL DATA

DESCRIPTION:

YELLOW-BROWN, OILY LIQUID WITH A MILD PETROLEUM ODOR.

SOLUBILITY IN WATER:

INSOLUBLE

SPECIFIC GRAVITY:

0.80

VAPOR PRESSURE:

2 MM HG @ 20 C

VAPOR DENSITY:

>1 AIR = 1.0

BOILING POINT:

325 - 675 F (163 - 357 C)

MELTING POINT:

-30 F (-34 C)

FIRE AND EXPLOSION DATA

**FIRE AND
EXPLOSION HAZARD:**

MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT AND FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE ABOVE FLASH POINT.

FLASH POINT: 100 F (38 C) (CC)
UPPER EXPLOSIVE LIMIT: 6.0 %
LOWER EXPLOSIVE LIMIT: 1.3 %
AUTOIGNITION TEMP.: 350 F (177 C)
OSHA FLAMMABILITY CLASS: II
FIREFIGHTING MEDIA: DRY CHEMICAL, CARBON DIOXIDE, WATER SPRAY OR
REGULAR FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK,
DOT P 5800.5).

FOR LARGER FIRES, USE WATER SPRAY, FOG OR REGULAR
FOAM (1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P
5800.5).

FIREFIGHTING: MOVE CONTAINER FROM FIRE AREA IF YOU CAN DO IT
WITHOUT RISK. APPLY COOLING WATER TO SIDES OF
CONTAINERS THAT ARE EXPOSED TO FLAMES UNTIL WELL
AFTER FIRE IS OUT. STAY AWAY FROM ENDS OF TANKS.
FOR MASSIVE FIRE IN CARGO AREA, USE UNMANNED HOSE
HOLDER OR MONITOR NOZZLES; IF THIS IS IMPOSSIBLE,
WITHDRAW FROM AREA AND LET FIRE BURN. WITHDRAW
IMMEDIATELY IN CASE OF RISING SOUND FROM VENTING
SAFETY DEVICE OR ANY DISCOLORATION OF TANK DUE TO
FIRE. ISOLATE FOR 1/2 MILE IN ALL DIRECTIONS IF
TANK, RAIL CAR, OR TANK TRUCK IS INVOLVED IN FIRE
(1990 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.5,
GUIDE PAGE 27).

EXTINGUISH ONLY IF FLOW CAN BE STOPPED. USE
FLOODING AMOUNTS OF WATER AS FOG, SOLID STREAMS MAY
BE INEFFECTIVE. COOL CONTAINERS WITH FLOODING
AMOUNTS OF WATER. APPLY WATER FROM AS FAR A
DISTANCE AS POSSIBLE. AVOID BREATHING VAPORS, KEEP
UPWIND.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD
CLASSIFICATION 49 CFR 172.101: COMBUSTIBLE LIQUID

DEPARTMENT OF TRANSPORTATION LABELING
REQUIREMENTS 49 CFR 172.101 AND SUBPART E: NONE

DEPARTMENT OF TRANSPORTATION PACKAGING
REQUIREMENTS: NONE
EXCEPTIONS: 49 CFR 173.118(A)

FINAL RULE ON HAZARDOUS MATERIALS REGULATIONS (HMR, 49 CFR PARTS 171-180), DOCKET NUMBERS HM-181, HM-181A, HM-181C, HM-181D, AND HM-204. EFFECTIVE DATE OCTOBER 1, 1991. HOWEVER, COMPLIANCE WITH THE REGULATIONS IS AUTHORIZED ON AND AFTER JANUARY 1, 1991. (55 FR 52402, 12/21/90).

EXCEPT FOR EXPLOSIVES, INHALATION HAZARDS, AND INFECTIOUS SUBSTANCES, THE EFFECTIVE DATE FOR HAZARD COMMUNICATION REQUIREMENTS IS EXTENDED TO OCTOBER 1, 1993. (56 FR 47158, 10/18/91)

U.S. DEPARTMENT OF TRANSPORTATION SHIPPING
NAME-ID NUMBER, 49 CFR 172.101: DIESEL FUEL-NA 1993

U.S. DEPARTMENT OF TRANSPORTATION HAZARD
CLASS OR DIVISION, 49 CFR 172.101: 3 - FLAMMABLE LIQUID

U.S. DEPARTMENT OF TRANSPORTATION PACKING
GROUP, 49 CFR 172.101: PG III

U.S. DEPARTMENT OF TRANSPORTATION LABELING
REQUIREMENTS, 49 CFR 172.101 AND SUBPART E: NONE

U.S. DEPARTMENT OF TRANSPORTATION PACKAGING
REQUIREMENTS:
EXCEPTIONS: 49 CFR 173.150
NON-BULK PACKAGING: 49 CFR 173.203
BULK PACKAGING: 49 CFR 173.241

U.S. DEPARTMENT OF TRANSPORTATION QUANTITY
LIMITATIONS, 49 CFR 172.101:
PASSENGER AIRCRAFT OR RAILCAR: 60 L
CARGO AIRCRAFT ONLY: 220 L

TOXICITY

DIESEL FUEL

IRRITATION DATA: 500 MG SKIN-RABBIT MODERATE.

TOXICITY DATA: 9 GM/KG ORAL-RAT LD50; 7.5 GM/KG (MARKET PLACE SAMPLE) ORAL-RAT LD50 (AETODY); >5 ML/KG (MARKET PLACE SAMPLE) SKIN-RABBIT LD50 (AETODY).

CARCINOGEN STATUS: HUMAN INADEQUATE EVIDENCE, ANIMAL LIMITED EVIDENCE (IARC-GROUP 3). (SEE ADDITIONAL DATA).

LOCAL EFFECTS: IRRITANT - INHALATION, SKIN.

ACUTE TOXICITY LEVEL: SLIGHTLY TOXIC BY DERMAL ABSORPTION; RELATIVELY NON-TOXIC BY INGESTION.

TARGET EFFECTS: CENTRAL NERVOUS SYSTEM DEPRESSANT. POISONING MAY ALSO AFFECT THE LIVER AND KIDNEYS.

ADDITIONAL DATA: ANIMAL STUDIES HAVE CONFIRMED AN ASSOCIATION BETWEEN THE INDUCTION OF CANCER, PRIMARILY OF THE LUNG, AND INHALATION EXPOSURE TO WHOLE DIESEL EXHAUST. LIMITED EPIDEMIOLOGIC EVIDENCE ALSO SUGGESTS AN ASSOCIATION BETWEEN OCCUPATIONAL EXPOSURE TO DIESEL ENGINE EMISSIONS AND LUNG CANCER (NIOSH, 1988).

HEALTH EFFECTS AND FIRST AID

INHALATION:

DIESEL FUEL: IRRITANT/NARCOTIC.

ACUTE EXPOSURE: VAPORS OR MIST MAY CAUSE RESPIRATORY TRACT IRRITATION. A HUMAN EXPOSURE HAS RESULTED IN IMMEDIATE COUGH, DYSPNEA, CYANOSIS AND UNCONSCIOUSNESS FOR ONE HOUR. A PRODUCTIVE COUGH WITH SPUTUM SMELLING OF DIESEL FUEL PERSISTED FOR 37 DAYS. CHEST X-RAYS SHOWED DIFFUSE SHADOWING, MOST PROMINENT AT THE LUNG BASES, WHICH RESOLVED SLOWLY WITH TREATMENT BUT WAS STILL PRESENT AT DAY 37. HIGH LEVELS MAY ALSO CAUSE CENTRAL NERVOUS SYSTEM EXCITATION FOLLOWED BY DEPRESSION WITH SYMPTOMS POSSIBLY INCLUDING RESTLESSNESS, CONFUSION, ATAXIA, HEADACHE, DIZZINESS, ANOREXIA, NAUSEA, VOMITING, WEAKNESS, INCOORDINATION, STUPOR, DELIRIUM, AND COMA.

CHRONIC EXPOSURE: PROLONGED OR REPEATED EXPOSURE MAY CAUSE IRRITATION. ONE INDIVIDUAL EXPOSED TO DIESEL VAPORS IN A TRUCK CAB DEVELOPED NEPHROTOXIC EFFECTS.

FIRST AID: REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, PERFORM ARTIFICIAL RESPIRATION. KEEP PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:

DIESEL FUEL: IRRITANT.

ACUTE EXPOSURE: MAY CAUSE SMARTING, REDNESS AND IRRITATION. A SAMPLE OF DIESEL FUEL APPLIED TO RABBITS UNDER A PATCH FOR 24 HOURS CAUSED EXTREME IRRITATION WITH SEVERE ERYTHEMA AND EDEMA WITH BLISTERING AND OPEN SORES.

CHRONIC EXPOSURE:

REPEATED OR PROLONGED EXPOSURE MAY CAUSE DEFATTING AND DRYING OF THE SKIN RESULTING IN SEVERE IRRITATION AND DERMATITIS. CUTANEOUS HYPERKERATOSIS HAS BEEN DESCRIBED IN ENGINE DRIVERS WITH OCCUPATIONAL EXPOSURE TO DIESEL FUEL. TWO INDIVIDUALS WITH TOPICAL EXPOSURE FROM WASHING HAIR OR HANDS WITH DIESEL FUEL DEVELOPED ACUTE RENAL FAILURE; ONE ALSO HAD GASTROINTESTINAL SYMPTOMS. REPEATED APPLICATIONS TO RABBIT SKIN PRODUCED 67 % MORTALITY AT 8 ML/KG. THE PRIMARY CAUSE OF DEATH WERE DEPRESSION AND ANOREXIA WHICH WERE INDUCED BY DERMAL IRRITATION WITH INFECTION, RATHER THAN SYSTEMIC INTOXICATION. AUTOPSY REVEALED EFFECTS ON THE LIVER AND KIDNEYS.

FIRST AID:

REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15 - 20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:

DIESEL FUEL:

ACUTE EXPOSURE:

LIQUID OR VAPOR MAY CAUSE SLIGHT IRRITATION, ALTHOUGH TESTS WITH ONE SAMPLE OF DIESEL FUEL IN RABBIT EYES WAS NON-IRRITATING.

CHRONIC EXPOSURE:

REPEATED OR PROLONGED EXPOSURE MAY CAUSE IRRITATION.

FIRST AID:

WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER OR NORMAL SALINE, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (APPROXIMATELY 15-20 MINUTES). GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:

DIESEL FUEL:

NARCOTIC.

ACUTE EXPOSURE:

MAY CAUSE NAUSEA, VOMITING, CRAMPING, DIARRHEA, AND POSSIBLY SYMPTOMS OF CENTRAL NERVOUS SYSTEM DEPRESSION. ASPIRATION OF EVEN SMALL AMOUNTS DURING INGESTION OR VOMITING MAY RESULT IN SEVERE PULMONARY IRRITATION WITH COUGHING, GAGGING, DYSPNEA, SUBSTERNAL DISTRESS, AND PNEUMONITIS, PULMONARY EDEMA AND HEMORRHAGE, AND DEATH.

CHRONIC EXPOSURE:

NO DATA AVAILABLE.

FIRST AID: ONLY HYDROCARBONS THAT ARE SOLVENTS FOR A TOXIC AGENT OR ARE THEMSELVES TOXIC NEED TO BE EVACUATED. EXTREME CARE MUST BE TAKEN TO AVOID ASPIRATION. GASTRIC LAVAGE WITH A CUFFED ENDOTRACHEAL TUBE IN PLACE TO PREVENT FURTHER ASPIRATION SHOULD BE DONE WITHIN 15 MINUTES. IN THE ABSENCE OF DEPRESSION OR CONVULSIONS OR IMPAIRED GAG REFLEX, EMESIS CAN ALSO BE INDUCED USING SYRUP OF IPECAC WITHOUT INCREASING THE HAZARD OF ASPIRATION. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. GASTRIC LAVAGE SHOULD BE PREFORMED BY QUALIFIED MEDICAL PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

ANTIDOTE: NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY: STABLE UNDER NORMAL TEMPERATURES AND PRESSURES IN A CLOSED CONTAINER.

INCOMPATIBILITIES:

DIESEL FUEL AND: STRONG OXIDIZERS: MAY REACT.

DECOMPOSITION: THERMAL DECOMPOSITION MAY INCLUDE TOXIC OXIDES OF SULFUR AND CARBON.

POLYMERIZATION: HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

CONDITIONS TO AVOID: AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

TRACE AMOUNTS OF HYDROGEN SULFIDE MAY BE PRESENT. THERE IS A POTENTIAL FOR THE ACCUMULATION OF HYDROGEN SULFIDE IN THE HEAD SPACE OF CONTAINERS OR IN ENCLOSED AREAS WHERE THIS PRODUCT IS STORED, HANDLED OR USED.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE:

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

BONDING AND GROUNDING:

SUBSTANCES WITH LOW ELECTROCONDUCTIVITY, WHICH MAY BE IGNITED BY ELECTROSTATIC SPARKS, SHOULD BE STORED IN CONTAINERS WHICH MEET THE BONDING AND GROUNDING GUIDELINES SPECIFIED IN NFPA 77-1983, RECOMMENDED PRACTICE ON STATIC ELECTRICITY.

**THRESHOLD PLANNING
QUANTITY (TPQ):**

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION (SERC) FOR THAT STATE IN WHICH IT IS LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOCAL EMERGENCY RESPONSE.

HYDROGEN SULFIDE:

SARA SECTION 302 TPQ: 500 POUNDS.

DISPOSAL:

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. ALSO COMPLY WITH APPROPRIATE STATE STANDARDS.

**EPA HAZARDOUS
WASTE NUMBER:**

D001

**CERCLA SECTION 103
REPORTABLE QUANTITY:**

100 POUNDS

REPORTABLE QUANTITY (RQ):

THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

D001 HAZARDOUS WASTE:

**CERCLA SECTION 103
REPORTABLE QUANTITY:**

100 POUNDS

HYDROGEN SULFIDE:

CERCLA SECTION 103 100 POUNDS
REPORTABLE QUANTITY (RQ):

SARA SECTION 304 100 POUNDS
REPORTABLE QUANTITY (RQ):

SPILLS AND LEAKS

OCCUPATIONAL SPILL: SHUT OFF IGNITION SOURCES. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. FOR SMALL SPILLS, TAKE UP WITH SAND OR OTHER ABSORBENT MATERIAL AND PLACE INTO CONTAINERS FOR LATER DISPOSAL. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. NO SMOKING, FLAMES OR FLARES IN HAZARD AREA. KEEP UNNECESSARY PEOPLE AWAY; ISOLATE HAZARD AREA AND RESTRICT ENTRY.

PROTECTIVE EQUIPMENT

VENTILATION: PROVIDE LOCAL EXHAUST VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS. VENTILATION EQUIPMENT MUST BE EXPLOSION-PROOF.

RESPIRATOR: THE FOLLOWING RESPIRATORS ARE RECOMMENDED BASED ON INFORMATION FOUND IN THE PHYSICAL DATA, TOXICITY AND HEALTH EFFECTS SECTIONS. THEY ARE RANKED IN ORDER FROM MINIMUM TO MAXIMUM RESPIRATORY PROTECTION.

THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE, MUST BE BASED ON THE SPECIFIC OPERATION, MUST NOT EXCEED THE WORKING LIMITS OF THE RESPIRATOR AND MUST BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION (NIOSH-MSHA).

ANY CHEMICAL CARTRIDGE RESPIRATOR WITH ORGANIC VAPOR CARTRIDGE(S) AND A FULL FACEPIECE.

ANY GAS MASK WITH ORGANIC VAPOR CANISTER (CHIN-STYLE OR FRONT- OR BACK-MOUNTED CANISTER), WITH A FULL FACEPIECE.

ANY TYPE 'C' SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE OR WITH A FULL FACEPIECE, HELMET, HOOD OPERATED IN CONTINUOUS-FLOW MODE.

ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) CONDITIONS:

ANY SELF-CONTAINED BREATHING APPARATUS THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

ANY SUPPLIED-AIR RESPIRATOR THAT HAS A FULL FACEPIECE AND IS OPERATED IN A PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE-PRESSURE MODE.

CLOTHING:

WEAR OIL IMPERVIOUS CLOTHING. AVOID PROLONGED OR REPEATED CONTACT WITH SUBSTANCE. AVOID WEARING OIL SOAKED CLOTHING.

GLOVES:

EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THIS SUBSTANCE.

EYE PROTECTION:

EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES TO PREVENT EYE CONTACT WITH THIS SUBSTANCE.

EMERGENCY EYE WASH:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

CREATION DATE: 01/04/90

MOST RECENT REVISION: 06/03/92

THE ABOVE DATA IS BASED ON EXPERIENCE AND OTHER INFORMATION WHICH NCRA BELIEVES TO BE RELIABLE AND IS SUPPLIED FOR INFORMATIONAL PURPOSES ONLY. SINCE CONDITIONS OF USE ARE OUTSIDE OUR CONTROL, NCRA DISCLAIMS ANY LIABILITY FOR DAMAGE OR INJURY WHICH RESULTS FROM USE OF THE ABOVE DATA. NOTHING CONTAINED HEREIN SHALL CONSTITUTE A GUARANTEE, WARRANTY (INCLUDING WARRANTY OF MERCHANTABILITY) OR REPRESENTATION BY NCRA WITH RESPECT TO THE DATA, THE MATERIAL DESCRIBED, OR ITS USE FOR ANY SPECIFIC PURPOSE, EVEN IF THAT USE IS KNOWN TO NCRA.



Health	2
Fire	0
Reactivity	0
Personal Protection	

Material Safety Data Sheet

Sodium Hydroxide, 25% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Hydroxide, 25%

Catalog Codes: SLS4210

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sodium hydroxide; Water

CI#: Not applicable.

Synonym:

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.

14025 Smith Rd.

Houston, Texas 77396

US Sales: 1-800-901-7247

International Sales: 1-281-441-4400

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	25
Water	7732-18-5	75

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (corrosive, irritant), of eye contact (irritant), of ingestion. Hazardous in case of inhalation. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Non-corrosive for skin. Non-irritant for skin. Non-sensitizer for skin. Non-permeator by skin. Non-irritating to the eyes. Non-hazardous in case of ingestion. Non-hazardous in case of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe

skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Finish by rinsing thoroughly with running water to avoid a possible infection. Cold water may be used.

Skin Contact:

If the chemical got onto the clothed portion of the body, remove the contaminated clothes as quickly as possible, protecting your own hands and body. Place the victim under a deluge shower. If the chemical got on the victim's exposed skin, such as the hands : Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cold water may be used. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:

Corrosive liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:

Keep container dry. Do not breathe gas/fumes/ vapour/spray. Never add water to this product In case of insufficient ventilation, wear suitable respiratory equipment If you feel unwell, seek medical attention and show the label when possible. Avoid contact with skin and eyes Keep away from incompatibles such as acids.

Storage:

Alkalis may be stored in heavy duty gauge steel containers. Corrosive materials should be stored in a separate safety storage cabinet or room.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

Sodium hydroxide CEIL: 2 (mg/m3) from ACGIH [1995] Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Alkaline. Bitter. (Strong.)

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Basic.

Boiling Point: The lowest known value is 100°C (212°F) (Water).

Melting Point: Not available.

Critical Temperature: Not available.

Specific Gravity: Weighted average: 1.15 (Water = 1)

Vapor Pressure: The highest known value is 17.535 mm of Hg (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Extremely reactive or incompatible with acids.

Corrosivity:

Highly corrosive in presence of aluminum. Slightly corrosive to corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

LD50: Not available. LC50: Not available.

Chronic Effects on Humans: The substance is toxic to lungs, mucous membranes.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (corrosive, irritant), of ingestion. Hazardous in case of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 8: Corrosive liquid.

Identification: : Sodium hydroxide, solution (Sodium hydroxide) : UN1824 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: Sodium hydroxide Massachusetts RTK: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC): R35- Causes severe burns.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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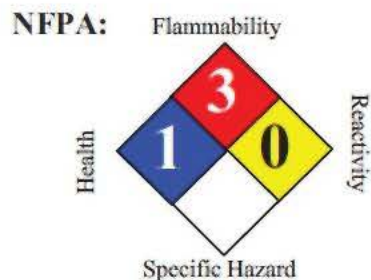
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Safety Data Sheet

Gasoline, Unleaded



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Gasoline, Unleaded	
Synonyms	:	Blend of Highly Flammable Petroleum Distillates, Regular, Mid-Grade, Premium, 888100008809	
SDS Number	:	888100008809	Version : 1.1
Product Use Description	:	Fuel	
Company	:	For: Tesoro Refining & Marketing Co. 19100 Ridgewood Parkway, San Antonio, TX 78259	
Tesoro Call Center	:	(877) 783-7676	Chemtrec (Emergency Contact) : (800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classifications : Flammable Liquid – Category 1 or 2 depending on formulation.
 Aspiration Hazard – Category 1
 Carcinogenicity – Category 2
 Specific Target Organ Toxicity (Repeated Exposure) – Category 2
 Specific Target Organ Toxicity (Single Exposure) – Category 3
 Skin Irritation – Category 2
 Eye Irritation – Category 2B
 Chronic Aquatic Toxicity – Category 2

Pictograms :



Signal Word : **Danger**

Hazard Statements

Extremely flammable liquid and vapor.
 May be fatal if swallowed and enters airways – do not siphon gasoline by mouth.
 Suspected of causing blood cancer if repeated over-exposure by inhalation and/or skin contact occurs.
 May cause damage to liver, kidneys and nervous system by repeated and prolonged inhalation or skin contact. Causes eye irritation. Can be absorbed through skin.
 May cause drowsiness or dizziness. Extreme exposure such as intentional inhalation may cause unconsciousness, asphyxiation and death.
 Repeated or prolonged skin contact can cause irritation and dermatitis.

Harmful to aquatic life.

Precautionary statements

Prevention

- : Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat, sparks, open flames, welding and hot surfaces.
- No smoking.
- Keep container tightly closed.
- Ground and/or bond container and receiving equipment.
- Use explosion-proof electrical equipment.
- Use only non-sparking tools (if tools are used in flammable atmosphere).
- Take precautionary measures against static discharge.
- Wear gloves, eye protection and face protection (as needed to prevent skin and eye contact with liquid).
- Wash hands or liquid-contacted skin thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Do not breathe vapors.
- Use only outdoors or in a well-ventilated area.

Response

- : In case of fire: Use dry chemical, CO₂, water spray or fire fighting foam to extinguish.
- If swallowed: Immediately call a poison center, doctor, hospital emergency room, medical clinic or 911. Do NOT induce vomiting. Rinse mouth.
- If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- If in eye: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- If skin or eye irritation persists, get medical attention.
- If inhaled: Remove person to fresh air and keep comfortable for breathing. Get medical attention if you feel unwell.

Storage

- : Store in a well ventilated place. Keep cool. Store locked up. Keep container tightly closed. Use only approved containers. Some containers not approved for gasoline may dissolve and release flammable gasoline liquid and vapors.

Disposal

- : Dispose of contents/containers to approved disposal site in accordance with local, regional, national, and/or international regulations.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Gasoline, natural; Low boiling point naphtha	8006 61 9	10 30%
Toluene	108 88 3	10 30%
Xylene	1330 20 7	10 30%
Ethanol; ethyl alcohol	64 17 5	0 8.2%
Trimethylbenzene	25551 13 7	1 5%
Isopentane; 2-methylbutane	78 78 4	1 5%

Naphthalene	91 20 3	1 5%
Benzene	71 43 2	Less than 1.3%
Pentane	109 66 0	1 5%
Cyclohexane	110 82 7	1 5%
Ethylbenzene	100 41 4	1 5%
Butane	106 97 8	1 20%
Heptane [and isomers]	142 82 5	0.5 0.75%
N-hexane	110 54 3	0.5 0.75%

SECTION 4. FIRST AID MEASURES

Inhalation	: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Seek medical attention immediately.
Skin contact	: In case of contact, immediately flush skin with plenty of water. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Contaminated leather, particularly footwear, must be discarded. Note that contaminated clothing may be a fire hazard. Seek medical advice if symptoms persist or develop.
Eye contact	: Remove contact lenses. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical advice if symptoms persist or develop.
Ingestion	: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Obtain medical attention.
Notes to physician	: Symptoms: Dizziness, Discomfort, Headache, Nausea, Kidney disorders, Liver disorders. Aspiration may cause pulmonary edema and pneumonitis. Swallowing gasoline is more likely to be fatal for small children than adults, even if aspiration does not occur.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	: SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO ₂ , water spray or fire fighting foam. LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers. Keep containers and surroundings cool with water spray.
Specific hazards during fire fighting	: Extremely flammable liquid and vapor. This material is combustible/flammable and is sensitive to fire, heat, and static discharge.
Special protective equipment for fire-fighters	: Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Further information : Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam. Exposure to decomposition products may be a hazard to health. Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Evacuate personnel to safe areas. Ventilate the area. Remove all sources of ignition. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental precautions : Discharge into the environment must be avoided. If the product contaminates rivers and lakes or drains inform respective authorities.

Methods for cleaning up : Contain and collect spillage with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations.

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling : Keep away from fire, sparks and heated surfaces. No smoking near areas where material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:

- (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
- (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha).
- (3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Conditions for safe storage, including incompatibilities : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Reports suggest that government-mandated ethanol, if present, may not be compatible with fiberglass gasoline tanks. Ethanol may dissolve fiberglass resin, causing engine damage and possibly allow leakage of explosive gasoline.

Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.

No decomposition if stored and applied as directed. Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Store only in containers approved and labeled for gasoline.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA	Benzene	71 43 2	TWA	1 ppm
		71 43 2	STEL	5 ppm
		71 43 2	OSHA_ACT	0.5 ppm
OSHA Z1	Xylene	1330 20 7	PEL	100 ppm 435 mg/m3
	Ethanol; Ethyl alcohol	64 17 5	PEL	1,000 ppm 1,900 mg/m3
	Naphthalene	91 20 3	PEL	10 ppm 50 mg/m3
	Cyclohexane	110 82 7	PEL	300 ppm 1,050 mg/m3
	Ethylbenzene	100 41 4	PEL	100 ppm 435 mg/m3
	Heptane [and isomers]	142 82 5	PEL	500 ppm 2,000 mg/m3
	N hexane	110 54 3	PEL	500 ppm 1,800 mg/m3
ACGIH	Toluene	108 88 3	TWA	50 ppm
	Xylene	1330 20 7	TWA	100 ppm
		1330 20 7	STEL	150 ppm
	Ethanol; Ethyl alcohol	64 17 5	TWA	1,000 ppm
	Trimethylbenzene	25551 13 7	TWA	25 ppm
	Isopentane; 2 Methylbutane	78 78 4	TWA	600 ppm
	Naphthalene	91 20 3	TWA	10 ppm
		91 20 3	STEL	15 ppm
	Benzene	71 43 2	TWA	0.5 ppm
		71 43 2	STEL	2.5 ppm
	Pentane	109 66 0	TWA	600 ppm
	Cyclohexane	110 82 7	TWA	100 ppm
	Ethylbenzene	100 41 4	TWA	100 ppm
100 41 4		STEL	125 ppm	
Heptane [and isomers]	142 82 5	TWA	400 ppm	
	142 82 5	STEL	500 ppm	

	N hexane	110 54 3	TWA	50 ppm
Engineering measures	: Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use only intrinsically safe electrical equipment approved for use in classified areas.			
Eye protection	: Safety glasses or goggles are recommended where there is a possibility of splashing or spraying. Ensure that eyewash stations and safety showers are close to the workstation location.			
Hand protection	: Gloves constructed of nitrile or neoprene are recommended. Consult manufacturer specifications for further information.			
Skin and body protection	: If needed to prevent skin contact, chemical protective clothing such as of DuPont TyChem®, Saranex or equivalent recommended based on degree of exposure. Flame resistant clothing such as Nomex ® is recommended in areas where material is stored or handled.			
Respiratory protection	: A NIOSH/ MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection. Use a NIOSH/ MSHA-approved positive-pressure supplied-air respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.			
Work / Hygiene practices	: Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.			

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Clear to straw colored liquid
Odor	: Characteristic hydrocarbon-like
Odor threshold	0.5 - 1.1 ppm
pH	: Not applicable
Melting point/freezing point	About -101°C (-150°F)
Initial boiling point & range	Boiling point varies: 30 – 200°C (85 – 392°F)
Flash point	< -21°C (-5.8°F)
Evaporation rate	: Higher initially and declining as lighter components evaporate
Flammability (solid, gas)	: Flammable vapor released by liquid

Upper explosive limit	7.6 %(V)
Lower explosive limit	1.3 %(V)
Vapor pressure	345 - 1,034 hPa at 37.8 °C (100.0 °F)
Vapor density (air = 1)	Approximately 3 to 4
Relative density (water = 1)	0.8 g/mL
Solubility (in water)	Negligible
Partition coefficient (n-octanol/water)	2 – 7 as log Pow
Auto-ignition temperature	Approximately 250°C (480°F)
Decomposition temperature	Will evaporate or boil and possibly ignite before decomposition occurs.
Kinematic viscosity	0.64 to 0.88 mm ² /s range reported for gasoline
Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature)	: Hydrocarbon liquids without static dissipater additive may have conductivity below 1 picoSiemens per meter (pS/m). The highest electro-static ignition risks are associated with "ultra-low conductivities" below 5 pS/m. See Section 7 for sources of information on defining safe loading and handling procedures for low conductivity products.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: Vapors may form explosive mixture with air. Hazardous polymerization does not occur.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	Can react with strong oxidizing agents, peroxides, alkaline products and strong acids. Contact with nitric and sulfuric acids will form nitroresols that can decompose violently.
Conditions to avoid	: Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Avoid static charge accumulation and discharge (see Section 7).
Hazardous decomposition products	: Ignition and burning can release carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

SECTION 11. TOXICOLOGICAL INFORMATION

Skin contact	: Irritating to skin. Can be partially absorbed through skin.
Eye contact	: Irritating to eyes.
Ingestion	: Aspiration hazard if liquid is inhaled into lungs, particularly from vomiting after ingestion. Aspiration may result in chemical pneumonia, severe lung damage, respiratory failure and even death. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death may occur.

Inhalation and further information

Acute toxicity of benzene results primarily from depression of the central nervous system (CNS). Inhalation of concentrations over 50 ppm can produce headache, lassitude, weariness, dizziness, drowsiness, over excitation. Exposure to very high levels can result in unconsciousness and death.

Repeated over-exposure may cause liver and kidney injuries. Components of the product may affect the nervous system.

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

Component:

Gasoline, natural; Low boiling point naphtha 8006 61 9

Acute oral toxicity: LD50 rat
Dose: 18.8 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 20.7 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation

Eye irritation: Classification: Irritating to eyes.
Result: Moderate eye irritation

Toluene

108 88 3

Acute oral toxicity: LD50 rat
Dose: 636 mg/kg

Acute dermal toxicity: LD50 rabbit
Dose: 12,124 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 49 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation
Prolonged skin contact may defat the skin and produce dermatitis.
Eye irritation: Classification: Irritating to eyes.
Result: Mild eye irritation

Xylene

1330 20 7

Acute oral toxicity: LD50 rat
Dose: 2,840 mg/kg

Acute dermal toxicity: LD50 rabbit
Dose: ca. 4,500 mg/kg

Acute inhalation toxicity: LC50 rat
Dose: 6,350 mg/l
Exposure time: 4 h

Skin irritation: Classification: Irritating to skin.
Result: Mild skin irritation

Ethanol; Ethyl alcohol	64 17 5	<p>Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
		<p><u>Acute oral toxicity:</u> LD50 rat Dose: 6,200 mg/kg</p>
		<p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: 19,999 mg/kg</p>
		<p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 8,001 mg/l Exposure time: 4 h</p>
		<p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation Prolonged skin contact may cause skin irritation and/or dermatitis. <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation Mild eye irritation</p>
Naphthalene	91 20 3	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 2,001 mg/kg</p>
		<p><u>Acute dermal toxicity:</u> LD50 rat Dose: 2,501 mg/kg</p>
		<p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 101 mg/l Exposure time: 4 h</p>
		<p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation</p>
		<p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
		<p><u>Carcinogenicity:</u> N11.00422130</p>
Benzene	71 43 2	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 930 mg/kg</p>
		<p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 44 mg/l Exposure time: 4 h</p>
		<p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Risk of serious damage to eyes.</p>
Pentane	109 66 0	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 2,001 mg/kg</p>
		<p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 364 mg/l Exposure time: 4 h</p>
		<p><u>Skin irritation:</u> Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product. <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
Cyclohexane	110 82 7	<p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: 2,001 mg/kg</p>
		<p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 14 mg/l Exposure time: 4 h</p>

		<p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Skin irritation</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
Ethylbenzene	100 41 4	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 3,500 mg/kg</p> <p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: 15,500 mg/kg</p> <p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 18 mg/l Exposure time: 4 h</p> <p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Risk of serious damage to eyes.</p>
Heptane [and isomers]	142 82 5	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 15,001 mg/kg</p> <p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 103 g/m³ Exposure time: 4 h</p> <p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Skin irritation Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p>
N-hexane	110 54 3	<p><u>Acute oral toxicity:</u> LD50 rat Dose: 25,000 mg/kg</p> <p><u>Acute dermal toxicity:</u> LD50 rabbit Dose: 2,001 mg/kg</p> <p><u>Acute inhalation toxicity:</u> LC50 rat Dose: 171.6 mg/l Exposure time: 4 h</p> <p><u>Skin irritation:</u> Classification: Irritating to skin. Result: Skin irritation</p> <p><u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation</p> <p><u>Teratogenicity:</u> N11.00418960</p>

Carcinogenicity

NTP	<ul style="list-style-type: none"> ⊖ Naphthalene (CAS-No.: 91-20-3) ⊖ Benzene (CAS-No.: 71-43-2)
IARC	<ul style="list-style-type: none"> ⊖ Gasoline, natural; Low boiling point naphtha (CAS-No.: 8006-61-9) ⊖ Naphthalene (CAS-No.: 91-20-3) ⊖ Benzene (CAS-No.: 71-43-2) ⊖ Ethylbenzene (CAS-No.: 100-41-4)
OSHA	<ul style="list-style-type: none"> ⊖ Benzene (CAS-No.: 71-43-2)
CA Prop 65	<ul style="list-style-type: none"> ⊖ WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. ⊖ Toluene (CAS-No.: 108-88-3)

Benzene (CAS-No.: 71-43-2)

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : Keep out of sewers, drainage areas, and waterways. Report spills and releases, as applicable, under Federal and State regulations.

Component:

Toluene	108 88 3	<p><u>Toxicity to fish:</u> LC50 Species: Carassius auratus (goldfish) Dose: 13 mg/l Exposure time: 96 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 11.5 mg/l Exposure time: 48 h</p> <p><u>Toxicity to algae:</u> IC50 Species: Selenastrum capricornutum (green algae) Dose: 12 mg/l Exposure time: 72 h</p>
Ethanol; Ethyl alcohol	64 17 5	<p><u>Toxicity to fish:</u> LC50 Species: Leuciscus idus (Golden orfe) Dose: 8,140 mg/l Exposure time: 48 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 9,268 - 14,221 mg/l Exposure time: 48 h</p>
Isopentane; 2-Methylbutane	78 78 4	<p><u>Toxicity to fish:</u> LC50 Species: Oncorhynchus mykiss (rainbow trout) Dose: 3.1 mg/l Exposure time: 96 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 2.3 mg/l Exposure time: 96 h</p>
Naphthalene	91 20 3	<p><u>Toxicity to algae:</u> EC50 Species: Dose: 33 mg/l Exposure time: 24 h</p>
Pentane	109 66 0	<p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 9.74 mg/l Exposure time: 48 h</p>
Cyclohexane	110 82 7	<p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 3.78 mg/l Exposure time: 48 h</p>

Heptane [and isomers]	142 82 5	<p><u>Toxicity to fish</u> LC50 Species: Carassius auratus (goldfish) Dose: 4 mg/l Exposure time: 24 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 1.5 mg/l Exposure time: 48 h</p>
N-hexane	110 54 3	<p><u>Toxicity to fish</u> LC50 Species: Pimephales promelas (fathead minnow) Dose: 2.5 mg/l Exposure time: 96 h</p> <p><u>Acute and prolonged toxicity for aquatic invertebrates:</u> EC50 Species: Daphnia magna (Water flea) Dose: 2.1 mg/l Exposure time: 48 h</p>

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 14. TRANSPORT INFORMATION

CFR

Proper shipping name : Petrol
UN-No. : 1203
Class : 3
Packing group : II

TDG

Proper shipping name : Gasoline
UN-No. : UN1203
Class : 3
Packing group : II

IATA Cargo Transport

UN UN-No. : UN1203
Description of the goods : Gasoline
Class : 3
Packaging group : II
ICAO-Labels : 3
Packing instruction (cargo aircraft) : 364
Packing instruction (cargo aircraft) : Y341

IATA Passenger Transport

UN UN-No. : UN1203
Description of the goods : Gasoline
Class : 3

Packaging group	: II
ICAO-Labels	: 3
Packing instruction (passenger aircraft)	: 353
Packing instruction (passenger aircraft)	: Y341

IMDG-Code

UN-No.	: UN 1203
Description of the goods	: Gasoline
Class	: 3
Packaging group	: II
IMDG-Labels	: 3
EmS Number	: F-E S-E
Marine pollutant	: No

SECTION 15. REGULATORY INFORMATION

OSHA Hazards	: Flammable liquid Highly toxic by ingestion Moderate skin irritant Severe eye irritant Carcinogen
TSCA Status	: On TSCA Inventory
DSL Status	: . All components are on the Canadian DSL list.
SARA 311/312 Hazards	: Fire Hazard Acute Health Hazard Chronic Health Hazard

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

California Prop. 65	: WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
	Toluene 108-88-3
	Benzene 71-43-2

SECTION 16. OTHER INFORMATION**Further information**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Date : 08/09/2012

6, 8, 10, 12, 14, 16, 64, 68, 91, 112, 306, 1092, 1106, 1500, 1570, 1571, 1651, 1652, 1654, 1700, 1701, 1702, 1710, 1711, 1714, 1726, 1729, 1730, 1732, 1733, 1826, 1848, 1880, 1950